PTO/AIA/15 (10-17)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number.

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	S20003USUC01T
First Named Inventor	Tao JIANG
Title	LED TUBE LAMP
Priority Mail Express® Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [✔] **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. [ ] **Applicant asserts small entity status.** See 37 CFR 1.27
3. [ ] **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. [✔] **Specification** [*Total Pages* 187] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. [✔] **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* 31]
6. **Inventor's Oath or Declaration** [*Total Pages* 3] *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. [ ] Newly executed (original or copy)
   b. [✔] A copy from a prior application (37 CFR 1.63(d))
7. [✔] **Application Data Sheet** ** See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (*Appendix*)
   [ ] Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*)
   a. [ ] Computer Readable Form (CRF)
   b. [ ] Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

ADDRESS TO:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

ACCOMPANYING APPLICATION PAPERS

10. [✔] **Assignment Papers** (cover sheet & document(s))
    Name of Assignee JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD
11. [✔] **37 CFR 3.73(c) Statement** (*when there is an assignee*) [✔] **Power of Attorney**
12. [ ] **English Translation Document** (*if applicable*)
13. [✔] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [✔] Copies of citations attached
14. [ ] **Preliminary Amendment**
15. [ ] **Return Receipt Postcard** (*MPEP § 503*) (*Should be specifically itemized*)
16. [ ] **Certified Copy of Priority Document(s)** (*if foreign priority is claimed*)
17. [ ] **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. [ ] **Other:**

***Note**: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

[✔] The address associated with Customer Number: 147274 **OR** [ ] Correspondence address below

Name					
Address	1380 Charles Willard Street, Carson				
City		State	California	Zip Code	90746
Country		Telephone		Email	

Signature	/Simon Kuang Lu/	Date	2020-04-01
Name (Print/Type)	Simon Kuang Lu	Registration No. (Attorney/Agent)	51,974

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	Not Yet Assigned
Filing Date	Herewith
First Named Inventor	LI-QIN LI
Title	LED TUBE LAMP
Art Unit	Not Yet Assigned
Examiner Name	Not Yet Assigned
Attorney Docket Number	S20003USUC01T

SIGNATURE of Applicant or Patent Practitioner

Signature	/Simon Kuang Lu/	Date (Optional)	
Name	Simon Kuang Lu	Registration Number	51,974
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA.
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 01/31/2016. OMB 0651-0035
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above.

OR

147274

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LTD

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Tao Jiang	Date (Optional)	10/18/2018
Name	Tao Jiang		
Title	Chairman of the Board, JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LTD		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

COMBINED DECLARATION AND ASSIGNMENT

Title of Invention: LED TUBE LAMP

As a below named inventor, I hereby declare that:

This declaration is directed to:
☒ The attached application; or
☐ United States application number or PCT international application number _____, filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LTD of No.1288 Jiachuang Rd. Xiuzhou Area, Jiaxing, Zhejiang, China, its heirs, successors, legal representatives and assigns (hereinafter designated as the Assignee) is desirous of acquiring the entire right, title and interest in and to said invention and in and to any Letters Patent(s) that may be granted therefor in the United States of America and ☐ in any foreign countries.

NOW, THEREFORE, in consideration of the sum of Ten Dollars ($10.00) to the undersigned in hand paid, the receipt of which is hereby acknowledged, and other good and valuable consideration, the undersigned has (have) sold, assigned and transferred, and by these presents does sell, assign and transfer unto said Assignee the full and exclusive right to the said invention in the United States of America, its territories, dependencies and possessions and the entire right, title and interest in and to any and all Letters Patent(s) which may be granted therefor in the United States of America, its territories, dependencies and possessions, and if the box above is designated, in any and all foreign countries; and to any and all divisions, reissues,

continuations, conversions and extensions thereof for the full term or terms for which the same may be granted.

The undersigned agree(s) to execute all papers necessary in connection with this application and any continuing, divisional, conversion or reissue applications thereof and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

The undersigned agree(s) to execute all papers necessary in connection with any interference which may be declared concerning this application or continuation, division, conversion or reissue thereof or Letter Patent(s) or reissue patent issued thereon and to cooperate with the Assignee in every way possible in obtaining and producing evidence and proceeding with such interference.

The undersigned agree(s) to execute all papers and documents and to perform any act which may be necessary in connection with claims or provisions of the International Convention for the Protection of Industrial Property or similar agreements.

The undersigned agree(s) to perform all affirmative acts which may be necessary to obtain a grant of a valid United States of America patent(s) or a grant of a valid United States of America and any foreign patent(s) to the Assignee and to vest all rights therein hereby conveyed to said Assignee as fully and entirely as the same would have been held by the undersigned if this Assignment and sale had not been made.

The undersigned hereby authorize(s) and request(s) the Patent and Trademark Office Officials in the United States of America and in any foreign countries to issue any and all Letters Patents resulting from said application or any continuing, divisional, conversion or reissue applications thereof to the said Assignee, as Assignee of the entire interest, and hereby covenants that he has (they have) the full right to convey the entire interest herein assigned, and that he has (they have) not executed, and will not execute, any agreement in conflict herewith.

The undersigned hereby covenant(s) that no assignment, sale, agreement or encumbrance has been or will be made or entered into which would conflict with this assignment.

In witness whereof, executed by the undersigned on the date(s) opposite the undersigned name(s).

LEGAL NAME OF FIRST OR SOLE INVENTOR:

LI, LILONG

Signature: LI LILONG Date: 2/23/2017

LEGAL NAME OF ADDITIONAL JOINT INVENTOR, IF ANY:

JIANG, TAO

Signature: JiangTao Date: 2/23/2017

LEGAL NAME OF ADDITIONAL JOINT INVENTOR, IF ANY:

YANG, CHANG

Signature: YANG CHANG Date: 2/23/2017

LEGAL NAME OF ADDITIONAL JOINT INVENTOR, IF ANY

WANG, BAO

Signature: WANG BAO Date: 2/22/2017

☐ Additional inventors are being named on separately numbered sheets attached hereto

LED TUBE LAMP

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation application of non-provisional application serial no. 16/399,004, which is a continuation application of non-provisional application serial no. 16/012,320, which is a continuation application of non-provisional application serial no. 15/441,789. And the non-provisional application serial no. 15/441,789 is a continuation application of non-provisional application serial no. 14/865,387 and claims priority to Chinese Patent Applications No. CN 201410507660.9 filed on 2014 Sep. 28; CN 201410508899.8 filed on 2014 Sep. 28; CN 201410623355.6 filed on 2014 Nov. 6; CN 201410734425.5 filed on 2014 Dec. 5; CN 201510075925.7 filed on 2015 Feb. 12; CN 201510104823.3 filed on 2015 Mar. 10; CN 201510134586.5 filed on 2015 Mar. 26; CN 201510133689.x filed on 2015 Mar. 25; CN 201510136796.8 filed on 2015 Mar. 27; CN 201510173861.4 filed on 2015 Apr. 14; CN 201510155807.7 filed on 2015 Apr. 3; CN 201510193980.6 filed on 2015 Apr. 22; CN 201510372375.5 filed on 2015 Jun. 26; CN 201510259151.3 filed on 2015 May 19; CN 201510268927.8 filed on 2015 May 22; CN 201510284720.x filed on 2015 May 29; CN 201510338027.6 filed on 2015 Jun. 17; CN 201510315636.x filed on 2015 Jun. 10; CN 201510373492.3 filed on 2015 Jun. 26; CN 201510364735.7 filed on 2015 Jun. 26; CN 201510378322.4 filed on 2015 Jun. 29; CN 201510391910.1 filed on 2015 Jul. 2; CN 201510406595.5 filed on 2015 Jul. 10; CN 201510482944.1 filed on 2015 Aug. 7; CN 201510486115.0 filed on 2015 Aug. 8; CN 201510428680.1 filed on 2015 Jul. 20; CN 201510483475.5 filed on 2015 Aug. 8; CN 201510555543.4 filed on 2015 Sep. 2; CN 201510557717.0 filed on 2015 Sep. 6; and CN 201510595173.7 filed on 2015 Sep. 18, the disclosures of which are incorporated herein in their entirety by reference.

TECHNICAL FIELD

[0002] The instant disclosure relates to illumination devices, and more particularly to an LED tube lamp.

RELATED ART

[0003] LED lighting technology is rapidly developing to replace traditional incandescent and fluorescent lightings. LED tube lamps are mercury-free in comparison with fluorescent tube lamps that need to be filled with inert gas and mercury. Thus, it is not surprising that LED tube lamps are becoming a highly desired illumination option among different available lighting systems used in homes and workplaces. Lighting systems in homes and workplace are used to be dominated by traditional lighting options such as compact fluorescent light bulbs (CFLs) and fluorescent tube lamps. Benefits of LED tube lamps include improved durability and longevity and far less energy consumption; therefore, when taking into account all factors, they would typically be considered as a cost effective lighting option.

[0004] Typical LED tube lamps have a lamp tube, light sources in the lamp tube, two caps connected to two ends of the lamp tube, and one power supply or two at the ends of the lamp tube. The caps receive external electricity and transmit it to the power supply and the light sources through a wire or wires (wire bonding).

[0005] However, existing LED tube lamps have certain drawbacks. Specifically, the wires may be easily damaged and even broken due to any movement during manufacturing, transportation, and usage of the LED tube lamp and therefore may disable the LED tube lamp.

SUMMARY

[0006] To address the above issue, the instant disclosure provides an LED lamp tube.

[0007] Various embodiments are summarized in this section, and are described with respect to the "present invention," which terminology is used to describe certain presently disclosed embodiments, whether claimed or not, and is not necessarily an

exhaustive description of all possible embodiments, but rather is merely a summary of certain embodiments. Certain of the embodiments described below as various aspects of the "present invention" can be combined in different manners to form an LED tube lamp or a portion thereof.

[0008] According to an embodiment of the instant disclosure, an LED tube lamp comprises a glass tube, two end caps, an LED light strip attached to an inner circumferential surface of the glass tube, a plurality of LED light sources, at least two first soldering pads arranged at an end of the LED light strip, at least two notches are formed at an edge of the end of the LED light strip, a protective layer disposed on a surface of the LED light strip and a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources. Each of the notches is formed at one of the first soldering pads. The protective layer comprises at least two openings to expose the two first soldering pads. The power supply module at least comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit. The printed circuit board comprises at least two second soldering pads, each of the two first soldering pad is soldered to the respective second soldering pad by a solder. The solder is disposed on the first soldering pad, the corresponding second soldering pad and in the corresponding notch.

[0009] According to an embodiment of the instant disclosure, an LED tube lamp comprises a glass tube, two end caps, an LED light strip attached to an inner circumferential surface of the glass tube, a plurality of LED light sources, at least two first soldering pads arranged at an end of the LED light strip, at least two through holes in the LED light strip, a protective layer disposed on a surface of the LED light strip and a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources. Each of the two through holes penetrates the respective first soldering pad and the LED light strip. The protective layer comprises at least two

openings to expose the two first soldering pads. The power supply module at least comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit. The printed circuit board comprises at least two second soldering pads, each of the two first soldering pad is soldered to the respective second soldering pad by a solder. The solder is disposed on the first soldering pad, the corresponding second soldering pad and in the corresponding through hole.

[0010] According to an embodiment of the instant disclosure, an LED tube lamp comprises a glass tube, two end caps, an LED light strip attached to an inner circumferential surface of the glass tube, a plurality of LED light sources, at least two first soldering pads arranged at an end of the LED light strip, a protective layer disposed on a surface of the LED light strip and a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources. The protective layer comprises at least two openings to expose the two first soldering pads. The power supply module at least comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit. The printed circuit board comprises at least two second soldering pads, each of the two first soldering pad is soldered to the respective second soldering pad by a solder. The solder is disposed on the first soldering pad, the corresponding second soldering pad and covering an edge of the end of the LED light strip.

[0011] According to an embodiment of the instant disclosure, the protective layer further comprises a plurality of second openings thereon for disposing the plurality of LED light sources.

[0012] According to an embodiment of the instant disclosure, the protective layer further comprises a third opening adjacent to the two first openings.

[0013] According to an embodiment of the instant disclosure, the LED light strip comprises a recognizing mark arranged adjacent to the two first openings.

[0014] According to an embodiment of the instant disclosure, the glass tube comprises

a diffusing layer coated on the inner circumferential surface of the glass tube.

[0015] According to an embodiment of the instant disclosure, the end of the LED light strip is detached from the inner circumferential surface of the glass tube and soldered on the printed circuit board.

[0016] According to some embodiments of the instant disclosure, the filtering circuit comprises a first capacitor having an end coupled to a first output terminal of the rectifying circuit, and the other end coupled to a second output terminal of the rectifying circuit.

[0017] According to some embodiments of the instant disclosure, the filtering circuit further comprises an EMI-reducing capacitor coupled between input terminals of the rectifying circuit.

[0018] According to some embodiments of the instant disclosure, the filtering circuit further comprises a first resistor having an end coupled to a pin on one of the end caps and a second capacitor having an end coupled to the other end of the first resistor, and the other end coupled to one of the input terminals of the rectifying circuit.

[0019] According to some embodiments of the instant disclosure, the filtering circuit further comprises a passive component coupled to the second capacitor in parallel.

[0020] According to some embodiments of the instant disclosure, the passive component is an inductor.

[0021] According to some embodiments of the instant disclosure, the rectifying circuit comprises a first diode, a second diode, a third diode and a fourth diode. The first diode having an anode connected to the second output terminal and a cathode connected to a pin on one of the end caps. The second diode having an anode connected to the second output terminal and a cathode connected to a pin on the other one of the end caps. The third diode having an anode connected to the pin on the one of the end caps and a cathode connected to the first output terminal. The fourth diode having an anode

connected to the pin on the other one of the end caps and a cathode connected to the first output terminal.

[0022] According to an embodiment of the instant disclosure, the rectifying circuit further comprises a terminal adapter circuit coupled to the cathode of the first diode, the anode of the second diode and the pins on both of the end caps. The terminal adapter circuit is configured to transmit signal received from at least one of the pins to the cathode of the first diode and the anode of the second diode.

[0023] According to some embodiments of the instant disclosure, the terminal adapter circuit comprises a third capacitor and a fourth capacitor. The third capacitor has an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode. The fourth capacitor has an end connected to the pin on the one of the end caps, and the other end connected to the other end of the third capacitor.

[0024] According to some embodiments of the instant disclosure, the terminal adapter circuit comprises a first fuse and a second fuse. The first fuse has an end connected to the pin on the other one of the end caps and the other end connected to the cathode of the first diode and the anode of the second diode. The second fuse has an end connected to the pin on the one of the end caps and the other end connected to the other end of the first fuse.

[0025] The features of the instant disclosure will no doubt become understandable to those of ordinary skill in the art after reading the following detailed description of the preferred embodiment that is illustrated in the various figures and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] FIG. 1 is a perspective view schematically illustrating an LED tube lamp according to one embodiment of the present invention;

[0027] FIG. 1A is a perspective view schematically illustrating the different sized end

caps of an LED tube lamp according to another embodiment of the present invention to illustrate;

[0028] FIG. 2 is an exemplary exploded view schematically illustrating the LED tube lamp shown in FIG. 1;

[0029] FIG. 3 is a perspective view schematically illustrating front and top of an end cap of the LED tube lamp according to one embodiment of the present invention;

[0030] FIG. 4 is an exemplary perspective view schematically illustrating bottom of the end cap as shown in FIG. 3;

[0031] FIG. 5 is a plane cross-sectional partial view schematically illustrating a connecting region of the end cap and the lamp tube of the LED tube lamp according to one embodiment of the present invention;

[0032] FIG. 6 is a perspective cross-sectional view schematically illustrating inner structure of an all-plastic end cap (having a magnetic metal member and hot melt adhesive inside) according to another embodiment of the present invention;

[0033] FIG. 7 is a perspective view schematically illustrating the all-plastic end cap and the lamp tube being bonded together by utilizing an induction coil according to certain embodiments of the present invention;

[0034] FIG. 8 is a perspective view schematically illustrating a supporting portion and a protruding portion of the electrically insulating tube of the end cap of the LED tube lamp according to another embodiment of the present invention;

[0035] FIG. 9 is an exemplary plane cross-sectional view schematically illustrating the inner structure of the electrically insulating tube and the magnetic metal member of the end cap of FIG. 8 taken along a line X-X;

[0036] FIG. 10 is a plane view schematically illustrating the configuration of the openings on surface of the magnetic metal member of the end cap of the LED tube lamp according to another embodiment of the present invention;

[0037] FIG. 11 is a plane view schematically illustrating the indentation/embossment on a surface of the magnetic metal member of the end cap of the LED tube lamp according to certain embodiments of the present invention;

[0038] FIG. 12 is an exemplary plane cross-sectional view schematically illustrating the structure of the connection of the end cap of FIG. 8 and the lamp tube along a radial axis of the lamp tube, where the electrically insulating tube is in shape of a circular ring;

[0039] FIG. 13 is an exemplary plane cross-sectional view schematically illustrating the structure of the connection of the end cap of FIG. 8 and the lamp tube along a radial axis of the lamp tube, where the electrically insulating tube is in shape of an elliptical or oval ring;

[0040] FIG. 14 is a perspective view schematically illustrating still another end cap of an LED tube lamp according to still another embodiment of the prevent invention;

[0041] FIG. 15 is a plane cross-sectional view schematically illustrating end structure of a lamp tube of the LED tube lamp according to one embodiment of the present invention;

[0042] FIG. 16 is an exemplary plane cross-sectional view schematically illustrating the local structure of the transition region of the end of the lamp tube of FIG. 15;

[0043] FIG. 17 is a plane cross-sectional view schematically illustrating inside structure of the lamp tube of the LED tube lamp according to one embodiment of the present invention, wherein two reflective films are respectively adjacent to two sides of the LED light strip along the circumferential direction of the lamp tube;

[0044] FIG. 18 is a plane cross-sectional view schematically illustrating inside structure of the lamp tube of the LED tube lamp according to another embodiment of the present invention, wherein only a reflective film is disposed on one side of the LED light strip along the circumferential direction of the lamp tube;

[0045] FIG. 19 is a plane cross-sectional view schematically illustrating inside structure

of the lamp tube of the LED tube lamp according to still another embodiment of the present invention, wherein the reflective film is under the LED light strip and extends at both sides along the circumferential direction of the lamp tube;

[0046] FIG. 20 is a plane cross-sectional view schematically illustrating inside structure of the lamp tube of the LED tube lamp according to yet another embodiment of the present invention, wherein the reflective film is under the LED light strip and extends at only one side along the circumferential direction of the lamp tube;

[0047] FIG. 21 is a plane cross-sectional view schematically illustrating inside structure of the lamp tube of the LED tube lamp according to still yet another embodiment of the present invention, wherein two reflective films are respectively adjacent to two sides of the LED light strip and extending along the circumferential direction of the lamp tube;

[0048] FIG. 22 is a plane sectional view schematically illustrating the LED light strip is a bendable circuit sheet with ends thereof passing across the transition region of the lamp tube of the LED tube lamp to be soldering bonded to the output terminals of the power supply according to one embodiment of the present invention;

[0049] FIG. 23 is a plane cross-sectional view schematically illustrating a bi-layered structure of the bendable circuit sheet of the LED light strip of the LED tube lamp according to an embodiment of the present invention;

[0050] FIG. 24 is a perspective view schematically illustrating the soldering pad of the bendable circuit sheet of the LED light strip for soldering connection with the printed circuit board of the power supply of the LED tube lamp according to one embodiment of the present invention;

[0051] FIG. 25 is a plane view schematically illustrating the arrangement of the soldering pads of the bendable circuit sheet of the LED light strip of the LED tube lamp according to one embodiment of the present invention;

[0052] FIG. 26 is a plane view schematically illustrating a row of three soldering pads

of the bendable circuit sheet of the LED light strip of the LED tube lamp according to another embodiment of the present invention;

[0053] FIG. 27 is a plane view schematically illustrating two rows of soldering pads of the bendable circuit sheet of the LED light strip of the LED tube lamp according to still another embodiment of the present invention;

[0054] FIG. 28 is a plane view schematically illustrating a row of four soldering pads of the bendable circuit sheet of the LED light strip of the LED tube lamp according to yet another embodiment of the present invention;

[0055] FIG. 29 is a plane view schematically illustrating two rows of two soldering pads of the bendable circuit sheet of the LED light strip of the LED tube lamp according to yet still another embodiment of the present invention;

[0056] FIG. 30 is a plane view schematically illustrating through holes are formed on the soldering pads of the bendable circuit sheet of the LED light strip of the LED tube lamp according to one embodiment of the present invention;

[0057] FIG. 31 is a plane cross-sectional view schematically illustrating soldering bonding process utilizing the soldering pads of the bendable circuit sheet of the LED light strip of FIG. 30 taken from side view and the printed circuit board of the power supply according to one embodiment of the present invention;

[0058] FIG. 32 is a plane cross-sectional view schematically illustrating soldering bonding process utilizing the soldering pads of the bendable circuit sheet of the LED light strip of FIG. 30 taken from side view and the printed circuit board of the power supply according to another embodiment of the present invention, wherein the through hole of the soldering pads is near the edge of the bendable circuit sheet;

[0059] FIG. 33 is a plane view schematically illustrating notches formed on the soldering pads of the bendable circuit sheet of the LED light strip of the LED tube lamp according to one embodiment of the present invention;

[0060] FIG. 34 is an exemplary plane cross-sectional view of FIG. 33 taken along a line A-A';

[0061] FIG. 35 is a perspective view schematically illustrating a circuit board assembly composed of the bendable circuit sheet of the LED light strip and the printed circuit board of the power supply according to another embodiment of the present invention;

[0062] FIG. 36 is a perspective view schematically illustrating another arrangement of the circuit board assembly of FIG. 35;

[0063] FIG. 37 is a perspective view schematically illustrating an LED lead frame for the LED light sources of the LED tube lamp according to one embodiment of the present invention;

[0064] FIG. 38 is a perspective view schematically illustrating a power supply of the LED tube lamp according to one embodiment of the present invention;

[0065] FIG. 39 is a perspective view schematically illustrating the printed circuit board of the power supply, which is perpendicularly adhered to a hard circuit board made of aluminum via soldering according to another embodiment of the present invention;

[0066] FIG. 40 is a perspective view illustrating a thermos-compression head used in soldering the bendable circuit sheet of the LED light strip and the printed circuit board of the power supply according to one embodiment of the present invention;

[0067] FIG. 41 is a plane view schematically illustrating the thickness difference between two solders on the pads of the bendable circuit sheet of the LED light strip or the printed circuit board of the power supply according to one embodiment of the invention;

[0068] FIG. 42 is a perspective view schematically illustrating the soldering vehicle for soldering the bendable circuit sheet of the LED light strip and the printed circuit board of the power supply according to one embodiment of the invention;

[0069] FIG. 43 is an exemplary plan view schematically illustrating a rotation status of

the rotary platform of the soldering vehicle in FIG. 41;

[0070] FIG. 44 is a plan view schematically illustrating an external equipment for heating the hot melt adhesive according to another embodiment of the present invention;

[0071] FIG. 45 is a cross-sectional view schematically illustrating the hot melt adhesive having uniformly distributed high permeability powder particles with small particle size according to one embodiment of the present invention;

[0072] FIG. 46 is a cross-sectional view schematically illustrating the hot melt adhesive having non-uniformly distributed high permeability powder particles with small particle size according to another embodiment of the present invention, wherein the powder particles form a closed electric loop;

[0073] FIG. 47 is a cross-sectional view schematically illustrating the hot melt adhesive having non-uniformly distributed high permeability powder particles with large particle size according to yet another embodiment of the present invention, wherein the powder particles form a closed electric loop;

[0074] FIG. 48 is a perspective view schematically illustrating the bendable circuit sheet of the LED light strip is formed with two conductive wiring layers according to another embodiment of the present invention.

[0075] Fig. 49A is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[0076] Fig. 49B is a circuit block diagram of an LED lamp according to some embodiments of the present invention;

[0077] Fig. 50A is a schematic diagram of a rectifying circuit according to some embodiments of the present invention;

[0078] Fig. 50B is a schematic diagram of a rectifying circuit according to some embodiments of the present invention;

[0079] Fig. 50C is a schematic diagram of a rectifying circuit according to some

embodiments of the present invention;

[0080] Fig. 50D is a schematic diagram of a rectifying circuit according to some embodiments of the present invention;

[0081] Fig. 51A is a schematic diagram of a terminal adapter circuit according to some embodiments of the present invention;

[0082] Fig. 51B is a schematic diagram of a terminal adapter circuit according to some embodiments of the present invention;

[0083] Fig. 51C is a schematic diagram of a terminal adapter circuit according to some embodiments of the present invention;

[0084] Fig. 51D is a schematic diagram of a terminal adapter circuit according to some embodiments of the present invention;

[0085] Fig. 52A is a block diagram of a filtering circuit according to some embodiments of the present invention;

[0086] Fig. 52B is a schematic diagram of a filtering unit according to some embodiments of the present invention;

[0087] Fig. 52C is a schematic diagram of a filtering unit according to some embodiments of the present invention;

[0088] Fig. 52D is a schematic diagram of a filtering unit according to some embodiments of the present invention;

[0089] Fig. 52E is a schematic diagram of a filtering unit according to some embodiments of the present invention;

[0090] FIG. 53A is a schematic diagram of an LED module according to some embodiments of the present invention;

[0091] FIG. 53B is a schematic diagram of an LED module according to some embodiments of the present invention;

[0092] FIG. 53C is a plan view of a circuit layout of the LED module according to some

embodiments of the present invention;

[0093] FIG. 53D is a plan view of a circuit layout of the LED module according to some embodiments of the present invention;

[0094] FIG. 53E is a plan view of a circuit layout of the LED module according to some embodiments of the present invention;

[0095] Fig. 54A is a block diagram of an exemplary power supply module in an LED lamp according to some embodiments of the present invention;

[0096] Fig. 54B is a block diagram of a driving circuit according to some embodiments of the present invention;

[0097] Fig. 54C is a schematic diagram of a driving circuit according to some embodiments of the present invention;

[0098] Fig. 54D is a schematic diagram of a driving circuit according to some embodiments of the present invention;

[0099] Fig. 54E is a schematic diagram of a driving circuit according to some embodiments of the present invention;

[00100] Fig. 54F is a schematic diagram of a driving circuit according to some embodiments of the present invention;

[00101] Fig. 54G is a block diagram of a driving circuit according to some embodiments of the present invention;

[00102] Fig. 54H is a graph illustrating the relationship between the voltage Vin and the objective current Iout according to certain embodiments of the present invention;

[00103] Fig. 55A is a block diagram of an exemplary power supply module in an LED lamp according to some embodiments of the present invention;

[00104] Fig. 55B is a schematic diagram of an anti-flickering circuit according to some embodiments of the present invention;

[00105] Fig. 56A is a block diagram of an exemplary power supply module in an

LED lamp according to some embodiments of the present invention;

[00106] Fig. 56B is a schematic diagram of a protection circuit according to some embodiments of the present invention;

[00107] Fig. 57A is a block diagram of an exemplary power supply module in an LED lamp according to some embodiments of the present invention;

[00108] Fig. 57B is a schematic diagram of a mode switching circuit in an LED lamp according to some embodiments of the present invention;

[00109] Fig. 57C is a schematic diagram of a mode switching circuit in an LED lamp according to some embodiments of the present invention;

[00110] Fig. 57D is a schematic diagram of a mode switching circuit in an LED lamp according to some embodiments of the present invention;

[00111] Fig. 57E is a schematic diagram of a mode switching circuit in an LED lamp according to some embodiments of the present invention;

[00112] Fig. 57F is a schematic diagram of a mode switching circuit in an LED lamp according to some embodiments of the present invention;

[00113] Fig. 57G is a schematic diagram of a mode switching circuit in an LED lamp according to some embodiments of the present invention;

[00114] Fig. 57H is a schematic diagram of a mode switching circuit in an LED lamp according to some embodiments of the present invention;

[00115] Fig. 57I is a schematic diagram of a mode switching circuit in an LED lamp according to some embodiment of the present invention;

[00116] Fig. 58A is a block diagram of an exemplary power supply module in an LED lamp according to some embodiments of the present invention;

[00117] Fig. 58B is a block diagram of an exemplary power supply module in an LED lamp according to some embodiments of the present invention;

[00118] Fig. 58C illustrates an arrangement with a ballast-compatible circuit in an

LED lamp according to some embodiments of the present invention;

[00119] Fig. 58D is a block diagram of an exemplary power supply module in an LED lamp according to some embodiments of the present invention;

[00120] Fig. 58E is a block diagram of an exemplary power supply module in an LED lamp according to some embodiments of the present invention;

[00121] Fig. 58F is a schematic diagram of a ballast-compatible circuit according to some embodiments of the present invention;

[00122] Fig. 58G is a block diagram of an exemplary power supply module in an LED lamp according to some embodiments of the present invention;

[00123] Fig. 58H is a schematic diagram of a ballast-compatible circuit according to some embodiments of the present invention;

[00124] Fig. 58I illustrates a ballast-compatible circuit according to some embodiments of the present invention;

[00125] Fig. 59A is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[00126] Fig. 59B is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[00127] Fig. 59C is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[00128] Fig. 59D is a schematic diagram of a ballast-compatible circuit according to some embodiments of the present invention;

[00129] Fig. 60A is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[00130] Fig. 60B is a schematic diagram of a filament-simulating circuit according to some embodiments of the present invention;

[00131] Fig. 60C is a schematic block diagram including a filament-simulating

circuit according to some embodiments of the present invention;

[00132] Fig. 60D is a schematic block diagram including a filament-simulating circuit according to some embodiments of the present invention;

[00133] Fig. 60E is a schematic diagram of a filament-simulating circuit according to some embodiments of the present invention;

[00134] Fig. 60F is a schematic block diagram including a filament-simulating circuit according to some embodiments of the present invention;

[00135] Fig. 61A is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[00136] Fig. 61B is a schematic diagram of an OVP circuit according to an embodiment of the present invention;

[00137] Fig. 62A is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[00138] Fig. 62B is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[00139] Fig. 62C is a block diagram of a ballast detection circuit according to some embodiments of the present invention;

[00140] Fig. 62D is a schematic diagram of a ballast detection circuit according to some embodiments of the present invention;

[00141] Fig. 62E is a schematic diagram of a ballast detection circuit according to some embodiments of the present invention;

[00142] Fig. 63A is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[00143] Fig. 63B is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[00144] Fig. 63C is a schematic diagram of an auxiliary power module according to

an embodiment of the present invention;

[00145] Fig. 64A is a block diagram of an exemplary power supply module in an LED tube lamp according to some embodiments of the present invention;

[00146] Fig. 64B is a block diagram of an installation detection module according to some embodiments of the present invention;

[00147] Fig. 64C is a schematic detection pulse generating module according to some embodiments of the present invention;

[00148] Fig. 64D is a schematic detection determining circuit according to some embodiments of the present invention;

[00149] Fig. 64E is a schematic detection result latching circuit according to some embodiments of the present invention; and

[00150] Fig. 64F is a schematic switch circuit according to some embodiments of the present invention.

DETAILED DESCRIPTION

[00151] The present disclosure provides a novel LED tube lamp. The present disclosure will now be described in the following embodiments with reference to the drawings. The following descriptions of various embodiments of this invention are presented herein for purpose of illustration and giving examples only. It is not intended to be exhaustive or to be limited to the precise form disclosed. These example embodiments are just that—examples—and many implementations and variations are possible that do not require the details provided herein. It should also be emphasized that the disclosure provides details of alternative examples, but such listing of alternatives is not exhaustive. Furthermore, any consistency of detail between various examples should not be interpreted as requiring such detail - it is impracticable to list every possible variation for every feature described herein. The language of the claims should be referenced in determining the requirements of the invention.

[00152] In the drawings, the size and relative sizes of components may be exaggerated for clarity. Like numbers refer to like elements throughout.

[00153] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items and may be abbreviated as "/".

[00154] It will be understood that, although the terms first, second, third etc. may be used herein to describe various elements, components, regions, layers, or steps, these elements, components, regions, layers, and/or steps should not be limited by these terms. Unless the context indicates otherwise, these terms are only used to distinguish one element, component, region, layer, or step from another element, component, region, or step, for example as a naming convention. Thus, a first element, component, region, layer, or step discussed below in one section of the specification could be termed a second element, component, region, layer, or step in another section of the specification or in the claims without departing from the teachings of the present invention. In addition, in certain cases, even if a term is not described using "first," "second," etc., in the specification, it may still be referred to as "first" or "second" in a claim in order to distinguish different claimed elements from each other.

[00155] It will be further understood that the terms "comprises" and/or "comprising," or "includes" and/or "including" when used in this specification, specify the presence of stated features, regions, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, regions, integers, steps, operations, elements, components, and/or groups thereof.

[00156] It will be understood that when an element is referred to as being

"connected" or "coupled" to or "on" another element, it can be directly connected or coupled to or on the other element or intervening elements may be present. In contrast, when an element is referred to as being "directly connected" or "directly coupled" to another element, there are no intervening elements present. Other words used to describe the relationship between elements should be interpreted in a like fashion (e.g., "between" versus "directly between," "adjacent" versus "directly adjacent," etc.). However, the term "contact," as used herein refers to direct contact (i.e., touching) unless the context indicates otherwise.

[00157] Embodiments described herein will be described referring to plan views and/or cross-sectional views by way of ideal schematic views. Accordingly, the exemplary views may be modified depending on manufacturing technologies and/or tolerances. Therefore, the disclosed embodiments are not limited to those shown in the views, but include modifications in configuration formed on the basis of manufacturing processes. Therefore, regions exemplified in figures may have schematic properties, and shapes of regions shown in figures may exemplify specific shapes of regions of elements to which aspects of the invention are not limited.

[00158] Spatially relative terms, such as "beneath," "below," "lower," "above," "upper" and the like, may be used herein for ease of description to describe one element's or feature's relationship to another element(s) or feature(s) as illustrated in the figures. It will be understood that the spatially relative terms are intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as "below" or "beneath" other elements or features would then be oriented "above" the other elements or features. Thus, the term "below" can encompass both an orientation of above and below. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein

interpreted accordingly.

[00159] Terms such as "same," "equal," "planar," or "coplanar," as used herein when referring to orientation, layout, location, shapes, sizes, amounts, or other measures do not necessarily mean an exactly identical orientation, layout, location, shape, size, amount, or other measure, but are intended to encompass nearly identical orientation, layout, location, shapes, sizes, amounts, or other measures within acceptable variations that may occur, for example, due to manufacturing processes. The term "substantially" may be used herein to reflect this meaning.

[00160] Terms such as "about" or "approximately" may reflect sizes, orientations, or layouts that vary only in a small relative manner, and/or in a way that does not significantly alter the operation, functionality, or structure of certain elements. For example, a range from "about 0.1 to about 1" may encompass a range such as a 0%-5% deviation around 0.1 and a 0% to 5% deviation around 1, especially if such deviation maintains the same effect as the listed range.

[00161] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this disclosure belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and/or the present application, and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[00162] As used herein, items described as being "electrically connected" are configured such that an electrical signal can be passed from one item to the other. Therefore, a passive electrically conductive component (e.g., a wire, pad, internal electrical line, etc.) physically connected to a passive electrically insulative component (e.g., a prepreg layer of a printed circuit board, an electrically insulative adhesive

connecting two devices, an electrically insulative underfill or mold layer, etc.) is not electrically connected to that component. Moreover, items that are "directly electrically connected," to each other are electrically connected through one or more passive elements, such as, for example, wires, pads, internal electrical lines, resistors, etc. As such, directly electrically connected components do not include components electrically connected through active elements, such as transistors or diodes.

[00163] Components described as thermally connected or in thermal communication are arranged such that heat will follow a path between the components to allow the heat to transfer from the first component to the second component. Simply because two components are part of the same device or board does not make them thermally connected. In general, components which are heat-conductive and directly connected to other heat-conductive or heat-generating components (or connected to those components through intermediate heat-conductive components or in such close proximity as to permit a substantial transfer of heat) will be described as thermally connected to those components, or in thermal communication with those components. On the contrary, two components with heat-insulative materials therebetween, which materials significantly prevent heat transfer between the two components, or only allow for incidental heat transfer, are not described as thermally connected or in thermal communication with each other. The terms "heat-conductive" or "thermally-conductive" do not apply to any material that provides incidental heat conduction, but are intended to refer to materials that are typically known as good heat conductors or known to have utility for transferring heat, or components having similar heat conducting properties as those materials.

[00164] Referring to FIGS. 1 and 2, an LED tube lamp of one embodiment of the present invention includes a lamp tube 1, an LED light strip 2 (shown in FIG. 2) disposed inside the lamp tube 1, and two end caps 3 respectively disposed at two ends of the

lamp tube 1. The lamp tube 1 may be made of plastic or glass. The sizes of the two end caps 3 may be same or different. Referring to FIG. 1A, the size of one end cap may, in some embodiments, be about 30% to about 80% times the size of the other end cap.

[00165] In one embodiment, the lamp tube 1 is made of glass with strengthened or tempered structure to avoid being easily broken and incurring electrical shock, and to avoid the fast aging process. The glass made lamp tube 1 may be additionally strengthened or tempered by a chemical tempering method or a physical tempering method in various embodiments of the present invention.

[00166] An exemplary chemical tempering method is accomplished by exchanging the Na ions or K ions on the glass surface with other alkali metal ions and therefore changes composition of the glass surface. The sodium (Na) ions or potassium (K) ions and other alkali metal ions on the glass surface are exchanged to form an ion exchange layer on the glass surface. The glass is then under tension on the inside while under compression on the outside when cooled to room temperature, so as to achieve the purpose of increased strength. The chemical tempering method includes but is not limited to the following glass tempering methods: high temperature type ion exchange method, the low temperature type ion exchange method, dealkalization, surface crystallization, and/or sodium silicate strengthening methods, further explained as follows.

[00167] An exemplary embodiment of the high temperature type ion exchange method includes the following steps: Inserting glass containing sodium oxide (Na_2O) or potassium oxide (K_2O) in the temperature range of the softening point and glass transition point into molten salt of lithium, so that the Na ions in the glass are exchanged for Li ions in the molten salt. Later, the glass is then cooled to room temperature, since the surface layer containing Li ions has a different expansion coefficient with respect to the inner layer containing Na ions or K ions, thus the surface produces residual stress

and is reinforced. Meanwhile, the glass containing Al_2O_3, TiO_2 and other components, by performing ion exchange, can produce glass crystals having an extremely low coefficient of expansion. The crystallized glass surface after cooling produces a significant amount of pressure, up to 700 MPa, which can enhance the strength of glass.

[00168] An exemplary embodiment of the low-temperature ion exchange method includes the following steps: First, a monovalent cation (e.g., K ions) undergoes ion exchange with the alkali ions (e.g. Na ion) on the surface layer at a temperature range that is lower than the strain point temperature, so as to allow the K ions to penetrate the surface. For example, for manufacturing a $Na_2O+CaO+SiO_2$ system glass, the glass can be impregnated for ten hours at more than four hundred degrees in the molten salt. The low temperature ion exchange method can easily obtain glass of higher strength, and the processing method is simple, does not damage the transparent nature of the glass surface, and does not undergo shape distortion.

[00169] An exemplary embodiment of dealkalization includes treating glass using platinum (Pt) catalyst along with sulfurous acid gas and water in a high temperature atmosphere. The Na+ ions are migrated out and bleed from the glass surface to be reacted with the Pt catalyst, so that the surface layer becomes a SiO_2 enriched layer, which results in a low expansion glass and produces compressive stress upon cooling.

[00170] The surface crystallization method and the high temperature type ion exchange method are different, but only the surface layer is treated by heat treatment to form low expansion coefficient microcrystals on the glass surface, thus reinforcing the glass.

[00171] An exemplary embodiment of the sodium silicate glass strengthening method is a tempering method using sodium silicate (water glass) in water solution at 100 degrees Celsius and several atmospheres of pressure treatment, where a stronger/higher strength glass surface that is harder to scratch is thereby produced.

[00172] An exemplary embodiment of the physical tempering method includes but is not limited to applying a coating to or changing the structure of an object such as to strengthen the easily broken position. The applied coating can be, for example, a ceramic coating, an acrylic coating, or a glass coating depending on the material used. The coating can be performed in a liquid phase or gaseous phase.

[00173] The above glass tempering methods described including physical tempering methods and chemical tempering methods can be accomplished singly or combined together in any fashion.

[00174] Referring to FIG. 2 and FIG. 15, a glass made lamp tube of an LED tube lamp according to one embodiment of the present invention has structure-strengthened end regions described as follows. The glass made lamp tube 1 includes a main body region 102, two rear end regions 101 (or just end regions 101) respectively formed at two ends of the main body region 102, and end caps 3 that respectively sleeve the rear end regions 101. The outer diameter of at least one of the rear end regions 101 is less than the outer diameter of the main body region 102. In the embodiment of FIGS. 2 and 15, the outer diameters of the two rear end regions 101 are less than the outer diameter of the main body region 102. In addition, the surface of the rear end region 101 is in substantially parallel with the surface of the main body region 102 in a cross-sectional view. Specifically, the glass made lamp tube 1 is strengthened at both ends, such that the rear end regions 101 are formed to be strengthened structures. In certain embodiments, the rear end regions 101 with strengthened structure are respectively sleeved with the end caps 3, and the outer diameters of the end caps 3 and the main body region 102 have little or no differences. For example, the end caps 3 may have the same or substantially the same outer diameters as that of the main body region 102 such that there is no gap between the end caps 3 and the main body region 102. In this way, a supporting seat in a packing box for transportation of the LED tube lamp contacts

not only the end caps 3 but also the lamp tube 1 and makes uniform the loadings on the entire LED tube lamp to avoid situations where only the end caps 3 are forced, therefore preventing breakage at the connecting portion between the end caps 3 and the rear end regions 101 due to stress concentration. The quality and the appearance of the product are therefore improved.

[00175] In one embodiment, the end caps 3 and the main body region 102 have substantially the same outer diameters. These diameters may have a tolerance for **example within +/−0.2 millimeter (mm), or in some cases up to +/−1.0 millimeter (mm).** Depending on the thickness of the end caps 3, the difference between an outer diameter of the rear end regions 101 and an outer diameter of the main body region 102 can be about 1 mm to about 10 mm for typical product applications. In some embodiments, the difference between the outer diameter of the rear end regions 101 and the outer diameter of the main body region 102 can be about 2 mm to about 7 mm.

[00176] Referring to FIG. 15, the lamp tube 1 is further formed with a transition region 103 between the main body region 102 and the rear end regions 101. In one embodiment, the transition region 103 is a curved region formed to have cambers at two ends to smoothly connect the main body region 102 and the rear end regions 101, respectively. For example, the two ends of the transition region 103 may be arc-shaped in a cross-section view along the axial direction of the lamp tube 1. Furthermore, one of the cambers connects the main body region 102 while the other one of the cambers connects the rear end region 101. In some embodiments, the arc angle of the cambers is greater than 90 degrees while the outer surface of the rear end region 101 is a continuous surface in parallel with the outer surface of the main body region 102 when viewed from the cross-section along the axial direction of the lamp tube. In other embodiments, the transition region 103 can be without curve or arc in shape. In certain embodiments, the length of the transition region 103 along the axial direction of the lamp

tube 1 is between about 1 mm to about 4 mm. Upon experimentation, it was found that when the length of the transition region 103 along the axial direction of the lamp tube 1 is less than 1 mm, the strength of the transition region would be insufficient; when the length of the transition region 103 along the axial direction of the lamp tube 1 is more than 4 mm, the main body region 102 would be shorter and the desired illumination surface would be reduced, and the end caps 3 would be longer and the more materials for the end caps 3 would be needed.

[00177] Referring to FIG. 5 and FIG. 16, in certain embodiments, the lamp tube 1 is made of glass, and has a rear end region 101, a main body region 102, and a transition region 103. The transition region 103 has two arc-shaped cambers at both ends to form an S shape; one camber positioned near the main body region 102 is convex outwardly, while the other camber positioned near the rear end region 101 is concaved inwardly. Generally speaking, the radius of curvature, R1, of the camber/arc between the transition region 103 and the main body region 102 is smaller than the radius of curvature, R2, of the camber/arc between the transition region 103 and the rear end region 101. The ratio R1:R2 may range, for example, from about 1:1.5 to about 1:10, and in some embodiments is more effective from about 1:2.5 to about 1:5, and in some embodiments is even more effective from about 1:3 to about 1:4. In this way, the camber/arc of the transition region 103 positioned near the rear end region 101 is in compression at outer surfaces and in tension at inner surfaces, and the camber/arc of the transition region 103 positioned near the main body region 102 is in tension at outer surfaces and in compression at inner surfaces. Therefore, the goal of strengthening the transition region 103 of the lamp tube 1 is achieved.

[00178] Taking the standard specification for T8 lamp as an example, the outer diameter of the rear end region 101 is configured between 20.9 mm to 23 mm. An outer diameter of the rear end region 101 being less than 20.9 mm would be too small to

fittingly insert the power supply into the lamp tube 1. The outer diameter of the main body region 102 is in some embodiments configured to be between about 25 mm to about 28 mm. An outer diameter of the main body region 102 being less than 25 mm would be inconvenient to strengthen the ends of the main body region 102 as far as the current manufacturing skills are concerned, while an outer diameter of the main body region 102 being greater than 28 mm is not compliant to the industrial standard.

[00179] Referring to FIGS. 3 and 4, in one embodiment of the invention, each end cap 3 includes an electrically insulating tube 302, a thermal conductive member 303 sleeving over the electrically insulating tube 302, and two hollow conductive pins 301 disposed on the electrically insulating tube 302. The thermal conductive member 303 can be a metal ring that is tubular in shape.

[00180] Referring FIG. 5, in one embodiment, one end of the thermal conductive member 303 extends away from the electrically insulating tube 302 of the end cap 3 and towards one end of the lamp tube 1, and is bonded and adhered to the end of the lamp tube 1 using a hot melt adhesive 6. In this way, the end cap 3 by way of the thermal conductive member 303 extends to the transition region 103 of the lamp tube 1. In one embodiment, the thermal conductive member 303 and the transition region 103 are closely connected such that the hot melt adhesive 6 would not overflow out of the end cap 3 and remain on the main body region 102 when using the hot melt adhesive 6 to join the thermal conductive member 303 and the lamp tube 1. In addition, the electrically insulating tube 302 facing toward the lamp tube 1 does not have an end extending to the transition region 103, and that there is a gap between the electrically insulating tube 302 and the transition region 103. In one embodiment, the electrically insulating tube 302 is not limited to being made of plastic or ceramic, any material that is not a good electrical conductor can be used.

[00181] The hot melt adhesive 6 is a composite including a so-called commonly

known as "welding mud powder", and in some embodiments includes one or more of phenolic resin 2127#, shellac, rosin, calcium carbonate powder, zinc oxide, and ethanol. Rosin is a thickening agent with a feature of being dissolved in ethanol but not dissolved in water. In one embodiment, a hot melt adhesive 6 having rosin could be expanded to change its physical status to become solidified when being heated to high temperature in addition to the intrinsic viscosity. Therefore, the end cap 3 and the lamp tube 1 can be adhered closely by using the hot melt adhesive to accomplish automatic manufacture for the LED tube lamps. In one embodiment, the hot melt adhesive 6 may be expansive and flowing and finally solidified after cooling. In this embodiment, the volume of the hot melt adhesive 6 expands to about 1.3 times the original size when heated from room temperature to about 200 to 250 degrees Celsius. The hot melt adhesive 6 is not limited to the materials recited herein. Alternatively, a material for the hot melt adhesive 6 to be solidified immediately when heated to a predetermined temperature can be used. The hot melt adhesive 6 provided in each embodiments of the present invention is durable with respect to high temperature inside the end caps 3 due to the heat resulted from the power supply. Therefore, the lamp tube 1 and the end caps 3 could be secured to each other without decreasing the reliability of the LED tube lamp.

[00182] Furthermore, there is formed an accommodation space between the inner surface of the thermal conductive member 303 and the outer surface of the lamp tube 1 to accommodate the hot melt adhesive 6, as indicated by the dotted line B in FIG. 5. For example, the hot melt adhesive 6 can be filled into the accommodation space at a location where a first hypothetical plane (as indicated by the dotted line B in FIG. 5) being perpendicular to the axial direction of the lamp tube 1 would pass through the thermal conductive member, the hot melt adhesive 6, and the outer surface of the lamp tube 1. The hot melt adhesive 6 may have a thickness, for example, of about 0.2 mm to about 0.5 mm. In one embodiment, the hot melt adhesive 6 will be expansive to solidify in and

connect with the lamp tube 1 and the end cap 3 to secure both. The transition region 103 brings a height difference between the rear end region 101 and the main body region 102 to avoid the hot melt adhesives 6 being overflowed onto the main body region 102, and thereby saves manpower to remove the overflowed adhesive and increase the LED tube lamp productivity. The hot melt adhesive 6 is heated by receiving heat from the thermal conductive member 303 to which an electricity from an external heating equipment is applied, and then expands and finally solidifies after cooling, such that the end caps 3 are adhered to the lamp tube 1.

[00183] Referring to FIG. 5, in one embodiment, the electrically insulating tube 302 of the end cap 3 includes a first tubular part 302a and a second tubular part 302b connected along an axial direction of the lamp tube 1. The outer diameter of the second tubular part 302b is less than the outer diameter of the first tubular part 302a. In some embodiments, the outer diameter difference between the first tubular part 302a and the second tubular part 302b is between about 0.15 mm and about 0.30 mm. The thermal conductive member 303 sleeves over the outer circumferential surface of the second tubular part 302b. The outer surface of the thermal conductive member 303 is coplanar or substantially flush with respect to the outer circumferential surface of the first tubular part 302a. For example, the thermal conductive member 303 and the first tubular part 302a have substantially uniform exterior diameters from end to end. As a result, the entire end cap 3 and thus the entire LED tube lamp may be smooth with respect to the outer appearance and may have a substantially uniform tubular outer surface, such that the loading during transportation on the entire LED tube lamp is also uniform. In one embodiment, a ratio of the length of the thermal conductive member 303 along the axial direction of the end cap 3 to the axial length of the electrically insulating tube 302 ranges from about 1:2.5 to about 1:5.

[00184] In one embodiment, for the sake of securing adhesion between the end

cap 3 and the lamp tube 1, the second tubular part 302b is at least partially disposed around the lamp tube 1, and the accommodation space further includes a space encompassed by the inner surface of the second tubular part 302b and the outer surface of the rear end region 101 of the lamp tube 1. The hot melt adhesive 6 is at least partially filled in an overlapped region (shown by a dotted line "A" in FIG. 5) between the inner surface of the second tubular part 302b and the outer surface of the rear end region 101 of the lamp tube 1. For example, the hot melt adhesive 6 may be filled into the accommodation space at a location where a second hypothetical plane (shown by the dotted line A in FIG. 5) being perpendicular to the axial direction of the lamp tube 1 would pass through the thermal conductive member 303, the second tubular part 302b, the hot melt adhesive 6, and the rear end region 101.

[00185] The hot melt adhesive 6 is not required to completely fill the entire accommodation space as shown in FIG. 5, especially where a gap is reserved or formed between the thermal conductive member 303 and the second tubular part 302b. For example, in some embodiments, the hot melt adhesive 6 can be only partially filled into the accommodation space. During manufacturing of the LED tube lamp, the amount of the hot melt adhesive 6 coated and applied between the thermal conductive member 303 and the rear end region 101 may be appropriately increased, such that in the subsequent heating process, the hot melt adhesive 6 can be caused to expand and flow in between the second tubular part 302b and the rear end region 101, and thereby solidify after cooling to join the second tubular part 302b and the rear end region 101.

[00186] During fabrication of the LED tube lamp, the rear end region 101 of the lamp tube 1 is inserted into one of the end caps 3. In some embodiments, the axial length of the inserted portion of the rear end region 101 of the lamp tube 1 accounts for approximately one-third (⅓) to two-thirds (⅔) of the total axial length of the thermal conductive member 303. One benefit is that, there will be sufficient creepage distance

between the hollow conductive pins 301 and the thermal conductive member 303, and thus it is not easy to form a short circuit leading to dangerous electric shock to individuals. On the other hand, the creepage distance between the hollow conductive pin 301 and the thermal conductive member 303 is increased due to the electrically insulating effect of the electrically insulating tube 302, and thus a high voltage test is more likely to pass without causing electrical shocks to people.

[00187] Furthermore, the presence of the second tubular part 302b interposed between the hot melt adhesive 6 and the thermal conductive member 303 may reduce the heat from the thermal conductive member 303 to the hot melt adhesive 6. To help prevent or minimize this problem, referring to FIG. 4 in one embodiment, the end of the second tubular part 302b facing the lamp tube 1 (i.e., away from the first tubular part 302a) is circumferentially provided with a plurality of notches 302c. These notches 302c help to increase the contact areas between the thermal conductive member 303 and the hot melt adhesive 6 and therefore provide rapid heat conduction from the thermal conductive member 303 to the hot melt adhesive 6 so as to accelerate the solidification of the hot melt adhesive 6. Moreover, the hot melt adhesive 6 electrically insulates the thermal conductive member 303 and the lamp tube 1 so that a user would not be electrically shocked when he touches the thermal conductive member 303 connected to a broken lamp tube 1.

[00188] The thermal conductive member 303 can be made of various heat conducting materials. The thermal conductive member 303 can be a metal sheet such as an aluminum alloy. The thermal conductive member 303 sleeves the second tubular part 302b and can be tubular or ring-shaped. The electrically insulating tube 302 may be made of electrically insulating material, but in some embodiments have low thermal conductivity so as to prevent the heat from reaching the power supply module located inside the end cap 3 and therefore negatively affecting performance of the power supply

module. In one embodiment, the electrically insulating tube 302 is a plastic tube.

[00189] Alternatively, the thermal conductive member 303 may be formed by a plurality of metal plates circumferentially arranged on the tubular part 302b with either an equidistant space or a non-equidistant space.

[00190] The end cap 3 may be designed to have other kinds of structures or include other elements. Referring to FIG. 6, the end cap 3 according to another embodiment further includes a magnetic metal member 9 within the electrically insulating tube 302 but excludes the thermal conductive member 3. The magnetic metal member 9 is fixedly arranged on the inner circumferential surface of the electrically insulating tube 302 and therefore interposed between the electrically insulating tube 302 and the lamp tube 1 such that the magnetic metal member 9 is partially overlapped with the lamp tube 1 in the radial direction. In this embodiment, the whole magnetic metal member 9 is inside the electrically insulating tube 302, and the hot melt adhesive 6 is coated on the inner surface of the magnetic metal member 9 (the surface of the magnetic metal tube member 9 facing the lamp tube 1) and adhered to the outer peripheral surface of the lamp tube 1. In some embodiments, the hot melt adhesive 6 covers the entire inner surface of the magnetic metal member 9 in order to increase the adhesion area and to improve the stability of the adhesion.

[00191] Referring to FIG. 7, when manufacturing the LED tube lamp of this embodiment, the electrically insulating tube 302 is inserted in an external heating equipment which is in some embodiments an induction coil 11, so that the induction coil 11 and the magnetic metal member 9 are disposed opposite (or adjacent) to one another along the radially extending direction of the electrically insulating tube 302. The induction coil 11 is energized and forms an electromagnetic field, and the electromagnetic field induces the magnetic metal member 9 to create an electrical current and become heated. The heat from the magnetic metal member 9 is transferred to the hot melt adhesive 6 to

make the hot melt adhesive 6 expansive and flowing and then solidified after cooling, and the bonding for the end cap 3 and the lamp tube 1 can be accomplished. The induction coil 11 may be made, for example, of red copper and composed of metal wires having width of, for example, about 5 mm to about 6 mm to be a circular coil with a diameter, for example, of about 30 mm to about 35 mm, which is a bit greater than the outer diameter of the end cap 3. Since the end cap 3 and the lamp tube 1 may have the same outer diameters, the outer diameter may change depending on the outer diameter of the lamp tube 1, and therefore the diameter of the induction coil 11 used can be changed depending on the type of the lamp tube 1 used. As examples, the outer diameters of the lamp tube for T12, T10, T8, T5, T4, and T2 are 38.1 mm, 31.8 mm, 25.4 mm, 16 mm, 12.7 mm, and 6.4 mm, respectively.

[00192] Furthermore, the induction coil 11 may be provided with a power amplifying unit to increase the alternating current power to about 1 to 2 times the original. In some embodiments, it is better that the induction coil 11 and the electrically insulating tube 302 are coaxially aligned to make energy transfer more uniform. In some embodiments, a deviation value between the axes of the induction coil 11 and the electrically insulating tube 302 is not greater than about 0.05 mm. When the bonding process is complete, the end cap 3 and the lamp tube 1 are moved away from the induction coil. Then, the hot melt adhesive 6 absorbs the energy to be expansive and flowing and solidified after cooling. In one embodiment, the magnetic metal member 9 can be heated to a temperature of about 250 to about 300 degrees Celsius; the hot melt adhesive 6 can be heated to a temperature of about 200 to about 250 degrees Celsius. The material of the hot melt adhesive is not limited here, and a material of allowing the hot melt adhesive to immediately solidify when absorb heat energy can also be used.

[00193] In one embodiment, the induction coil 11 may be fixed in position to allow the end cap 3 and the lamp tube 1 to be moved into the induction coil 11 such that the

hot melt adhesive 6 is heated to expand and flow and then solidify after cooling when the end cap 3 is again moved away from the induction coil 11. Alternatively, the end cap 3 and the lamp tube 1 may be fixed in position to allow the induction coil 11 to be moved to encompass the end cap 3 such that the hot melt adhesive 6 is heated to expand and flow and then solidify after cooling when the induction coil 11 is again moved away from the end cap 3. In one embodiment, the external heating equipment for heating the magnetic metal member 9 is provided with a plurality of devices the same as the induction coils 11, and the external heating equipment moves relative to the end cap 3 and the lamp tube 1 during the heating process. In this way, the external heating equipment moves away from the end cap 3 when the heating process is completed. However, the length of the lamp tube 1 is far greater than the length of the end cap 3 and may be up to above 240 cm in some special appliances, and this may cause bad connection between the end cap 3 and the lamp tube 1 during the process that the lamp tube 1 accompany with the end cap 3 to relatively enter or leave the induction coil 11 in the back and for the direction as mentioned above when a position error exists.

[00194] Referring to FIG. 44, an external heating equipment 110 having a plurality sets of upper and lower semicircular fixtures 11a is provided to achieve same heating effect as that brought by the induction coils 11. In this way, the above-mentioned damage risk due to the relative movement in back-and-forth direction can be reduced. The upper and lower semicircular fixtures 11a each has a semicircular coil made by winding a metal wire of, for example, about 5 mm to about 6 mm wide. The combination of the upper and lower semicircular fixtures form a ring with a diameter, for example, of about 30 mm to about 35 mm, and the inside semicircular coils form a closed loop to become the induction coil 11 as mentioned. In this embodiment, the end cap 3 and the lamp tube 1 do not relatively move in the back-and-forth manner, but roll into the notch of the lower semicircular fixture. Specifically, an end cap 3 accompanied with a lamp tube 1

initially roll on a production line, and then the end cap 3 rolls into the notch of a lower semicircular fixture, and then the upper and the lower semicircular fixtures are combined to form a closed loop, and the fixtures are detached when heating is completed. This method reduces the need for high position precision and yield problems in production.

[00195] Referring to FIG. 6, the electrically insulating tube 302 is further divided into two parts, namely a first tubular part 302d and a second tubular part 302e, i.e. the remaining part. In order to provide better support of the magnetic metal member 9, an inner diameter of the first tubular part 302d for supporting the magnetic metal member 9 is larger than the inner diameter of the second tubular part 302e which does not have the magnetic metal member 9, and a stepped structure is formed at the connection of the first tubular part 302d and the second tubular part 302e. In this way, an end of the magnetic metal member 9 as viewed in an axial direction is abutted against the stepped structure such that the entire inner surface of the end cap is smooth and plain. Additionally, the magnetic metal member 9 may be of various shapes, e.g., a sheet-like or tubular-like structure being circumferentially arranged or the like, where the magnetic metal member 9 is coaxially arranged with the electrically insulating tube 302.

[00196] Referring to FIGS. 8 and 9, the electrically insulating tube may be further formed with a supporting portion 313 on the inner surface of the electrically insulating tube 302 to be extending inwardly such that the magnetic metal member 9 is axially abutted against the upper edge of the supporting portion 313. In some embodiments, the thickness of the supporting portion 313 along the radial direction of the electrically insulating tube 302 is between 1 mm to 2 mm. The electrically insulating tube 302 may be further formed with a protruding portion 310 on the inner surface of the electrically insulating tube 302 to be extending inwardly such that the magnetic metal member 9 is radially abutted against the side edge of the protruding portion 310 and that the outer surface of the magnetic metal member 9 and the inner surface of the electrically

insulating tube 302 is spaced apart with a gap. The thickness of the protruding portion 310 along the radial direction of the electrically insulating tube 302 is less than the thickness of the supporting portion 313 along the radial direction of the electrically insulating tube 302 and in some embodiments be 0.2 mm to 1 mm in an embodiment.

[00197] Referring to FIG. 9, the protruding portion 310 and the supporting portion are connected along the axial direction, and the magnetic metal member 9 is axially abutted against the upper edge of the supporting portion 313 while radially abutted against the side edge of the protruding portion 310 such that at least part of the protruding portion 310 intervenes between the magnetic metal member 9 and the electrically insulating tube 302. The protruding portion 310 may be arranged along the circumferential direction of the electrically insulating tube 302 to have a circular configuration. Alternatively, the protruding portion 310 may be in the form of a plurality of bumps arranged on the inner surface of the electrically insulating tube 302. The bumps may be equidistantly or non-equidistantly arranged along the inner circumferential surface of the electrically insulating tube 302 as long as the outer surface of the magnetic metal member 9 and the inner surface of the electrically insulating tube 302 are in a minimum contact and simultaneously hold the hot melt adhesive 6. In other embodiments, an entirely metal made end cap 3 could be used with an insulator disposed under the hollow conductive pin to endure the high voltage.

[00198] Referring to FIG. 10, in one embodiment, the magnetic metal member 9 can have one or more openings 91 that are circular. However, the openings 91 may instead be, for example, oval, square, star shaped, etc., as long as the contact area between the magnetic metal member 9 and the inner peripheral surface of the electrically insulating tube 302 can be reduced and the function of the magnetic metal member 9 to heat the hot melt adhesive 6 can be performed. In some embodiments, the openings 91 occupy about 10% to about 50% of the surface area of the magnetic metal

member 9. The opening 91 can be arranged circumferentially on the magnetic metal member 9 in an equidistantly spaced or non-equidistantly spaced manner.

[00199] Referring to FIG. 11, in other embodiments, the magnetic metal member 9 has an indentation/embossment 93 on surface facing the electrically insulating tube 302. The embossment is raised from the inner surface of the magnetic metal member 9, while the indentation is depressed under the inner surface of the magnetic metal member 9. The indentation/embossment reduces the contact area between the inner peripheral surface of the electrically insulating tube 302 and the outer surface of the magnetic metal member 9 while maintaining the function of melting and curing the hot melt adhesive 6. In sum, the surface of the magnetic metal member 9 can be configured to have openings, indentations, or embossments or any combination thereof to achieve the goal of reducing the contact area between the inner peripheral surface of the electrically insulating tube 302 and the outer surface of the magnetic metal member 9. At the same time, the firm adhesion between the magnetic metal member 9 and the lamp tube 1 should be secured to accomplish the heating and solidification of the hot melt adhesive 6.

[00200] Referring to FIG. 12, in one embodiment, the magnetic metal member 9 is a circular ring. Referring to FIG. 13, in another embodiment, the magnetic metal member 9 is a non-circular ring such as but not limited to an oval ring. When the magnetic metal member 9 is an oval ring, the minor axis of the oval ring is slightly larger than the outer diameter of the end region of the lamp tube 1 such that the contact area of the inner peripheral surface of the electrically insulating tube 302 and the outer surface of the magnetic metal member 9 is reduced and the function of melting and curing the hot melt adhesive 6 still performs properly. For example, the inner surface of the electrically insulating tube 302 may be formed with supporting portion 313 and the magnetic metal member 9 in a non-circular ring shape is seated on the supporting portion 313. Thus, the

contact area of the outer surface of the magnetic metal member 9 and the inner surface of the electrically insulating tube 302 could be reduced while that the function of solidifying the hot melt adhesive 6 could be performed. In other embodiments, the magnetic metal member 9 can be disposed on the outer surface of the end cap 3 to replace the thermal conductive member 303 as shown in FIG. 5 and to perform the function of heating and solidifying the hot melt adhesive 6 via electromagnetic induction.

[00201] Referring to FIGS. 45 to 47, in other embodiments, the magnetic metal member 9 may be omitted. Instead, in some embodiments, the hot melt adhesive 6 has a predetermined proportion of high permeability powders 65 having relative permeability ranging, for example, from about 102 to about 106. The powders can be used to replace the calcite powders originally included in the hot melt adhesive 6, and in certain embodiments, a volume ratio of the high permeability powders 65 to the calcite powders **may be about 1:3˜1:1. In some embodiments, the material of the high permeability** powders 65 is one of iron, nickel, cobalt, alloy thereof, or any combination thereof; the weight percentage of the high permeability powders 65 with respect to the hot melt adhesive is about 10% to about 50%; and/or the powders may have mean particle size of about 1 to about 30 micrometers. Such a hot melt adhesive 6 allows the end cap 3 and the lamp tube 1 to adhere together and be qualified in a destruction test, a torque test, and a bending test. Generally speaking, the bending test standard for the end cap of the LED tube lamp is greater than 5 newton-meters (Nt-m), while the torque test standard is greater than 1.5 newton-meters (Nt-m). In one embodiment, upon the ratio of the high permeability powders 65 to the hot melt adhesive 6 and the magnetic flux applied, the end cap 3 and the end of the lamp tube 1 secured by using the hot melt adhesive 6 are qualified in a torque test of 1.5 to 5 newton-meters (Nt-m) and a bending test of 5 to 10 newton-meters (Nt-m). The induction coil 11 is first switched on and allow the high permeability powders uniformly distributed in the hot melt adhesive 6 to be

charged, and therefore allow the hot melt adhesive 6 to be heated to be expansive and flowing and then solidified after cooling. Thereby, the goal of adhering the end cap 3 onto the lamp tube 1 is achieved.

[00202] Referring to FIGS. 45 to 47, the high permeability powders 65 may have different distribution manners in the hot melt adhesive 6. As shown in FIG. 45, the high permeability powders 65 have mean particle size (e.g., diameter) of about 1 to about 5 micrometers, and are distributed uniformly in the hot melt adhesive 6. When such a hot melt adhesive 6 is coated on the inner surface of the end cap 3, though the high permeability powders 65 cannot form a closed loop due to the uniform distribution, they can still be heated due to magnetic hysteresis in the electromagnetic field, so as to heat the hot melt adhesive 6. As shown in FIG. 46, the high permeability powders 65 have mean particle size of about 1 to about 5 micrometers, and are distributed randomly in the hot melt adhesive 6. When such a hot melt adhesive 6 is coated on the inner surface of the end cap 3, the high permeability powders 65 form a closed loop due to the random distribution; they can be heated due to magnetic hysteresis or the closed loop in the electromagnetic field, so as to heat the hot melt adhesive 6. As shown in FIG. 47, the high permeability powders 65 have mean particle size of about 5 to about 30 micrometers, and are distributed randomly in the hot melt adhesive 6. When such a hot melt adhesive 6 is coated on the inner surface of the end cap 3, the high permeability powders 65 form a closed loop due to the random distribution; they can be heated due to magnetic hysteresis or the closed loop in the electromagnetic field, so as to heat the hot melt adhesive 6. Accordingly, depending on the adjustment of the particle size, the distribution density and the distribution manner of the high permeability powders 65, and the electromagnetic flux applied to the end cap 3, the heating temperature of the hot melt adhesive 6 can be controlled. In one embodiment, the hot melt adhesive 6 is flowing and solidified after cooling from a temperature of about 200 to about 250 degrees Celsius. In

another embodiment, the hot melt adhesive 6 is immediately solidified at a temperature of about 200 to about 250 degrees Celsius.

[00203] Referring to FIGS. 14 and 39, in one embodiment, an end cap 3' has a pillar 312 at one end, the top end of the pillar 312 is provided with an opening having a groove 314 of, for example 0.1±1% mm depth at the periphery thereof for positioning a conductive lead 53 as shown in FIG. 39. The conductive lead 53 passes through the opening on top of the pillar 312 and has its end bent to be disposed in the groove 314. After that, a conductive metallic cap 311 covers the pillar 312 such that the conductive lead 53 is fixed between the pillar 312 and the conductive metallic cap 311. In some embodiments, the inner diameter of the conductive metallic cap 311 is 7.56±5% mm, the outer diameter of the pillar 312 is 7.23±5% mm, and the outer diameter of the conductive lead 53 is 0.5±1% mm. Nevertheless, the mentioned sizes are not limited here once that the conductive metallic cap 311 closely covers the pillar 312 without using extra adhesives and therefore completes the electrical connection between the power supply 5 and the conductive metallic cap 311.

[00204] Referring to FIGS. 2, 3, 12, and 13, in one embodiment, the end cap 3 may have openings 304 to dissipate heat generated by the power supply modules inside the end cap 3 so as to prevent a high temperature condition inside the end cap 3 that might reduce reliability. In some embodiments, the openings are in a shape of an arc; especially in a shape of three arcs with different size. In one embodiment, the openings are in a shape of three arcs with gradually varying size. The openings on the end cap 3 can be in any one of the above-mentioned shape or any combination thereof.

[00205] In other embodiments, the end cap 3 is provided with a socket (not shown) for installing the power supply module.

[00206] Referring to FIG. 17, in one embodiment, the lamp tube 1 further has a diffusion film 13 coated and bonded to the inner surface thereof so that the light

outputted or emitted from the LED light sources 202 is diffused by the diffusion film 13 and then pass through the lamp tube 1. The diffusion film 13 can be in form of various types, such as a coating onto the inner surface or outer wall of the lamp tube 1, or a diffusion coating layer (not shown) coated at the surface of each LED light source 202, or a separate membrane covering the LED light source 202.

[00207] Referring again to FIG. 17, in one embodiment, when the diffusion film 13 is in the form of a sheet, it covers but is not in contact with the LED light sources 202. The diffusion film 13 in the form of a sheet is usually called an optical diffusion sheet or board, usually a composite made of mixing diffusion particles into polystyrene (PS), polymethyl methacrylate (PMMA), polyethylene terephthalate (PET), and/or polycarbonate (PC), and/or any combination thereof. The light passing through such composite is diffused to expand in a wide range of space such as a light emitted from a plane source, and therefore makes the brightness of the LED tube lamp uniform.

[00208] In alternative embodiments, the diffusion film 13 is in form of an optical diffusion coating, which is composed of any one of calcium carbonate, halogen calcium phosphate and aluminum oxide, or any combination thereof. When the optical diffusion coating is made from a calcium carbonate with suitable solution, an excellent light diffusion effect and transmittance to exceed 90% can be obtained. Furthermore, the diffusion film 13 in form of an optical diffusion coating may be applied to an outer surface of the rear end region 101 having the hot melt adhesive 6 to produce increased friction resistance between the end cap 3 and the rear end region 101. Compared with an example without any optical diffusion coating, the rear end region 101 having the diffusion film 13 is beneficial, for example for preventing accidental detachment of the end cap 3 from the lamp tube 1.

[00209] In one embodiment, the composition of the diffusion film 13 in form of the optical diffusion coating includes calcium carbonate, strontium phosphate (e.g.,

CMS-5000, white powder), thickener, and a ceramic activated carbon (e.g., ceramic activated carbon SW—C, which is a colorless liquid). Specifically, in one example, such an optical diffusion coating on the inner circumferential surface of the glass tube has an **average thickness ranging between about 20 and about 30 μm. A** light transmittance of the diffusion film 13 using this optical diffusion coating is about 90%. Generally speaking, the light transmittance of the diffusion film 13 ranges from 85% to 96%. In addition, this diffusion film 13 can also provide electrical isolation for reducing risk of electric shock to a user upon breakage of the lamp tube 1. Furthermore, the diffusion film 13 provides an improved illumination distribution uniformity of the light outputted by the LED light sources 202 such that the light can illuminate the back of the light sources 202 and the side edges of the bendable circuit sheet so as to avoid the formation of dark regions inside the lamp tube 1 and improve the illumination comfort. In another possible embodiment, the light transmittance of the diffusion film can be 92% to 94% while the **thickness ranges from about 200 to about 300 μm.**

[00210] In another embodiment, the optical diffusion coating can also be made of a mixture including a calcium carbonate-based substance, some reflective substances like strontium phosphate or barium sulfate, a thickening agent, ceramic activated carbon, and deionized water. The mixture is coated on the inner circumferential surface of the **glass tube and has an average thickness ranging between about 20 and about 30 μ**m. In view of the diffusion phenomena in microscopic terms, light is reflected by particles. The particle size of the reflective substance such as strontium phosphate or barium sulfate will be much larger than the particle size of the calcium carbonate. Therefore, adding a small amount of reflective substance in the optical diffusion coating can effectively increase the diffusion effect of light.

[00211] In other embodiments, halogen calcium phosphate or aluminum oxide can also serve as the main material for forming the diffusion film 13. The particle size of the

calcium carbonate is, for example, about 2 to 4 μm, while the particle size of the halogen calcium phosphate and aluminum oxide are about 4 to 6 μm and 1 to 2 μm, respectively. When the light transmittance is required to be 85% to 92%, the average thickness for the optical diffusion coating mainly having the calcium carbonate may be about 20 to about 30 μm, while the average thickness for the optical diffusion coating mainly having the halogen calcium phosphate may be about 25 to about 35 μm, and/or the average thickness for the optical diffusion coating mainly having the aluminum oxide may be about 10 to about 15 μm. However, when the required light transmittance is up to 92% and even higher, the optical diffusion coating mainly having the calcium carbonate, the halogen calcium phosphate, or the aluminum oxide should be even thinner.

[00212] The main material and the corresponding thickness of the optical diffusion coating can be decided according to the place for which the lamp tube 1 is used and the light transmittance required. It is noted that the higher the light transmittance of the diffusion film is required, the more apparent the grainy visual of the light sources is.

[00213] Referring to FIG. 17, the inner circumferential surface of the lamp tube 1 may also be provided or bonded with a reflective film 12. The reflective film 12 is provided around the LED light sources 202, and occupies a portion of an area of the inner circumferential surface of the lamp tube 1 arranged along the circumferential direction thereof. As shown in FIG. 17, the reflective film 12 is disposed at two sides of the LED light strip 2 extending along a circumferential direction of the lamp tube 1. The LED light strip 2 is basically in a middle position of the lamp tube 1 and between the two reflective films 12. The reflective film 12, when viewed by a person looking at the lamp tube from the side (in the X-direction shown in FIG. 17), serves to block the LED light sources 202, so that the person does not directly see the LED light sources 202, thereby reducing the visual graininess effect. On the other hand, that the lights emitted from the LED light sources 202 are reflected by the reflective film 12 facilitates the divergence

angle control of the LED tube lamp, so that more lights illuminate toward directions without the reflective film 12, such that the LED tube lamp has higher energy efficiency when providing the same level of illumination performance.

[00214] Specifically, the reflection film 12 is provided on the inner peripheral surface of the lamp tube 1, and has an opening 12a configured to accommodate the LED light strip 2. The size of the opening 12a is the same or slightly larger than the size of the LED light strip 2. During assembly, the LED light sources 202 are mounted on the LED light strip 2 (a bendable circuit sheet) provided on the inner surface of the lamp tube 1, and then the reflective film 12 is adhered to the inner surface of the lamp tube 1, so that the opening 12a of the reflective film 12 correspondingly matches the LED light strip 2 in a one-to-one relationship, and the LED light strip 2 is exposed to the outside of the reflective film 12.

[00215] In one embodiment, the reflectance of the reflective film 12 is generally at least greater than 85%, in some embodiments greater than 90%, and in some embodiments greater than 95%, to be most effective. In one embodiment, the reflective film 12 extends circumferentially along the length of the lamp tube 1 occupying about 30% to 50% of the inner surface area of the lamp tube 1. In other words, a ratio of a circumferential length of the reflective film 12 along the inner circumferential surface of the lamp tube 1 to a circumferential length of the lamp tube 1 is about 0.3 to 0.5. In the illustrated embodiment of FIG. 17, the reflective film 12 is disposed substantially in the middle along a circumferential direction of the lamp tube 1, so that the two distinct portions or sections of the reflective film 12 disposed on the two sides of the LED light strip 2 are substantially equal in area. The reflective film 12 may be made of PET with some reflective materials such as strontium phosphate or barium sulfate or any combination thereof, **with a thickness between about 140 μm and about 350 μm or between about 150 μm and about 220 μm for a more preferred effect in some**

embodiments. As shown in FIG. 18, in other embodiments, the reflective film 12 may be provided along the circumferential direction of the lamp tube 1 on only one side of the LED light strip 2 while occupying the same percentage of the inner surface area of the lamp tube 1 (e.g., 15% to 25% for the one side). Alternatively, as shown in FIGS. 19 and 20, the reflective film 12 may be provided without any opening, and the reflective film 12 is directly adhered or mounted to the inner surface of the lamp tube 1 and followed by mounting or fixing the LED light strip 2 on the reflective film 12 such that the reflective film 12 positioned on one side or two sides of the LED light strip 2.

[00216] In the above mentioned embodiments, various types of the reflective film 12 and the diffusion film 13 can be adopted to accomplish optical effects including single reflection, single diffusion, and/or combined reflection-diffusion. For example, the lamp tube 1 may be provided with only the reflective film 12, and no diffusion film 13 is disposed inside the lamp tube 1, such as shown in FIGS. 19, 20, and 21.

[00217] In other embodiments, the width of the LED light strip 2 (along the circumferential direction of the lamp tube) can be widened to occupy a circumference area of the inner circumferential surface of the lamp tube 1. Since the LED light strip 2 has on its surface a circuit protective layer made of an ink which can reflect lights, the widen part of the LED light strip 2 functions like the reflective film 12 as mentioned above. In some embodiments, a ratio of the length of the LED light strip 2 along the circumferential direction to the circumferential length of the lamp tube 1 is about 0.3 to 0.5. The light emitted from the light sources could be concentrated by the reflection of the widen part of the LED light strip 2.

[00218] In other embodiments, the inner surface of the glass made lamp tube may be coated totally with the optical diffusion coating, or partially with the optical diffusion coating (where the reflective film 12 is coated have no optical diffusion coating). No matter in what coating manner, in some embodiments, it is more desirable that the

optical diffusion coating be coated on the outer surface of the rear end region of the lamp tube 1 so as to firmly secure the end cap 3 with the lamp tube 1.

[00219] In the present invention, the light emitted from the light sources may be processed with the abovementioned diffusion film, reflective film, other kinds of diffusion layer sheets, adhesive film, or any combination thereof.

[00220] Referring again to FIG. 2, the LED tube lamp according to some embodiments of present invention also includes an adhesive sheet 4, an insulation adhesive sheet 7, and an optical adhesive sheet 8. The LED light strip 2 is fixed by the adhesive sheet 4 to an inner circumferential surface of the lamp tube 1. The adhesive sheet 4 may be but is not limited to a silicone adhesive. The adhesive sheet 4 may be in the form of several short pieces or a long piece. Various kinds of the adhesive sheet 4, the insulation adhesive sheet 7, and the optical adhesive sheet 8 can be used to constitute various embodiments of the present invention.

[00221] The insulation adhesive sheet 7 is coated on the surface of the LED light strip 2 that faces the LED light sources 202 so that the LED light strip 2 is not exposed and thus electrically insulated from the outside environment. In application of the insulation adhesive sheet 7, a plurality of through holes 71 on the insulation adhesive sheet 7 are reserved to correspondingly accommodate the LED light sources 202 such that the LED light sources 202 are mounted in the through holes 71. The material composition of the insulation adhesive sheet 7 may include, for example vinyl silicone, hydrogen polysiloxane and aluminum oxide. The insulation adhesive sheet 7 has a **thickness, for example, ranging from about 100 μm to about 140 μm (micrometers). The** insulation adhesive sheet 7 h**aving a thickness less than 100 μm typically does not** produce sufficient insulating effect, while the insulation adhesive sheet 7 having a **thickness more than 140 μm may result in material waste.**

[00222] The optical adhesive sheet 8, which is a clear or transparent material, is

applied or coated on the surface of the LED light source 202 in order to ensure optimal light transmittance. After being applied to the LED light sources 202, the optical adhesive sheet 8 may have a granular, strip-like or sheet-like shape. The performance of the optical adhesive sheet 8 depends on its refractive index and thickness. The refractive index of the optical adhesive sheet 8 is in some embodiments between 1.22 and 1.6. In some embodiments, it is better for the optical adhesive sheet 8 to have a refractive index being a square root of the refractive index of the housing or casing of the LED light source 202, or the square root of the refractive index of the housing or casing of the LED light source 202 plus or minus 15%, to contribute better light transmittance. The housing/casing of the LED light sources 202 is a structure to accommodate and carry the LED dies (or chips) such as a LED lead frame 202b as shown in FIG. 37. The refractive index of the optical adhesive sheet 8 may range from 1.225 to 1.253. In some embodiments, the thickness of the optical adhesive sheet 8 may range from 1.1 mm to 1.3 mm. The optical adhesive sheet 8 having a thickness less than 1.1 mm may not be able to cover the LED light sources 202, while the optical adhesive sheet 8 having a thickness more than 1.3 mm may reduce light transmittance and increases material cost.

[00223] In some embodiments, in the process of assembling the LED light sources to the LED light strip, the optical adhesive sheet 8 is first applied on the LED light sources 202; then the insulation adhesive sheet 7 is coated on one side of the LED light strip 2; then the LED light sources 202 are fixed or mounted on the LED light strip 2; the other side of the LED light strip 2 being opposite to the side of mounting the LED light sources 202 is bonded and affixed to the inner surface of the lamp tube 1 by the adhesive sheet 4; finally, the end cap 3 is fixed to the end portion of the lamp tube 1, and the LED light sources 202 and the power supply 5 are electrically connected by the LED light strip 2. As shown in the embodiment of FIG. 22, the bendable circuit sheet 2 passes the transition region 103 to be soldered or traditionally wire-bonded with the power

supply 5, and then the end cap 3 having the structure as shown in FIG. 3 or 4 or FIG. 6 is adhered to the strengthened transition region 103 via methods as shown in FIG. 5 or FIG. 7, respectively to form a complete LED tube lamp.

[00224] In this embodiment, the LED light strip 2 is fixed by the adhesive sheet 4 to an inner circumferential surface of the lamp tube 1, so as to increase the light illumination angle of the LED tube lamp and broaden the viewing angle to be greater than 330 degrees. By means of applying the insulation adhesive sheet 7 and the optical adhesive sheet 8, electrical insulation of the entire light strip 2 is accomplished such that electrical shock would not occur even when the lamp tube 1 is broken and therefore safety could be improved.

[00225] Furthermore, the inner peripheral surface or the outer circumferential surface of the glass made lamp tube 1 may be covered or coated with an adhesive film (not shown) to isolate the inside from the outside of the glass made lamp tube 1 when the glass made lamp tube 1 is broken. In this embodiment, the adhesive film is coated on the inner peripheral surface of the lamp tube 1. The material for the coated adhesive film includes, for example, methyl vinyl silicone oil, hydro silicone oil, xylene, and calcium carbonate, wherein xylene is used as an auxiliary material. The xylene will be volatilized and removed when the coated adhesive film on the inner surface of the lamp tube 1 solidifies or hardens. The xylene is mainly used to adjust the capability of adhesion and therefore to control the thickness of the coated adhesive film.

[00226] In one embodiment, the thickness of the coated adhesive film is preferably **between about 100 and about 140 micrometers (μm). The adhesive film having a** thickness being less than 100 micrometers may not have sufficient shatterproof capability for the glass tube, and the glass tube is thus prone to crack or shatter. The adhesive film having a thickness being larger than 140 micrometers may reduce the light transmittance and also increase material cost. The thickness of the coated adhesive film

may be between **about 10 and about 800 micrometers (μm) when the shatterproof** capability and the light transmittance are not strictly demanded.

[00227] In one embodiment, the inner peripheral surface or the outer circumferential surface of the glass made lamp tube 1 is coated with an adhesive film such that the broken pieces are adhered to the adhesive film when the glass made lamp tube is broken. Therefore, the lamp tube 1 would not be penetrated to form a through hole connecting the inside and outside of the lamp tube 1 and thus prevents a user from touching any charged object inside the lamp tube 1 to avoid electrical shock. In addition, the adhesive film is able to diffuse light and allows the light to transmit such that the light uniformity and the light transmittance of the entire LED tube lamp increases. The adhesive film can be used in combination with the adhesive sheet 4, the insulation adhesive sheet 7 and the optical adhesive sheet 8 to constitute various embodiments of the present invention. As the LED light strip 2 is configured to be a bendable circuit sheet, no coated adhesive film is thereby required.

[00228] Furthermore, the light strip 2 may be an elongated aluminum plate, FR 4 board, or a bendable circuit sheet. When the lamp tube 1 is made of glass, adopting a rigid aluminum plate or FR4 board would make a broken lamp tube, e.g., broken into two parts, remain a straight shape so that a user may be under a false impression that the LED tube lamp is still usable and fully functional, and it is easy for him to incur electric shock upon handling or installation of the LED tube lamp. Because of added flexibility and bendability of the flexible substrate for the LED light strip 2, the problem faced by the aluminum plate, FR4 board, or 3-layered flexible board having inadequate flexibility and bendability, are thereby addressed. In certain embodiments, a bendable circuit sheet is adopted as the LED light strip 2 for that such a LED light strip 2 would not allow a ruptured or broken lamp tube to maintain a straight shape and therefore instantly inform the user of the disability of the LED tube lamp and avoid possibly incurred electrical

shock. The following are further descriptions of the bendable circuit sheet used as the LED light strip 2.

[00229] Referring to FIG. 23, in one embodiment, the LED light strip 2 includes a bendable circuit sheet having a conductive wiring layer 2a and a dielectric layer 2b that are arranged in a stacked manner, wherein the wiring layer 2a and the dielectric layer 2b have same areas. The LED light source 202 is disposed on one surface of the wiring layer 2a, the dielectric layer 2b is disposed on the other surface of the wiring layer 2a that is away from the LED light sources 202. The wiring layer 2a is electrically connected to the power supply 5 to carry direct current (DC) signals. Meanwhile, the surface of the dielectric layer 2b away from the wiring layer 2a is fixed to the inner circumferential surface of the lamp tube 1 by means of the adhesive sheet 4. The wiring layer 2a can be a metal layer or a power supply layer including wires such as copper wires.

[00230] In another embodiment, the outer surface of the wiring layer 2a or the dielectric layer 2b may be covered with a circuit protective layer made of an ink with function of resisting soldering and increasing reflectivity. Alternatively, the dielectric layer can be omitted and the wiring layer can be directly bonded to the inner circumferential surface of the lamp tube, and the outer surface of the wiring layer 2a is coated with the circuit protective layer. Whether the wiring layer 2a has a one-layered, or two-layered structure, the circuit protective layer can be adopted. In some embodiments, the circuit protective layer is disposed only on one side/surface of the LED light strip 2, such as the surface having the LED light source 202. In some embodiments, the bendable circuit sheet is a one-layered structure made of just one wiring layer 2a, or a two-layered structure made of one wiring layer 2a and one dielectric layer 2b, and thus is more bendable or flexible to curl when compared with the three-layered flexible substrate (one dielectric layer sandwiched with two wiring layers). As a result, the bendable circuit sheet of the LED light strip 2 can be installed in a lamp tube with a customized shape or

non-tubular shape, and fitly mounted to the inner surface of the lamp tube. The bendable circuit sheet closely mounted to the inner surface of the lamp tube is preferable in some cases. In addition, using fewer layers of the bendable circuit sheet improves the heat dissipation and lowers the material cost.

[00231] Nevertheless, the bendable circuit sheet is not limited to being one-layered or two-layered; in other embodiments, the bendable circuit sheet may include multiple layers of the wiring layers 2a and multiple layers of the dielectric layers 2b, in which the dielectric layers 2b and the wiring layers 2a are sequentially stacked in a staggered manner, respectively. These stacked layers are away from the surface of the outermost wiring layer 2a which has the LED light source 202 disposed thereon and is electrically connected to the power supply 5. Moreover, the length of the bendable circuit sheet is greater than the length of the lamp tube.

[00232] Referring to FIG. 48, in one embodiment, the LED light strip 2 includes a bendable circuit sheet having in sequence a first wiring layer 2a, a dielectric layer 2b, and a second wiring layer 2c. The thickness of the second wiring layer 2c is greater than that of the first wiring layer 2a, and the length of the LED light strip 2 is greater than that of the lamp tube 1. The end region of the light strip 2 extending beyond the end portion of the lamp tube 1 without disposition of the light source 202 is formed with two separate through holes 203 and 204 to respectively electrically communicate the first wiring layer 2a and the second wiring layer 2c. The through holes 203 and 204 are not communicated to each other to avoid short.

[00233] In this way, the greater thickness of the second wiring layer 2c allows the second wiring layer 2c to support the first wiring layer 2a and the dielectric layer 2b, and meanwhile allow the LED light strip 2 to be mounted onto the inner circumferential surface without being liable to shift or deform, and thus the yield rate of product can be improved. In addition, the first wiring layer 2a and the second wiring layer 2c are in

electrical communication such that the circuit layout of the first wiring layer 2a can be extended downward to the second wiring layer 2c to reach the circuit layout of the entire LED light strip 2. Moreover, since the land for the circuit layout becomes two-layered, the area of each single layer and therefore the width of the LED light strip 2 can be reduced such that more LED light strips 2 can be put on a production line to increase productivity.

[00234] Furthermore, the first wiring layer 2a and the second wiring layer 2c of the end region of the LED light strip 2 that extends beyond the end portion of the lamp tube 1 without disposition of the light source 202 can be used to accomplish the circuit layout of a power supply module so that the power supply module can be directly disposed on the bendable circuit sheet of the LED light strip 2.

[00235] Referring to FIG. 2, in one embodiment, the LED light strip 2 has a plurality of LED light sources 202 mounted thereon, and the end cap 3 has a power supply 5 installed therein. The LED light sources 202 and the power supply 5 are electrically connected by the LED light strip 2. The power supply 5 may be a single integrated unit (i.e., all of the power supply components are integrated into one module unit) installed in one end cap 3. Alternatively, the power supply 5 may be divided into two separate units (i.e. the power supply components are divided into two parts) installed in two end caps 3, respectively. When only one end of the lamp tube 1 is strengthened by a glass tempering process, it may be preferable that the power supply 5 is a single integrated unit and installed in the end cap 3 corresponding to the strengthened end of the lamp tube 1.

[00236] The power supply 5 can be fabricated by various ways. For example, the power supply 5 may be an encapsulation body formed by injection molding a silica gel with high thermal conductivity such as being greater than 0.7 w/m·k. This kind of power supply has advantages of high electrical insulation, high heat dissipation, and regular shape to match other components in an assembly. Alternatively, the power supply 5 in the end caps may be a printed circuit board having components that are directly exposed

or packaged by a heat shrink sleeve. The power supply 5 according to some embodiments of the present invention can be a single printed circuit board provided with a power supply module as shown in FIG. 24 or a single integrated unit as shown in FIG. 38.

[00237] Referring to FIGS. 2 and 38, in one embodiment of the present invention, the power supply 5 is provided with a male plug 51 at one end and a metal pin 52 at the other end, one end of the LED light strip 2 is correspondingly provided with a female plug 201, and the end cap 3 is provided with a hollow conductive pin 301 to be connected with an outer electrical power source. Specifically, the male plug 51 is fittingly inserted into the female plug 201 of the LED light strip 2, while the metal pins 52 are fittingly inserted into the hollow conductive pins 301 of the end cap 3. The male plug 51 and the female plug 201 function as a connector between the power supply 5 and the LED light strip 2. Upon insertion of the metal pin 52, the hollow conductive pin 301 is punched with an external punching tool to slightly deform such that the metal pin 52 of the power supply 5 is secured and electrically connected to the hollow conductive pin 301. Upon turning on the electrical power, the electrical current passes in sequence through the hollow conductive pin 301, the metal pin 52, the male plug 51, and the female plug 201 to reach the LED light strip 2 and go to the LED light sources 202. However, the power supply 5 of the present invention is not limited to the modular type as shown in FIG. 38. The power supply 5 may be a printed circuit board provided with a power supply module and electrically connected to the LED light strip 2 via the abovementioned the male plug 51 and female plug 201 combination.

[00238] In another embodiment, a traditional wire bonding technique can be used instead of the male plug 51 and the female plug 201 for connecting any kind of the power supply 5 and the light strip 2. Furthermore, the wires may be wrapped with an electrically insulating tube to protect a user from being electrically shocked.

[00239] In still another embodiment, the connection between the power supply 5 and the LED light strip 2 may be accomplished via tin soldering, rivet bonding, or welding. One way to secure the LED light strip 2 is to provide the adhesive sheet 4 at one side thereof and adhere the LED light strip 2 to the inner surface of the lamp tube 1 via the adhesive sheet 4. Two ends of the LED light strip 2 can be either fixed to or detached from the inner surface of the lamp tube 1.

[00240] In case that two ends of the LED light strip 2 are fixed to the inner surface of the lamp tube 1, it may be preferable that the bendable circuit sheet of the LED light strip 2 is provided with the female plug 201 and the power supply is provided with the male plug 51 to accomplish the connection between the LED light strip 2 and the power supply 5. In this case, the male plug 51 of the power supply 5 is inserted into the female plug 201 to establish electrical connection.

[00241] In case that two ends of the LED light strip 2 are detached from the inner surface of the lamp tube and that the LED light strip 2 is connected to the power supply 5 via wire-bonding, any movement in subsequent transportation is likely to cause the bonded wires to break. Therefore, an option for the connection between the light strip 2 and the power supply 5 could be soldering. Specifically, referring to FIG. 22, the ends of the LED light strip 2 including the bendable circuit sheet are arranged to pass over the strengthened transition region 103 and directly soldering bonded to an output terminal of the power supply 5 such that the product quality is improved without using wires. In this way, the female plug 201 and the male plug 51 respectively provided for the LED light strip 2 and the power supply 5 are no longer needed.

[00242] Referring to FIG. 24, an output terminal of the printed circuit board of the **power supply 5 may have soldering pads "a" provided with an amount of tin solder with a** thickness sufficient to later form a solder joint. Correspondingly, the ends of the LED light **strip 2 may have soldering pads "b". The soldering pads "a" on the output terminal of the**

printed circuit board of the power supply 5 are soldered to the soldering pads "b" on the LED light strip 2 via the tin solder on the soldering pads "a". The soldering pads "a" and the soldering pads "b" may be face to face during soldering such that the connection between the LED light strip 2 and the printed circuit board of the power supply 5 is the most firm. However, this kind of soldering typically includes that a thermo-compression head presses on the rear surface of the LED light strip 2 and heats the tin solder, i.e. the LED light strip 2 intervenes between the thermo-compression head and the tin solder, and therefore may easily cause reliability problems. Referring to FIG. 30, a through hole may be formed in each of the soldering pads "b" on the LED light strip 2 to allow the soldering pads "b" overlay the soldering pads "b" without face-to-face and the thermo-compression head directly presses tin solders on the soldering pads "a" on surface of the printed circuit board of the power supply 5 when the soldering pads "a" and the soldering pads "b" are vertically aligned. This is an easy way to accomplish in practice.

[00243] Referring again to FIG. 24, two ends of the LED light strip 2 detached from the inner surface of the lamp tube 1 are formed as freely extending portions 21, while most of the LED light strip 2 is attached and secured to the inner surface of the lamp tube 1. One of the freely extending portions 21 has the soldering pads "b" as mentioned above. Upon assembling of the LED tube lamp, the freely extending end portions 21 along with the soldered connection of the printed circuit board of the power supply 5 and the LED light strip 2 would be coiled, curled up or deformed to be fittingly accommodated inside the lamp tube 1. When the bendable circuit sheet of the LED light strip 2 includes in sequence the first wiring layer 2a, the dielectric layer 2b, and the second wiring layer 2c as shown in FIG. 48, the freely extending end portions 21 can be used to accomplish the connection between the first wiring layer 2a and the second wiring layer 2c and arrange the circuit layout of the power supply 5.

[00244] In this embodiment, during the connection of the LED light strip 2 and the power supply 5, the soldering pads "b" and the soldering pads "a" and the LED light sources 202 are on surfaces facing toward the same direction and the soldering pads "b" on the LED light strip 2 are each formed with a through hole "e" as shown in FIG. 30 such that the soldering pads "b" and the soldering pads "a" communicate with each other via the through holes "e". When the freely extending end portions 21 are deformed due to contraction or curling up, the soldered connection of the printed circuit board of the power supply 5 and the LED light strip 2 exerts a lateral tension on the power supply 5. Furthermore, the soldered connection of the printed circuit board of the power supply 5 and the LED light strip 2 also exerts a downward tension on the power supply 5 when compared with the situation where the soldering pads "a" of the power supply 5 and the soldering pads "b" of the LED light strip 2 are face to face. This downward tension on the power supply 5 comes from the tin solders inside the through holes "e" and forms a stronger and more secure electrical connection between the LED light strip 2 and the power supply 5.

[00245] Referring to FIG. 25, in one embodiment, the soldering pads "b" of the LED light strip 2 are two separate pads to electrically connect the positive and negative electrodes of the bendable circuit sheet of the LED light strip 2, respectively. The size of the soldering pads "b" may be, for example, about 3.5×2 mm2. The printed circuit board of the power supply 5 is correspondingly provided with soldering pads "a" having reserved tin solders, and the height of the tin solders suitable for subsequent automatic soldering bonding process is generally, for example, about 0.1 to 0.7 mm, in some preferable embodiments about 0.3 to about 0.5 mm, and in some even more preferable embodiments about 0.4 mm. An electrically insulating through hole "c" may be formed between the two soldering pads "b" to isolate and prevent the two soldering pads from electrically short during soldering. Furthermore, an extra positioning opening "d" may

also be provided behind the electrically insulating through hole "c" to allow an automatic soldering machine to quickly recognize the position of the soldering pads "b".

[00246] For the sake of achieving scalability and compatibility, the amount of the soldering pads "b" on each end of the LED light strip 2 may be more than one such as two, three, four, or more than four. When there is only one soldering pad "b" provided at each end of the LED light strip 2, the two ends of the LED light strip 2 are electrically connected to the power supply 5 to form a loop, and various electrical components can be used. For example, a capacitance may be replaced by an inductance to perform current regulation. Referring to FIGS. 26 to 28, when each end of the LED light strip 2 has three soldering pads, the third soldering pad can be grounded; when each end of the LED light strip 2 has four soldering pads, the fourth soldering pad can be used as a signal input terminal. Correspondingly, in some embodiments, the power supply 5 should have same amount of soldering pads "a" as that of the soldering pads "b" on the LED light strip 2. In some embodiments, as long as electrical short between the soldering pads "b" can be prevented, the soldering pads "b" should be arranged according to the dimension of the actual area for disposition, for example, three soldering pads can be arranged in a row or two rows. In other embodiments, the amount of the soldering pads "b" on the bendable circuit sheet of the LED light strip 2 may be reduced by rearranging the circuits on the bendable circuit sheet of the LED light strip 2. The lesser the amount of the soldering pads, the easier the fabrication process becomes. On the other hand, a greater number of soldering pads may improve and secure the electrical connection between the LED light strip 2 and the output terminal of the power supply 5.

[00247] Referring to FIG. 30, in another embodiment, the soldering pads "b" each is formed with a through hole "e" having a diameter generally of about 1 to 2 mm, in some preferred embodiments of about 1.2 to 1.8 mm, and in yet further preferred embodiments of about 1.5 mm. The through hole "e" communicates the soldering pad "a" with the

soldering pad "b" so that the tin solder on the soldering pads "a" passes through the through holes "e" and finally reach the soldering pads "b". A smaller through hole "e" would make it difficult for the tin solder to pass. The tin solder accumulates around the through holes "e" upon exiting the through holes "e" and condense to form a solder ball "g" with a larger diameter than that of the through holes "e" upon condensing. Such a solder ball "g" functions as a rivet to further increase the stability of the electrical connection between the soldering pads "a" on the power supply 5 and the soldering pads "b" on the LED light strip 2.

[00248] Referring to FIGS. 31 to 32, in other embodiments, when a distance from the through hole "e" to the side edge of the LED light strip 2 is less than 1 mm, the tin solder may pass through the through hole "e" to accumulate on the periphery of the through hole "e", and extra tin solder may spill over the soldering pads "b" to reflow along the side edge of the LED light strip 2 and join the tin solder on the soldering pads "a" of the power supply 5. The tin solder then condenses to form a structure like a rivet to firmly secure the LED light strip 2 onto the printed circuit board of the power supply 5 such that reliable electric connection is achieved. Referring to FIGS. 33 and 34, in another embodiment, the through hole "e" can be replaced by a notch "f" formed at the side edge of the soldering pads "b" for the tin solder to easily pass through the notch "f" and accumulate on the periphery of the notch "f" and to form a solder ball with a larger diameter than that of the notch "e" upon condensing. Such a solder ball may be formed like a C-shape rivet to enhance the secure capability of the electrically connecting structure.

[00249] The abovementioned through hole "e" or notch "f" might be formed in advance of soldering or formed by direct punching with a thermo-compression head, as shown in FIG. 40, during soldering. The portion of the thermo-compression head for touching the tin solder may be flat, concave, or convex, or any combination thereof. The

portion of the thermo-compression head for restraining the object to be soldered such as the LED light strip 2 may be strip-like or grid-like. The portion of the thermo-compression head for touching the tin solder does not completely cover the **through hole "e" or the notch "f" to make sure that the tin solder is able to pass through the through hole "e" or the notch "f". The portion of the thermo**-compression head being concave may function as a room to receive the solder ball.

[00250] Referring to FIG. 40, a thermo-compression head 41 used for bonding the **soldering pads "a" on the power supply 5 and the soldering pads "b" on the light strip 2 is** mainly composed of four sections: a bonding plane 411, a plurality of concave guiding tanks 412, a plurality of concave molding tanks 413, and a restraining plane 414. The bonding plane 411 is a portion actually touching, pressing and heating the tin solder to perform soldering bonding. The bonding plane 411 may be flat, concave, convex or any combination thereof. The concave guiding tanks 412 are formed on the bonding plane 411 and opened near an edge of the bonding plane 411 to guide the heated and melted tin solder to flow into the through holes or notches formed on the soldering pads. For example, the guiding tanks 412 may function to guide and stop the melted tin solders. The concave molding tanks 413 are positioned beside the guiding tanks 412 and have a concave portion more depressed than that of the guiding tanks 412 such that the concave molding tanks 413 each form a housing to receive the solder ball. The restraining plane 414 is a portion next to the bonding plane 411 and formed with the concave molding tanks 413. The restraining plane 414 is lower than the bonding plane 411 such that the restraining plane 414 firmly presses the LED light strip 2 on the printed circuit board of the power supply 5 while the bonding plane 411 presses against the **soldering pads "b" during the soldering bonding. The restraining plane 414 may be** strip-like or grid-like on surface. The difference of height of the bonding plane 411 and the restraining plane 414 is the thickness of the LED light strip 2.

[00251] Referring to FIGS. 41, 25, and 40, soldering pads corresponding to the soldering pads of the LED light strip are formed on the printed circuit board of the power supply 5 and tin solder is reserved on the soldering pads on the printed circuit board of the power supply 5 for subsequent soldering bonding performed by an automatic soldering bonding machine. The tin solder in some embodiments has a thickness of about 0.3 mm to about 0.5 mm such that the LED light strip 2 can be firmly soldered to the printed circuit board of the power supply 5. As shown in FIG. 41, in case of having height difference between two tin solders respectively reserved on two soldering pads on the printed circuit board of the power supply 5, the higher one will be touched first and melted by the thermo-compression head 41 while the other one will be touched and start to melt until the higher one is melted to a height the same as the height of the other one. This usually incurs unsecured soldering bonding for the reserved tin solder with smaller height, and therefore affects the electrical connection between the LED light strip 2 and the printed circuit board of the power supply 5. To alleviate this problem, in one embodiment, the present invention applies the kinetic equilibrium principal and installs a linkage mechanism on the thermo-compression head 41 to allow rotation of the thermo-compression head 41 during a soldering bonding such that the thermo-compression head 41 starts to heat and melt the two reserved tin solders only when the thermo-compression head 41 detects that the pressure on the two reserved tin solders are the same.

[00252] In the abovementioned embodiment, the thermo-compression head 41 is rotatable while the LED light strip 2 and the printed circuit board of the power supply 5 remain unmoved. Referring to FIG. 42, in another embodiment, the thermo-compression head 41 is unmoved while the LED light strip is allowed to rotate. In this embodiment, the LED light strip 2 and the printed circuit board of the power supply 5 are loaded on a soldering vehicle 60 including a rotary platform 61, a vehicle holder 62, a rotating shaft

63, and two elastic members 64. The rotary platform 61 functions to carry the LED light strip 2 and the printed circuit board of the power supply 5. The rotary platform 61 is movably mounted to the vehicle holder 62 via the rotating shaft 63 so that the rotary platform 61 is able to rotate with respect to the vehicle holder 62 while the vehicle holder 62 bears and holds the rotary platform 61. The two elastic members 64 are disposed on two sides of the rotating shaft 63, respectively, such that the rotary platform 61 in connection with the rotating shaft 63 always remains at the horizontal level when the rotary platform 61 is not loaded. In this embodiment, the elastic members 64 are springs for example, and the ends thereof are disposed corresponding to two sides of the rotating shaft 63 so as to function as two pivots on the vehicle holder 62. As shown in FIG. 42, when two tin solders reserved on the LED light strip 2 pressed by the thermo-compression head 41 are not at the same height level, the rotary platform 61 carrying the LED light strip 2 and the printed circuit board of the power supply 5 will be driven by the rotating shaft 63 to rotate until the thermo-compression head 41 detects the same pressure on the two reserved tin solders, and then starts a soldering bonding. Referring to FIG. 43, when the rotary platform 61 rotates, the elastic members 64 at two sides of the rotating shaft 63 are compressed or pulled; and the driving force of the rotating shaft 63 releases and the rotary platform 61 returns to the original height level by the resilience of the elastic members 64 when the soldering bonding is completed.

[00253] In other embodiments, the rotary platform 61 may be designed to have mechanisms without using the rotating shaft 63 and the elastic members 64. For example, the rotary platform 61 may be designed to have driving motors and active rotary mechanisms, and therefore the vehicle holder 62 is saved. Accordingly, other embodiments utilizing the kinetic equilibrium principle to drive the LED light strip 2 and the printed circuit board of the power supply 5 to move in order to complete the soldering bonding process are within the spirit of the present invention.

[00254] Referring to FIGS. 35 and 36, in another embodiment, the LED light strip 2 and the power supply 5 may be connected by utilizing a circuit board assembly 25 instead of soldering bonding. The circuit board assembly 25 has a long circuit sheet 251 and a short circuit board 253 that are adhered to each other with the short circuit board 253 being adjacent to the side edge of the long circuit sheet 251. The short circuit board 253 may be provided with power supply module 250 to form the power supply 5. The short circuit board 253 is stiffer or more rigid than the long circuit sheet 251 to be able to support the power supply module 250.

[00255] The long circuit sheet 251 may be the bendable circuit sheet of the LED light strip including a wiring layer 2a as shown in FIG. 23. The wiring layer 2a of the long circuit sheet 251 and the power supply module 250 may be electrically connected in various manners depending on the demand in practice. As shown in FIG. 35, the power supply module 250 and the long circuit sheet 251 having the wiring layer 2a on surface are on the same side of the short circuit board 253 such that the power supply module 250 is directly connected to the long circuit sheet 251. As shown in FIG. 36, alternatively, the power supply module 250 and the long circuit sheet 251 including the wiring layer 2a on surface are on opposite sides of the short circuit board 253 such that the power supply module 250 is directly connected to the short circuit board 253 and indirectly connected to the wiring layer 2a of the LED light strip 2 by way of the short circuit board 253.

[00256] As shown in FIG. 35, in one embodiment, the long circuit sheet 251 and the short circuit board 253 are adhered together first, and the power supply module 250 is subsequently mounted on the wiring layer 2a of the long circuit sheet 251 serving as the LED light strip 2. The long circuit sheet 251 of the LED light strip 2 herein is not limited to include only one wiring layer 2a and may further include another wiring layer such as the wiring layer 2c shown in FIG. 48. The light sources 202 are disposed on the wiring layer

2a of the LED light strip 2 and electrically connected to the power supply 5 by way of the wiring layer 2a. As shown in FIG. 36, in another embodiment, the long circuit sheet 251 of the LED light strip 2 may include a wiring layer 2a and a dielectric layer 2b. The dielectric layer 2b may be adhered to the short circuit board 253 first and the wiring layer 2a is subsequently adhered to the dielectric layer 2b and extends to the short circuit board 253. All these embodiments are within the scope of applying the circuit board assembly concept of the present invention.

[00257] In the above-mentioned embodiments, the short circuit board 253 may have a length generally of about 15 mm to about 40 mm and in some preferable embodiments about 19 mm to about 36 mm, while the long circuit sheet 251 may have a length generally of about 800 mm to about 2800 mm and in some embodiments of about 1200 mm to about 2400 mm. A ratio of the length of the short circuit board 253 to the length of the long circuit sheet 251 ranges from, for example, about 1:20 to about 1:200.

[00258] When the ends of the LED light strip 2 are not fixed on the inner surface of the lamp tube 1, the connection between the LED light strip 2 and the power supply 5 via soldering bonding could not firmly support the power supply 5, and it may be necessary to dispose the power supply 5 inside the end cap 3. For example, a longer end cap to have enough space for receiving the power supply 5 would be needed. However, this will reduce the length of the lamp tube under the prerequisite that the total length of the LED tube lamp is fixed according to the product standard, and may therefore decrease the effective illuminating areas.

[00259] Referring to FIG. 39, in one embodiment, a hard circuit board 22 made of aluminum (or an elongated aluminum plate) is used instead of the bendable circuit sheet, such that the ends or terminals of the hard circuit board 22 can be mounted at ends of the lamp tube 1, and the power supply 5 is solder bonded to one of the ends or terminals of the hard circuit board 22 in a manner such that the printed circuit board of the power

supply 5 is not parallel but may be perpendicular to the hard circuit board 22 to save space in the longitudinal direction used for the end cap. This solder bonding technique may be more convenient to accomplish and the effective illuminating areas of the LED tube lamp could also remain. Moreover, a conductive lead 53 for electrical connection with the end cap 3 could be formed directly on the power supply 5 without soldering other metal wires between the power supply 5 and the hollow conductive pin 301 as shown in FIG. 3, and which facilitates the manufacturing of the LED tube lamp.

[00260] Fig. 49A is a block diagram of a system including an LED tube lamp including a power supply module according to certain embodiments. Referring to Fig. 49A, an AC power supply 508 is used to supply an AC supply signal. A lamp driving circuit 505 receives the AC supply signal from the AC power supply 508 and then converts it into an AC driving signal. An LED tube lamp 500 receives the AC driving signal from the lamp driving circuit 505 and is thus driven to emit light. In this embodiment, the LED tube lamp 500 is power-supplied at its both end caps respectively having two pins 501 and 502 and two pins 503 and 504, which are coupled to the lamp driving circuit 505 to concurrently receive the AC driving signal to drive an LED unit (not shown) in the LED tube lamp 500 to emit light. However, in other embodiments, each end cap of the LED tube lamp could have only at least one pin for receiving the AC driving signal. That is, it is unnecessary to have two pins used in each end cap for the purpose of passing electricity through the both ends of the LED tube lamp 500. In the present embodiment, the AC power supply 508 could be commercial electricity with 100-277 voltages in frequency of 50Hz or 60Hz. The lamp driving circuit 505 receives the AC supply signal from the AC power supply 508 and then converts it into the AC driving signal as an external driving signal. The lamp driving circuit 505 could be an electronic ballast and is used to convert the signal of commercial electricity into high-frequency and high-voltage AC driving signal. The common types of electronic

ballast, such as instant-start electronic ballast, program-start electronic ballast, and rapid-start electronic ballast, can be applied to the LED tube lamp of the present invention. In some embodiments, the voltage of the AC driving signal is bigger than 300V and prefers 400-700V with frequency being higher than 10kHz and preferring 20-50kHz.

Fig. 49B is a block diagram of an LED lamp according to certain embodiments. Referring to Fig. 49B, the power supply module of the LED lamp summarily includes a rectifying circuit 510, a filtering circuit 520, and a rectifying circuit 540, and may comprise a portion of an LED lighting module 530. The power supply module of the LED lamp could be used in the LED tube lamp 500 with a dual-end power supply in Fig. 49A. The rectifying circuit 510 is coupled to pins 501 and 502 to receive and then rectify an external driving signal conducted by pins 501 and 502. The rectifying circuit 540 is coupled to pins 503 and 504 to receive and then rectify an external driving signal conducted by pins 503 and 504. Therefore, the power supply module of the LED lamp may include two rectifying circuits 510 and 540 configured to output a rectified signal at output terminals 511 and 512. The filtering circuit 520 is coupled to the output terminals 511 and 512 to receive and then filter the rectified signal, so as to output a filtered signal to filtering output terminals 521 and 522. The LED lighting module 530 is coupled to the filtering output terminals 521 and 522 to receive the filtered signal and thereby to drive an LED unit (not shown) in the LED lighting module 530 to emit light.

[00261] Fig. 50A is a schematic diagram of a rectifying circuit according to an embodiment of the present invention. Referring to Fig. 50A, a rectifying circuit 610, i.e. a bridge rectifier, includes four rectifying diodes 611, 612, 613, and 614, configured to full-wave rectify a received signal. The diode 611 has an anode connected to the output terminal 512, and a cathode connected to the pin 502. The diode 612 has an anode connected to the output terminal 512, and a cathode connected to the pin 501. The diode 613 has an anode connected to the pin 502, and a cathode connected to the

output terminal 511. The diode 614 has an anode connected to the pin 501, and a cathode connected to the output terminal 511.

[00262] When the pins 501 and 502 receive an AC signal, the rectifying circuit 610 operates as follows. During the connected AC signal's positive half cycle, the AC signal is input through the pin 501, the diode 614, and the output terminal 511 in sequence, and later output through the output terminal 512, the diode 611, and the pin 502 in sequence. During the connected AC signal's negative half cycle, the AC signal is input through the pin 502, the diode 613, and the output terminal 511 in sequence, and later output through the output terminal 512, the diode 612, and the pin 501 in sequence. Therefore, during the connected AC signal's full cycle, the positive pole of the rectified signal produced by the rectifying circuit 610 keeps at the output terminal 511, and the negative pole of the rectified signal remains at the output terminal 512. Accordingly, the rectified signal produced or output by the rectifying circuit 610 is a full-wave rectified signal.

[00263] When the pins 501 and 502 are coupled to a DC power supply to receive a DC signal, the rectifying circuit 610 operates as follows. When the pin 501 is coupled to the positive end of the DC power supply and the pin 502 to the negative end of the DC power supply, the DC signal is input through the pin 501, the diode 614, and the output terminal 511 in sequence, and later output through the output terminal 512, the diode 611, and the pin 502 in sequence. When the pin 501 is coupled to the negative end of the DC power supply and the pin 502 to the positive end of the DC power supply, the DC signal is input through the pin 502, the diode 613, and the output terminal 511 in sequence, and later output through the output terminal 512, the diode 612, and the pin 501 in sequence. Therefore, no matter what the electrical polarity of the DC signal is between the pins 501 and 502, the positive pole of the rectified signal produced by the rectifying circuit 610 keeps at the output terminal 511, and the negative pole of the rectified signal remains at the output terminal 512.

[00264] Therefore, the rectifying circuit 610 in this embodiment can output or produce a proper rectified signal regardless of whether the received input signal is an AC or DC signal.

[00265] Fig. 50B is a schematic diagram of a rectifying circuit according to an embodiment of the present invention. Referring to Fig. 50B, a rectifying circuit 710 includes two rectifying diodes 711 and 712 configured to half-wave rectify a received signal. The diode 711 has an anode connected to the pin 502, and a cathode connected to the output terminal 511. The diode 712 has an anode connected to the output terminal 511, and a cathode connected to the pin 501. The output terminal 512 may be omitted or grounded depending on applications in practice.

[00266] Next, exemplary operation(s) of the rectifying circuit 710 is described as follows.

[00267] In one embodiment, during a received AC signal's positive half cycle, the electrical potential at the pin 501 is higher than that at the pin 502, so the diodes 711 and 712 are both in a cutoff state as being reverse-biased and make the rectifying circuit 710 stop outputting a rectified signal. During a received AC signal's negative half cycle, the electrical potential at the pin 501 is lower than that at the pin 502, so the diodes 711 and 712 are both in a conducting state as being forward-biased and allow the AC signal to be input through the diode 711 and the output terminal 511, and later to be output through the output terminal 512, a ground terminal, or another end of the LED lamp which is not directly connected to the rectifying circuit 710. Accordingly, the rectified signal produced or output by the rectifying circuit 710 is a half-wave rectified signal.

[00268] Fig. 50C is a schematic diagram of a rectifying circuit according to an embodiment of the present invention. Referring to Fig. 50C, a rectifying circuit 810 includes a rectifying unit 815 and a terminal adapter circuit 541. In this embodiment, the rectifying unit 815 comprises a half-wave rectifier circuit including two diodes 811 and

812, and is configured to half-wave rectification. The diode 811 has an anode connected to an output terminal 512, and a cathode connected to a half-wave node 819. The diode 812 has an anode connected to the half-wave node 819, and a cathode connected to an output terminal 511. The terminal adapter circuit 541 is coupled to the half-wave node 819 and the pins 501 and 502 to transmit a signal received at the pin 501 and/or the pin 502 to the half-wave node 819. By means of the terminal adapting function of the terminal adapter circuit 541, the rectifying circuit 810 allows of two input terminals (connected to the pins 501 and 502) and two output terminals 511 and 512.

[00269] Next, in certain embodiments, the rectifying circuit 810 operates as follows.

[00270] **During a received AC signal's positive half cycle, the AC signal may be** input through the pin 501 or 502, the terminal adapter circuit 541, the half-wave node 819, the diode 812, and the output terminal 511 in sequence, and later output through **another end or circuit of the LED tube lamp. During a received AC signal's negative half** cycle, the AC signal may be input through another end or circuit of the LED tube lamp, and later output through the output terminal 512, the diode 811, the half-wave node 819, the terminal adapter circuit 541, and the pin 501 or 502 in sequence.

[00271] **It's worth noting that the terminal adapter circuit 541 m**ay include resistor(s), capacitor(s), inductor(s), or any combination thereof, for performing at least one of functions of current/voltage limiting, types of protection, current/voltage regulation, and so forth. Descriptions of these functions are presented below.

[00272] In practice, the rectifying unit 815 and terminal adapter circuit 541 may be interchanged in position (as shown in Fig. 50D) without altering the function of half-wave rectification. Fig. 50D is a schematic diagram of a rectifying circuit according to an embodiment of the present invention. Referring to Fig. 50D, the diode 811 has an anode connected to the pin 502 and the diode 812 has a cathode connected to the pin 501. The cathode of diode 811 and the anode of diode 812 are connected to the half-wave node

819. The terminal adapter circuit 541 is coupled to the half-wave node 819 and the output terminals 511 and 512. During a received AC signal's positive half cycle, the AC signal may be input through another end or circuit of the LED tube lamp, and later output through the output terminal 512 or 511, the terminal adapter circuit 541, the half-wave node 819, the diode 812, and the pin 501 in sequence. During a received AC signal's negative half cycle, the AC signal may be input through the pin 502, the diode 811, the half-wave node 819, the terminal adapter circuit 541, and the output terminal 511 or 512 in sequence, and later output through another end or circuit of the LED tube lamp.

[00273] It is noticeable that the terminal adapter circuit 541 in embodiments shown in Figs. 50C and 50D may be omitted and is therefore depicted by a dotted line. If the terminal adapter circuit 541 of Fig. 50C is omitted, the pins 501 and 502 will be coupled to the half-wave node 819. If the terminal adapter circuit 541 of Fig. 50D is omitted, the output terminals 511 and 512 will be coupled to the half-wave node 819.

[00274] The rectifying circuit as shown and explained in Figs. 50A-D can constitute or be the rectifying circuit 540 shown in Fig. 49B, as having the pins 503 and 504 for conducting instead of the pins 501 and 502.

[00275] Next, an explanation follows as to choosing embodiments and their combinations of the rectifying circuits 510 and 540, with reference to Fig. 49B.

[00276] The rectifying circuits 510 and 540 in embodiments shown in Fig. 49B may each comprise any one of the rectifying circuits in Figs. 50A-D, and the terminal adapter circuit 541 in Figs. 50C-D may be omitted without altering the rectification function used by an LED tube lamp. When the rectifying circuits 510 and 540 each comprise a half-wave rectifier circuit described in Figs. 50B-D, during a received AC signal's positive or negative half cycle, the AC signal may be input to either the rectifying circuit 510 or the rectifying circuit 540, and later output from another. Further, when the rectifying circuits 510 and 540 each comprise the rectifying circuit described in Fig. 50C or 50D, or when

they comprise the rectifying circuits in Figs. 50C and 50D individually, only one terminal adapter circuit 541 may be needed for functions of current/voltage limiting, types of protection, current/voltage regulation, etc. within the rectifying circuits 510 and 540, and another terminal adapter circuit 541 within the rectifying circuit 510 or 540 can be ignored.

[00277] Fig. 51A is a schematic diagram of the terminal adapter circuit according to an embodiment of the present invention. Referring to Fig. 51A, a terminal adapter circuit 641 includes a capacitor 642 having an end connected to the pins 501 and 502, and the other end thereof connected to the half-wave node 819. The capacitor 642 has an equivalent impedance to an AC signal. This impedance increases as the frequency of the AC signal decreases, and decreases as the frequency increases. Therefore, the capacitor 642 in the terminal adapter circuit 641 in this embodiment works as a high-pass filter. Further, the terminal adapter circuit 641 is connected in series to an LED unit in the LED tube lamp, producing an equivalent impedance of the terminal adapter circuit 641 to perform a current/voltage limiting function on the LED unit, thereby preventing damaging of the LED unit from an excessive voltage across and/or current in the LED unit. In addition, selecting the capacitance value of the capacitor 642 according to the frequency of the AC signal can further enhance current/voltage regulation to the LED assembly.

[00278] **It's worth noting that the terminal adapter circuit 641 may further include a** capacitor 645 and/or capacitor 646. The capacitor 645 has an end connected to the half-wave node 819, and the other end connected to the pin 503. The capacitor 646 has an end connected to the half-wave node 819, and the other end connected to the pin 504. For example, the half-wave node 819 may be a common connection node between the capacitors 645 and 646. And the capacitor 642 acting as a current regulating capacitor is coupled to the common connection node and the pins 501 and 502. In such

a structure, the series-connected capacitors 642 and 645 exist between one of the pins 501 and 502 and the pin 503, and/or the series-connected capacitors 642 and 646 exist between one of the pins 501 and 502 and the pin 504. Through equivalent impedances of series-connected capacitors, voltages from the AC signal are divided. The divided voltage on the capacitors 645 and 646 prefers 100-500V, and 300-400V would be a preferred range. Referring to Figs. 49B and 51A, according to the ratios between equivalent impedances of the series-connected capacitors, the voltages respectively across the capacitor 642 in the rectifying circuit 510, the filtering circuit 520, and the LED lighting module 530 can be controlled to make the current flowing through an LED module in the LED lighting module 530 being limited within a current rating, and then to protect/prevent the filtering circuit 520 and the LED lighting module 530 from being damaged by excessive voltages.

[00279] Fig. 51B is a schematic diagram of the terminal adapter circuit according to an embodiment of the present invention. Referring to Fig. 51B, a terminal adapter circuit 741 includes two capacitors 743 and 744. The capacitor 743 has an end connected to the pin 501, and the other end connected to the half-wave node 819. The capacitor 744 has an end connected to the pin 502, and the other end connected to the half-wave node 819. Compared to the terminal adapter circuit 641 in Fig. 51A, the terminal adapter circuit 741 has the capacitors 743 and 744 in place of the capacitor 642. The capacitance values of the capacitors 743 and 744 may be the same as each other, or may differ from each other depending on the magnitudes of signals received by the pins 501 and 502.

[00280] Also, the terminal adapter circuit 741 may further comprise a capacitor 745 and/or a capacitor 746, and two of them are respectively connected to the pins 503 and 504. Thus, each of the pins 501 and 502 and each of the pins 503 and 504 may be connected to a capacitor in series to achieve the functions of voltage division and other

protections.

[00281] Fig. 51C is a schematic diagram of the terminal adapter circuit according to an embodiment of the present invention. Referring to Fig. 51C, a terminal adapter circuit 841 includes three capacitors 842, 843, and 844. The capacitors 842 and 843 are connected in series between the pin 501 and the half-wave node 819. The capacitors 842 and 844 are connected in series between the pin 502 and the half-wave node 819. In such a circuit structure, if any one of the capacitors 842, 843, and 844 is shorted, there is still at least one capacitor (of the other two capacitors) between the pin 501 and the half-wave node 819 and between the pin 502 and the half-wave node 819, which performs a current-limiting function. Therefore, in the event that a user accidentally gets an electric shock, this circuit structure will prevent an excessive current from flowing through and then seriously hurting the body of the user.

[00282] Likewise, the terminal adapter circuit 841 may further include a capacitor 845 and/or a capacitor 846, and two of them are respectively connected to the pins 503 and 504. Thus, each of the pins 501 and 502 and each of the pins 503 and 504 may be connected to a capacitor in series to achieve the functions of voltage division and other protections.

[00283] Fig. 51D is a schematic diagram of the terminal adapter circuit according to an embodiment of the present invention. Referring to Fig. 51D, a terminal adapter circuit 941 includes two fuses 947 and 948. The fuse 947 has an end connected to the pin 501, and the other end connected to the half-wave node 819. The fuse 948 has an end connected to the pin 502, and the other end connected to the half-wave node 819. With the fuses 947 and 948, when the current passing through each of the pins 501 and 502 exceeds the current threshold corresponding to the fuse 947 or 948, the corresponding fuse 947 or 948 will accordingly melt and then break the circuit to achieve overcurrent protection.

[00284] Each of the embodiments for the terminal adapter circuits coupled to the pins 501 and 502 mentioned above can be used or included in the rectifying circuit 540 when the pins 503 and 504 and the pins 501 and 502 are interchanged in position.

[00285] Capacitance values of the capacitors in the embodiments of the terminal adapter circuits shown and described above, in some embodiments for example, are desirable to be in the range of about 100pF – 100nF. Also, a capacitor used in the embodiments may be equivalently replaced by two or more capacitors connected in series or parallel. For example, each of the capacitors 642 and 842 may be replaced by two series-connected capacitors, one having a capacitance value chosen from the range of, for example, about 1.0nF to 2.5nF and being 1.5nF in some embodiments, and another having a capacitance value chosen from the range of, such as about 1.5nF to 3.0nF and being 2.2 nF in some embodiments.

[00286] Fig. 43 is a circuit diagram of an LED lamp according to some embodiments of the present disclosure. In these embodiment(s) illustrated in Fig. 43, a compatible circuit 140 (for the LED lamp to be compatible with e.g. an external AC power supply 508, as described in this disclosure) is present which is electrically connected between the third pin B1 (or 503 herein) and the fourth pin B2 (or 504 herein), other than the first pin A1 (or 501 herein) and the second pin A2 (or 502 herein). The compatible circuit 140 includes or allows a first unidirectional current path I1 and a second unidirectional current path I2. The first unidirectional current path I1 electrically connects to the LED (lighting) module 130, to allow a current to flow from the LED (lighting) module 130 to one of the pins B1 and B2. The LED (lighting) module 130 includes at least one LED 135, an inductor L1, a diode D, and a transistor switch Q1, and is comparable to the LED lighting module 530 herein, wherein inductor L1, diode D, and transistor switch Q1 are comparable to driving circuit 1930 herein. The second unidirectional current path I2 electrically connects to the filtering unit 120, to allow a

current to flow from one of the pins B1 and B2 to the filtering unit 120. The filtering unit 120 includes two capacitors C1 and C2 and an inductor L2, and is comparable to the filtering unit 723 herein. Also, as shown in Fig. 43, a rectifying unit 110 comprising diodes D1, D2, D3, and D4 is coupled between the first and second pins A1 and A2 and the filtering unit 120, and is comparable to the rectifying circuit 510 herein.

[00287] In these embodiments, the compatible circuit 140 includes diodes D5 and D6, a capacitor C3, and fuses F1 and F2. A cathode of the diode D5 is electrically connected to the filtering unit 120; an anode of the diode D5 is electrically connected to both an end of capacitor C3 and a cathode of the diode D6; and an anode of the diode D6 is electrically connected to the filtering unit 120. The other end of capacitor C3 is electrically connected to the fuses F1 and F2, which are electrically connected to pins B1 and B2 respectively. The capacitor C3 can prevent or reduce the risk of a user accidentally touching electrically conducting part(s) of the LED lamp and thus getting electrically shocked when the user is installing the LED lamp (as to a lamp holder or socket). And the fuses F1 and F2 perform protection when an electrical current conducted through the LED lamp is excessive, to prevent an excessive current from damaging (electrical circuits in) the LED lamp.

[00288] If an AC signal is coupled/input across the pins A1 and A2 to provide a single-end power supply to an LED tube lamp, meaning the AC signal is provided across the pins A1 and A2 on one of the two ends of the lamp tube of the LED tube lamp, a current from the AC signal flows from one of the two pins A1 and A2 into the LED tube lamp, and then flows out of the LED tube lamp from the other of the two pins A1 and A2.

[00289] On the other hand, if an AC signal is coupled/input across the two ends of the LED tube lamp, meaning the AC signal is coupled to one of pins A1 and A2 and one of pins B1 and B2 to provide a double-end power supply to the LED tube lamp, then a current from the AC signal flows from one of the two pins A1 and A2 (or one of the two

pins B1 and B2) into the LED tube lamp, and then flows out of the LED tube lamp from one of the two pins B1 and B2 (or one of the two pins A1 and A2) at the other end of the LED tube lamp. Putting this differently, during the connected AC signal's positive half cycle, the current from the AC signal may flow through the first pin A1 and the diode D1 of the rectifying unit 110, or through the second pin A2 and the diode D3 of the rectifying unit 110, into the LED tube lamp, then flow through the filtering circuit 120 and the LED (lighting) module 130, and then flow through the diode D6 of the compatible circuit 140, the capacitor C3, and finally through the fuse F1 and the third pin B1, or fuse F2 and the fourth pin B2, out of the LED tube lamp. And during the connected AC signal's negative half cycle, the current from the AC signal may flow through the third pin B1 and the fuse F1, or through the fourth pin B2 and the fuse F2, into the LED tube lamp, then flow through the capacitor C3, the diode D5, the filtering circuit 120 and the LED (lighting) module 130, and finally through the diode D2 of the rectifying unit 110 and the first pin A1, or the diode D4 of the rectifying unit 110 and the second pin A2, out of the LED tube lamp.

[00290] Fig. 52A is a block diagram of the filtering circuit according to an embodiment of the present invention. A rectifying circuit 510 is shown in Fig. 52A for illustrating its connection with other components, without intending a filtering circuit 520 to include the rectifying circuit 510. Referring to Fig. 52A, the filtering circuit 520 includes a filtering unit 523 coupled to two rectifying output terminals 511 and 512 to receive and to filter out ripples of a rectified signal from the rectifying circuit 510. Accordingly, the waveform of a filtered signal is smoother than that of the rectified signal. The filtering circuit 520 may further include another filtering unit 524 coupled between a rectifying circuit and a pin correspondingly, for example, between the rectifying circuit 510 and the pin 501, the rectifying circuit 510 and the pin 502, the rectifying circuit 540 and the pin 503, and/or the rectifying circuit 540 and the pin 504. The filtering unit 524 is used to filter

a specific frequency, for example, to filter out a specific frequency of an external driving signal. In this embodiment, the filtering unit 524 is coupled between the rectifying circuit 510 and the pin 501. The filtering circuit 520 may further include another filtering unit 525 coupled between one of the pins 501 and 502 and one of the diodes of the rectifying circuit 510, or between one of the pins 503 and 504 and one of the diodes of the rectifying circuit 540 to reduce or filter out electromagnetic interference (EMI). In this embodiment, the filtering unit 525 is coupled between the pin 501 and one of diodes of the rectifying circuit 510 (not shown in Fig. 52A). Since the filtering units 524 and 525 may be present or omitted depending on actual circumstances of their uses, they are depicted by a dotted line in Fig. 52A.

[00291] Fig. 52B is a schematic diagram of the filtering unit according to an embodiment of the present invention. Referring to Fig. 52B, a filtering unit 623 includes a capacitor 625 having an end coupled to the output terminal 511 and a filtering output terminal 521 and the other end thereof coupled to the output terminal 512 and a filtering output terminal 522, and is configured to low-pass filter a rectified signal from the output terminals 511 and 512, so as to filter out high-frequency components of the rectified signal and thereby output a filtered signal at the filtering output terminals 521 and 522.

[00292] Fig. 52C is a schematic diagram of the filtering unit according to an embodiment of the present invention. Referring to Fig. 52C, a filtering unit 723 includes a pi filter circuit including a capacitor 725, an inductor 726, and a capacitor 727. As is well known, a pi **filter circuit looks like the symbol π in its shape or structure. The capacitor** 725 has an end connected to the output terminal 511 and coupled to the filtering output terminal 521 through the inductor 726, and has another end connected to the output terminal 512 and the filtering output terminal 522. The inductor 726 is coupled between output terminal 511 and the filtering output terminal 521. The capacitor 727 has an end connected to the filtering output terminal 521 and coupled to the output terminal 511

through the inductor 726, and has another end connected to the output terminal 512 and the filtering output terminal 522.

[00293] As seen between the output terminals 511 and 512 and the filtering output terminals 521 and 522, the filtering unit 723 compared to the filtering unit 623 in Fig. 52B additionally has an inductor 726 and a capacitor 727, which perform the function of low-pass filtering like the capacitor 725 does. Therefore, the filtering unit 723 in this embodiment compared to the filtering unit 623 in Fig. 52B has a better ability to filter out high-frequency components to output a filtered signal with a smoother waveform.

[00294] The inductance values of the inductor 726 in the embodiments mentioned above are chosen in the range of, for example in some embodiments, about 10nH to 10mH. And the capacitance values of the capacitors 625, 725, and 727 in the embodiments stated above are chosen in the range of, for example in some embodiments, about 100pF to 1uF.

[00295] Fig. 52D is a schematic diagram of the filtering unit according to an embodiment of the present invention. Referring to Fig. 52D, a filtering unit 824 includes a capacitor 825 and an inductor 828 connected in parallel. The capacitor 825 has an end coupled to the pin 501, and the other end coupled to the output terminal 511, and is configured to high-pass filter an external driving signal input at the pin 501 so as to filter out low-frequency components of the external driving signal. The inductor 828 has an end coupled to the pin 501 and the other end coupled to the output terminal 511, and is configured to low-pass filter an external driving signal input at the pin 501 so as to filter out high-frequency components of the external driving signal. Therefore, the combination of the capacitor 825 and the inductor 828 works to present high impedance to one or more specific frequencies in an external driving signal. That is, the parallel-connected capacitor and inductor work to present a biggest equivalent impedance to a specific frequency in the external driving signal.

[00296] Through appropriately choosing a capacitance value for the capacitor 825 and an inductance value for the inductor 828, a center frequency f on the high-impedance band may be set at a specific value given by $f = \frac{1}{2\pi\sqrt{LC}}$, where L denotes inductance of the inductor 828 and C denotes capacitance of the capacitor 825. The center frequency in some embodiments is in the range of about 20-30 kHz, and may be in some cases about 25 kHz. And an LED lamp with filtering unit 824 is able to be certified under safety standards, for a specific center frequency, as provided by Underwriters Laboratories (UL).

[00297] **It's worth noting that the filtering unit 824 may further include a resistor 829** coupled between the pin 501 and the filtering output terminal 511. In Fig. 52D, the resistor 829 is connected in series to the parallel-connected capacitor 825 and inductor 828. For example, the resistor 829 may be coupled between the pin 501 and the parallel-connected capacitor 825 and inductor 828, or may be coupled between the output terminal 511 and the parallel-connected capacitor 825 and inductor 828. In this embodiment, the resistor 829 is coupled between the pin 501 and the parallel-connected capacitor 825 and inductor 828. Further, the resistor 829 is configured to adjust the quality factor (Q) of the LC circuit comprising the capacitor 825 and the inductor 828 to make the filtering unit 824 adapting to application environments with different quality factor requirements. Since the resistor 829 is an optional component, it is depicted in a dotted line in Fig. 52D.

[00298] The capacitance values of the capacitor 825, in some embodiments, are in the range of about 10nF - 2uF. The inductance values of the inductor 828 are smaller than 2mH in some embodiments, and may be in some cases smaller than 1mH. The resistance values of the resistor 829 are bigger than 50 ohms in some embodiments, and may be in some cases bigger than 500 ohms.

[00299] In addition to the filtering circuits shown and described in the above

embodiments, the traditional low-pass or band-pass filters can also be used as the filtering unit in the filtering circuit for the present invention.

[00300] Fig. 52E is a schematic diagram of the filtering unit according to an embodiment of the present invention. Referring to Fig. 52E, in this embodiment, a filtering unit 925 is disposed in the rectifying circuit 610 as shown in Fig. 50A, and is configured for reducing the EMI (Electromagnetic interference) caused by the rectifying circuit 610 and/or other circuits. In this embodiment, the filtering unit 925 includes an EMI-reducing capacitor coupled between the pin 501 and the anode of the rectifying diode 614, and also between the pin 502 and the anode of the rectifying diode 613 to reduce the EMI associated with the positive half cycle of the AC driving signal received at the pins 501 and 502. The EMI-reducing capacitor of the filtering unit 925 is also coupled between the pin 501 and the cathode of the rectifying diode 612, and between the pin 502 and the cathode of the rectifying diode 611 to reduce the EMI associated with the negative half cycle of the AC driving signal received at the pins 501 and 502. In some embodiments, the rectifying circuit 610 includes a full-wave bridge rectifier circuit including four rectifying diodes 611, 612, 613, and 614. The full-wave bridge rectifier circuit has a first filtering node connecting the anode of the diode 613 and the cathode of the diode 611, and a second filtering node connecting the anode of the diode 614 and the cathode of the diode 612. And the EMI-reducing capacitor of the filtering unit 925 is coupled between the first filtering node and the second filtering node.

[00301] Similarly, with reference to Figs. 50C and 51A-C, any capacitor in each of the circuits in Figs. 51A-C is coupled between the pins 501 and 502 (or the pins 503 and 504) and any diode in Fig. 50C, so any or each capacitor in Figs. 51A-C can work as an EMI-reducing capacitor to achieve the function of reducing EMI. For example, the rectifying circuit 510 in Fig. 49B may include a half-wave rectifier circuit including two rectifying diodes and having a half-wave node respectively connecting an anode and a

cathode of the two rectifying diodes, and any or each capacitor in Figs. 51A-C may be coupled between the half-wave node and at least one of the pins 501 and 502. And the rectifying circuit 540 in Fig. 49B may include a half-wave rectifier circuit including two rectifying diodes and having a half-wave node respectively connecting an anode and a cathode of the two rectifying diodes, and any or each capacitor in Figs. 51A-C may be coupled between the half-wave node and at least one of the pins 503 and 504.

[00302] However, the filtering unit 925 coupled between the pins 501 and 502 is equal to make them short. Referring to Figs. 51A-C with the state of the filtering unit 925 making the pins 501 and 502 short, one of the capacitors 645, 646, 745, 746, 845, and 846 in each corresponding embodiment can be ignored. In spite of the external AC signal being output from the pin 501 or 502, the voltage-divided function still can be achieved after omitting one of the capacitors 645, 646, 745, 746, 845, and 846 in each corresponding embodiment.

[00303] **It's worth noting that the EMI**-reducing capacitor in the embodiment of Fig. 52E may also act as the capacitor 825 in the filtering unit 824 shown in Fig. 52D, in combination with the inductor 828, to achieve the functions of reducing EMI and presenting high impedance to an external driving signal at specific frequencies simultaneously. For example, when the rectifying circuit includes a full-wave bridge rectifier circuit, the capacitor 825 of the filtering unit 824 may be coupled between the first filtering node and the second filtering node of the full-wave bridge rectifier circuit. When the rectifying circuit includes a half-wave rectifier circuit, the capacitor 825 of the filtering unit 824 may be coupled between the half-wave node of the half-wave rectifier circuit and at least one of the pins 501 and 502.

[00304] FIG. 53A is a schematic diagram of an LED module according to an embodiment of the present invention. Referring to FIG. 53S, LED module 630 has an anode connected to the filtering output terminal 521, has a cathode connected to the

filtering output terminal 522, and comprises at least one LED unit 632. When two or more LED units are included, they are connected in parallel. The anode of each LED unit 632 is connected to the anode of LED module 630 and thus output terminal 521, and the cathode of each LED unit 632 is connected to the cathode of LED module 630 and thus output terminal 522. Each LED unit 632 includes at least one LED 631. When multiple LEDs 631 are included in an LED unit 632, they are connected in series, with the anode of the first LED 631 connected to the anode of this LED unit 632, and the cathode of the first LED 631 connected to the next or second LED 631. And the anode of the last LED 631 in this LED unit 632 is connected to the cathode of a previous LED 631, with the cathode of the last LED 631 connected to the cathode of this LED unit 632.

[00305] It's worth noting that LED module 630 may produce a current detection signal S531 reflecting a magnitude of current through LED module 630 and used for controlling or detecting on the LED module 630.

[00306] FIG. 53B is a schematic diagram of an LED module according to an embodiment of the present invention. Referring to FIG. 53B, LED module 630 has an anode connected to the filtering output terminal 521, has a cathode connected to the filtering output terminal 522, and comprises at least two LED units 732, with the anode of each LED unit 732 connected to the anode of LED module 630, and the cathode of each LED unit 732 connected to the cathode of LED module 630. Each LED unit 732 includes at least two LEDs 731 connected in the same way as described in FIG. 53A. For example, the anode of the first LED 731 in an LED unit 732 is connected to the anode of this LED unit 732, the cathode of the first LED 731 is connected to the anode of the next or second LED 731, and the cathode of the last LED 731 is connected to the cathode of this LED unit 732. Further, LED units 732 in an LED module 630 are connected to each other in this embodiment. All of the n-th LEDs 731 respectively of the LED units 732 are connected by every anode of every n-th LED 731 in the LED units 732, and by every

cathode of every n-th LED 731, where n is a positive integer. In this way, the LEDs in LED module 630 in this embodiment are connected in the form of a mesh.

[00307] Compared to the embodiments of FIGS. 54A-54G, LED driving module 530 of the above embodiments includes LED module 630, but doesn't include a driving circuit for the LED module 630.

[00308] Similarly, LED module 630 in this embodiment may produce a current detection signal S531 reflecting a magnitude of current through LED module 630 and used for controlling or detecting on the LED module 630.

[00309] In actual practice, the number of LEDs 731 included by an LED unit 732 is in some embodiments in the range of 15-25, and is may be preferably in the range of 18-22.

[00310] FIG. 53C is a plan view of a circuit layout of the LED module according to an embodiment of the present invention. Referring to FIG. 53C, in this embodiment LEDs 831 are connected in the same way as described in FIG. 53B, and three LED units are assumed in LED module 630 and described as follows for illustration. A positive conductive line 834 and a negative conductive line 835 are to receive a driving signal, for supplying power to the LEDs 831. For example, positive conductive line 834 may be coupled to the filtering output terminal 521 of the filtering circuit 520 described above, and negative conductive line 835 coupled to the filtering output terminal 522 of the filtering circuit 520, to receive a filtered signal. For the convenience of illustration, all three of the n-th LEDs 831 respectively of the three LED units are grouped as an LED set 833 in FIG. 53C.

[00311] Positive conductive line 834 connects the three first LEDs 831 respectively of the leftmost three LED units, at the anodes on the left sides of the three first LEDs 831 as shown in the leftmost LED set 833 of FIG. 53C. Negative conductive line 835 connects the three last LEDs 831 respectively of the leftmost three LED units, at the

cathodes on the right sides of the three last LEDs 831 as shown in the rightmost LED set 833 of FIG. 53C. And of the three LED units, the cathodes of the three first LEDs 831, the anodes of the three last LEDs 831, and the anodes and cathodes of all the remaining LEDs 831 are connected by conductive lines or parts 839.

[00312] For example, the anodes of the three LEDs 831 in the leftmost LED set 833 may be connected together by positive conductive line 834, and their cathodes may be connected together by a leftmost conductive part 839. The anodes of the three LEDs 831 in the second leftmost LED set 833 are also connected together by the leftmost conductive part 839, whereas their cathodes are connected together by a second leftmost conductive part 839. Since the cathodes of the three LEDs 831 in the leftmost LED set 833 and the anodes of the three LEDs 831 in the second leftmost LED set 833 are connected together by the same leftmost conductive part 839, in each of the three LED units the cathode of the first LED 831 is connected to the anode of the next or second LED 831, with the remaining LEDs 831 also being connected in the same way. Accordingly, all the LEDs 831 of the three LED units are connected to form the mesh as shown in FIG. 53B.

[00313] It's worth noting that in this embodiment the length 836 of a portion of each conductive part 839 that immediately connects to the anode of an LED 831 is smaller than the length 837 of another portion of each conductive part 839 that immediately connects to the cathode of an LED 831, making the area of the latter portion immediately connecting to the cathode larger than that of the former portion immediately connecting to the anode. The length 837 may be smaller than a length 838 of a portion of each conductive part 839 that immediately connects the cathode of an LED 831 and the anode of the next LED 831, making the area of the portion of each conductive part 839 that immediately connects a cathode and an anode larger than the area of any other portion of each conductive part 839 that immediately connects to only a cathode or an

anode of an LED 831. Due to the length differences and area differences, this layout structure improves heat dissipation of the LEDs 831.

[00314] In some embodiments, positive conductive line 834 includes a lengthwise portion 834a, and negative conductive line 835 includes a lengthwise portion 835a, which are conducive to making the LED module have a positive "+" **connective portion and a negative** "–" connective portion at each of the two ends of the LED module, as shown in FIG. 53C. Such a layout structure allows for coupling any of other circuits of the power supply module of the LED lamp, including e.g. filtering circuit 520 and rectifying circuits 510 and 540, to the LED module through the positive connective portion and/or the negative connective portion at each or both ends of the LED lamp. Thus the layout structure increases the flexibility in arranging actual circuits in the LED lamp.

[00315] FIG. 53D is a plan view of a circuit layout of the LED module according to another embodiment of the present invention. Referring to FIG. 53D, in this embodiment LEDs 931 are connected in the same way as described in FIG. 53A, and three LED units each including 7 LEDs 931 are assumed in LED module 630 and described as follows for illustration. A positive conductive line 934 and a negative conductive line 935 are to receive a driving signal, for supplying power to the LEDs 931. For example, positive conductive line 934 may be coupled to the filtering output terminal 521 of the filtering circuit 520 described above, and negative conductive line 935 coupled to the filtering output terminal 522 of the filtering circuit 520, to receive a filtered signal. For the convenience of illustration, all seven LEDs 931 of each of the three LED units are grouped as an LED set 932 in FIG. 53D. Thus there are three LED sets 932 corresponding to the three LED units.

[00316] Positive conductive line 934 connects to the anode on the left side of the first or leftmost LED 931 of each of the three LED sets 932. Negative conductive line 935 connects to the cathode on the right side of the last or rightmost LED 931 of each of the

three LED sets 932. In each LED set 932 of two consecutive LEDs 931, the LED 931 on the left has a cathode connected by a conductive part 939 to an anode of the LED 931 on the right. By such a layout, the LEDs 931 of each LED set 932 are connected in series.

[00317] It's also worth noting that a conductive part 939 may be used to connect an anode and a cathode respectively of two consecutive LEDs 931. Negative conductive line 935 connects to the cathode of the last or rightmost LED 931 of each of the three LED sets 932. And positive conductive line 934 connects to the anode of the first or leftmost LED 931 of each of the three LED sets 932. Therefore, as shown in FIG. 53D, the length (and thus area) of the conductive part 939 is larger than that of the portion of negative conductive line 935 immediately connecting to a cathode, which length (and thus area) is then larger than that of the portion of positive conductive line 934 immediately connecting to an anode. For example, the length 938 of the conductive part 939 may be larger than the length 937 of the portion of negative conductive line 935 immediately connecting to a cathode of an LED 931, which length 937 is then larger than the length 936 of the portion of positive conductive line 934 immediately connecting to an anode of an LED 931. Such a layout structure improves heat dissipation of the LEDs 931 in LED module 630.

[00318] Positive conductive line 934 may include a lengthwise portion 934 a, and negative conductive line 935 may include a lengthwise portion 935a, which are **conducive to making the LED module have a positive "+" connective** portion and a **negative "–" connective portion at each of the two ends of the LED module, as shown in** FIG. 53D. Such a layout structure allows for coupling any of other circuits of the power supply module of the LED lamp, including e.g. filtering circuit 520 and rectifying circuits 510 and 540, to the LED module through the positive connective portion 934 a and/or the negative connective portion 935a at each or both ends of the LED lamp. Thus the

layout structure increases the flexibility in arranging actual circuits in the LED lamp.

[00319] Further, the circuit layouts as shown in FIGS. 53C and 53D may be implemented with a bendable circuit sheet or substrate, which may even be called flexible circuit board depending on its specific definition used. For example, the bendable circuit sheet may comprise one conductive layer where positive conductive line 834, positive lengthwise portion 834a, negative conductive line 835, negative lengthwise portion 835a, and conductive parts 839 shown in FIG. 53C, and positive conductive line 934, positive lengthwise portion 934 a, negative conductive line 935, negative lengthwise portion 935a, and conductive parts 939 shown in FIG. 53D are formed by the method of etching.

[00320] FIG. 53E is a plan view of a circuit layout of the LED module according to another embodiment of the present invention. The layout structures of the LED module in FIGS. 53E and 53C each correspond to the same way of connecting LEDs 831 as that shown in FIG. 53B, but the layout structure in FIG. 53E comprises two conductive layers, instead of only one conductive layer for forming the circuit layout as shown in FIG. 53C. Referring to FIG. 53E, the main difference from the layout in FIG. 53C is that positive conductive line 834 and negative conductive line 835 have a lengthwise portion 834a and a lengthwise portion 835a, respectively, that are formed in a second conductive layer instead. The difference is elaborated as follows.

[00321] Referring to FIG. 53E, the bendable circuit sheet of the LED module comprises a first conductive layer 2a and a second conductive layer 2c electrically insulated from each other by a dielectric layer 2b (not shown). Of the two conductive layers, positive conductive line 834, negative conductive line 835, and conductive parts 839 in FIG. 53E are formed in first conductive layer 2a by the method of etching for electrically connecting the plurality of LED components 831 e.g. in a form of a mesh, whereas positive lengthwise portion 834a and negative lengthwise portion 835a are

formed in second conductive layer 2c by etching for electrically connecting to (the filtering output terminal of) the filtering circuit. Further, positive conductive line 834 and negative conductive line 835 in first conductive layer 2a have via points 834b and via points 835b, respectively, for connecting to second conductive layer 2c. And positive lengthwise portion 834a and negative lengthwise portion 835a in second conductive layer 2c have via points 834c and via points 835b, respectively. Via points 834b are positioned corresponding to via points 834c, for connecting positive conductive line 834 and positive lengthwise portion 834a. Via points 835b are positioned corresponding to via points 835b, for connecting negative conductive line 835 and negative lengthwise portion 835a. A preferable way of connecting the two conductive layers is to form a hole connecting each via point 834b and a corresponding via point 834c, and to form a hole connecting each via point 835b and a corresponding via point 835b, with the holes extending through the two conductive layers and the dielectric layer in-between. And positive conductive line 834 and positive lengthwise portion 834a can be electrically connected by welding metallic part(s) through the connecting hole(s), and negative conductive line 835 and negative lengthwise portion 835a can be electrically connected by welding metallic part(s) through the connecting hole(s).

[00322] Similarly, the layout structure of the LED module in FIG. 53D may alternatively have positive lengthwise portion 934 a, and negative lengthwise portion 935a disposed in a second conductive layer, to constitute a two-layer layout structure.

[00323] It's worth noting that the thickness of the second conductive layer of a two-layer bendable circuit sheet is in some embodiments larger than that of the first conductive layer, in order to reduce the voltage drop or loss along each of the positive lengthwise portion and the negative lengthwise portion disposed in the second conductive layer. Compared to a one-layer bendable circuit sheet, since a positive lengthwise portion and a negative lengthwise portion are disposed in a second

conductive layer in a two-layer bendable circuit sheet, the width (between two lengthwise sides) of the two-layer bendable circuit sheet is or can be reduced. On the same fixture or plate in a production process, the number of bendable circuit sheets each with a shorter width that can be laid together at most is larger than the number of bendable circuit sheets each with a longer width that can be laid together at most. Thus adopting a bendable circuit sheet with a shorter width can increase the efficiency of production of the LED module. And reliability in the production process, such as the accuracy of welding position when welding (materials on) the LED components, can also be improved, because a two-layer bendable circuit sheet can better maintain its shape.

[00324] According to the detailed description of the instant disclosure, the LED light strip may be a bendable circuit sheet, a conductive wiring layer, a dielectric layer stacked on the conductive wiring layer, a bi-layered structure, two conductive wiring layers, an elongated aluminum plate, a FR4 board, 3-layered flexible board, or multiple layers of the wiring layers and multiple layers of the dielectric layers sequentially stacked in a staggered manner.

[00325] As a variant of the above embodiments, a type of LED tube lamp is provided that has at least some of the electronic components of its power supply module disposed on a light strip of the LED tube lamp. For example, the technique of printed electronic circuit (PEC) can be used to print, insert, or embed at least some of the electronic components onto the light strip.

[00326] In one embodiment, all electronic components of the power supply module are disposed on the light strip. The production process may include or proceed with the following steps: preparation of the circuit substrate (e.g. preparation of a flexible printed circuit board); ink jet printing of metallic nano-ink; ink jet printing of active and passive components (as of the power supply module); drying/sintering; ink jet printing of interlayer bumps; spraying of insulating ink; ink jet printing of metallic nano-ink; ink jet

printing of active and passive components (to sequentially form the included layers); spraying of surface bond pad(s); and spraying of solder resist against LED components.

[00327] In certain embodiments, if all electronic components of the power supply module are disposed on the light strip, electrical connection between terminal pins of the LED tube lamp and the light strip may be achieved by connecting the pins to conductive lines which are welded with ends of the light strip. In this case, another substrate for supporting the power supply module is not required, thereby allowing of an improved design or arrangement in the end cap(s) of the LED tube lamp. In some embodiments, (components of) the power supply module are disposed at two ends of the light strip, in order to significantly reduce the impact of heat generated from the power supply module's operations on the LED components. Since no substrate other than the light strip is used to support the power supply module in this case, the total amount of welding or soldering can be significantly reduced, improving the general reliability of the power supply module.

[00328] Another case is that some of all electronic components of the power supply module, such as some resistors and/or smaller size capacitors, are printed onto the light strip, and some bigger size components, such as some inductors and/or electrolytic capacitors, are disposed in the end cap(s). The production process of the light strip in this case may be the same as that described above. And in this case disposing some of all electronic components on the light strip is conducive to achieving a reasonable layout of the power supply module in the LED tube lamp, which may allow of an improved design in the end cap(s).

[00329] As a variant embodiment of the above, electronic components of the power supply module may be disposed on the light strip by a method of embedding or inserting, e.g. by embedding the components onto a bendable or flexible light strip. In some embodiments, this embedding may be realized by a method using copper-clad laminates

(CCL) for forming a resistor or capacitor; a method using ink related to silkscreen printing; or a method of ink jet printing to embed passive components, wherein an ink jet printer is used to directly print inks to constitute passive components and related functionalities to intended positions on the light strip. Then through treatment by ultraviolet (UV) light or drying/sintering, the light strip is formed where passive components are embedded. The electronic components embedded onto the light strip include for example resistors, capacitors, and inductors. In other embodiments, active components also may be embedded. Through embedding some components onto the light strip, a reasonable layout of the power supply module can be achieved to allow of an improved design in the end cap(s), because the surface area on a printed circuit board used for carrying components of the power supply module is reduced or smaller, and as a result the size, weight, and thickness of the resulting printed circuit board for carrying components of the power supply module is also smaller or reduced. Also in this situation since welding points on the printed circuit board for welding resistors and/or capacitors if they were not to be disposed on the light strip are no longer used, the reliability of the power supply module is improved, in view of the fact that these welding points are most liable to (cause or incur) faults, malfunctions, or failures. Further, the length of conductive lines needed for connecting components on the printed circuit board is therefore also reduced, which allows of a more compact layout of components on the printed circuit board and thus improving the functionalities of these components.

[00330] Next, methods to produce embedded capacitors and resistors are explained as follows.

[00331] Usually, methods for manufacturing embedded capacitors employ or involve a concept called distributed or planar capacitance. The manufacturing process may include the following step(s). On a substrate of a copper layer a very thin insulation layer is applied or pressed, which is then generally disposed between a pair of layers

including a power conductive layer and a ground layer. The very thin insulation layer makes the distance between the power conductive layer and the ground layer very short. A capacitance resulting from this structure can also be realized by a technique of a plated-through hole. Basically, this step is used to create this structure comprising a big parallel-plate capacitor on a circuit substrate.

[00332] Of products of high electrical capacity, certain types of products employ distributed capacitances, and other types of products employ separate embedded capacitances. Through putting or adding a high dielectric-constant material such as barium titanate into the insulation layer, the high electrical capacity is achieved.

[00333] A usual method for manufacturing embedded resistors employ conductive or resistive adhesive. This may include, for example, a resin to which conductive carbon or graphite is added, which may be used as an additive or filler. The additive resin is silkscreen printed to an object location, and is then after treatment laminated inside the circuit board. The resulting resistor is connected to other electronic components through plated-through holes or microvias. Another method is called Ohmega-Ply, by which a two metallic layer structure of a copper layer and a thin nickel alloy layer constitutes a layer resistor relative to a substrate. Then through etching the copper layer and nickel alloy layer, different types of nickel alloy resistors with copper terminals can be formed. These types of resistor are each laminated inside the circuit board.

[00334] In an embodiment, conductive wires/lines are directly printed in a linear layout on an inner surface of the LED glass lamp tube, with LED components directly attached on the inner surface and electrically connected by the conductive wires. In some embodiments, the LED components in the form of chips are directly attached over the conductive wires on the inner surface, and connective points are at terminals of the wires for connecting the LED components and the power supply module. After being attached, the LED chips may have fluorescent powder applied or dropped thereon, for

producing white light or light of other color by the operating LED tube lamp.

[00335] In some embodiments, luminous efficacy of the LED or LED component is 80 lm/W or above, and in some embodiments, it may be 120 lm/W or above. Certain more optimal embodiments may include a luminous efficacy of the LED or LED component of 160 lm/W or above. White light emitted by an LED component in the invention may be produced by mixing fluorescent powder with the monochromatic light emitted by a monochromatic LED chip. The white light in its spectrum has major wavelength ranges of 430-460 nm and 550-560 nm, or major wavelength ranges of 430-460 nm, 540-560 nm, and 620-640 nm.

[00336] Fig. 54A is a block diagram of a power supply module in an LED lamp according to an embodiment of the present invention. As shown in Fig. 54A, the power supply module of the LED lamp includes two rectifying circuits 510 and 540, a filtering circuit 520, and a driving circuit 1530. In this embodiment, a driving circuit 1530 and an LED module 630 compose the LED lighting module 530. The driving circuit 1530 comprises a DC-to-DC converter circuit, and is coupled to the filtering output terminals 521 and 522 to receive a filtered signal and then perform power conversion for converting the filtered signal into a driving signal at the driving output terminals 1521 and 1522. The LED module 630 is coupled to the driving output terminals 1521 and 1522 to receive the driving signal for emitting light. In some embodiments, the current of LED module 630 is stabilized at an objective current value. Descriptions of this LED module 630 are the same as those provided above with reference to Figs. 53A-D.

[00337] Fig. 54B is a block diagram of the driving circuit according to an embodiment of the present invention. Referring to Fig. 54B, a driving circuit includes a controller 1531, and a conversion circuit 1532 for power conversion based on a current source, for driving the LED module to emit light. The conversion circuit 1532 includes a switching circuit 1535 and an energy storage circuit 1538. And the conversion circuit

1532 is coupled to the filtering output terminals 521 and 522 to receive and then convert a filtered signal, under the control by the controller 1531, into a driving signal at the driving output terminals 1521 and 1522 for driving the LED module. Under the control by the controller 1531, the driving signal output by the conversion circuit 1532 comprises a steady current, making the LED module emitting steady light.

[00338] Fig. 54C is a schematic diagram of the driving circuit according to an embodiment of the present invention. Referring to Fig. 54C, a driving circuit 1630 in this embodiment comprises a buck DC-to-DC converter circuit having a controller 1631 and a converter circuit. The converter circuit includes an inductor 1632, a diode 1633 for **"freewheeling" of current, a capacitor 1634, and a switch 1635. The driving circuit 1630 is** coupled to the filtering output terminals 521 and 522 to receive and then convert a filtered signal into a driving signal for driving an LED module connected between the driving output terminals 1521 and 1522.

[00339] In this embodiment, the switch 1635 comprises a metal-oxide-semiconductor field-effect transistor (MOSFET) and has a first terminal coupled to the anode of freewheeling diode 1633, a second terminal coupled to the filtering output terminal 522, and a control terminal coupled to the controller 1631 used for controlling current conduction or cutoff between the first and second terminals of switch 1635. The driving output terminal 1521 is connected to the filtering output terminal 521, and the driving output terminal 1522 is connected to an end of the inductor 1632, which has another end connected to the first terminal of switch 1635. The capacitor 1634 is coupled between the driving output terminals 1521 and 1522 to stabilize the voltage between the driving output terminals 1521 and 1522. The freewheeling diode 1633 has a cathode connected to the driving output terminal 1521.

[00340] Next, a description follows as to an exemplary operation of the driving circuit 1630.

[00341] The controller 1631 is configured for determining when to turn the switch 1635 on (in a conducting state) or off (in a cutoff state) according to a current detection signal S535 and/or a current detection signal S531. For example, in some embodiments, the controller 1631 is configured to control the duty cycle of switch 1635 being on and switch 1635 being off in order to adjust the size or magnitude of the driving signal. The current detection signal S535 represents the magnitude of current through the switch 1635. The current detection signal S531 represents the magnitude of current through the LED module coupled between the driving output terminals 1521 and 1522. According to any of current detection signal S535 and current detection signal S531, the controller 1631 can obtain information on the magnitude of power converted by the converter circuit. When the switch 1635 is switched on, a current of a filtered signal is input through the filtering output terminal 521, and then flows through the capacitor 1634, the driving output terminal 1521, the LED module, the inductor 1632, and the switch 1635, and then flows out from the filtering output terminal 522. During this flowing of current, the capacitor 1634 and the inductor 1632 are performing storing of energy. On the other hand, when the switch 1635 is switched off, the capacitor 1634 and the inductor 1632 perform releasing of stored energy by a current flowing from the freewheeling diode 1633 to the driving output terminal 1521 to make the LED module continuing to emit light.

[00342] **It's worth noting that the capacitor 1634 is an optional element, so it can be** omitted and is thus depicted in a dotted line in Fig. 54C. In some application environments, the natural characteristic of an inductor to oppose instantaneous change in electric current passing through the inductor may be used to achieve the effect of stabilizing the current through the LED module, thus omitting the capacitor 1634.

[00343] Fig. 54D is a schematic diagram of the driving circuit according to an embodiment of the present invention. Referring to Fig. 54D, a driving circuit 1730 in this

embodiment comprises a boost DC-to-DC converter circuit having a controller 1731 and a converter circuit. The converter circuit includes an inductor 1732, a diode 1733 for **"freewheeling" of current, a capacitor 1734, and a switch 1735. The driving circuit 1730 is** configured to receive and then convert a filtered signal from the filtering output terminals 521 and 522 into a driving signal for driving an LED module coupled between the driving output terminals 1521 and 1522.

[00344] The inductor 1732 has an end connected to the filtering output terminal 521, and another end connected to the anode of freewheeling diode 1733 and a first terminal of the switch 1735, which has a second terminal connected to the filtering output terminal 522 and the driving output terminal 1522. The freewheeling diode 1733 has a cathode connected to the driving output terminal 1521. And the capacitor 1734 is coupled between the driving output terminals 1521 and 1522.

[00345] The controller 1731 is coupled to a control terminal of switch 1735, and is configured for determining when to turn the switch 1735 on (in a conducting state) or off (in a cutoff state), according to a current detection signal S535 and/or a current detection signal S531. When the switch 1735 is switched on, a current of a filtered signal is input through the filtering output terminal 521, and then flows through the inductor 1732 and the switch 1735, and then flows out from the filtering output terminal 522. During this flowing of current, the current through the inductor 1732 increases with time, with the inductor 1732 being in a state of storing energy, while the capacitor 1734 enters a state of releasing energy, making the LED module continuing to emit light. On the other hand, when the switch 1735 is switched off, the inductor 1732 enters a state of releasing energy as the current through the inductor 1732 decreases with time. In this state, the current through the inductor 1732 then flows through the freewheeling diode 1733, the capacitor 1734, and the LED module, while the capacitor 1734 enters a state of storing energy.

[00346] It's worth noting that the capacitor 1734 is an optional element, so it can be omitted and is thus depicted in a dotted line in Fig. 54D. When the capacitor 1734 is omitted and the switch 1735 is switched on, the current of inductor 1732 does not flow through the LED module, making the LED module not emit light; but when the switch 1735 is switched off, the current of inductor 1732 flows through the freewheeling diode 1733 to reach the LED module, making the LED module emit light. Therefore, by controlling the time that the LED module emits light, and the magnitude of current through the LED module, the average luminance of the LED module can be stabilized to be above a defined value, thus also achieving the effect of emitting a steady light.

[00347] Fig. 54E is a schematic diagram of the driving circuit according to an embodiment of the present invention. Referring to Fig. 54E, a driving circuit 1830 in this embodiment comprises a buck DC-to-DC converter circuit having a controller 1831 and a converter circuit. The converter circuit includes an inductor 1832, a diode 1833 for "freewheeling" of current, a capacitor 1834, and a switch 1835. The driving circuit 1830 is coupled to the filtering output terminals 521 and 522 to receive and then convert a filtered signal into a driving signal for driving an LED module connected between the driving output terminals 1521 and 1522.

[00348] The switch 1835 has a first terminal coupled to the filtering output terminal 521, a second terminal coupled to the cathode of freewheeling diode 1833, and a control terminal coupled to the controller 1831 to receive a control signal from the controller 1831 for controlling current conduction or cutoff between the first and second terminals of the switch 1835. The anode of freewheeling diode 1833 is connected to the filtering output terminal 522 and the driving output terminal 1522. The inductor 1832 has an end connected to the second terminal of switch 1835, and another end connected to the driving output terminal 1521. The capacitor 1834 is coupled between the driving output terminals 1521 and 1522 to stabilize the voltage between the driving output terminals

1521 and 1522.

[00349] The controller 1831 is configured for controlling when to turn the switch 1835 on (in a conducting state) or off (in a cutoff state) according to a current detection signal S535 and/or a current detection signal S531. When the switch 1835 is switched on, a current of a filtered signal is input through the filtering output terminal 521, and then flows through the switch 1835, the inductor 1832, and the driving output terminals 1521 and 1522, and then flows out from the filtering output terminal 522. During this flowing of current, the current through the inductor 1832 and the voltage of the capacitor 1834 both increase with time, so the inductor 1832 and the capacitor 1834 are in a state of storing energy. On the other hand, when the switch 1835 is switched off, the inductor 1832 is in a state of releasing energy and thus the current through it decreases with time. In this case, the current through the inductor 1832 circulates through the driving output terminals 1521 and 1522, the freewheeling diode 1833, and back to the inductor 1832.

[00350] **It's worth noting that the capacitor 1834 is an optional element, so it can be** omitted and is thus depicted in a dotted line in Fig. 54E. When the capacitor 1834 is omitted, no matter whether the switch 1835 is turned on or off, the current through the inductor 1832 will flow through the driving output terminals 1521 and 1522 to drive the LED module to continue emitting light.

[00351] Fig. 54F is a schematic diagram of the driving circuit according to an embodiment of the present invention. Referring to Fig. 54F, a driving circuit 1930 in this embodiment comprises a buck DC-to-DC converter circuit having a controller 1931 and a converter circuit. The converter circuit includes an inductor 1932, a diode 1933 for **"freewheeling" of current, a capacitor 1934, and a switch 1935. The driving circuit 1930 is** coupled to the filtering output terminals 521 and 522 to receive and then convert a filtered signal into a driving signal for driving an LED module connected between the driving output terminals 1521 and 1522.

[00352] The inductor 1932 has an end connected to the filtering output terminal 521 and the driving output terminal 1522, and another end connected to a first end of the switch 1935. The switch 1935 has a second end connected to the filtering output terminal 522, and a control terminal connected to controller 1931 to receive a control signal from controller 1931 for controlling current conduction or cutoff of the switch 1935. The freewheeling diode 1933 has an anode coupled to a node connecting the inductor 1932 and the switch 1935, and a cathode coupled to the driving output terminal 1521. The capacitor 1934 is coupled to the driving output terminals 1521 and 1522 to stabilize the driving of the LED module coupled between the driving output terminals 1521 and 1522.

[00353] The controller 1931 is configured for controlling when to turn the switch 1935 on (in a conducting state) or off (in a cutoff state) according to a current detection signal S531 and/or a current detection signal S535. When the switch 1935 is turned on, a current is input through the filtering output terminal 521, and then flows through the inductor 1932 and the switch 1935, and then flows out from the filtering output terminal 522. During this flowing of current, the current through the inductor 1932 increases with time, so the inductor 1932 is in a state of storing energy; but the voltage of the capacitor 1934 decreases with time, so the capacitor 1934 is in a state of releasing energy to keep the LED module continuing to emit light. On the other hand, when the switch 1935 is turned off, the inductor 1932 is in a state of releasing energy and its current decreases with time. In this case, the current through the inductor 1932 circulates through the freewheeling diode 1933, the driving output terminals 1521 and 1522, and back to the inductor 1932. During this circulation, the capacitor 1934 is in a state of storing energy and its voltage increases with time.

[00354] **It's worth noting that the capacitor 1934 is an optional element, so it can be** omitted and is thus depicted in a dotted line in Fig. 54F. When the capacitor 1934 is

omitted and the switch 1935 is turned on, the current through the inductor 1932 doesn't flow through the driving output terminals 1521 and 1522, thereby making the LED module not emit light. On the other hand, when the switch 1935 is turned off, the current through the inductor 1932 flows through the freewheeling diode 1933 and then the LED module to make the LED module emit light. Therefore, by controlling the time that the LED module emits light, and the magnitude of current through the LED module, the average luminance of the LED module can be stabilized to be above a defined value, thus also achieving the effect of emitting a steady light.

[00355] Fig. 54G is a block diagram of the driving circuit according to an embodiment of the present invention. Referring to Fig. 54G, the driving circuit includes a controller 2631, and a conversion circuit 2632 for power conversion based on an adjustable current source, for driving the LED module to emit light. The conversion circuit 2632 includes a switching circuit 2635 and an energy storage circuit 2638. And the conversion circuit 2632 is coupled to the filtering output terminals 521 and 522 to receive and then convert a filtered signal, under the control by the controller 2631, into a driving signal at the driving output terminals 1521 and 1522 for driving the LED module. The controller 2631 is configured to receive a current detection signal S535 and/or a current detection signal S539 for controlling or stabilizing the driving signal output by the conversion circuit 2632 to be above an objective current value. The current detection signal S535 represents the magnitude of current through the switching circuit 2635. The current detection signal S539 represents the magnitude of current through energy storage circuit 2638, which current may be e.g. an inductor current in energy storage circuit 2638 or a current output at the driving output terminal 1521. Any of current detection signal S535 and current detection signal S539 can represent the magnitude of current Iout provided by the driving circuit from the driving output terminals 1521 and 1522 to the LED module. The controller 2631 is coupled to the filtering output terminal

521 for setting the objective current value according to the voltage Vin at the filtering output terminal 521. Therefore, the current Iout provided by the driving circuit or the objective current value can be adjusted corresponding to the magnitude of the voltage Vin of a filtered signal output by a filtering circuit.

[00356] **It's worth noting that current detection signals S535 and S539 can be** generated by measuring current through a resistor or induced by an inductor. For example, a current can be measured according to a voltage drop across a resistor in the conversion circuit 2632 the current flows through, or which arises from a mutual induction between an inductor in the conversion circuit 2632 and another inductor in its energy storage circuit 2638.

[00357] The above driving circuit structures are especially suitable for an application environment in which the external driving circuit for the LED tube lamp includes electronic ballast. An electronic ballast is equivalent to a current source whose output power is not constant. In an internal driving circuit as shown in each of Figs. 54C-F, power consumed by the internal driving circuit relates to or depends on the number of LEDs in the LED module, and could be regarded as constant. When the output power of the electronic ballast is higher than power consumed by the LED module driven by the driving circuit, the output voltage of the ballast will increase continually, causing the logic level of an AC driving signal received by the power supply module of the LED lamp to continually increase, so as to risk damaging the ballast and/or components of the power supply module due to their voltage ratings being exceeded. On the other hand, when the output power of the electronic ballast is lower than power consumed by the LED module driven by the driving circuit, the output voltage of the ballast and the logic level of the AC driving signal will decrease continually so that the LED tube lamp fail to normally operate.

[00358] **It's worth noting that the power needed for an LED lamp to work is already**

lower than that needed for a fluorescent lamp to work. If a conventional control mechanism of e.g. using a backlight module to control the LED luminance is used with a conventional driving system of e.g. a ballast, a problem will probably arise of mismatch or incompatibility between the output power of the external driving system and the power needed by the LED lamp. This problem may even cause damaging of the driving system and/or the LED lamp. To prevent or reduce this problem, using e.g. the power/current adjustment method described above in Fig. 54G enables the LED (tube) lamp to be better compatible with traditional fluorescent lighting system.

[00359] Fig. 54H is a graph illustrating the relationship between the voltage Vin and the objective current value Iout according to an embodiment of the present invention. In Fig. 54H, the variable Vin is on the horizontal axis, and the variable Iout is on the vertical axis. In some cases, when the logic level of the voltage Vin of a filtered signal is between the upper voltage limit VH and the lower voltage limit VL, the objective current value Iout will be about an initial objective current value. The upper voltage limit VH is higher than the lower voltage limit VL. When the voltage Vin increases to be higher than the upper voltage limit VH, the objective current value Iout will increase with the increasing of the voltage Vin. During this stage, a situation that may be preferable is that the slope of the relationship curve increase with the increasing of the voltage Vin. When the voltage Vin of a filtered signal decreases to be below the lower voltage limit VL, the objective current value Iout will decrease with the decreasing of the voltage Vin. During this stage, a situation that may be preferable is that the slope of the relationship curve decrease with the decreasing of the voltage Vin. For example, during the stage when the voltage Vin is higher than the upper voltage limit VH or lower than the lower voltage limit VL, the objective current value Iout is in some embodiments a function of the voltage Vin to the power of 2 or above, in order to make the rate of increase/decrease of the consumed power higher than the rate of increase/decrease of the output power of the external

driving system. Thus, adjustment of the objective current value Iout is in some embodiments a function of the filtered voltage Vin to the power of 2 or above.

[00360] In another case, when the voltage Vin of a filtered signal is between the upper voltage limit VH and the lower voltage limit VL, the objective current value Iout of the LED lamp will vary, increase or decrease, linearly with the voltage Vin. During this stage, when the voltage Vin is at the upper voltage limit VH, the objective current value Iout will be at the upper current limit IH. When the voltage Vin is at the lower voltage limit VL, the objective current value Iout will be at the lower current limit IL. The upper current limit IH is larger than the lower current limit IL. And when the voltage Vin is between the upper voltage limit VH and the lower voltage limit VL, the objective current value Iout will be a function of the voltage Vin to the power of 1.

[00361] With the designed relationship in Fig. 54H, when the output power of the ballast is higher than the power consumed by the LED module driven by the driving circuit, the voltage Vin will increase with time to exceed the upper voltage limit VH. When the voltage Vin is higher than the upper voltage limit VH, the rate of increase of the consumed power of the LED module is higher than that of the output power of the electronic ballast, and the output power and the consumed power will be balanced or equal when the voltage Vin is at a high balance voltage value VH+ and the current Iout is at a high balance current value IH+. In this case, the high balance voltage value VH+ is larger than the upper voltage limit VH, and the high balance current value IH+ is larger than the upper current limit IH. On the other hand, when the output power of the ballast is lower than the power consumed by the LED module driven by the driving circuit, the voltage Vin will be below the lower voltage limit VL. When the voltage Vin is lower than the lower voltage limit VL, the rate of decrease of the consumed power of the LED module is higher than that of the output power of the electronic ballast, and the output power and the consumed power will be balanced or equal when the voltage Vin is at a

low balance voltage value VL- and the objective current value Iout is at a low balance current value IL-. In this case, the low balance voltage value VL- is smaller than the lower voltage limit VL, and the low balance current value IL- is smaller than the lower current limit IL.

[00362] In some embodiments, the lower voltage limit VL is defined to be around 90% of the lowest output power of the electronic ballast, and the upper voltage limit VH is defined to be around 110% of its highest output power. Taking a common AC powerline with a voltage range of 100 - 277 volts and a frequency of 60Hz as an example, the lower voltage limit VL may be set at 90 volts (=100 * 90%), and the upper voltage limit VH may be set at 305 volts (= 277 *110%).

[00363] With reference to Figs. 19 and 20, a short circuit board 253 includes a first short circuit substrate and a second short circuit substrate respectively connected to two terminal portions of a long circuit sheet 251, and electronic components of the power supply module are respectively disposed on the first short circuit substrate and the second short circuit substrate. The first short circuit substrate and the second short circuit substrate may have roughly the same length, or different lengths. In general, the first short circuit substrate (i.e. the right circuit substrate of short circuit board 253 in Fig. 19 and the left circuit substrate of short circuit board 253 in Fig. 20) has a length that is about 30% - 80% of the length of the second short circuit substrate (i.e. the left circuit substrate of short circuit board 253 in Fig. 19 and the right circuit substrate of short circuit board 253 in Fig. 20). In some embodiments the length of the first short circuit substrate is about 1/3 ~ 2/3 of the length of the second short circuit substrate. For example, in one embodiment, the length of the first short circuit substrate may be about half the length of the second short circuit substrate. The length of the second short circuit substrate may be, for example in the range of about 15mm to about 65mm, depending on actual application occasions. In certain embodiments, the first short circuit substrate

is disposed in an end cap at an end of the LED tube lamp, and the second short circuit substrate is disposed in another end cap at the opposite end of the LED tube lamp.

[00364] For example, capacitors of the driving circuit, such as the capacitors 1634, 1734, 1834, and 1934 in Figs. 54C - 54F, in practical use may include two or more capacitors connected in parallel. Some or all capacitors of the driving circuit in the power supply module may be arranged on the first short circuit substrate of short circuit board 253, while other components such as the rectifying circuit, filtering circuit, inductor(s) of the driving circuit, controller(s), switch(es), diodes, etc. are arranged on the second short circuit substrate of short circuit board 253. Since the inductors, controllers, switches, etc. are electronic components with higher temperature, arranging some or all capacitors on a circuit substrate separate or away from the circuit substrate(s) of high-temperature components helps prevent the working life of capacitors (especially electrolytic capacitors) from being negatively affected by the high-temperature components, thus improving the reliability of the capacitors. Further, the physical separation between the capacitors and both the rectifying circuit and filtering circuit also contributes to reducing the problem of EMI.

[00365] In some embodiments, the driving circuit has power conversion efficiency of 80% or above, which may be 90% or above, and may even be 92% or above. Therefore, without the driving circuit, luminous efficacy of the LED lamp according to some embodiments may be 120 lm/W or above, and may even be 160 lm/W or above. On the other hand, with the driving circuit in combination with the LED component(s), luminous efficacy of the LED lamp in the invention may be, in some embodiments, 120 lm/W*90%=108 lm/W or above, and may even be, in some embodiments 160 lm/W*92%=147.2 lm/W or above.

[00366] In view of the fact that the diffusion film or layer in an LED tube lamp has light transmittance of 85% or above, luminous efficacy of the LED tube lamp of the

invention is in some embodiments 108 lm/W*85%=91.8 lm/W or above, and may be, in some more effective embodiments, 147.2 lm/W*85%=125.12 lm/W.

[00367] Fig. 55A is a block diagram of using a power supply module in an LED lamp according to an embodiment of the present invention. Compared to Fig. 49B, the embodiment of Fig. 55A includes two rectifying circuits 510 and 540, a filtering circuit 520, and a driving circuit 1530, and further includes an anti-flickering circuit 550 coupled between the filtering circuit 520 and the LED lighting module 530. In this embodiment, a driving circuit 1530 and an LED module 630 compose the LED lighting module 530.

[00368] The anti-flickering circuit 550 is coupled to the filtering output terminals 521 and 522 to receive a filtered signal, and under specific circumstances to consume partial energy of the filtered signal so as to reduce (the incidence of) ripples of the filtered signal disrupting or interrupting the light emission of the LED lighting module 530. In general, the filtering circuit 520 has such filtering components as capacitor(s) and/or inductor(s), and/or parasitic capacitors and inductors, which may form resonant circuits. Upon breakoff or stop of an AC power signal, as when the power supply of the LED lamp is turned off by a user, the amplitude(s) of resonant signals in the resonant circuits will decrease with time. But LEDs in the LED module of the LED lamp are unidirectional conduction devices and generally require a minimum conduction voltage for the LED module. When a resonant signal's trough value is lower than the minimum conduction voltage of the LED module, but its peak value is still higher than the minimum conduction voltage, the flickering phenomenon will occur in light emission of the LED module. In this case the anti-flickering circuit 550 works by allowing a current matching a defined flickering current value of the LED component to flow through, consuming partial energy of the filtered signal which should be higher than the energy difference of the resonant signal between its peak and trough values, so as to reduce the flickering phenomenon. In certain embodiments, a preferred occasion for the anti-flickering circuit 550 to work is

when the filtered signal's voltage approaches (and is still higher than) the minimum conduction voltage, and thus the partial energy of the filtered signal consumed by the anti-flickering circuit 550 is higher than the energy difference of the resonant signal between its peak and trough values.

[00369] It's worth noting that the anti-flickering circuit 550 may be more suitable for the situation in which the LED lighting module 530 doesn't include the driving circuit 1530, for example, when the LED module 630 of LED lighting module 530 is (directly) driven to emit light by a filtered signal from a filtering circuit. In this case, the light emission of LED module 630 will directly reflect variation in the filtered signal due to its ripples. In this situation, the introduction of anti-flickering circuit 550 will prevent the flickering phenomenon from occurring in the LED lamp upon the breakoff of power supply to the LED lamp.

[00370] Fig. 55B is a schematic diagram of the anti-flickering circuit according to an embodiment of the present invention. Referring to Fig. 55B, an anti-flickering circuit 650 includes at least a resistor, such as two resistors connected in series between the filtering output terminals 521 and 522. In this embodiment, the anti-flickering circuit 650 in use consumes partial energy of a filtered signal continually. When in normal operation of the LED lamp, this partial energy is far lower than the energy consumed by LED lighting module 530. But upon a breakoff or stop of the power supply, when the voltage logic level of the filtered signal decreases to approach the minimum conduction voltage of LED module 630, this partial energy is still consumed by the anti-flickering circuit 650 in order to offset the impact of the resonant signals which may cause the flickering of light emission of LED module 630. In some embodiments, a current equal to or larger than an anti-flickering current logic level may be set to flow through the anti-flickering circuit 650 when the LED module 630 is supplied by the minimum conduction voltage, and then an equivalent anti-flickering resistance of anti-flickering circuit 650 can be

determined based on the set current.

[00371] Fig. 56A is a block diagram of using a power supply module in an LED lamp according to an embodiment of the present invention. Compared to Fig. 55A, the embodiment of Fig. 56A includes two rectifying circuits 510 and 540, a filtering circuit 520, a driving circuit 1530, and an anti-flickering circuit 550, and further includes a protection circuit 560. In this embodiment, a driving circuit 1530 and an LED module 630 compose the LED lighting module 530. The protection circuit 560 is coupled to the filtering output terminals 521 and 522 to detect the filtered signal from the filtering circuit 520 for determining whether to enter a protection state. Upon entering a protection state, the protection circuit 560 works to limit, restrain, or clamp down on the logic level of the filtered signal, preventing damaging of components in the LED lighting module 530. And the anti-flickering circuit 550 may be omitted and are thus depicted in a dotted line in Fig. 56A.

[00372] Fig. 56B is a schematic diagram of the protection circuit according to an embodiment of the present invention. Referring to Fig. 56B, a protection circuit 660 includes a voltage clamping circuit, a voltage division circuit, two capacitors 663 and 670, a resistor 669, and a diode 672, for entering a protection state when a current and/or voltage of the LED module is/are or might be excessively high, thus preventing damaging of the LED module. The voltage clamping circuit includes a bidirectional triode thyristor (TRIAC) 661 and a DIAC or symmetrical trigger diode 662. The voltage division circuit includes two bipolar junction transistors (BJT) 667 and 668 and multiple resistors 664, 665, 666, and 671.

[00373] The bidirectional triode thyristor 661 has a first terminal connected to the filtering output terminal 521, a second terminal connected to the filtering output terminal 522, and a control terminal connected to a first terminal of symmetrical trigger diode 662, which has a second terminal connected to an end of the capacitor 663, which has

another end connected to the filtering output terminal 522. The resistor 664 is in parallel to the capacitor 663, and has an end connected to the second terminal of symmetrical trigger diode 662 and another end connected to the filtering output terminal 522. The resistor 665 has an end connected to the second terminal of symmetrical trigger diode 662 and another end connected to the collector terminal of BJT 667, whose emitter terminal is connected to the filtering output terminal 522. The resistor 666 has an end connected to the second terminal of symmetrical trigger diode 662 and another end connected to the collector terminal of BJT 668 and the base terminal of BJT 667. The emitter terminal of BJT 668 is connected to the filtering output terminal 522. The resistor 669 has an end connected to the base terminal of BJT 668 and another end connected to an end of the capacitor 670, which has another end connected to the filtering output terminal 522. The resistor 671 has an end connected to the second terminal of symmetrical trigger diode 662 and another end connected to the cathode of diode 672, whose anode is connected to the filtering output terminal 521.

[00374] **It's worth noting that according to some embodiments, the resistance of** resistor 665 should be smaller than that of resistor 666.

[00375] Next, an exemplary operation of the protection circuit 660 in overcurrent protection is described as follows.

[00376] The node connecting the resistor 669 and the capacitor 670 is to receive a current detection signal S531, which represents the magnitude of current through the LED module. The other end of the resistor 671 is a voltage termina**l 521'. In this embodiment concerning overcurrent protection, the voltage terminal 521' may be** coupled to a biasing voltage source, or be connected through the diode 672 to the filtering output terminal 521, as shown in Fig. 56B, to take a filtered signal as a biasing **voltage source. If the voltage terminal 521' is coupled to an external biasing voltage** source, the diode 672 may be omitted, so it is depicted in a dotted line in Fig. 56B. The

combination of the resistor 669 and the capacitor 670 can work to filter out high frequency components of the current detection signal S531, and then input the filtered current detection signal S531 to the base terminal of BJT 668 for controlling current conduction and cutoff of the BJT 668. The filtering function of the resistor 669 and the capacitor 670 can prevent misoperation of the BJT 668 due to noises. In practical use, the resistor 669 and the capacitor 670 may be omitted, so they are each depicted in a dotted line in Fig. 56B. When they are omitted, the current detection signal S531 is input directly to the base terminal of the BJT 668.

[00377] When the LED lamp is operating normally and the current of the LED module is within a normal range, the BJT 668 is in a cutoff state, and the resistor 666 works to pull up the base voltage of the BJT 667, which therefore enters a conducting state. In this state, the electric potential at the second terminal of the symmetrical trigger **diode 662 is determined based on the voltage at the voltage terminal 521' of the biasing** voltage source and voltage division ratios between the resistor 671 and the parallel-connected resistors 664 and 665. Since the resistance of resistor 665 is relatively small, voltage share for the resistor 665 is smaller and the electric potential at the second terminal of the symmetrical trigger diode 662 is therefore pulled down. Then, the electric potential at the control terminal of the bidirectional triode thyristor 661 is in turn pulled down by the symmetrical trigger diode 662, causing the bidirectional triode thyristor 661 to enter a cutoff state, which cutoff state makes the protection circuit 660 not being in a protection state.

[00378] When the current of the LED module exceeds an overcurrent value, the logic level of current detection signal S531 will increase significantly to cause the BJT 668 to enter a conducting state and then pull down the base voltage of the BJT 667, which thereby enters a cutoff state. In this case, the electric potential at the second terminal of the symmetrical trigger diode 662 is determined based on the voltage at the

voltage terminal 521' of the biasing voltage source and voltage division ratios between the resistor 671 and the parallel-connected resistors 664 and 666. Since the resistance of resistor 666 is relatively high, voltage share for the resistor 666 is larger and the electric potential at the second terminal of symmetrical trigger diode 662 is therefore higher. Then the electric potential at the control terminal of bidirectional triode thyristor 661 is in turn pulled up by the symmetrical trigger diode 662, causing the bidirectional triode thyristor 661 to enter a conducting state, which conducting state works to restrain or clamp down on the voltage between the filtering output terminals 521 and 522 and thus makes the protection circuit 660 being in a protection state.

[00379] In this embodiment, the voltage at the voltage terminal 521' of the biasing voltage source is determined based on the trigger voltage of the bidirectional triode thyristor 661, and voltage division ratio between the resistor 671 and the parallel-connected resistors 664 and 665, or voltage division ratio between the resistor 671 and the parallel-connected resistors 664 and 666. Through voltage division between the resistor 671 and the parallel-connected resistors 664 and 665, the voltage from the voltage terminal 521' at the symmetrical trigger diode 662 will be lower than the trigger voltage of the bidirectional triode thyristor 661. Otherwise, through voltage division between the resistor 671 and the parallel-connected resistors 664 and 666, the voltage from the voltage terminal 521' at the symmetrical trigger diode 662 will be higher than the trigger voltage of the bidirectional triode thyristor 661. For example, in some embodiments, when the current of the LED module exceeds an overcurrent value, the voltage division circuit is adjusted to the voltage division ratio between the resistor 671 and the parallel-connected resistors 664 and 666, causing a higher portion of the voltage at the voltage terminal 521' to result at the symmetrical trigger diode 662, achieving a hysteresis function. Specifically, the BJTs 667 and 668 as switches are respectively connected in series to the resistors 665 and 666 which determine the voltage division

ratios. The voltage division circuit is configured to control turning on which one of the BJTs 667 and 668 and leaving the other off for determining the relevant voltage division ratio, according to whether the current of the LED module exceeds an overcurrent value. And the clamping circuit determines whether to restrain or clamp down on the voltage of the LED module according to the applying voltage division ratio.

[00380] Next, an exemplary operation of the protection circuit 660 in overvoltage protection is described as follows.

[00381] The node connecting the resistor 669 and the capacitor 670 is to receive a current detection signal S531, which represents the magnitude of current through the LED module. As described above, the protection circuit 660 still works to provide overcurrent protection. The other end of resistor 671 is a voltage terminal 521'. In this embodiment concerning overvoltage protection, the voltage terminal 521' is coupled to the positive terminal of the LED module to detect the voltage of the LED module. Taking previously described embodiments for example, in embodiments of Figs. 53A and 53B, the LED lighting module 530 doesn't include the driving circuit 1530, and the voltage terminal 521' would be coupled to the filtering output terminal 521. Whereas in embodiments of Figs. 54A - 54G, the LED lighting module 530 includes the driving circuit 1530, and the voltage terminal 521' would be coupled to the driving output terminal 1521. In this embodiment, voltage division ratios between the resistor 671 and the parallel-connected resistors 664 and 665, and voltage division ratios between the resistor 671 and the parallel-connected resistors 664 and 666 will be adjusted according to the voltage at the voltage terminal 521', for example, the voltage at the driving output terminal 1521 or the filtering output terminal 521. Therefore, normal overcurrent protection can still be provided by the protection circuit 660.

[00382] In some embodiments, when the LED lamp is operating normally, assuming overcurrent condition doesn't occur, the electric potential at the second

terminal of the symmetrical trigger diode 662 is determined based on the voltage at the **voltage terminal 521' and voltage division ratios between the resistor 671 and the** parallel-connected resistors 664 and 665, and is insufficient to trigger the bidirectional triode thyristor 661. Then the bidirectional triode thyristor 661 is in a cutoff state, making the protection circuit 660 not being in a protection state. On the other hand, when the LED module is operating abnormally with the voltage at the positive terminal of the LED module exceeding an overvoltage value, the electric potential at the second terminal of symmetrical trigger diode 662 is sufficiently high to trigger the bidirectional triode thyristor 661 when the voltage at the first terminal of the symmetrical trigger diode 662 is larger than the trigger voltage of the bidirectional triode thyristor 661. Then the bidirectional triode thyristor 661 enters a conducting state, making the protection circuit 660 being in a protection state to restrain or clamp down on the logic level of the filtered signal.

[00383] As described above, the protection circuit 660 provides one or two of the functions of overcurrent protection and overvoltage protection.

[00384] In some embodiments, the protection circuit 660 may further include a zener diode connected to the resistor 664 in parallel, which zener diode is used to limit or restrain the voltage across the resistor 664. The breakdown voltage of the zener diode is in some embodiments in the range of about 25 - 50 volts, and in some embodiments may be about 36 volts.

[00385] Further, a silicon controlled rectifier may be substituted for the bidirectional triode thyristor 661, without negatively affecting the protection functions. Using a silicon controlled rectifier instead of a bidirectional triode thyristor 661 has a lower voltage drop across itself in conduction than that across the bidirectional triode thyristor 661 in conduction.

[00386] In one embodiment, values of the parameters of the protection circuit 660

may be set as follows. The resistance of resistor 669 may be about 10 ohms. The capacitance of capacitor 670 may be about 1nF. The capacitance of capacitor 633 may be about 10 nF. The (breakover) voltage of symmetrical trigger diode 662 may be in the range of about 26 - 36 volts. The resistance of resistor 671 may be in the range of about 300k - 600k ohms, and may be, in some embodiments, about 540k ohms. The resistance of resistor 666 is in some embodiments in the range of about 100k - 300k ohms, and may be, in some embodiments, about 220k ohms. The resistance of resistor 665 is in some embodiments in the range of about 30k - 100k ohms, and may be, in some embodiments about 40k ohms. The resistance of resistor 664 is in some embodiments in the range of about 100k - 300k ohms, and may be, in some embodiments about 220k ohms.

[00387] Fig. 57A is a block diagram of a power supply module in an LED lamp according to an embodiment of the present invention. Compared to Fig. 54A, the embodiment of Fig. 57A includes two rectifying circuits 510 and 540, a filtering circuit 520, and a driving circuit 1530, and further includes a mode switching circuit 580. In this embodiment, a driving circuit 1530 and an LED module 630 compose the LED lighting module 530. The mode switching circuit 580 is coupled to at least one of the filtering output terminals 521 and 522 and at least one of the driving output terminals 1521 and 1522, for determining whether to perform a first driving mode or a second driving mode, as according to a frequency of the external driving signal. In the first driving mode, a filtered signal from the filtering circuit 520 is input into the driving circuit 1530, while in the second driving mode the filtered signal bypasses at least a component of the driving circuit 1530, making the driving circuit 1530 stop working in conducting the filtered signal, allowing the filtered signal to (directly) reach and drive the LED module 630. The bypassed component(s) of the driving circuit 1530 may include an inductor or a switch, which when bypassed makes the driving circuit 1530 unable to transfer and/or convert

power, and then stop working in conducting the filtered signal. If the driving circuit 1530 includes a capacitor, the capacitor can still be used to filter out ripples of the filtered signal in order to stabilize the voltage across the LED module. When the mode switching circuit 580 determines on performing the first driving mode, allowing the filtered signal to be input to the driving circuit 1530, the driving circuit 1530 then transforms the filtered signal into a driving signal for driving the LED module 630 to emit light. On the other hand, when the mode switching circuit 580 determines on performing the second driving mode, allowing the filtered signal to bypass the driving circuit 1530 to reach the LED module 630, the filtering circuit 520 becomes in effect a driving circuit for LED module 630. Then the filtering circuit 520 provides the filtered signal as a driving signal for the LED module for driving the LED module to emit light.

[00388] **It's worth noting that the mode switching circuit 580 can determine whether to perform the first driving mode or the second driving mode based on a user's** instruction or a detected signal received by the LED lamp through the pins 501, 502, 503, and 504. With the mode switching circuit, the power supply module of the LED lamp can adapt to or perform one of appropriate driving modes corresponding to different application environments or driving systems, thus improving the compatibility of the LED lamp.

[00389] Fig. 57B is a schematic diagram of the mode switching circuit in an LED lamp according to an embodiment of the present invention. Referring to Fig. 57B, a mode switching circuit 680 includes a mode switch 681 suitable for use with the driving circuit 1630 in Fig. 54C. Referring to Figs. 57B and 54C, the mode switch 681 has three terminals 683, 684, and 685, wherein the terminal 683 is coupled to the driving output terminal 1522, the terminal 684 is coupled to the filtering output terminal 522, and the terminal 685 is coupled to the inductor 1632 in the driving circuit 1630.

[00390] When the mode switching circuit 680 determines on performing a first

driving mode, the mode switch 681 conducts current in a first conductive path through the terminals 683 and 685 and a second conductive path through the terminals 683 and 684 is in a cutoff state. In this case, the driving output terminal 1522 is coupled to the inductor 1632, and therefore the driving circuit 1630 is working normally, which working includes receiving a filtered signal from the filtering output terminals 521 and 522 and then transforming the filtered signal into a driving signal, output at the driving output terminals 1521 and 1522 for driving the LED module.

[00391] When the mode switching circuit 680 determines on performing a second driving mode, the mode switch 681 conducts current in the second conductive path through the terminals 683 and 684 and the first conductive path through the terminals 683 and 685 is in a cutoff state. In this case, the driving output terminal 1522 is coupled to the filtering output terminal 522, and therefore the driving circuit 1630 stops working, and a filtered signal is input through the filtering output terminals 521 and 522 to the driving output terminals 1521 and 1522 for driving the LED module, while bypassing the inductor 1632 and the switch 1635 in the driving circuit 1630.

[00392] Fig. 57C is a schematic diagram of the mode switching circuit in an LED lamp according to an embodiment of the present invention. Referring to Fig. 57C, a mode switching circuit 780 includes a mode switch 781 being suitable for use with the driving circuit 1630 in Fig. 54C. Referring to Figs. 57C and 54C, the mode switch 781 has three terminals 783, 784, and 785, wherein the terminal 783 is coupled to the filtering output terminal 522, the terminal 784 is coupled to the driving output terminal 1522, and the terminal 785 is coupled to switch 1635 in the driving circuit 1630.

[00393] When the mode switching circuit 780 determines on performing a first driving mode, the mode switch 781 conducts current in a first conductive path through the terminals 783 and 785 and a second conductive path through the terminals 783 and 784 is in a cutoff state. In this case, the filtering output terminal 522 is coupled to the

switch 1635, and therefore the driving circuit 1630 is working normally, which working includes receiving a filtered signal from the filtering output terminals 521 and 522 and then transforming the filtered signal into a driving signal, output at the driving output terminals 1521 and 1522 for driving the LED module.

[00394] When the mode switching circuit 780 determines on performing a second driving mode, the mode switch 781 conducts current in the second conductive path through the terminals 783 and 784 and the first conductive path through the terminals 783 and 785 is in a cutoff state. In this case, the driving output terminal 1522 is coupled to the filtering output terminal 522, and therefore the driving circuit 1630 stops working, and a filtered signal is input through the filtering output terminals 521 and 522 to the driving output terminals 1521 and 1522 for driving the LED module, while bypassing the inductor 1632 and the switch 1635 in the driving circuit 1630.

[00395] Fig. 57D is a schematic diagram of the mode switching circuit in an LED lamp according to an embodiment of the present invention. Referring to Fig. 57D, a mode switching circuit 880 includes a mode switch 881 being suitable for use with the driving circuit 1730 in Fig. 54D. Referring to Figs. 57D and 54D, the mode switch 881 has three terminals 883, 884, and 885, wherein the terminal 883 is coupled to the filtering output terminal 521, the terminal 884 is coupled to the driving output terminal 1521, and the terminal 885 is coupled to the inductor 1732 in the driving circuit 1730.

[00396] When the mode switching circuit 880 determines on performing a first driving mode, the mode switch 881 conducts current in a first conductive path through the terminals 883 and 885 and a second conductive path through the terminals 883 and 884 is in a cutoff state. In this case, the filtering output terminal 521 is coupled to the inductor 1732, and therefore the driving circuit 1730 is working normally, which working includes receiving a filtered signal from the filtering output terminals 521 and 522 and then transforming the filtered signal into a driving signal, output at the driving output

terminals 1521 and 1522 for driving the LED module.

[00397] When the mode switching circuit 880 determines on performing a second driving mode, the mode switch 881 conducts current in the second conductive path through the terminals 883 and 884 and the first conductive path through the terminals 883 and 885 is in a cutoff state. In this case, the driving output terminal 1521 is coupled to the filtering output terminal 521, and therefore the driving circuit 1730 stops working, and a filtered signal is input through the filtering output terminals 521 and 522 to the driving output terminals 1521 and 1522 for driving the LED module, while bypassing the inductor 1732 and the freewheeling diode 1733 in the driving circuit 1730.

[00398] Fig. 57E is a schematic diagram of the mode switching circuit in an LED lamp according to an embodiment of the present invention. Referring to Fig. 57E, a mode switching circuit 980 includes a mode switch 981 being suitable for use with the driving circuit 1730 in Fig. 54D. Referring to Figs. 57E and 54D, the mode switch 981 has three terminals 983, 984, and 985, wherein the terminal 983 is coupled to the driving output terminal 1521, the terminal 984 is coupled to the filtering output terminal 521, and the terminal 985 is coupled to the cathode of diode 1733 in the driving circuit 1730.

[00399] When the mode switching circuit 980 determines on performing a first driving mode, the mode switch 981 conducts current in a first conductive path through the terminals 983 and 985, and a second conductive path through the terminals 983 and 984 is in a cutoff state. In this case, the filtering output terminal 521 is coupled to the cathode of diode 1733, and therefore the driving circuit 1730 is working normally, which working includes receiving a filtered signal from the filtering output terminals 521 and 522 and then transforming the filtered signal into a driving signal, output at the driving output terminals 1521 and 1522 for driving the LED module.

[00400] When the mode switching circuit 980 determines on performing a second driving mode, the mode switch 981 conducts current in the second conductive path

through the terminals 983 and 984 and the first conductive path through the terminals 983 and 985 is in a cutoff state. In this case, the driving output terminal 1521 is coupled to the filtering output terminal 521, and therefore the driving circuit 1730 stops working, and a filtered signal is input through the filtering output terminals 521 and 522 to the driving output terminals 1521 and 1522 for driving the LED module, while bypassing the inductor 1732 and the freewheeling diode 1733 in the driving circuit 1730.

[00401] Fig. 57F is a schematic diagram of the mode switching circuit in an LED lamp according to an embodiment of the present invention. Referring to Fig. 57F, a mode switching circuit 1680 includes a mode switch 1681 being suitable for use with the driving circuit 1830 in Fig. 54E. Referring to Figs. 57F and 54E, the mode switch 1681 has three terminals 1683, 1684, and 1685, wherein the terminal 1683 is coupled to the filtering output terminal 521, the terminal 1684 is coupled to the driving output terminal 1521, and the terminal 1685 is coupled to switch 1835 in the driving circuit 1830.

[00402] When the mode switching circuit 1680 determines on performing a first driving mode, the mode switch 1681 conducts current in a first conductive path through the terminals 1683 and 1685, and a second conductive path through the terminals 1683 and 1684 is in a cutoff state. In this case, the filtering output terminal 521 is coupled to the switch 1835, and therefore the driving circuit 1830 is working normally, which working includes receiving a filtered signal from the filtering output terminals 521 and 522 and then transforming the filtered signal into a driving signal, output at the driving output terminals 1521 and 1522 for driving the LED module.

[00403] When the mode switching circuit 1680 determines on performing a second driving mode, the mode switch 1681 conducts current in the second conductive path through the terminals 1683 and 1684 and the first conductive path through the terminals 1683 and 1685 is in a cutoff state. In this case, the driving output terminal 1521 is coupled to the filtering output terminal 521, and therefore the driving circuit 1830 stops

working, and a filtered signal is input through the filtering output terminals 521 and 522 to the driving output terminals 1521 and 1522 for driving the LED module, while bypassing the inductor 1832 and the switch 1835 in the driving circuit 1830.

[00404] Fig. 57G is a schematic diagram of the mode switching circuit in an LED lamp according to an embodiment of the present invention. Referring to Fig. 57G, a mode switching circuit 1780 includes a mode switch 1781 being suitable for use with the driving circuit 1830 in Fig. 54E. Referring to Figs. 57G and 54E, the mode switch 1781 has three terminals 1783, 1784, and 1785, wherein the terminal 1783 is coupled to the filtering output terminal 521, the terminal 1784 is coupled to the driving output terminal 1521, and the terminal 1785 is coupled to inductor 1832 in the driving circuit 1830.

[00405] When the mode switching circuit 1780 determines on performing a first driving mode, the mode switch 1781 conducts current in a first conductive path through the terminals 1783 and 1785, and a second conductive path through the terminals 1783 and 1784 is in a cutoff state. In this case, the filtering output terminal 521 is coupled to the inductor 1832, and therefore the driving circuit 1830 is working normally, which working includes receiving a filtered signal from the filtering output terminals 521 and 522 and then transforming the filtered signal into a driving signal, output at the driving output terminals 1521 and 1522 for driving the LED module.

[00406] When the mode switching circuit 1780 determines on performing a second driving mode, the mode switch 1781 conducts current in the second conductive path through the terminals 1783 and 1784 and the first conductive path through the terminals 1783 and 1785 is in a cutoff state. In this case, the driving output terminal 1521 is coupled to the filtering output terminal 521, and therefore the driving circuit 1830 stops working, and a filtered signal is input through the filtering output terminals 521 and 522 to the driving output terminals 1521 and 1522 for driving the LED module, while bypassing the inductor 1832 and the switch 1835 in the driving circuit 1830.

[00407] Fig. 57H is a schematic diagram of the mode switching circuit in an LED lamp according to an embodiment of the present invention. Referring to Fig. 57H, a mode switching circuit 1880 includes two mode switches 1881 and 1882 being suitable for use with the driving circuit 1930 in Fig. 54F. Referring to Figs. 57H and 54F, the mode switch 1881 has three terminals 1883, 1884, and 1885, wherein the terminal 1883 is coupled to the driving output terminal 1521, the terminal 1884 is coupled to the filtering output terminal 521, and the terminal 1885 is coupled to the freewheeling diode 1933 in the driving circuit 1930. And the mode switch 1882 has three terminals 1886, 1887, and 1888, wherein the terminal 1886 is coupled to the driving output terminal 1522, the terminal 1887 is coupled to the filtering output terminal 522, and the terminal 1888 is coupled to the filtering output terminal 521.

[00408] When the mode switching circuit 1880 determines on performing a first driving mode, the mode switch 1881 conducts current in a first conductive path through the terminals 1883 and 1885, and a second conductive path through the terminals 1883 and 1884 is in a cutoff state, and the mode switch 1882 conducts current in a third conductive path through the terminals 1886 and 1888, and a fourth conductive path through the terminals 1886 and 1887 is in a cutoff state. In this case, the driving output terminal 1521 is coupled to the freewheeling diode 1933, and the filtering output terminal 521 is coupled to the driving output terminal 1522. Therefore the driving circuit 1930 is working normally, which working includes receiving a filtered signal from the filtering output terminals 521 and 522 and then transforming the filtered signal into a driving signal, output at the driving output terminals 1521 and 1522 for driving the LED module.

[00409] When the mode switching circuit 1880 determines on performing a second driving mode, the mode switch 1881 conducts current in the second conductive path through the terminals 1883 and 1884, and the first conductive path through the terminals 1883 and 1885 is in a cutoff state, and the mode switch 1882 conducts current in the

fourth conductive path through the terminals 1886 and 1887, and the third conductive path through the terminals 1886 and 1888 is in a cutoff state. In this case, the driving output terminal 1521 is coupled to the filtering output terminal 521, and the filtering output terminal 522 is coupled to the driving output terminal 1522. Therefore the driving circuit 1930 stops working, and a filtered signal is input through the filtering output terminals 521 and 522 to the driving output terminals 1521 and 1522 for driving the LED module, while bypassing the freewheeling diode 1933 and the switch 1935 in the driving circuit 1930.

[00410] Fig. 57I is a schematic diagram of the mode switching circuit in an LED lamp according to an embodiment of the present invention. Referring to Fig. 57I, a mode switching circuit 1980 includes two mode switches 1981 and 1982 being suitable for use with the driving circuit 1930 in Fig. 54F. Referring to Figs. 57I and 54F, the mode switch 1981 has three terminals 1983, 1984, and 1985, wherein the terminal 1983 is coupled to the filtering output terminal 522, the terminal 1984 is coupled to the driving output terminal 1522, and the terminal 1985 is coupled to switch 1935 in the driving circuit 1930. And the mode switch 1982 has three terminals 1986, 1987, and 1988, wherein the terminal 1986 is coupled to the filtering output terminal 521, the terminal 1987 is coupled to the driving output terminal 1521, and the terminal 1988 is coupled to the driving output terminal 1522.

[00411] When the mode switching circuit 1980 determines on performing a first driving mode, the mode switch 1981 conducts current in a first conductive path through the terminals 1983 and 1985, and a second conductive path through the terminals 1983 and 1984 is in a cutoff state, and the mode switch 1982 conducts current in a third conductive path through the terminals 1986 and 1988, and a fourth conductive path through the terminals 1986 and 1987 is in a cutoff state. In this case, driving output terminal 1522 is coupled to the filtering output terminal 521, and the filtering output

terminal 522 is coupled to the switch 1935. Therefore the driving circuit 1930 is working normally, which working includes receiving a filtered signal from the filtering output terminals 521 and 522 and then transforming the filtered signal into a driving signal, output at the driving output terminals 1521 and 1522 for driving the LED module.

[00412] When the mode switching circuit 1980 determines on performing a second driving mode, the mode switch 1981 conducts current in the second conductive path through the terminals 1983 and 1984, and the first conductive path through the terminals 1983 and 1985 is in a cutoff state, and the mode switch 1982 conducts current in the fourth conductive path through the terminals 1986 and 1987, and the third conductive path through the terminals 1986 and 1988 is in a cutoff state. In this case, the driving output terminal 1521 is coupled to the filtering output terminal 521, and the filtering output terminal 522 is coupled to the driving output terminal 1522. Therefore the driving circuit 1930 stops working, and a filtered signal is input through the filtering output terminals 521 and 522 to the driving output terminals 1521 and 1522 for driving the LED module, while bypassing the freewheeling diode 1933 and the switch 1935 in the driving circuit 1930.

[00413] **It's worth noting that the mode switches in the above embodiments may** each comprise, for example, a single-pole double-throw switch, or comprise two semiconductor switches (such as metal oxide semiconductor transistors), for switching a conductive path on to conduct current while leaving the other conductive path cutoff. Each of the two conductive paths provides a path for conducting the filtered signal, allowing the current of the filtered signal to flow through one of the two paths, thereby achieving the function of mode switching or selection. For example, with reference to Fig. 49A, when the lamp driving circuit 505 is not present and the LED tube lamp 500 is directly supplied by the AC power supply 508, the mode switching circuit may determine on performing a first driving mode in which the driving circuit transforms the filtered

signal into a driving signal with a logic level meeting a required logic level to properly drive the LED module to emit light. On the other hand, when the lamp driving circuit 505 is present, the mode switching circuit may determine on performing a second driving mode in which the filtered signal is (almost) directly used to drive the LED module to emit light; or alternatively the mode switching circuit may determine on performing the first driving mode to drive the LED module to emit light.

[00414] Fig. 58A is a block diagram of a power supply module in an LED lamp according to an embodiment of the present invention. Compared to Fig. 49B, the embodiment of Fig. 58A includes two rectifying circuits 510 and 540, a filtering circuit 520, and a driving circuit 1530, and further includes a ballast-compatible circuit 1510. In this embodiment, a driving circuit 1530 and an LED module 630 compose the LED lighting module 530. The ballast-compatible circuit 1510 may be coupled between the pin 501 and/or pin 502 and the rectifying circuit 510. This embodiment is explained assuming the ballast-compatible circuit 1510 to be coupled between the pin 501 and the rectifying circuit 510.

[00415] In an initial stage upon the activation of the driving system of the lamp **driving circuit 505, the lamp driving circuit 505's ability to output relevant signal**(s) has not risen to a standard state. However, in the initial stage the power supply module of the LED lamp instantly or rapidly receives or conducts the AC driving signal provided by the lamp driving circuit 505, which initial conduction is likely to fail the starting of the LED lamp by the lamp driving circuit 505 as the lamp driving circuit 505 is initially loaded by the LED lamp in this stage. For example, the internal components of the lamp driving circuit 505 may need to retrieve power from a transformed output in the lamp driving circuit 505 in order to maintain their operation upon the activation. In this case, the activation of the lamp driving circuit 505 may end up failing as its output voltage could not normally rise to a required logic level in this initial stage; or the quality factor (Q) of a

resonant circuit in the lamp driving circuit 505 may vary as a result of the initial loading from the LED lamp, so as to cause the failure of the activation.

[00416] In this embodiment, in the initial stage upon activation, the ballast-compatible circuit 1510 will be in an open-circuit state, preventing the energy of the AC driving signal from reaching the LED module. After a defined delay upon the AC driving signal as an external driving signal being input to the LED tube lamp, the ballast-compatible circuit 1510 switches from a cutoff state during the delay to a conducting state, allowing the energy of the AC driving signal to start to reach the LED module. By means of the delayed conduction of the ballast-compatible circuit 1510, operation of the LED lamp simulates the lamp-starting characteristics of a fluorescent lamp, that is, internal gases of the fluorescent lamp will normally discharge for light emission after a delay upon activation of a driving power supply. Therefore, the ballast-compatible circuit 1510 further improves the compatibility of the LED lamp with the lamp driving circuits 505 such as an electronic ballast.

[00417] Fig. 58B is a block diagram of a power supply module in an LED lamp according to an embodiment of the present invention. Compared to Fig. 58A, a ballast-compatible circuit 1510 in the embodiment of Fig. 58B is coupled between the pin 503 and/or pin 504 and the rectifying circuit 540. As explained regarding the ballast-compatible circuit 1510 in Fig. 58A, the ballast-compatible circuit 1510 in Fig. 58B performs the function of delaying the starting of the LED lamp, or causing the input of the AC driving signal to be delayed for a predefined time, in order to prevent the failure of starting by the lamp driving circuits 505 such as an electronic ballast.

[00418] Apart from coupling the ballast-compatible circuit 1510 between the terminal pin(s) and the rectifying circuit in the above embodiments, the ballast-compatible circuit 1510 may alternatively be included within a rectifying circuit with a different structure. Fig. 58C illustrates an arrangement with a ballast-compatible

circuit in an LED lamp according to a preferred embodiment of the present invention. Referring to Fig. 58C, the rectifying circuit assumes the circuit structure of the rectifying circuit 810 in Fig. 50C. The rectifying circuit 810 includes a rectifying unit 815 and a terminal adapter circuit 541. The rectifying unit 815 is coupled to the pins 501 and 502, the terminal adapter circuit 541 is coupled to the output terminals 511 and 512, and the ballast-compatible circuit 1510 in Fig. 58C is coupled between the rectifying unit 815 and the terminal adapter circuit 541. In this case, in the initial stage upon activation of the ballast, an AC driving signal as an external driving signal is input to the LED tube lamp, where the AC driving signal can only reach the rectifying unit 815, but cannot reach other circuits such as the terminal adapter circuit 541, other internal filter circuitry, and the LED lighting module. Moreover, the parasitic capacitors associated with the rectifying diodes 811 and 812 within the rectifying unit 815 are quite small in capacitance and thus can be ignored. Accordingly, the lamp driving circuit 505 in the initial stage isn't loaded with or effectively connected to the equivalent capacitor or inductor of the power supply module of the LED lamp, and the quality factor (Q) of the lamp driving circuit 505 is therefore not adversely affected in this stage, resulting in a successful starting of the LED lamp by the lamp driving circuit 505.

[00419] It's worth noting that under the condition that the terminal adapter circuit 541 doesn't include components such as capacitors or inductors, interchanging the rectifying unit 815 and the terminal adapter circuit 541 in position, meaning the rectifying unit 815 is connected to the output terminals 511 and 512 and the terminal adapter circuit 541 is connected to the pins 501 and 502, doesn't affect or alter the function of the ballast-compatible circuit 1510.

[00420] Further, as explained in Figs. 50A - 50D, when a rectifying circuit is connected to the pins 503 and 504 instead of the pins 501 and 502, this rectifying circuit may constitute the rectifying circuit 540. That is, the circuit arrangement with a

ballast-compatible circuit 1510 in Fig. 58C may be alternatively included in the rectifying circuit 540 instead of the rectifying circuit 810, without affecting the function of the ballast-compatible circuit 1510.

[00421] In some embodiments, as described above the terminal adapter circuit 541 doesn't include components such as capacitors or inductors. Or when the rectifying circuit 610 in Fig. 50A constitutes the rectifying circuit 510 or 540, the parasitic capacitances in the rectifying circuit 510 or 540 are quite small and thus can be ignored. These conditions contribute to not affecting the quality factor of the lamp driving circuit 505.

[00422] Fig. 58D is a block diagram of a power supply module in an LED lamp according to an embodiment of the present invention. Compared to the embodiment of Fig. 58A, a ballast-compatible circuit 1510 in the embodiment of Fig. 58D is coupled between the rectifying circuit 540 and the filtering circuit 520. Since the rectifying circuit 540 also doesn't include components such as capacitors or inductors, the function of the ballast-compatible circuit 1510 in the embodiment of Fig. 58D will not be affected.

[00423] Fig. 58E is a block diagram of a power supply module in an LED lamp according to an embodiment of the present invention. Compared to the embodiment of Fig. 58A, a ballast-compatible circuit 1510 in the embodiment of Fig. 58E is coupled between the rectifying circuit 510 and the filtering circuit 520. Similarly, since the rectifying circuit 510 doesn't include components such as capacitors or inductors, the function of the ballast-compatible circuit 1510 in the embodiment of Fig. 58E will not be affected.

[00424] Fig. 58F is a schematic diagram of the ballast-compatible circuit according to an embodiment of the present invention. Referring to Fig. 58F, a ballast-compatible circuit 1610 has an initial state in which an equivalent open-circuit is obtained at the ballast-compatible circuit input and output terminals 1611 and 1621. Upon receiving an

input signal at the ballast-compatible circuit input terminal 1611, a delay will pass until a current conduction occurs through and between the ballast-compatible circuit input and output terminals 1611 and 1621, transmitting the input signal to the ballast-compatible circuit output terminal 1621.

[00425] The Ballast-compatible circuit 1610 includes a diode 1612, multiple resistors 1613, 1615, 1618, 1620, and 1622, a bidirectional triode thyristor (TRIAC) 1614, a DIAC or symmetrical trigger diode 1617, a capacitor 1619, and ballast-compatible circuit input **and output terminals 1611 and 1621. It's noted that the resistance of resistor** 1613 should be quite large so that when the bidirectional triode thyristor 1614 is cutoff in an open-circuit state, an equivalent open-circuit is obtained at ballast-compatible circuit input and output terminals 1611 and 1621.

[00426] The bidirectional triode thyristor 1614 is coupled between the ballast-compatible circuit input and output terminals 1611 and 1621, and the resistor 1613 is also coupled between the ballast-compatible circuit input and output terminals 1611 and 1621 and in parallel to the bidirectional triode thyristor 1614. The diode 1612, the resistors 1620 and 1622, and the capacitor 1619 are series-connected in sequence between the ballast-compatible circuit input and output terminals 1611 and 1621, and are connected in parallel to the bidirectional triode thyristor 1614. The diode 1612 has an anode connected to the bidirectional triode thyristor 1614, and has a cathode connected to an end of the resistor 1620. The bidirectional triode thyristor 1614 has a control terminal connected to a terminal of the symmetrical trigger diode 1617, which has another terminal connected to an end of the resistor 1618, which has another end connected to a node connecting the capacitor 1619 and the resistor 1622. The resistor 1615 is connected between the control terminal of the bidirectional triode thyristor 1614 and a node connecting the resistor 1613 and the capacitor 1619. In some embodiments, the resistors 1615, 1618, and 1620 could be omitted, and hence they are depicted in

dotted line. When the resistor 1618 is omitted, another terminal of the symmetrical trigger diode 1617 mentioned above is directly connected to the node connecting the capacitor 1619 and the resistor 1622. And the cathode of the diode 1612 is connected to the resistor 1622 directly when the resistor 1620 is omitted.

[00427] When an AC driving signal (such as a high-frequency high-voltage AC signal output by an electronic ballast) is initially input to the ballast-compatible circuit input terminal 1611, the bidirectional triode thyristor 1614 will be in an open-circuit state, not allowing the AC driving signal to pass through and the LED lamp is therefore also in an open-circuit state. In this state, the AC driving signal is charging the capacitor 1619 through the diode 1612 and the resistors 1620 and 1622, gradually increasing the voltage of the capacitor 1619. Upon continually charging for a period of time, the voltage of the capacitor 1619 increases to be above the trigger voltage value of the symmetrical trigger diode 1617 so that the symmetrical trigger diode 1617 is turned on in a conducting state. Then the conducting symmetrical trigger diode 1617 will in turn trigger the bidirectional triode thyristor 1614 on in a conducting state. In this situation, the conducting bidirectional triode thyristor 1614 electrically connects the ballast-compatible circuit input and output terminals 1611 and 1621, allowing the AC driving signal to flow through the ballast-compatible circuit input and output terminals 1611 and 1621, thus starting the operation of the power supply module of the LED lamp. In this case the energy stored by the capacitor 1619 will maintain the conducting state of the bidirectional triode thyristor 1614, to prevent the AC variation of the AC driving signal from causing the bidirectional triode thyristor 1614 and therefore the ballast-compatible circuit 1610 to be cutoff again, or to prevent or reduce the bidirectional triode thyristor 1614 alternating or switching between its conducting and cutoff states.

[00428] When the ballast-compatible circuit 1610 for the present embodiment is applied to the application circuits shown in Figs. 58C-58D, the diode 1612 could be

omitted because the ballast-compatible circuit 1610 receives the signal that has rectified by the rectifying unit/circuit. In some cases, the bidirectional triode thyristor 1614 could be replaced with a silicon controlled rectifier (SCR), and the symmetrical trigger diode 1617 could be replaced with a thyristor surge suppresser. This kind of replacement does not affect the protection for the circuit. Further, using a silicon controlled rectifier instead of a bidirectional triode thyristor has a lower voltage drop across itself in conduction than that across the bidirectional triode thyristor in conduction.

[00429] In general, in hundreds of milliseconds upon activation of a lamp driving circuit 505 such as an electronic ballast, the output voltage of the ballast has risen above a certain voltage value as the output voltage has**n't been adversely affected by the** sudden initial loading from the LED lamp. In some cases, the AC voltage output from some instant-start ballasts will be firstly kept at a fixed value for a short period, such as 0.01 second, and in the meanwhile, the AC voltage at the fixed value is under 300V and rises or increases with time. However, any loading added at the output of the instant-start ballast in this short period would cause the instant-start ballast failing to pull up the AC voltage for outputting, in particularly, this situation will be quite often when the input voltage of the instant-start ballast is 120V or bellow. Besides, a detection mechanism to detect whether lighting of a fluorescent lamp is achieved may be disposed in lamp driving circuits 505 such as an electronic ballast. In this detection mechanism, if a fluorescent lamp fails to be lit up for a defined period of time, an abnormal state of the fluorescent lamp is detected, causing the fluorescent lamp to enter a protection state. In view of these facts, in certain embodiments, the delay provided by the ballast-compatible circuit 1610 until conduction of the ballast-compatible circuit 1610 and then the LED lamp should be bigger than 0.01 second and may be in the range of about 0.1 - 3 seconds.

[00430] **It's worth noting that an additional capacitor 1623 may be coupled in**

parallel to the resistor 1622. The capacitor 1623 works to reflect or support instantaneous change in the voltage between the ballast-compatible circuit input and output terminals 1611 and 1621, and will not affect the function of delayed conduction performed by the ballast-compatible circuit 1610.

[00431] Fig. 58G is a block diagram of a power supply module in an LED lamp according to an embodiment of the present invention. Compared to the embodiment of Fig. 49A, the lamp driving circuit 505 in the embodiment of Fig. 58G drives a plurality of LED tube lamps 500 connected in series, wherein a ballast-compatible circuit 1610 is disposed in each of the LED tube lamps 500. For the convenience of illustration, two series-connected LED tube lamps 500 are assumed for example and explained as follows.

[00432] Because the two ballast-compatible circuits 1610 respectively of the two LED tube lamps 500 can actually have different delays until conduction of the LED tube lamps 500, due to various factors such as errors occurring in production processes of some components, the actual timing of conduction of each of the ballast-compatible circuits 1610 is different. Upon activation of a lamp driving circuit 505, the voltage of the AC driving signal provided by the lamp driving circuit 505 will be shared out by the two LED tube lamps 500 roughly equally. Subsequently when only one of the two LED tube lamps 500 first enters a conducting state, the voltage of the AC driving signal then will be borne mostly or entirely by the other LED tube lamp 500. This situation will cause the voltage across the ballast-compatible circuits 1610 in the other LED tube lamp 500 that's not conducting to suddenly increase or be doubled, meaning the voltage between the ballast-compatible circuit input and output terminals 1611 and 1621 might even be suddenly doubled. In view of this, if the capacitor 1623 is included, the voltage division effect between the capacitors 1619 and 1623 will instantaneously increase the voltage of the capacitor 1619, making the symmetrical trigger diode 1617 triggering the

bidirectional triode thyristor 1614 into a conducting state, thus causing the two ballast-compatible circuits 1610 respectively of the two LED tube lamps 500 to become conducting almost at the same time. Therefore, by introducing the capacitor 1623, the situation, where one of the two ballast-compatible circuits 1610 respectively of the two series-connected LED tube lamps 500 that is first conducting has its bidirectional triode thyristor 1614 then suddenly cutoff as having insufficient current passing through due to the discrepancy between the delays provided by the two ballast-compatible circuits 1610 until their respective conductions, can be avoided. Therefore, using each ballast-compatible circuit 1610 with the capacitor 1623 further improves the compatibility of the series-connected LED tube lamps with each of the lamp driving circuits 505 such as an electronic ballast.

[00433] In practical use, a suggested range for the capacitance of the capacitor 1623 is about 10 pF to about 1 nF, which may in some cases be in the range of about 10 pF to about 100 pF, and may be about 47 pF in certain embodiments.

[00434] **It's worth noting that the diode 1612 is used or configu**red to rectify the signal for charging the capacitor 1619. Therefore, with reference to Figs. 58C, 58D, and 58E, in the case when the ballast-compatible circuit 1610 is arranged following a rectifying unit or circuit, the diode 1612 may be omitted. Thus the diode 1612 is depicted in a dotted line in Fig. 58F.

[00435] Fig. 58H is a schematic diagram of the ballast-compatible circuit according to another embodiment of the present invention. Referring to Fig. 58H, a ballast-compatible circuit 1710 has an initial state in which an equivalent open-circuit is obtained at the ballast-compatible circuit input and output terminals 1711 and 1721. Upon receiving an input signal at the ballast-compatible circuit input terminal 1711, the ballast-compatible circuit 1710 will be in a cutoff state when the logic level of the input external driving signal is below a defined value corresponding to a conduction delay of

the ballast-compatible circuit 1710; and the ballast-compatible circuit 1710 will enter a conducting state upon the logic level of the input external driving signal reaching the defined value, thus transmitting the input signal to the ballast-compatible circuit output terminal 1721. In some cases, the defined value is equal to or bigger than 400V.

[00436] The ballast-compatible circuit 1710 includes a bidirectional triode thyristor (TRIAC) 1712, a DIAC or symmetrical trigger diode 1713, multiple resistors 1714, 1716, and 1717, and a capacitor 1715. The bidirectional triode thyristor 1712 has a first terminal connected to the ballast-compatible circuit input terminal 1711; a control terminal connected to a terminal of the symmetrical trigger diode 1713 and an end of the resistor 1714; and a second terminal connected to another end of the resistor 1714. The capacitor 1715 has an end connected to another terminal of the symmetrical trigger diode 1713, and has another end connected to the second terminal of the bidirectional triode thyristor 1712. The resistor 1717 is in parallel connection with the capacitor 1715, and is therefore also connected to another terminal of the symmetrical trigger diode 1713 and the second terminal of the bidirectional triode thyristor 1712 mentioned above. And the resistor 1716 has an end connected to the node connecting the capacitor 1715 and the symmetrical trigger diode 1713, and has another end connected to the ballast-compatible circuit output terminal 1721.

[00437] When an AC driving signal (such as a high-frequency high-voltage AC signal output by an electronic ballast) is initially input to the ballast-compatible circuit input terminal 1711, the bidirectional triode thyristor 1712 will be in an open-circuit state, not allowing the AC driving signal to pass through and the LED lamp is therefore also in an open-circuit state. The input of the AC driving signal causes a potential difference between the ballast-compatible circuit input terminal 1711 and the ballast-compatible circuit output terminal 1721. When the AC driving signal increases with time to eventually reach a sufficient amplitude (which is a defined logic level after the delay) after a period

of time, the signal logic level at the ballast-compatible circuit output terminal 1721 has a reflected voltage at the control terminal of the bidirectional triode thyristor 1712 after passing through the resistor 1716, the parallel-connected capacitor 1715 and the resistor 1717, and the resistor 1714, wherein the reflected voltage then triggers the bidirectional triode thyristor 1712 into a conducting state. This conducting state makes the ballast-compatible circuit 1710 entering a conducting state which causes the LED lamp to operate normally. Upon the bidirectional triode thyristor 1712 conducting, a current flows through the resistor 1716 and then charges the capacitor 1715 to store a specific voltage on the capacitor 1715. In this case, the energy stored by the capacitor 1715 will maintain the conducting state of the bidirectional triode thyristor 1712, to prevent the AC variation of the AC driving signal from causing the bidirectional triode thyristor 1712 (or the ballast-compatible circuit 1710) to be cutoff again, or to prevent the situation of the bidirectional triode thyristor 1712 alternating or switching between its conducting and cutoff states.

[00438] Fig. 58I illustrates the ballast-compatible circuit according to an embodiment of the present invention. Referring to Fig. 58I, a ballast-compatible circuit 1810 includes a housing 1812, a metallic electrode 1813, a bimetallic strip 1814, and a heating filament 1816. The metallic electrode 1813 and the heating filament 1816 protrude from the housing 1812, so that they each have a portion inside the housing **1812 and a portion outside of the housing 1812. The metallic electrode 1813's outside** portion has a ballast-compatible circuit input terminal 1811, and the heating filament **1816's outside portion has a ballast**-compatible circuit output terminal 1821. The housing 1812 is hermetic or tightly sealed and contains inertial gas 1815 such as helium gas. The bimetallic strip 1814 is inside the housing 1812 and is physically and electrically connected to the portion of heating filament 1816 that is inside the housing 1812. And there is a spacing between the bimetallic strip 1814 and the metallic electrode 1813, so

that the ballast-compatible circuit input terminal 1811 and the ballast-compatible circuit output terminal 1821 are not electrically connected in the initial state of the ballast-compatible circuit 1810. The bimetallic strip 1814 may include two metallic strips with different temperature coefficients, wherein the metallic strip closer to the metallic electrode 1813 has a smaller temperature coefficient, and the metallic strip more away from the metallic electrode 1813 has a larger temperature coefficient.

[00439] When an AC driving signal (such as a high-frequency high-voltage AC signal output by an electronic ballast) is initially input at the ballast-compatible circuit input terminal 1811 and the ballast-compatible circuit output terminal 1821, a potential difference between the metallic electrode 1813 and the heating filament 1816 is formed. When the potential difference increases enough to cause electric arc or arc discharge through the inertial gas 1815, meaning when the AC driving signal increases with time to eventually reach the defined logic level after a delay, then the inertial gas 1815 is then heated to cause the bimetallic strip 1814 to swell toward the metallic electrode 1813 (as in the direction of the broken-line arrow in Fig. 58I), with this swelling eventually causing the bimetallic strip 1814 to bear against or close to the metallic electrode 1813, forming the physical and electrical connections between them. In this situation, there is electrical conduction between the ballast-compatible circuit input terminal 1811 and the ballast-compatible circuit output terminal 1821. Then the AC driving signal flows through and thus heats the heating filament 1816. In this heating process, the heating filament 1816 allows a current to flow through when electrical conduction exists between the metallic electrode 1813 and the bimetallic strip 1814, causing the temperature of the bimetallic strip 1814 to be above a defined conduction temperature. As a result, since the respective temperature of the two metallic strips of the bimetallic strip 1814 with different temperature coefficients are maintained above the defined conduction temperature, the bimetallic strip 1814 will bend against or toward the metallic electrode

1813, thus maintaining or supporting the physical joining or connection between the bimetallic strip 1814 and the metallic electrode 1813. Therefore, upon receiving an input signal at the ballast-compatible circuit input and output terminals 1811 and 1821, a delay will pass until an electrical/current conduction occurs through and between the ballast-compatible circuit input and output terminals 1811 and 1821.

[00440] Therefore, an exemplary ballast-compatible circuit such as described herein may be coupled between any pin and any rectifying circuit described above in the invention, wherein the ballast-compatible circuit will be in a cutoff state in a defined delay upon an external driving signal being input to the LED tube lamp, and will enter a conducting state after the delay. Otherwise, the ballast-compatible circuit will be in a cutoff state when the logic level of the input external driving signal is below a defined value corresponding to a conduction delay of the ballast-compatible circuit; and the ballast-compatible circuit will enter a conducting state upon the logic level of the input external driving signal reaching the defined value. Accordingly, the compatibility of the LED tube lamp described herein with the lamp driving circuits 505 such as an electronic ballast is further improved by using such a ballast-compatible circuit.

[00441] Fig. 59A is a block diagram of a power supply module in an LED tube lamp according to an embodiment of the present invention. Compared to that shown in Fig. 49B, the present embodiment comprises two rectifying circuits 510 and 540, a filtering circuit 520, and a driving circuit 1530, and further comprises two ballast-compatible circuits 1540. In this embodiment, a driving circuit 1530 and an LED module 630 compose the LED lighting module 530. The two ballast-compatible circuits 1540 are coupled respectively between the pin 503 and the rectifying output terminal 511 and between the pin 504 and the rectifying output terminal 511. Referring to Fig. 49A, the lamp driving circuit 505 is an electronic ballast for supplying an AC driving signal to drive the LED lamp of the present invention.

[00442] Two ballast-compatible circuits 1540 are initially in conducting states, and then enter into cutoff states in a delay. Therefore, in an initial stage upon activation of the lamp driving circuit 505, the AC driving signal is transmitted through the pin 503, the corresponding ballast-compatible circuit 1540, the rectifying output terminal 511 and the rectifying circuit 510, or through the pin 504, the corresponding ballast-compatible circuit 1540, the rectifying output terminal 511 and the rectifying circuit 510 of the LED lamp, and the filtering circuit 520 and the LED lighting module 530 of the LED lamp are bypassed. Thereby, the LED lamp presents almost no load and does not affect the quality factor of the lamp driving circuit 505 at the beginning, and so the lamp driving circuit can be activated successfully. The two ballast-compatible circuits 1540 are cut off after a time period while the lamp driving circuit 505 has been activated successfully. After that, the lamp driving circuit 505 has a sufficient drive capability for driving the LED lamp to emit light.

[00443] Fig. 59B is a block diagram of a power supply module in an LED tube lamp according to an embodiment of the present invention. Compared to that shown in Fig. 59A, two ballast-compatible circuits 1540 are changed to be coupled respectively between the pin 503 and the rectifying output terminal 512 and between the pin 504 and the rectifying output terminal 512. Similarly, two ballast-compatible circuits 1540 are initially in conducting states, and then changed to cutoff states after an objective delay. Thereby, the lamp driving circuit 505 drives the LED lamp to emit light after the lamp driving circuit 505 has activated.

[00444] It is worth noting that the arrangement of the two ballast-compatible circuits 1540 may be changed to be coupled between the pin 501 and the rectifying terminal 511 and between the pin 502 and the rectifying terminal 511, or between the pin 501 and the rectifying terminal 512 and between the pin 502 and the rectifying terminal 512, for having the lamp driving circuit 505 drive the LED lamp to emit light after being activated.

[00445] Fig. 59C is a block diagram of a power supply module in an LED tube lamp according to an embodiment of the present invention. Compared to that shown in Figs. 59A and 59B, the rectifying circuit 810 shown in Fig. 50C replaces the rectifying circuit 540, and the rectifying unit 815 of the rectifying circuit 810 is coupled to the pins 503 and 504 and the terminal adapter circuit 541 thereof is coupled to the rectifying output terminals 511 and 512. The arrangement of the two ballast-compatible circuits 1540 is also changed to be coupled respectively between the pin 501 and the half-wave node 819 and between the pin 502 and the half-wave node 819.

[00446] In an initial stage upon activation of the lamp driving circuit 505, two ballast-compatible circuits 1540 are initially in conducting states. At this moment, the AC driving signal is transmitted through the pin 501, the corresponding ballast-compatible circuit 1540, the half-wave node 819 and the rectifying unit 815, or the pin 502, the corresponding ballast-compatible circuit 1540, the half-wave node 819 and the rectifying unit 815 of the LED lamp, and the terminal adapter circuit 541, the filtering circuit 520 and the LED lighting module 530 of the LED lamp are bypassed. Thereby, the LED lamp presents almost no load and does not affect the quality factor of the lamp driving circuit 505 at the beginning, and so the lamp driving circuit can be activated successfully. The two ballast-compatible circuits 1540 are cut off after a time period while the lamp driving circuit 505 has been activated successfully. After that, the lamp driving circuit 505 has a sufficient drive capability for driving the LED lamp to emit light.

[00447] It is worth noting that the rectifying circuit 810 shown in Fig. 50C may replace the rectifying circuit 510 of the present embodiment shown in Fig. 59C. Wherein, the rectifying unit 815 of the rectifying circuit 810 is coupled to the pins 501 and 502 and the terminal adapter circuit 541 thereof is coupled to the rectifying output terminals 511 and 512. The arrangement of the two ballast-compatible circuits 1540 is also changed to be coupled respectively between the pin 503 and the half-wave node 819 and between

the pin 504 and the half-wave node 819. Accordingly, the ballast-compatible circuit 1540 can still make the lamp driving circuit 505 drive the LED lamp to emit light after being activated.

[00448] Fig. 59D is a schematic diagram of a ballast-compatible circuit according to an embodiment of the present invention, which is applicable to the embodiments shown in Figs. 59A and 59C and the described modification thereof.

[00449] A ballast-compatible circuit 1640 comprises multiple resistors 1643, 1645, 1648 and 1650, two capacitors 1644 and 1649, two diodes 1647 and 1652, two bipolar junction transistors (BJT) 1646 and 1651, a ballast-compatible circuit terminal 1641 and a ballast-compatible circuit terminal 1642. One end of the resistor 1645 is coupled to the ballast-compatible circuit terminal 1641, and the other end is coupled to an emitter of the BJT 1646. A collector of the BJT 1646 is coupled to a positive end of the diode 1647, and a negative end thereof is coupled to the ballast-compatible circuit terminal 1642. The resistor 1643 and the capacitor 1644 are connected in series with each other and coupled between the emitter and the collector of the BJT 1646, and the connection node of the resistor 1643 and the capacitor 1644 is coupled to a base of the BJT 1646. One end of the resistor 1650 is coupled to the ballast-compatible circuit terminal 1642, and the other end is coupled to an emitter of the BJT 1651. A collector of the BJT 1651 is coupled to a positive end of the diode 1652, and a negative end thereof is coupled to the ballast-compatible circuit terminal 1641. The resistor 1648 and the capacitor 1649 are connected in series with each other and coupled between the emitter and the collector of the BJT 1651, and the connection node of the resistor 1648 and the capacitor 1649 is coupled to a base of the BJT 1651.

[00450] In an initial stage upon the lamp driving circuit 505, e.g. electronic ballast, being activated, voltages across the capacitors 1644 and 1649 are about zero. At this time, the BJTs 1646 and 1651 are in conducting state and the bases thereof allow

currents to flow through. Therefore, in an initial stage upon activation of the lamp driving circuit 505, the ballast-compatible circuits 1640 are in conducting state. The AC driving signal charges the capacitor 1644 through the resistor 1643 and the diode 1647, and charges the capacitor 1649 through the resistor 1648 and the diode 1652. After a time period, the voltages across the capacitors 1644 and 1649 reach certain voltages so as to reduce the voltages of the resistors 1643 and 1648, thereby cutting off the BJTs 1646 and 1651, i.e., the states of the BJTs 1646 and 1651 are cutoff states. At this time, the state of the ballast-compatible circuit 1640 is changed to the cutoff state. Thereby, the internal capacitor(s) and inductor(s) do not affect in Q-factor of the lamp driving circuit 505 at the beginning for ensuring the lamp driving circuit activating. Hence, the ballast-compatible circuit 1640 improves the compatibility of LED lamp with the electronic ballast.

[00451] In summary, the two ballast-compatible circuits of the present invention are respectively coupled between a connection node of the rectifying circuit and the filtering circuit (i.e., the rectifying output terminal 511 or 512) and the pin 501 and between the connection node and the pin 502, or coupled between the connection node and the pin 503 and the connection node and the pin 504. The two ballast-compatible circuits conduct for an objective delay upon the external driving signal being input into the LED tube lamp, and then are cut off after the objective delay for enhancing the compatibility of the LED lamp with the electronic ballast.

[00452] Fig. 60A is a block diagram of a power supply module in an LED tube lamp according to an embodiment of the present invention. Compared to that shown in Fig. 49B, the LED tube lamp comprises two rectifying circuits 510 and 540, a filtering circuit 520, and an LED lighting module 530, and further comprises two filament-simulating circuits 1560. The filament-simulating circuits 1560 are respectively coupled between the pins 501 and 502 and coupled between the pins 503 and 504, for improving a

compatibility with a lamp driving circuit having filament detection function, e.g.: program-start ballast.

[00453] In an initial stage upon the lamp driving circuit having filament detection function being activated, the lamp driving circuit will determine whether the filaments of the lamp operate normally or are in an abnormal condition of short-circuit or open-circuit. Once determining the abnormal condition of the filaments, the lamp driving circuit stops operating and enters a protection state. In order to avoid a situation where the lamp driving circuit erroneously determines the LED tube lamp to be abnormal due to the LED tube lamp having no filament, the two filament-simulating circuits 1560 simulate the operation of actual filaments of a fluorescent tube to have the lamp driving circuit enter into a normal state to start the LED lamp normally.

[00454] Fig. 60B is a schematic diagram of a filament-simulating circuit according to an embodiment of the present invention. The filament-simulating circuit comprises a capacitor 1663 and a resistor 1665 connected in parallel, and two ends of the capacitor 1663 and two ends of the resistor 1665 are re respectively coupled to the filament simulating terminals 1661 and 1662. Referring to FIG. 60A, the filament simulating terminals 1661 and 1662 of the two filament simulating circuits 1660 are respectively coupled to the pins 501 and 502 and the pins 503 and 504. During the filament detection process, the lamp driving circuit outputs a detection signal to detect the state of the filaments. The detection signal passes the capacitor 1663 and the resistor 1665 and so the lamp driving circuit determines that the filaments of the LED lamp are normal.

[00455] In addition, a capacitance value of the capacitor 1663 is low and so a capacitive reactance (equivalent impedance) of the capacitor 1663 is far lower than an impedance of the resistor 1665 due to the lamp driving circuit outputting a high-frequency alternative current (AC) signal to drive LED lamp. Therefore, the filament-simulating circuit 1660 consumes fairly low power when the LED lamp operates

normally, and so it almost does not affect the luminous efficiency of the LED lamp.

[00456] Fig. 60C is a schematic block diagram including a filament-simulating circuit according to an embodiment of the present invention. In the present embodiment, the filament-simulating circuit 1660 replaces the terminal adapter circuit 541 of the rectifying circuit 810 shown in FIG. 50C, which is adopted as the rectifying circuit(s) 510 or/and 540 in the LED lamp. For example, the filament-simulating circuit 1660 of the present embodiment has both of filament simulating and terminal adapting functions. Referring to FIG. 60A, the filament simulating terminals 1661 and 1662 of the filament-simulating circuit 1660 are respectively coupled to the pins 501 and 502 or/and pins 503 and 504. The half-wave node 819 of the rectifying unit 815 in the rectifying circuit 810 is coupled to the filament simulating terminal 1662.

[00457] Fig. 60D is a schematic block diagram including a filament-simulating circuit according to another embodiment of the present invention. Compared to that shown in FIG. 60C, the half-wave node is changed to be coupled to the filament simulating terminal 1661, and the filament-simulating circuit 1660 in the present embodiment still has both of filament simulating and terminal adapting functions.

[00458] Fig. 60E is a schematic diagram of a filament-simulating circuit according to another embodiment of the present invention. A filament-simulating circuit 1760 comprises two capacitors 1763 and 1764, and two resistors 1765 and 1766. The capacitors 1763 and 1764 are connected in series and coupled between the filament simulating terminals 1661 and 1662. The resistors 1765 and 1766 are connected in series and coupled between the filament simulating terminals 1661 and 1662. Furthermore, the connection node of the capacitors 1763 and 1764 is coupled to that of the resistors 1765 and 1766. Referring to Fig. 60A, the filament simulating terminals 1661 and 1662 of the filament-simulating circuit 1760 are respectively coupled to the pins 501 and 502 and the pins 503 and 504. When the lamp driving circuit outputs the

detection signal for detecting the state of the filament, the detection signal passes the capacitors 1763 and 1764 and the resistors 1765 and 1766 so that the lamp driving circuit determines that the filaments of the LED lamp are normal.

[00459] It is worth noting that in some embodiments, capacitance values of the capacitors 1763 and 1764 are low and so a capacitive reactance of the serially connected capacitors 1763 and 1764 is far lower than an impedance of the serially connected resistors 1765 and 1766 due to the lamp driving circuit outputting the high-frequency AC signal to drive LED lamp. Therefore, the filament-simulating circuit 1760 consumes fairly low power when the LED lamp operates normally, and so it almost does not affect the luminous efficiency of the LED lamp. Moreover, any one of the capacitor 1763 and the resistor 1765 is short circuited or is an open circuit, or any one of the capacitor 1764 and the resistor 1766 is short circuited or is an open circuit, the detection signal still passes through the filament-simulating circuit 1760 between the filament simulating terminals 1661 and 1662. Therefore, the filament-simulating circuit 1760 still operates normally when any one of the capacitor 1763 and the resistor 1765 is short circuited or is an open circuit or any one of the capacitor 1764 and the resistor 1766 is short circuited or is an open circuit, and so it has quite high fault tolerance.

[00460] The embodiment of filament-simulating circuit mentioned above could use ceramic capacitor or metallized polypropylene film capacitor, such as the ceramic capacitor in class 2, the metallized polypropylene film capacitor(X2). When the metallized polypropylene film capacitor(X2) is adopted, since its capacitance is smaller than 100 nF and it has a small inherent impedance, it can make the current of the filament-simulating circuit down to tens mA to reduce power consumption. Also, the heating caused by the inherent impedance is smaller, the temperature could be above 70 degrees Celsius or even in the range of 50-60 degrees Celsius.

[00461] In some cases, the circuit design adopts the flexible sheet to make all of or

some of the LED components and the active/passive parts of the AC power module being able to be disposed on the same flexible sheet or different flexible sheets to simplify the structure design in the LED lamp. The capacitor(s) may be preferable to, for example, X7R multi-layer ceramic capacitor and the capacitance thereof can in some embodiments be bigger than 100 nF.

[00462] Fig. 60F is a schematic block diagram including a filament-simulating circuit according to an embodiment of the present invention. In the present embodiment, the filament-simulating circuit 1860 replaces the terminal adapter circuit 541 of the rectifying circuit 810 shown in FIG. 50C, which is adopted as the rectifying circuit 510 or/and 540 in the LED lamp. For example, the filament-simulating circuit 1860 of the present embodiment has both of filament simulating and terminal adapting functions. An impedance of the filament-simulating circuit 1860 has a negative temperature coefficient (NTC), i.e., the impedance at a higher temperature is lower than that at a lower temperature. In the present embodiment, the filament-simulating circuit 1860 comprises two NTC resistors 1863 and 1864 connected in series and coupled to the filament simulating terminals 1661 and 1662. Referring to Fig. 60A, the filament simulating terminals 1661 and 1662 are respectively coupled to the pins 501 and 502 or/and the pins 503 and 504. The half-wave node 819 of the rectifying unit 815 in the rectifying circuit 810 is coupled to a connection node of the NTC resistors 1863 and 1864.

[00463] When the lamp driving circuit outputs the detection signal for detecting the state of the filament, the detection signal passes the NTC resistors 1863 and 1864 so that the lamp driving circuit determines that the filaments of the LED lamp are normal. The impedance of the serially connected NTC resistors 1863 and1864 is gradually decreased with the gradually increasing of temperature due to the detection signal or a preheat process. When the lamp driving circuit enters into the normal state to start the LED lamp normally, the impedance of the serially connected NTC resistors 1863 and

1864 is decreased to a relative low value and so the power consumption of the filament simulation circuit 1860 is lower.

[00464] An exemplary impedance of the filament-simulating circuit 1860 can be 10 ohms or more at room temperature (25 degrees Celsius) and may be decreased to a range of about 2-10 ohms when the lamp driving circuit enters into the normal state. It may be preferred that the impedance of the filament-simulating circuit 1860 is decreased to a range of about 3-6 ohms when the lamp driving circuit enters into the normal state.

[00465] Fig. 61A is a block diagram of a power supply module in an LED tube lamp according to an embodiment of the present invention. Compared to that shown in Fig. 49B, the present embodiment comprises two rectifying circuits 510 and 540, a filtering circuit 520, and an LED lighting module 530, and further comprises an over voltage protection (OVP) circuit 1570. The OVP circuit 1570 is coupled to the filtering output terminals 521 and 522 for detecting the filtered signal. The OVP circuit 1570 clamps the logic level of the filtered signal when determining the logic level thereof higher than a defined OVP value. Hence, the OVP circuit 1570 protects the LED lighting module 530 from damage due to an OVP condition.

[00466] Fig. 61B is a schematic diagram of an overvoltage protection (OVP) circuit according to an embodiment of the present invention. An OVP circuit 1670 comprises a voltage clamping diode 1671, such as zener diode, coupled to the filtering output terminals 521and 522. The voltage clamping diode 1671 is conducted to clamp a voltage difference at a breakdown voltage when the voltage difference of the filtering output terminals 521 and 522 (i.e., the logic level of the filtered signal) reaches the breakdown voltage. The breakdown voltage may be preferred in a range of about 40 V to about 100 V, and more preferred in a range of about 55 V to about 75V.

[00467] Fig. 62A is a block diagram of a power supply module in an LED tube lamp according to an embodiment of the present invention. Compared to that shown in Fig.

60A, the present embodiment comprises two rectifying circuits 510 and 540, a filtering circuit 520, an LED lighting module 530 and two filament-simulating circuits 1560, and further comprises a ballast detection circuit 1590. The ballast detection circuit 1590 may be coupled to any one of the pins 501, 502, 503 and 504 and a corresponding rectifying circuit of the rectifying circuits 510 and 540. In the present embodiment, the ballast detection circuit 1590 is coupled between the pin 501 and the rectifying circuit 510.

[00468] The ballast detection circuit 1590 detects the AC driving signal or a signal input through the pins 501, 502, 503 and 504, and determines whether the input signal is provided by an electric ballast based on the detected result.

[00469] Fig. 62B is a block diagram of a power supply module in an LED tube lamp according to an embodiment of the present invention. Compared to that shown in Fig. 62A, the rectifying circuit 810 shown in Fig. 50C replaces the rectifying circuit 540 in the present embodiment. The ballast detection circuit 1590 is coupled between the rectifying unit 815 and the terminal adapter circuit 541. One of the rectifying unit 815 and the terminal adapter circuit 541 is coupled to the pins 503 and 504, and the other one is coupled to the rectifying output terminals 511 and 512. In the present embodiment, the rectifying unit 815 is coupled to the pins 503 and 504, and the terminal adapter circuit 541 is coupled to the rectifying output terminals 511 and 512. Similarly, the ballast detection circuit 1590 detects the signal input through the pins 503 and 504 for determining the input signal whether provided by an electric ballast according to the frequency of the input signal.

[00470] In addition, the rectifying circuit 810 may replace the rectifying circuit 510 instead of the rectifying circuit 540, and the ballast detection circuit 1590 is coupled between the rectifying unit 815 and the terminal adapter circuit 541 in the rectifying circuit 510.

[00471] Fig. 62C is a block diagram of a ballast detection circuit according to an

embodiment of the present invention. A ballast detection circuit 1590 comprises a detection circuit 1590a and a switch circuit 1590b. The switch circuit 1590b is coupled to two switch terminals 1591 and 1592. The detection circuit 1590a is coupled to two detection terminals 1593 and 1594 for detecting a signal transmitted through the detection terminals 1593 and 1594. Alternatively, the switch terminals 1591 and 1592 serves as the detection terminals and the detection terminals 1593 and 1594 are omitted. For example, in certain embodiments, the switch circuit 1590b and the detection circuit 1590a are commonly coupled to the switch terminals 1591 and 1592, and the detection circuit 1590a detects a signal transmitted through the switch terminals 1591 and 1592. Hence, the detection terminals 1593 and 1594 are depicted by dotted lines.

[00472] Fig. 62D is a schematic diagram of a ballast detection circuit according to an embodiment of the present invention. A ballast detection circuit 1690 comprises a detection circuit 1690a and a switch circuit 1690b, and is coupled between the switch terminals 1591 and 1592. The detection circuit 1690a comprises a symmetrical trigger diode 1691, two resistors 1692 and 1696 and multiple capacitors 1693, 1697 and 1698. The switch circuit 1690b comprises a TRIAC 1699 and an inductor 1694.

[00473] The capacitor 1698 is coupled between the switch terminals 1591 and1592 for generating a detection voltage in response to a signal transmitted through the switch terminals 1591 and1592. When the signal is a high frequency signal, the capacitive reactance of the capacitor 1698 is fairly low and so the detection voltage generated thereby is quite small. Whereas the signal is a low frequency signal or a DC signal, the capacitive reactance of the capacitor 1698 is quite high and so the detection voltage generated thereby is quite high. The resistor 1692 and the capacitor 1693 are connected in series and coupled between two ends of the capacitor 1698. The serially connected resistor 1692 and the capacitor 1693 is used to filter the detection signal generated by the capacitor 1698 and generates a filtered detection signal at a connection node thereof.

The filter function of the resistor 1692 and the capacitor 1693 is used to filter high frequency noise in the detection signal for preventing the switch circuit 1690b from misoperation due to the high frequency noise. The resistor 1696 and the capacitor 1697 are connected in series and coupled between two ends of the capacitor 1693, and transmit the filtered detection signal to one end of the symmetrical trigger diode1691. The serially connected resistor 1696 and capacitor 1697 performs second filtering of the filtered detection signal to enhance the filter effect of the detection circuit 1690a. Based on requirement for filtering logic levels of different applications, the capacitor 1697 may be omitted and the end of the symmetrical trigger diode 1691 is coupled to the connection node of the resistor 1692 and the capacitor 1693 through the resistor 1696. Alternatively, both of the resistor 1696 and the capacitor 1697 are omitted and the end of the symmetrical trigger diode 1691 is directly coupled to the connection node of the resistor 1692 and the capacitor 1693. Therefore, the resistor 1696 and the capacitor 1697 are depicted by dotted lines. The other end of the symmetrical trigger diode 1691 is coupled to a control end of the TRIAC 1699 of the switch circuit 1690b. The symmetrical trigger diode 1691 determines whether to generate a control signal 1695 to trigger the TRIAC 1699 on according to a logic level of a received signal. A first end of the TRIAC 1699 is coupled to the switch terminal 1591 and a second end thereof is coupled to the switch terminal 1592 through the inductor 1694. The inductor 1694 is used to protect the TRIAC 1699 from damage due to a situation where the signal transmitted into the switch terminals 1591 and 1592 is over a maximum rate of rise of commutation voltage or switching voltage, a repetitive peak voltage in off-state or a maximum rate of change of current.

[00474] When the switch terminals 1591 and 1592 receive a low frequency signal or a DC signal, the detection signal generated by the capacitor 1698 is high enough to make the symmetrical trigger diode 1691 generate the control signal 1695 to trigger the

TRIAC 1699 on. At this time, the switch terminals 1591 and 1592 are shorted to bypass the circuit(s) connected in parallel with the switch circuit 1690b, such as a circuit coupled between the switch terminals 1591 and 1592, the detection circuit 1690a and the capacitor 1698.

[00475] In some embodiments, when the switch terminals 1591 and 1592 receive a high frequency AC signal, the detection signal generated by the capacitor 1698 is not high enough to make the symmetrical trigger diode 1691 generate the control signal 1695 to trigger the TRIAC 1699 on. At this time, the TRIAC 1699 is cut off and so the high frequency AC signal is mainly transmitted through an external circuit or the detection circuit 1690a.

[00476] Hence, the ballast detection circuit 1690 can determine whether the input signal is a high frequency AC signal provided by an electric ballast. If yes, the high frequency AC signal is transmitted through the external circuit or the detection circuit 1690a; if no, the input signal is transmitted through the switch circuit 1690b, bypassing the external circuit and the detection circuit 1690a.

[00477] It is worth noting that the capacitor 1698 may be replaced by external capacitor(s), such as at least one capacitor in the terminal adapter circuits shown in Fig. 51A-C. Therefore, the capacitor 1698 may be omitted and be therefore depicted by a dotted line.

[00478] Fig. 62E is a schematic diagram of a ballast detection circuit according to an embodiment of the present invention. A ballast detection circuit 1790 comprises a detection circuit 1790a and a switch circuit 1790b. The switch circuit 1790b is coupled between the switch terminals 1591 and 1592. The detection circuit 1790a is coupled between the detection terminals 1593 and 1594. The detection circuit 1790a comprises two inductors 1791 and 1792 with mutual induction, two capacitors 1793 and 1796, a resistor 1794 and a diode 1797. The switch circuit 1790b comprises a switch 1799. In

the present embodiment, the switch 1799 is a p-type depletion mode MOSFET, which is cut off when the gate voltage is higher than a threshold voltage and is conducted when the gate voltage is lower than the threshold voltage.

[00479] The inductor 1792 is coupled between the detection terminals 1593 and 1594 and induces a detection voltage in the inductor 1791 based on a current signal flowing through the detection terminals 1593 and 1594. The logic level of the detection voltage is varied with the frequency of the current signal, and may be increased with the increasing of that frequency and reduced with the decreasing of that frequency.

[00480] In some embodiments, when the signal is a high frequency signal, the inductive reactance of the inductor 1792 is quite high and so the inductor 1791 induces the detection voltage with a quite high logic level. When the signal is a low frequency signal or a DC signal, the inductive reactance of the inductor 1792 is quite low and so the inductor 1791 induces the detection voltage with a quite low logic level. One end of the inductor 1791 is grounded. The serially connected capacitor 1793 and resistor 1794 is connected in parallel with the inductor 1791 to receive the detection voltage generated by the inductor 1791 and to filter a high frequency component of the detection voltage to generate a filtered detection voltage. The filtered detection voltage charges the capacitor 1796 through the diode 1797 to generate a control signal 1795. Due to the diode 1797 providing a one-way charge for the capacitor 1796, the logic level of control signal 1795 generated by the capacitor 1796 is the maximum value of the detection voltage. The capacitor 1796 is coupled to the control end of the switch 1799. First and second ends of the switch 1799 are respectively coupled to the switch terminals 1591 and 1592.

[00481] When the signal received by the detection terminals 1593 and 1594 is a low frequency signal or a DC signal, the control signal 1795 generated by the capacitor 1796 is lower than the threshold voltage of the switch 1799 and so the switch 1799 are conducted. At this time, the switch terminals 1591 and 1592 are shorted to bypass the

external circuit(s) connected in parallel with the switch circuit 1790b, such as at least one capacitor in the terminal adapter circuits those shown in Figs. 51A-C.

[00482] When the signal received by the detection terminal 1593 and 1594 is a high frequency signal, the control signal 1795 generated by the capacitor 1796 is higher than the threshold voltage of the switch 1799 and so the switch 1799 are cut off. At this time, the high frequency signal is transmitted by the external circuit(s).

[00483] Hence, the ballast detection circuit 1790 can determine whether the input signal is a high frequency AC signal provided by an electric ballast. If yes, the high frequency AC signal is transmitted through the external circuit(s); if no, the input signal is transmitted through the switch circuit 1790b, bypassing the external circuit(s).

[00484] Next, exemplary embodiments of the conduction (bypass) and cut off (not bypass) operations of the switch circuit in the ballast detection circuit of an LED lamp will be illustrated. For example, the switch terminals 1591 and 1592 are coupled to a capacitor connected in series with the LED lamp, e.g., a signal for driving the LED lamp also flows through the capacitor. The capacitor may be disposed inside the LED lamp to be connected in series with internal circuit(s) or outside the LED lamp to be connected in series with the LED lamp. When the lamp driving circuit 505 exists, the lamp driving circuit 505 provides a high voltage and high frequency AC driving signal as an external driving signal to drive the LED tube lamp 500. At this moment, the switch circuit of the ballast detection circuit is cut off, and so the capacitor is connected in series with an equivalent capacitor of the internal circuit(s) of the LED tube lamp for forming a capacitive voltage divider network. Thereby, a division voltage applied in the internal circuit(s) of the LED tube lamp is lower than the high voltage and high frequency AC driving signal, e.g.: the division voltage is in a range of 100-270V, and so no over voltage causes the internal circuit(s) damage. Alternatively, the switch terminals 1591 and 1592 is coupled to the capacitor(s) of the terminal adapter circuit shown in Figs. 51A-C to have

the signal flowing through the half-wave node as well as the capacitor(s), e.g., the capacitor 642 in Fig. 51A, or the capacitor 842 in Fig. 51C. When the high voltage and high frequency AC signal generated by the lamp driving circuit 505 is input, the switch circuit is cut off and so the capacitive voltage divider is performed; and when the low frequency AC signal of the commercial power or the direct current of battery is input, the switch circuit bypasses the capacitor(s).

[00485] It is worth noting that the switch circuit may have plural switch units to have two or more switch terminals connecting in parallel with plural parallel-connected capacitors (e.g., the capacitors 645 and 646 in Fig. 51A, the capacitors 643, 645 and 646 in Fig. 51A, the capacitors 743 and 744 or/and the capacitors 745 and 746 in Fig. 51B, the capacitors 843 and 844 in Fig. 51C, the capacitors 845 and 846 in Fig. 51C, the capacitors 842, 843 and 844 in Fig. 51C, the capacitors 842, 845 and 846 in Fig. 51C, and the capacitors 842, 843, 844, 845 and 846 in Fig. 51C) to achieve the effect of bypassing the plural capacitors equivalently serial-connected with the LED tube lamp.

[00486] In addition, the ballast detection circuit of the present invention can be used in conjunction with the mode switching circuits shown in Figs. 57A-57I. The switch circuit of the ballast detection circuit is replaced with the mode switching circuit. The detection circuit of the ballast detection circuit is coupled to one of the pins 501, 502, 503 and 504 for detecting the signal input into the LED lamp through the pins 501, 502, 503 and 504. The detection circuit generates a control signal to control the mode switching circuit being at the first mode or the second mode according to whether the signal is a high frequency, low frequency or DC signal, i.e., the frequency of the signal.

[00487] For example, when the signal is a high frequency signal and higher than a defined mode switch frequency, such as the signal provided by the lamp driving circuit 505, the control signal generated by the detection circuit makes the mode switching circuit be at the second mode for directly inputting the filtered signal into the LED module.

When the signal is a low frequency signal or a direct signal and lower than the defined mode switch frequency, such as the signal provided by the commercial power or the battery, the control signal generated by the detection circuit makes the mode switching circuit be at the first mode for directly inputting the filtered signal into the driving circuit.

[00488] Fig. 63A is a block diagram of a power supply module in an LED tube lamp according to an embodiment of the present invention. Compared to that shown in Fig. 60A, the present embodiment comprises two rectifying circuits 510 and 540, a filtering circuit 520, an LED lighting module 530, two filament-simulating circuits 1560, and further comprises an auxiliary power module 2510. The auxiliary power module 2510 is coupled between the filtering output terminals 521 and 522. The auxiliary power module 2510 detects the filtered signal in the filtering output terminals 521 and 522, and determines whether providing an auxiliary power to the filtering output terminals 521 and 522 based on the detected result. When the supply of the filtered signal is stopped or a logic level thereof is insufficient, i.e., when a drive voltage for the LED module is below a defined voltage, the auxiliary power module provides auxiliary power to keep the LED lighting module 530 continuing to emit light. The defined voltage is determined according to an auxiliary power voltage of the auxiliary power module 2510. The filament-simulating circuits 1560 may be omitted and are therefore depicted by dotted lines.

[00489] Fig. 63B is a block diagram of a power supply module in an LED tube lamp according to an embodiment of the present invention. Compared to that shown in Fig. 63A, the present embodiment comprises two rectifying circuits 510 and 540, a filtering circuit 520, an LED lighting module 530, two filament-simulating circuits 1560, and an auxiliary power module 2510, and the LED lighting module 530 further comprises a driving circuit 1530 and an LED module 630. The auxiliary power module 2510 is coupled between the driving output terminals 1521 and 1522. The auxiliary power

module 2510 detects the driving signal in the driving output terminals 1521 and 1522, and determines whether to provide an auxiliary power to the driving output terminals 1521 and 1522 based on the detected result. When the driving signal is no longer being supplied or a logic level thereof is insufficient, the auxiliary power module 2510 provides the auxiliary power to keep the LED module 630 continuously light. The filament-simulating circuits 1560 may be omitted and are therefore depicted by dotted lines.

[00490] Fig. 63C is a schematic diagram of an auxiliary power module according to an embodiment of the present invention. The auxiliary power module 2610 comprises an energy storage unit 2613 and a voltage detection circuit 2614. The auxiliary power module further comprises an auxiliary power positive terminal 2611 and an auxiliary power negative terminal 2612 for being respectively coupled to the filtering output terminals 521 and 522 or the driving output terminals 1521 and 1522. The voltage detection circuit 2614 detects a logic level of a signal at the auxiliary power positive terminal 2611 and the auxiliary power negative terminal 2612 to determine whether releasing outward the power of the energy storage unit 2613 through the auxiliary power positive terminal 2611 and the auxiliary power negative terminal 2612.

[00491] In the present embodiment, the energy storage unit 2613 is a battery or a supercapacitor. When a voltage difference of the auxiliary power positive terminal 2611 and the auxiliary power negative terminal 2612(the drive voltage for the LED module) is higher than the auxiliary power voltage of the energy storage unit 2613, the voltage detection circuit 2614 charges the energy storage unit 2613 by the signal in the auxiliary power positive terminal 2611 and the auxiliary power negative terminal 2612. When the drive voltage is lower than the auxiliary power voltage, the energy storage unit 2613 releases the stored energy outward through the auxiliary power positive terminal 2611 and the auxiliary power negative terminal 2612.

[00492] The voltage detection circuit 2614 comprises a diode 2615, a bipolar junction transistor (BJT) 2616 and a resistor 2617. A positive end of the diode 2615 is coupled to a positive end of the energy storage unit 2613 and a negative end of the diode 2615 is coupled to the auxiliary power positive terminal 2611. The negative end of the energy storage unit 2613 is coupled to the auxiliary power negative terminal 2612. A collector of the BJT 2616 is coupled to the auxiliary power positive terminal 2611, and an emitter thereof is coupled to the positive end of the energy storage unit 2613. One end of the resistor 2617 is coupled to the auxiliary power positive terminal 2611 and the other end is coupled to a base of the BJT 2616. When the collector of the BJT 2616 is a cut-in voltage higher than the emitter thereof, the resistor 2617 conducts the BJT 2616. When the power source provides power to the LED tube lamp normally, the energy storage unit 2613 is charged by the filtered signal through the filtering output terminals 521 and 522 and the conducted BJT 2616 or by the driving signal through the driving output terminals 1521 and 1522 and the conducted BJT 2616 until that the collector-emitter voltage of the BJT 2616 is lower than or equal to the cut-in voltage. When the filtered signal or the driving signal is no longer being supplied or the logic level thereof is insufficient, the energy storage unit 2613 provides power through the diode 2615 to keep the LED lighting module 530 or the LED module 630 continuously light.

[00493] It is worth noting that in some embodiments, the maximum voltage of the charged energy storage unit 2613 is at least one cut-in voltage of the BJT 2616 lower than the voltage difference applied between the auxiliary power positive terminal 2611 and the auxiliary power negative terminal 2612. The voltage difference provided between the auxiliary power positive terminal 2611 and the auxiliary power negative terminal 2612 is a turn-on voltage of the diode 2615 lower than the voltage of the energy storage unit 2613. Hence, when the auxiliary power module 2610 provides power, the voltage applied at the LED module 630 is lower (about the sum of the cut-in voltage of

the BJT 2616 and the turn-on voltage of the diode 2615). In the embodiment shown in the Fig. 63B, the brightness of the LED module 630 is reduced when the auxiliary power module supplies power thereto. Thereby, when the auxiliary power module is applied to an emergency lighting system or a constant lighting system, the user realizes the main power supply, such as commercial power, is abnormal and then performs necessary precautions therefor.

[00494] Referring to Fig. 64A, a block diagram of an LED tube lamp including a power supply module in accordance with certain embodiments is illustrated. Compared to the LED lamp shown in Fig. 49B, the LED tube lamp of FIG. 64A comprises two rectifying circuits 510 and 540, a filtering circuit 520, and an LED lighting module 530, and further comprises an installation detection module 2520. The installation detection module 2520 is coupled to the rectifying circuit 510 (and/or the rectifying circuit 540) via an installation detection terminal 2521 and is coupled to the filtering circuit 520 via an installation detection terminal 2522. The installation detection module 2520 detects the signal passing through the installation detection terminals 2521 and 2522 and determines whether to cut off an LED driving signal (e.g., an external driving signal) passing through the LED tube lamp based on the detected result. The installation detection module includes circuitry configured to perform these steps, and thus may be referred to as an installation detection circuit, or more generally as a detection circuit or cut-off circuit. When an LED tube lamp is not yet installed on a lamp socket or holder, or in some cases if it is not installed properly or is only partly installed (e.g., one side is connected to a lamp socket, but not the other side yet), the installation detection module 2520 detects a smaller current and determines the signal is passing through a high impedance. In this case, in certain embodiments, the installation detection circuit 2520 is in a cut-off state to make the LED tube lamp stop working. Otherwise, the installation detection module 2520 determines that the LED tube lamp has already been installed on

the lamp socket or holder, and it keeps on conducting to make the LED tube lamp working normally.

[00495] For example, in some embodiments, when a current passing through the installation detection terminals is greater than or equal to a specific, defined installation current (or a current value), which may indicate that the current supplied to the lighting module 530 is greater than or equal to a specific, defined operating current, the installation detection module is conductive to make the LED tube lamp operate in a conductive state. For example, a current greater than or equal to the specific current value may indicate that the LED tube lamp has correctly been installed in the lamp socket or holder. When the current passing through the installation detection terminals is smaller than the specific, defined installation current (or the current value), which may indicate that the current supplied to the lighting module 530 is less than a specific, defined operating current, the installation detection module cuts off current to make the LED tube lamp enter in a non-conducting state based on determining that the LED tube lamp has been not installed in, or does not properly connect to, the lamp socket or holder. In certain embodiments, the installation detection module 2520 determines conducting or cutting off based on the impedance detection to make the LED tube lamp operate in a conducting state or enter non-conducting state. The LED tube lamp operating in a conducting state may refer to the LED tube lamp including a sufficient current passing through the LED module to cause the LED light sources to emit light. The LED tube lamp operating in a cut-off state may refer to the LED tube lamp including an insufficient current or no current passing through the LED module so that the LED light sources do not emit light. Accordingly, the occurrence of electric shock caused by touching the conductive part of the LED tube lamp which is incorrectly installed on the lamp socket or holder can be better avoided.

[00496] Referring to Fig. 64B, a block diagram of an installation detection module in

accordance with certain embodiments is illustrated. The installation detection module includes a switch circuit 2580, a detection pulse generating module 2540, a detection result latching circuit 2560, and a detection determining circuit 2570. Certain of these circuits or modules may be referred to as first, second, third, etc., circuits as a naming convention to differentiate them from each other.

[00497] The detection determining circuit 2570 is coupled to and detects the signal between the installation detection terminals 2521 (through a switch circuit coupling terminal 2581 and the switch circuit 2580) and 2522. It is also coupled to the detection result latching circuit 2560 via a detection result terminal 2571 to transmit the detection result signal. The detection determining circuit 2570 may be configured to detect a current passing through terminals 2521 and 2522 (e.g., to detect whether the current is above or below a specific value).

[00498] The detection pulse generating module 2540 is coupled to the detection result latching circuit 2560 via a pulse signal output terminal 2541, and generates a pulse signal to inform the detection result latching circuit 2560 of a time point for latching (storing) the detection result. For example, the detection pulse generating module 2540 may be a circuit configured to generate a signal that causes a latching circuit, such as the detection result latching circuit 2560 to enter and remain in a state that corresponds to one of a conducting state or a cut-off state for the LED tube lamp. The detection result latching circuit 2560 stores the detection result according to the detection result signal (or detection result signal and pulse signal), and transmits or provides the detection result to the switch circuit 2580 coupled to the detection result latching circuit 2560 via a detection result latching terminal 2561. The switch circuit 2580 controls the state between conducting or cut off between the installation detection terminals 2521 and 2522 according to the detection result.

[00499] Referring to Fig. 64C, a block diagram of a detection pulse generating

module in accordance with certain embodiments is illustrated. A detection pulse generating module 2640 may be a circuit that includes multiple capacitors 2642, 2645, and 2646, multiple resistors 2643, 2647, and 2648, two buffers 2644, and 2651, an inverter 2650, a diode 2649, and an OR gate 2652. With use or operation, the capacitor 2642 and the resistor 2643 connect in series between a driving voltage (e.g., a driving voltage source, which may be a node of a power supply), such as VCC usually defined as a high logic level voltage, and a reference voltage (or potential), such as ground potential in this embodiment. The connection node between the capacitor 2642 and the resistor 2643 is coupled to an input terminal of the buffer 2644. The resistor 2647 is coupled between the driving voltage, e.g., VCC, and an input terminal of the inverter 2650. The resistor 2648 is coupled between an input terminal of the buffer 2651 and the reference voltage, e.g. ground potential in this embodiment. An anode of the diode 2649 is grounded and a cathode thereof is coupled to the input terminal of the buffer 2651. First ends of the capacitors 2645 and 2646 are jointly coupled to an output terminal of the buffer 2644, and second, opposite ends of the capacitors 2645 and 2646 are respectively coupled to the input terminal of the inverter 2650 and the input terminal of the buffer 2651. An output terminal of the inverter 2650 and an output terminal of the buffer 2651 are coupled to two input terminals of the OR gate 2652. According to certain **embodiments, the voltage (or potential) for "high logic level" and "low logic level"** mentioned in this specification are all relative to another voltage (or potential) or a certain reference voltage (or potential) in circ**uits, and further may be described as "logic high logic level" and "logic low logic level."**

[00500] When an end cap of an LED tube lamp is inserted into a lamp socket and the other end cap thereof is electrically coupled to a human body, or when both end caps of the LED tube lamp are inserted into the lamp socket, the LED tube lamp is conductive with electricity. At this moment, the installation detection module enters a detection stage.

The voltage on the connection node of the capacitor 2642 and the resistor 2643 is high initially (equals to the driving voltage, VCC) and decreases with time to zero finally. The input terminal of the buffer 2644 is coupled to the connection node of the capacitor 2642 and the resistor 2643, so the buffer 2644 outputs a high logic level signal at the beginning and changes to output a low logic level signal when the voltage on the connection node of the capacitor 2642 and the resistor 2643 decreases to a low logic trigger logic level. As a result, the buffer 2644 is configured to produce an input pulse signal and then remain in a low logic level thereafter (stops outputting the input pulse signal.) The width for the input pulse signal may be described as equal to one (initial setting) time period, which is determined by the capacitance value of the capacitor 2642 and the resistance value of the resistor 2643.

[00501] Next, the operations for the buffer 2644 to produce the pulse signal with the initial setting time period will be described below. Since the voltage on a first end of the capacitor 2645 and on a first end of the resistor 2647 is equal to the driving voltage VCC, the voltage on the connection node of both of them is also a high logic level. The first end of the resistor 2648 is grounded and the first end of the capacitor 2646 receives the pulse signal from the buffer 2644, so the connection node of the capacitor 2646 and the resistor 2648 has a high logic level voltage at the beginning but this voltage decreases with time to zero (in the meantime, the capacitor stores the voltage being equal to or approaching the driving voltage VCC.) Accordingly, initially the inverter 2650 outputs a low logic level signal and the buffer 2651 outputs a high logic level signal, and hence the OR gate 2652 outputs a high logic level signal (a first pulse signal) at the pulse signal output terminal 2541. At this moment, the detection result latching circuit 2560 stores the detection result for the first time according to the detection result signal and the pulse signal. During that initial pulse time period, detection pulse generating module 2540 outputs a high logic level signal, which results in the detection result latching circuit 2560

outputting the result of that high logic level signal.

[00502] When the voltage on the connection node of the capacitor 2646 and the resistor 2648 decreases to the low logic trigger logic level, the buffer 2651 changes to output a low logic level signal to make the OR gate 2652 output a low logic level signal at the pulse signal output terminal 2541 (stops outputting the first pulse signal.) The width of the first pulse signal output from the OR gate 2652 is determined by the capacitance value of the capacitor 2646 and the resistance value of the resistor 2648.

[00503] The operation after the buffer 2644 stops outputting the pulse signal is described as below. For example, the operation may be initially in an operating stage. Since the capacitor 2646 stores the voltage being almost equal to the driving voltage VCC, and when the buffer 2644 instantaneously changes its output from a high logic level signal to a low logic level signal, the voltage on the connection node of the capacitor 2646 and the resistor 2648 is below zero but will be pulled up to zero by the diode 2649 rapidly charging the capacitor. Therefore, the buffer 2651 still outputs a low logic level signal.

[00504] On the other hand, when the buffer 2644 instantaneously changes its output from a high logic level signal to a low logic level signal, the voltage on the one end of the capacitor 2645 also changes from the driving voltage VCC to zero instantly. This makes the connection node of the capacitor 2645 and the resistor 2647 have a low logic level signal. At this moment, the output of the inverter 2650 changes to a high logic level signal to make the OR gate output a high logic level signal (a second pulse signal.) The detection result latching circuit 2560 stores the detection result for a second time according to the detection result signal and the pulse signal. Next, the driving voltage VCC charges the capacitor 2645 through the resistor 2647 to make the voltage on the connection node of the capacitor 2645 and the resistor 2647 increase with time to the driving voltage VCC. When the voltage on the connection node of the capacitor 2645

and the resistor 2647 increases to reach a high logic trigger logic level, the inverter 2650 outputs a low logic level signal again to make the OR gate 2652 stop outputting the second pulse signal. The width of the second pulse signal is determined by the capacitance value of the capacitor 2645 and the resistance value of the resistor 2647.

[00505] As those mentioned above, in certain embodiments, the detection pulse generating module 2640 generates two high logic level pulse signals in the detection stage, which are the first pulse signal and the second pulse signal. These pulse signals are output from the pulse signal output terminal 2541. Moreover, there is an interval with a defined time between the first and second pulse signals (e.g., an opposite-logic signal, which may have a low logic level when the pulse signals have a high logic level), and the defined time is determined by the capacitance value of the capacitor 2642 and the resistance value of the resistor 2643).

[00506] From the detection stage entering the operating stage, the detection pulse generating module 2640 does not produce the pulse signal any more, and keeps the pulse signal output terminal 2541 on a low logic level potential. As described herein, the operating stage is the stage following the detection stage (e.g., following the time after the second pulse signal ends). The operating stage occurs when the LED tube lamp is at least partly connected to a power source, such as provided in a lamp socket. For example, the operating stage may occur when part of the LED tube lamp, such as only one side of the LED tube lamp, is properly connected to one side of a lamp socket, and part of the LED tube lamp is either connected to a high impedance, such as a person, and/or is improperly connected to the other side of the lamp socket (e.g., is misaligned so that the metal contacts in the socket do not contact metal contacts in the LED tube lamp). The operating stage may also occur when the entire LED tube lamp is properly connected to the lamp socket.

[00507] Referring to Fig. 64D, a detection determining circuit in accordance with

certain embodiments is illustrated. An exemplary detection determining circuit 2670 includes a comparator 2671, and a resistor 2672. A negative input terminal of the comparator 2671 receives a reference logic level signal (or a reference voltage) Vref, a positive input terminal thereof is grounded through the resistor 2672 and is also coupled to a switch circuit coupling terminal 2581. Referring to Figs. 64B and 64D, the signal flowing into the switch circuit 2580 from the installation detection terminal 2521 outputs to the switch circuit coupling terminal 2581 to the resistor 2672. When the current of the signal passing through the resistor 2672 reaches a certain level (for example, bigger than or equal to a defined current for installation, (e.g. 2A) and this makes the voltage on the resistor 2672 higher than the reference voltage Vref (referring to two end caps inserted into the lamp socket,) the comparator 2671 produces a high logic level detection result signal and outputs it to the detection result terminal 2571. For example, when an LED tube lamp is correctly installed on a lamp socket, the comparator 2671 outputs a high logic level detection result signal at the detection result terminal 2571, whereas the comparator 2671 generates a low logic level detection result signal and outputs it to the detection result terminal 2571 when a current passing through the resistor 2672 is insufficient to make the voltage on the resistor 2672 higher than the reference voltage Vref (referring to only one end cap inserted into the lamp socket.) Therefore, in some embodiments, when the LED tube lamp is incorrectly installed on the lamp socket or one end cap thereof is inserted into the lamp socket but the other one is grounded by an object such as a human body, the current will be too small to make the comparator 2671 output a high logic level detection result signal to the detection result terminal 2571.

[00508] Referring to Fig. 64E, a schematic detection result latching circuit according to some embodiments of the present invention is illustrated. A detection result latching circuit 2660 includes a D flip-flop 2661, a resistor 2662, and an OR gate 2663. The D flip-flop 2661 has a CLK input terminal coupled to a detection result terminal 2571,

and a D input terminal coupled to a driving voltage VCC. When the detection result terminal 2571 first outputs a low logic level detection result signal, the D flip-flop 2661 initially outputs a low logic level signal at a Q output terminal thereof, but the D flip-flop 2661 outputs a high logic level signal at the Q output terminal thereof when the detection result terminal 2571 outputs a high logic level detection result signal. The resistor 2662 is coupled between the Q output terminal of the D flip-flop 2661 and a reference voltage, such as ground potential. When the OR gate 2663 receives the first or second pulse signals from the pulse signal output terminal 2541 or receives a high logic level signal from the Q output terminal of the D flip-flop 2661, the OR gate 2663 outputs a high logic level detection result latching signal at a detection result latching terminal 2561. The detection pulse generating module 2640 only in the detection stage outputs the first and the second pulse signals to make the OR gate 2663 output the high logic level detection result latching signal, and thus the D flip-flop 2661 decides the detection result latching signal to be the high logic level or the low logic level the rest of the time, e.g. including the operating stage after the detection stage. Accordingly, when the detection result terminal 2571 has no high logic level detection result signal, the D flip-flop 2661 keeps a low logic level signal at the Q output terminal to make the detection result latching terminal 2561 also keep a low logic level detection result latching signal in the detection stage. On the contrary, once the detection result terminal 2571 has a high logic level detection result signal, the D flip-flop 2661 outputs and keeps a high logic level signal (e.g., based on VCC) at the Q output terminal. In this way, the detection result latching terminal 2561 keeps a high logic level detection result latching signal in the operating stage as well.

[00509] Referring to Fig. 64F, a schematic switch circuit according to some embodiments is illustrated. A switch circuit 2680 includes a transistor, such as a bipolar junction transistor (BJT) 2681, as being a power transistor, which has the ability of

dealing with high current/power and is suitable for the switch circuit. The BJT 2681 has a collector coupled to an installation detection terminal 2521, a base coupled to a detection result latching terminal 2561, and an emitter coupled to a switch circuit coupling terminal 2581. When the detection pulse generating module 2640 produces the first and second pulse signals, the BJT 2681 is in a transient conduction state. This allows the detection determining circuit 2670 to perform the detection for determining the detection result latching signal to be a high logic level or a low logic level. When the detection result latching circuit 2660 outputs a high logic level detection result latching signal at the detection result latching terminal 2561, the BJT 2681 is in the conducting state to make the installation detection terminals 2521 and 2522 conducting. In contrast, when the detection result latching circuit 2660 outputs a low logic level detection result latching signal at the detection result latching terminal 2561 and the output from detection pulse generating module 2640 is a low logic level, the BJT 2681 is cut-off or in the blocking state to make the installation detection terminals 2521 and 2522 cut-off or blocking.

[00510] Since the external driving signal is an AC signal and in order to avoid the detection error resulting from the logic level of the external driving signal being just around zero when the detection determining circuit 2670 detects, the detection pulse generating module 2640 generates the first and second pulse signals to let the detection determining circuit 2670 perform two detections. So the issue of the logic level of the external driving signal being just around zero in a single detection can be avoided. In some cases, the time difference between the productions of the first and second pulse signals is not multiple times of half one cycle of the external driving signal. For example, it does not correspond to the multiple phase differences of 180 degrees of the external driving signal. In this way, when one of the first and second pulse signals is generated and unfortunately the external driving signal is around zero, it can be avoided that the

external driving signal is again around zero when the other pulse signal is generated.

[00511] The time difference between the productions of the first and second pulse signals, for example, an interval with a defined time between both of them can be represented as following:

[00512] the interval = (X+Y)(T/2),

[00513] where T represents the cycle of an external driving signal, X is a natural number, $0 < Y < 1$, with Y in some embodiments in the range of 0.05-0.95, and in some embodiments in the range of 0.15-0.85.

[00514] Furthermore, in order to avoid the installation detection module entering the detection stage from misjudgment resulting from the logic level of the driving voltage VCC being too small, the first pulse signal can be set to be produced when the driving voltage VCC reaches or is higher than a defined logic level. For example, in some embodiments, the detection determining circuit 2670 works after the driving voltage VCC reaching a high enough logic level in order to prevent the installation detection module from misjudgment due to an insufficient logic level.

[00515] According to the examples mentioned above, when one end cap of an LED tube lamp is inserted into a lamp socket and the other one floats or electrically couples to a human body or other grounded object, the detection determining circuit outputs a low logic level detection result signal because of high impedance. The detection result latching circuit stores the low logic level detection result signal based on the pulse signal of the detection pulse generating module, making it as the low logic level detection result latching signal, and keeps the detection result in the operating stage, without changing the logic value. In this way, the switch circuit keeps cutting-off or blocking instead of conducting continually. And further, the electric shock situation can be prevented and the requirement of safety standard can also be met. On the other hand, when two end caps of the LED tube lamp are correctly inserted into the lamp socket, the detection

determining circuit outputs a high logic level detection result signal because the impedance of the circuit for the LED tube lamp itself is small. The detection result latching circuit stores the high logic level detection result signal based on the pulse signal of the detection pulse generating module, making it as the high logic level detection result latching signal, and keeps the detection result in the operating stage. So the switch circuit keeps conducting to make the LED tube lamp work normally in the operating stage.

[00516] In some embodiments, when one end cap of the LED tube lamp is inserted into the lamp socket and the other one floats or electrically couples to a human body, the detection determining circuit outputs a low logic level detection result signal to the detection result latching circuit, and then the detection pulse generating module outputs a low logic level signal to the detection result latching circuit to make the detection result latching circuit output a low logic level detection result latching signal to make the switch circuit cutting-off or blocking. As such, the switch circuit blocking makes the installation detection terminals, e.g. the first and second installation detection terminals, blocking. As a result, the LED tube lamp is in non-conducting or blocking state.

[00517] However, in some embodiments, when two end caps of the LED tube lamp are correctly inserted into the lamp socket, the detection determining circuit outputs a high logic level detection result signal to the detection result latching circuit to make the detection result latching circuit output a high logic level detection result latching signal to make the switch circuit conducting. As such, the switch circuit conducting makes the installation detection terminals, e.g. the first and second installation detection terminals, conducting. As a result, the LED tube lamp operates in a conducting state.

[00518] Thus, according to the operation of the installation detection module, a first circuit, upon connection of at least one end of the LED tube lamp to a lamp socket, generates and outputs two pulses, each having a pulse width, with a time period

between the pulses. The first circuit may include various of the elements described above configured to output the pulses to a base of a transistor (e.g., a BJT transistor) that serves as a switch. The pulses occur during a detection stage for detecting whether the LED tube lamp is properly connected to a lamp socket. The timing of the pulses may be controlled based on the timing of various parts of the first circuit changing from high to low logic levels, or vice versa.

[00519] The pulses can be timed such that, during that detection stage time, if the LED tube lamp is properly connected to the lamp socket (e.g., both ends of the LED tube lamp are correctly connected to conductive terminals of the lamp socket), at least one of the pulse signals occurs when an AC current from a driving signal is at a non-zero level. For example, the pulse signals can occur at intervals that are different from half of the period of the AC signal. For example, respective start points or mid points of the pulse signals, or a time between an end of the first pulse signal and a beginning of the second pulse signal may be separated by an amount of time that is different from half of the period of the AC signal (e.g., it may be between 0.05 and 0.95 percent of a multiple of half of the period of the AC signal). During a pulse that occurs when the AC signal is at a non-zero level, a switch that receives the AC signal at the non-zero level may be turned on, causing a latch circuit to change states such that the switch remains permanently on so long as the LED tube lamp remains properly connected to the lamp socket. For example, the switch may be configured to turn on when each pulse is output from the first circuit. The latch circuit may be configured to change state only when the switch is on and the current output from the switch is above a threshold value, which may indicate a proper connection to a light socket. As a result, the LED tube lamp operates in a conducting state.

[00520] On the other hand, if both pulses occur when a driving signal at the LED tube lamp has a near-zero current level, or a current level below a particular threshold,

then the state of the latch circuit is not changed, and so the switch is only on during the two pulses, but then remains permanently off after the pulses and after the detection mode is over. For example, the latch circuit can be configured to remain in its present state if the current output from the switch is below the threshold value. In this manner, the LED tube lamp remains in a non-conducting state, which prevents electric shock, even though part of the LED tube lamp is connected to an electrical power source.

[00521] It is worth noting that according to certain embodiments, the width of the pulse signal generated by the detection pulse generating module is between 10 μs to 1 ms, and it is used to make the switch circuit conducting for a short period when the LED tube lamp conducts instantaneously. In some embodiments, a pulse current is generated to pass through the detection determining circuit for detecting and determining. Since the pulse is for a short time and not for a long time, the electric shock situation will not occur. Furthermore, the detection result latching circuit also keeps the detection result during the operating stage (e.g., the operating stage being the period after the detection stage and during which part of the LED tube lamp is still connected to a power source), and no longer changes the detection result stored previously complying with the circuit state changing. A situation resulting from changing the detection result can thus be avoided. In some embodiments, the installation detection module, such as the switch circuit, the detection pulse generating module, the detection result latching circuit, and the detection determining circuit, could be integrated into a chip and then embedded in circuits for saving the circuit cost and layout space.

[00522] As discussed in the above examples, in some embodiments, an LED tube lamp includes an installation detection circuit comprising a first circuit configured to output two pulse signals, the first pulse signal output at a first time and the second pulse signal output at a second time after the first time, and a switch configured to receive an LED driving signal and to receive the two pulse signals, wherein the two pulse signals

control turning on and off of the switch. The installation detection circuit may be configured to, during a detection stage, detect during each of the two pulse signals whether the LED tube lamp is properly connected to a lamp socket. When it is not detected during either pulse signal that the LED tube lamp is properly connected to the lamp socket, the switch may remain in an off state after the detection stage. When it is detected during at least one of the pulse signals that the LED tube lamp is properly connected to the lamp socket, the switch may remain in an on state after the detection stage. The two pulse signals may occur such that they are separated by a time different from a multiple of half of a period of the LED driving signal, and such that at least one of them does not occur when the LED driving signal has a current value of substantially zero. It should be noted that although a circuit for producing two pulse signals is described, the disclosure is not intended to be limiting as such. For example, a circuit may be implemented such that a plurality of pulse signals may occur, wherein at least two of the plurality of pulse signals are separated by a time different from a multiple of half of a period of the LED driving signal, and such that at least one of the plurality of pulse signals does not occur when the LED driving signal has a current value of substantially zero.

[00523] For example, according to the design of the power supply in some embodiments, the circuit board assembly has a long circuit sheet and a short circuit board that are adhered to each other with the short circuit board being adjacent to the side edge of the long circuit sheet. The short circuit board may be provided with power supply module to form the power supply, and may include the installation detection module.

[00524] According to the design of the power supply module, the external driving signal may be a low frequency AC signal (e.g., commercial power), a high frequency AC signal (e.g., that provided by an electronic ballast), or a DC signal (e.g., that provided by

a battery or external configured driving source), input into the LED tube lamp through a drive architecture of dual-end power supply. For the drive architecture of dual-end power supply, the external driving signal may be input by using only one end thereof as single-end power supply.

[00525] The LED tube lamp may omit the rectifying circuit in the power supply module when the external driving signal is a DC signal.

[00526] According to the design of the rectifying circuit in the power supply module, there may be a dual rectifying circuit. First and second rectifying circuits of the dual rectifying circuit are respectively coupled to the two end caps disposed on two ends of the LED tube lamp. The dual rectifying circuit is applicable to the drive architecture of dual-end power supply. Furthermore, the LED tube lamp having at least one rectifying circuit is applicable to the drive architecture of a low frequency AC signal, high frequency AC signal or DC signal.

[00527] The dual rectifying circuit may comprise, for example, two half-wave rectifier circuits, two full-wave bridge rectifying circuits or one half-wave rectifier circuit and one full-wave bridge rectifying circuit.

[00528] According to the design of the pin in the LED tube lamp, there may be two pins in single end (the other end has no pin), two pins in corresponding ends of two ends, or four pins in corresponding ends of two ends. The designs of two pins in single end and two pins in corresponding ends of two ends are applicable to a signal rectifying circuit design of the rectifying circuit. The design of four pins in corresponding ends of two ends is applicable to a dual rectifying circuit design of the rectifying circuit, and the external driving signal can be received by two pins in only one end or any pin in each of two ends.

[00529] According to the design of the filtering circuit of the power supply module, there may be a single capacitor, orπ filter circuit. The filtering circuit filters the high

frequency component of the rectified signal for providing a DC signal with a low ripple voltage as the filtered signal. The filtering circuit also further comprises the LC filtering circuit having a high impedance for a specific frequency for conforming to current limitations in specific frequencies of the UL standard. Moreover, the filtering circuit according to some embodiments further comprises a filtering unit coupled between a rectifying circuit and the pin(s) for reducing the EMI resulted from the circuit(s) of the LED tube lamp. The LED tube lamp may omit the filtering circuit in the power supply module when the external driving signal is a DC signal.

[00530] According to the design of the LED lighting module in some embodiments, the LED lighting module may comprise the LED module and the driving circuit or only the LED module. The LED module may be connected with a voltage stabilization circuit in parallel for preventing the LED module from over voltage. The voltage stabilization circuit may be a voltage clamping circuit, such as zener diode, DIAC and so on. When the rectifying circuit has a capacitive circuit, in some embodiments, two capacitors are respectively coupled between two corresponding pins in two end caps and so the two capacitors and the capacitive circuit as a voltage stabilization circuit perform a capacitive voltage divider.

[00531] If there are only the LED module in the LED lighting module and the external driving signal is a high frequency AC signal, a capacitive circuit (e.g., having at least one capacitor) is in at least one rectifying circuit and the capacitive circuit is connected in series with a half-wave rectifier circuit or a full-wave bridge rectifying circuit of the rectifying circuit and serves as a current modulation circuit (or a current regulator) to modulate or to regulate the current of the LED module due to that the capacitor equates a resistor for a high frequency signal. Thereby, even different ballasts provide high frequency signals with different voltage logic levels, the current of the LED module can be modulated into a defined current range for preventing overcurrent. In addition, an

energy-releasing circuit is connected in parallel with the LED module. When the external driving signal is no longer supplied, the energy-releasing circuit releases the energy stored in the filtering circuit to lower a resonance effect of the filtering circuit and other circuits for restraining the flicker of the LED module. In some embodiments, if there are the LED module and the driving circuit in the LED lighting module, the driving circuit may be a buck converter, a boost converter, or a buck-boost converter. The driving circuit stabilizes the current of the LED module at a defined current value, and the defined current value may be modulated based on the external driving signal. For example, the defined current value may be increased with the increasing of the logic level of the external driving signal and reduced with the reducing of the logic level of the external driving signal. Moreover, a mode switching circuit may be added between the LED module and the driving circuit for switching the current from the filtering circuit directly or through the driving circuit inputting into the LED module.

[00532] A protection circuit may be additionally added to protect the LED module. The protection circuit detects the current and/or the voltage of the LED module to determine whether to enable corresponding over current and/or over voltage protection.

[00533] According to the design of the ballast detection circuit of the power supply module, the ballast detection circuit is substantially connected in parallel with a capacitor connected in series with the LED module and determines the external driving signal whether flowing through the capacitor or the ballast detection circuit (i.e., bypassing the capacitor) based on the frequency of the external driving signal. The capacitor may be a capacitive circuit in the rectifying circuit.

[00534] According to the design of the filament-simulating circuit of the power supply module, there may be a single set of a parallel-connected capacitor and resistor, two serially connected sets, each having a parallel-connected capacitor and resistor, or a negative temperature coefficient circuit. The filament-simulating circuit is applicable to

program-start ballast for avoiding the program-start ballast determining the filament abnormally, and so the compatibility of the LED tube lamp with program-start ballast is enhanced. Furthermore, the filament-simulating circuit almost does not affect the compatibilities for other ballasts, e.g., instant-start and rapid-start ballasts.

[00535] According to the design of the ballast-compatible circuit of the power supply module in some embodiments, the ballast-compatible circuit can be connected in series with the rectifying circuit or connected in parallel with the filtering circuit and the LED lighting module. Under the design of being connected in series with the rectifying circuit, the ballast-compatible circuit is initially in a cutoff state and then changes to a conducting state in an objective delay. Under the design of being connected in parallel with the filtering circuit and the LED lighting module, the ballast-compatible circuit is initially in a conducting state and then changes to a cutoff state in an objective delay. The ballast-compatible circuit makes the electronic ballast really activate during the starting stage and enhances the compatibility for instant-start ballast. Furthermore, the ballast-compatible circuit almost does not affect the compatibilities with other ballasts, e.g., program-start and rapid-start ballasts.

[00536] According to the design of the auxiliary power module of the power supply module, the energy storage unit may be a battery or a supercapacitor, connected in parallel with the LED module. The auxiliary power module is applicable to the LED lighting module having the driving circuit.

[00537] According to the design of the LED module of the power supply module, the LED module comprises plural strings of LEDs connected in parallel with each other, wherein each LED may have a single LED chip or plural LED chips emitting different spectrums. Each LEDs in different LED strings may be connected with each other to form a mesh connection.

[00538] In other words, the abovementioned features can be implemented in any

combination to improve the LED tube lamp.

[00539] While the instant disclosure has been described by way of example and in terms of the preferred embodiments, it is to be understood that the instant disclosure needs not be limited to the disclosed embodiments. For anyone skilled in the art, various modifications and improvements within the spirit of the instant disclosure are covered under the scope of the instant disclosure. The covered scope of the instant disclosure is based on the appended claims.

CLAIMS

WHAT IS CLAIMED IS:

1. An LED tube lamp, comprising:

a glass tube;

two end caps, each of the two end caps coupled to a respective end of the glass tube;

an LED light strip attached to an inner circumferential surface of the glass tube;

a plurality of LED light sources mounted on the LED light strip;

at least two first soldering pads arranged at an end of the LED light strip;

at least two notches are formed at an edge of the end of the LED light strip, each of the notches is further formed at one of the first soldering pads;

a protective layer disposed on a surface of the LED light strip, the protective layer comprising at least two openings to expose the two first soldering pads;

a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources, the printed circuit board comprising at least two second soldering pads, each of the two first soldering pad soldered to the respective second soldering pad by a solder,

wherein the power supply module at least comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit, ant the solder is disposed on the first soldering pad, the corresponding second soldering pad and in the corresponding notch.

2. The LED tube lamp as claimed in claim 1, wherein the protective layer further comprises a plurality of second openings thereon for disposing the plurality of LED light sources.

3. The LED tube lamp as claimed in claim 2, wherein the protective layer further comprises a third opening adjacent to the two first openings.

4. The LED tube lamp as claimed in claim 2, wherein the LED light strip comprises a recognizing mark arranged adjacent to the two first openings.

5. The LED tube lamp as claimed in claim 4, wherein the glass tube comprises a diffusing layer coated on the inner circumferential surface of the glass tube.

6. The LED tube lamp as claimed in claim 5, wherein the end of the LED light strip is detached from the inner circumferential surface of the glass tube and soldered on the printed circuit board.

7. The LED tube lamp as claimed in claim 6, wherein the filtering circuit comprises:

a first capacitor, having an end coupled to a first output terminal of the rectifying circuit, and the other end coupled to a second output terminal of the rectifying circuit.

8. The LED tube lamp as claimed in claim 7, wherein the filtering circuit further comprises:

an EMI-reducing capacitor, coupled between input terminals of the rectifying circuit.

9. The LED tube lamp as claimed in claim 7, wherein the filtering circuit further comprises:

a first resistor, having an end coupled to a pin on one of the end caps; and

a second capacitor, having an end coupled to the other end of the first resistor, and the other end coupled to one of the input terminals of the rectifying circuit.

10. The LED tube lamp as claimed in claim 9, wherein the filtering circuit further

comprises:

a passive component, coupled to the second capacitor in parallel.

11. The LED tube lamp as claimed in claim 10, wherein the passive component is an inductor.

12. The LED tube lamp as claimed in claim 7, wherein the rectifying circuit comprises:

a first diode, having an anode connected to the second output terminal, and a cathode connected to a pin on one of the end caps;

a second diode, having an anode connected to the second output terminal, and a cathode connected to a pin on the other one of the end caps;

a third diode, having an anode connected to the pin on the one of the end caps, and a cathode connected to the first output terminal; and

a fourth diode, having an anode connected to the pin on the other one of the end caps, and a cathode connected to the first output terminal.

13. The LED tube lamp as claimed in claim 12, wherein the rectifying circuit further comprises:

a terminal adapter circuit, coupled to the cathode of the first diode, the anode of the second diode and the pins on both of the end caps, and configured to transmit signal received from at least one of the pins to the cathode of the first diode and the anode of the second diode.

14. The LED tube lamp as claimed in claim 13, wherein the terminal adapter circuit comprises:

a third capacitor, having an end connected to the pin on the other one of the end caps,

and the other end connected to the cathode of the first diode and the anode of the second diode; and

a fourth capacitor, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the third capacitor.

15. The LED tube lamp as claimed in claim 13, wherein the terminal adapter circuit comprises:

a first fuse, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a second fuse, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the first fuse.

16. An LED tube lamp, comprising:

a glass tube;

two end caps, each of the two end caps coupled to a respective end of the glass tube;

an LED light strip attached to an inner circumferential surface of the glass tube;

a plurality of LED light sources mounted on the LED light strip;

at least two first soldering pads arranged at one end of the LED light strip;

at least two through holes in the LED light strip, each of the two through holes penetrating the respective first soldering pad and the LED light strip;

a protective layer disposed on a surface of the LED light strip, the protective layer comprising at least two opening to expose the two first soldering pads;

a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources, the printed circuit board comprising at least two second soldering pads, each of the two first soldering pad soldered to the respective second

soldering pad by a solder,

wherein the power supply module at least comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit, the solder is disposed on the first soldering pad, the corresponding second soldering pad and in the corresponding through hole.

17. The LED tube lamp as claimed in claim 16, wherein the protective layer further comprises a plurality of second openings thereon for disposing the plurality of LED light sources.

18. The LED tube lamp as claimed in claim 17, wherein the protective layer further comprises a third opening adjacent to the two first openings.

19. The LED tube lamp as claimed in claim 17, wherein the LED light strip comprises a recognizing mark arranged adjacent to the two first openings.

20. The LED tube lamp as claimed in claim 19, wherein the glass tube comprises a diffusing layer coated on the inner circumferential surface of the glass tube.

21. The LED tube lamp as claimed in claim 20, wherein the end of the LED light strip is detached from the inner circumferential surface of the glass tube and soldered on the printed circuit board.

22. The LED tube lamp as claimed in claim 21, wherein the filtering circuit comprises:

a first capacitor, having an end coupled to a first output terminal of the rectifying circuit, and the other end coupled to a second output terminal of the rectifying circuit.

23. The LED tube lamp as claimed in claim 22, wherein the filtering circuit further comprises:

an EMI-reducing capacitor, coupled between input terminals of the rectifying circuit.

24. The LED tube lamp as claimed in claim 22, wherein the filtering circuit further comprises:

a first resistor, having an end coupled to a pin on one of the end caps; and

a second capacitor, having an end coupled to the other end of the first resistor, and the other end coupled to one of the input terminals of the rectifying circuit.

25. The LED tube lamp as claimed in claim 24, wherein the filtering circuit further comprises:

a passive component, coupled to the second capacitor in parallel.

26. The LED tube lamp as claimed in claim 25, wherein the passive component is an inductor.

27. The LED tube lamp as claimed in claim 22, wherein the rectifying circuit comprises:

a first diode, having an anode connected to the second output terminal, and a cathode connected to a pin on one of the end caps;

a second diode, having an anode connected to the second output terminal, and a cathode connected to a pin on the other one of the end caps;

a third diode, having an anode connected to the pin on the one of the end caps, and a cathode connected to the first output terminal; and

a fourth diode, having an anode connected to the pin on the other one of the end caps, and a cathode connected to the first output terminal.

28. The LED tube lamp as claimed in claim 27, wherein the rectifying circuit further comprises:

a terminal adapter circuit, coupled to the cathode of the first diode, the anode of the second diode and the pins on both of the end caps, and configured to transmit signal received from at least one of the pins to the cathode of the first diode and the anode of the second diode.

29. The LED tube lamp as claimed in claim 28, wherein the terminal adapter circuit comprises:

a third capacitor, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a fourth capacitor, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the third capacitor.

30. The LED tube lamp as claimed in claim 28, wherein the terminal adapter circuit comprises:

a first fuse, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a second fuse, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the first fuse.

31. An LED tube lamp, comprising:

a glass tube;

two end caps, each of the two end caps coupled to a respective end of the glass tube;

an LED light strip attached to an inner circumferential surface of the glass tube;

a plurality of LED light sources mounted on the LED light strip;

at least two first soldering pads arranged at one end of the LED light strip;

a protective layer disposed on a surface of the LED light strip, the protective layer comprising at least two opening to expose the two first soldering pads;

a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources, the printed circuit board comprising at least two second soldering pads, each of the two first soldering pad soldered to the respective second soldering pad by a solder,

wherein the power supply module at least comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit, the solder is disposed on the first soldering pad and the corresponding second soldering pad and covering an edge of the end of the LED light strip.

32. The LED tube lamp as claimed in claim 31, wherein the protective layer further comprises a plurality of second openings thereon for disposing the plurality of LED light sources.

33. The LED tube lamp as claimed in claim 32, wherein the protective layer further comprises a third opening adjacent to the two first openings.

34. The LED tube lamp as claimed in claim 32, wherein the LED light strip comprises a recognizing mark arranged adjacent to the two first openings.

35. The LED tube lamp as claimed in claim 34, wherein the glass tube comprises a

diffusing layer coated on the inner circumferential surface of the glass tube.

36. The LED tube lamp as claimed in claim 35, wherein the end of the LED light strip is detached from the inner circumferential surface of the glass tube and soldered on the printed circuit board.

37. The LED tube lamp as claimed in claim 36, wherein the filtering circuit comprises:

a first capacitor, having an end coupled to a first output terminal of the rectifying circuit, and the other end coupled to a second output terminal of the rectifying circuit.

38. The LED tube lamp as claimed in claim 37, wherein the filtering circuit further comprises:

an EMI-reducing capacitor, coupled between input terminals of the rectifying circuit.

39. The LED tube lamp as claimed in claim 37, wherein the filtering circuit further comprises:

a first resistor, having an end coupled to a pin on one of the end caps; and

a second capacitor, having an end coupled to the other end of the first resistor, and the other end coupled to one of the input terminals of the rectifying circuit.

40. The LED tube lamp as claimed in claim 39, wherein the filtering circuit further comprises:

a passive component, coupled to the second capacitor in parallel.

41. The LED tube lamp as claimed in claim 40, wherein the passive component is an inductor.

42. The LED tube lamp as claimed in claim 37, wherein the rectifying circuit comprises:

a first diode, having an anode connected to the second output terminal, and a cathode connected to a pin on one of the end caps;

a second diode, having an anode connected to the second output terminal, and a cathode connected to a pin on the other one of the end caps;

a third diode, having an anode connected to the pin on the one of the end caps, and a cathode connected to the first output terminal; and

a fourth diode, having an anode connected to the pin on the other one of the end caps, and a cathode connected to the first output terminal.

43. The LED tube lamp as claimed in claim 42, wherein the rectifying circuit further comprises:

a terminal adapter circuit, coupled to the cathode of the first diode, the anode of the second diode and the pins on both of the end caps, and configured to transmit signal received from at least one of the pins to the cathode of the first diode and the anode of the second diode.

44. The LED tube lamp as claimed in claim 43, wherein the terminal adapter circuit comprises:

a third capacitor, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a fourth capacitor, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the third capacitor.

45. The LED tube lamp as claimed in claim 43, wherein the terminal adapter circuit comprises:

a first fuse, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a second fuse, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the first fuse.

ABSTRACT

An LED tube lamp comprises a glass tube, two end caps coupled to a respective end of the glass tube, an LED light strip attached to an inner circumferential surface of the glass tube, a protective layer disposed on a surface of the LED light strip, a plurality of LED light sources mounted on the LED light strip, two first soldering pads arranged at an end of the LED light strip, two notches formed at an edge of the end of the LED light strip, a power supply module configured to drive the plurality of LED light sources. The protective layer comprises two openings to expose the two first soldering pads. The power supply module comprises a printed circuit board comprising two second soldering pads and each of the two first soldering pad soldered to the respective second soldering pad by a solder. The solder is disposed on the first soldering pad, the corresponding second soldering pad and in the corresponding notch. The power supply module comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit.

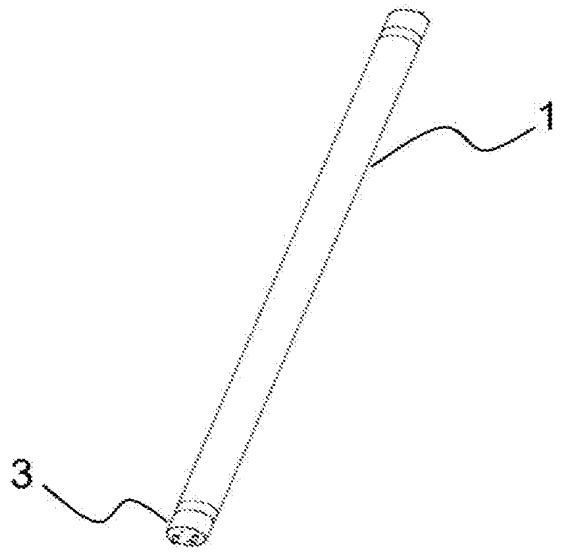

Fig. 1

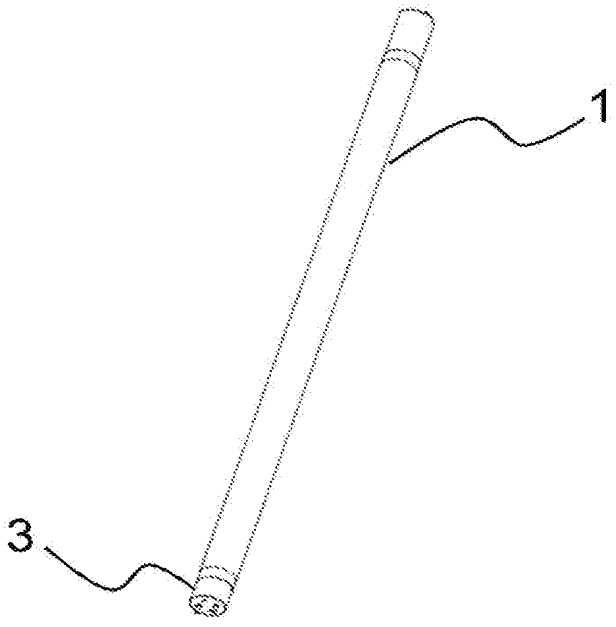

Fig. 1A

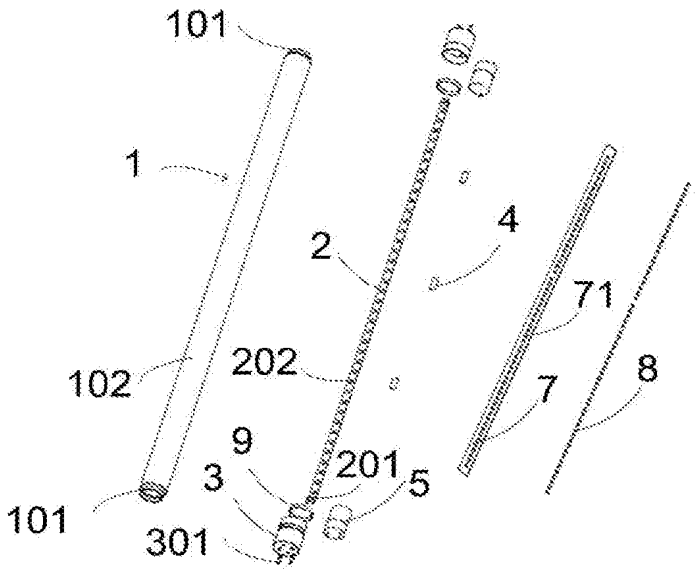

Fig. 2

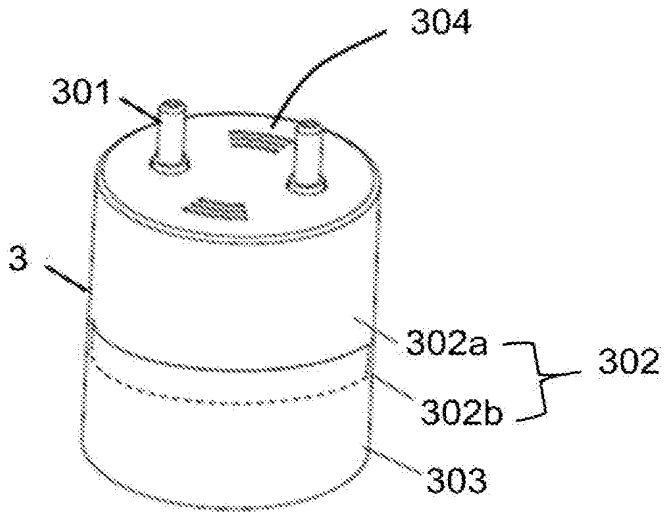

Fig. 3

5

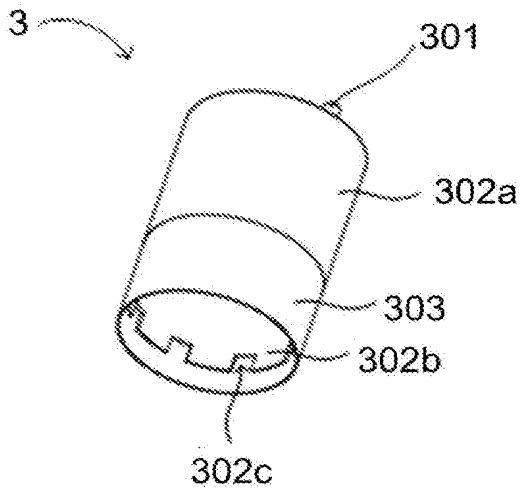

Fig. 4

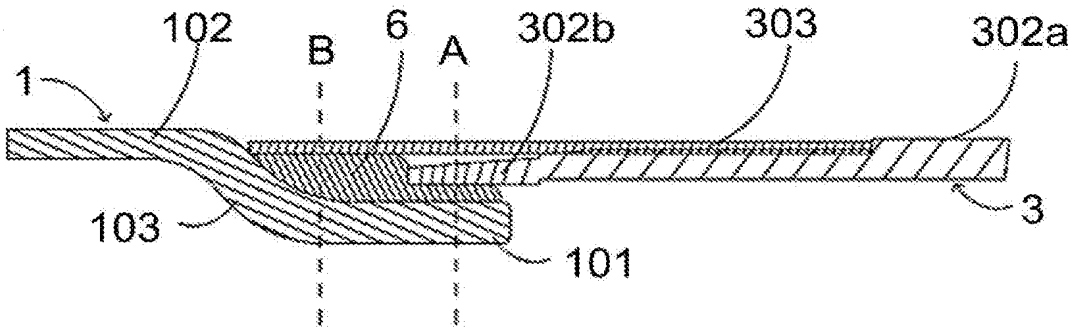

Fig. 5

5

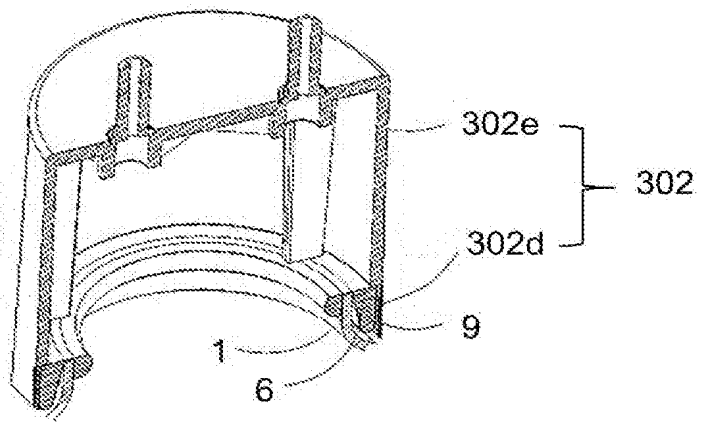

Fig. 6

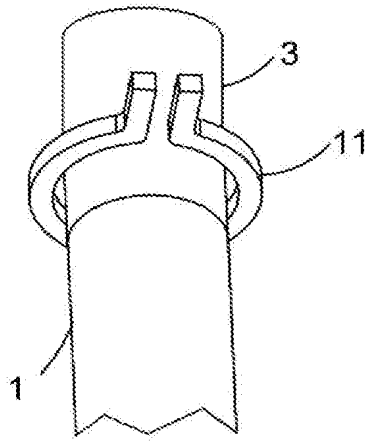

Fig. 7

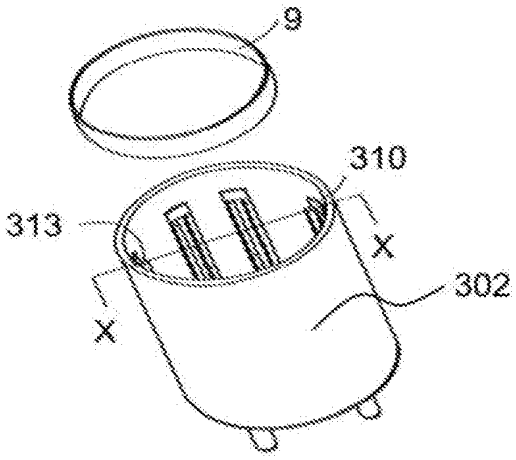

Fig. 8

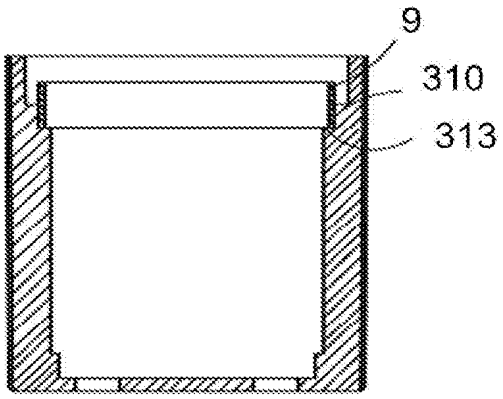

Fig. 9

5

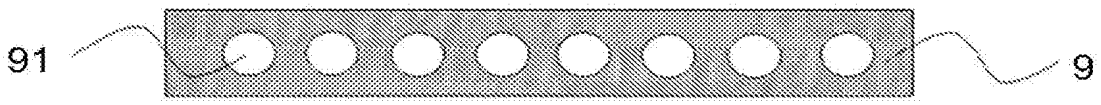

Fig. 10

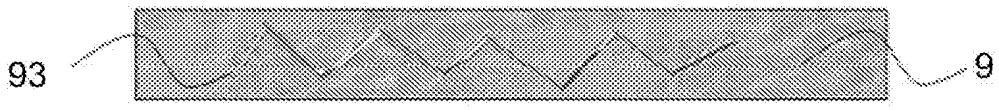

Fig. 11

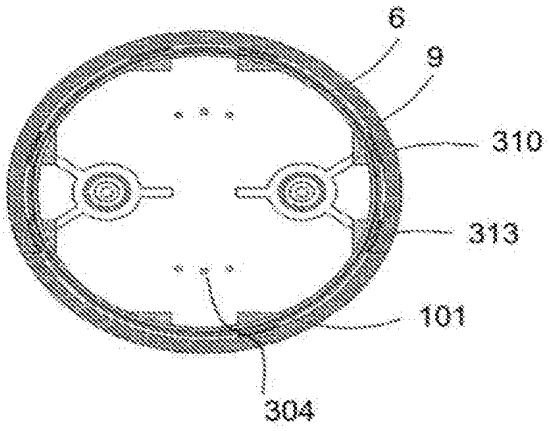

Fig. 12

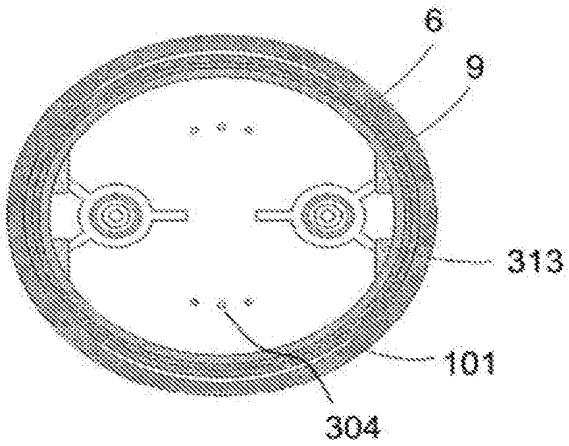

Fig. 13

5

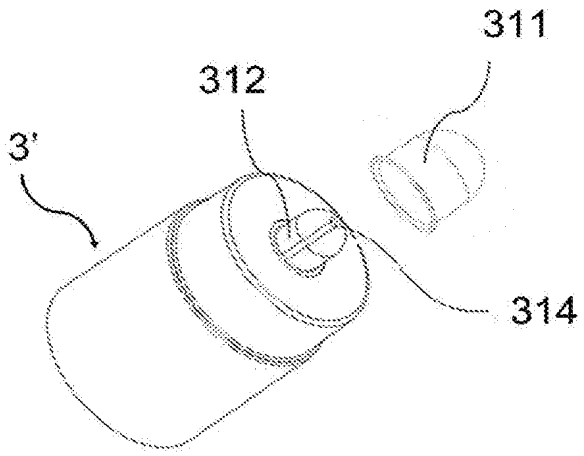

Fig. 14

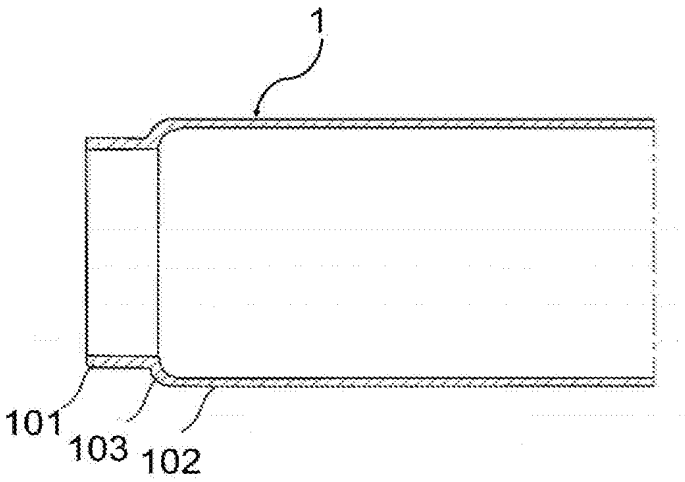

Fig. 15

5

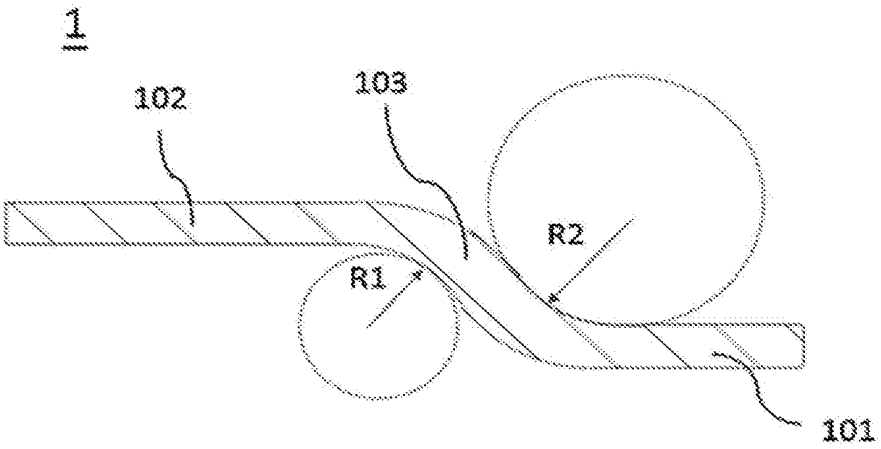

Fig. 16

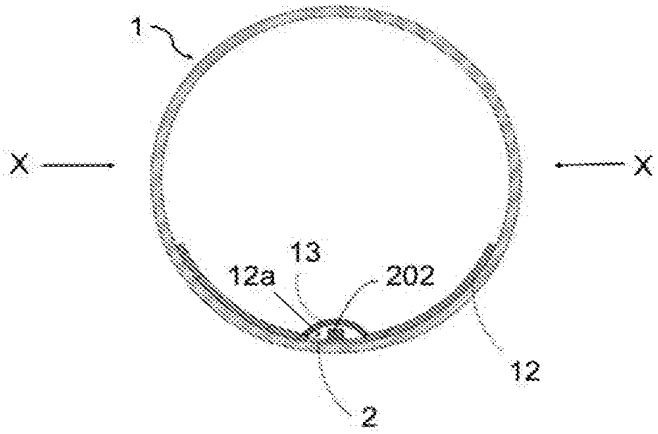

Fig. 17

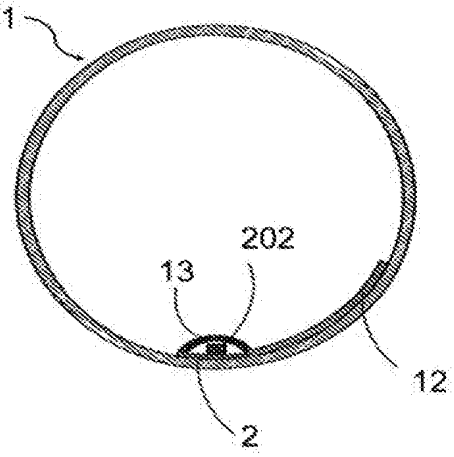

Fig. 18

5

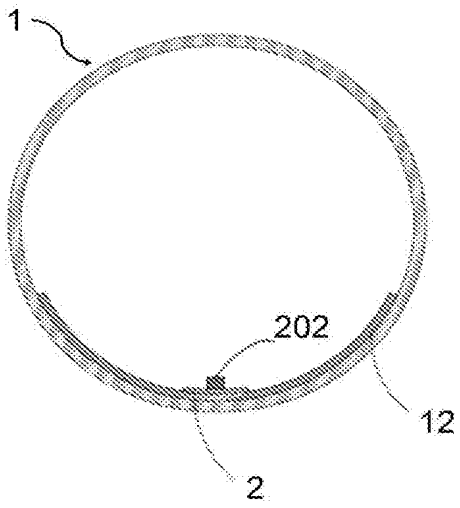

Fig. 19

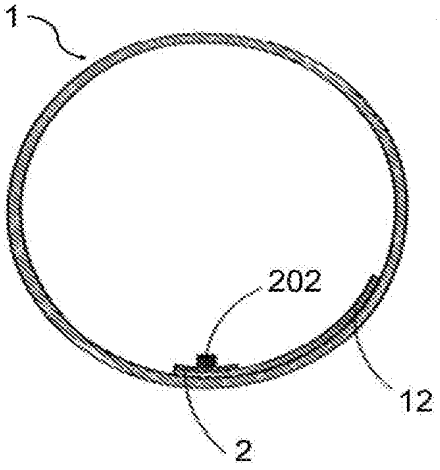

Fig. 20

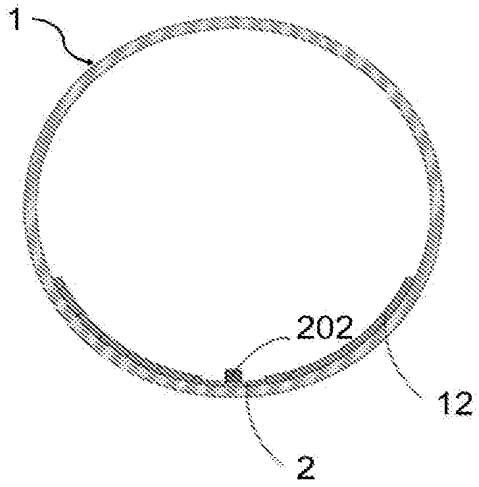

Fig. 21

5

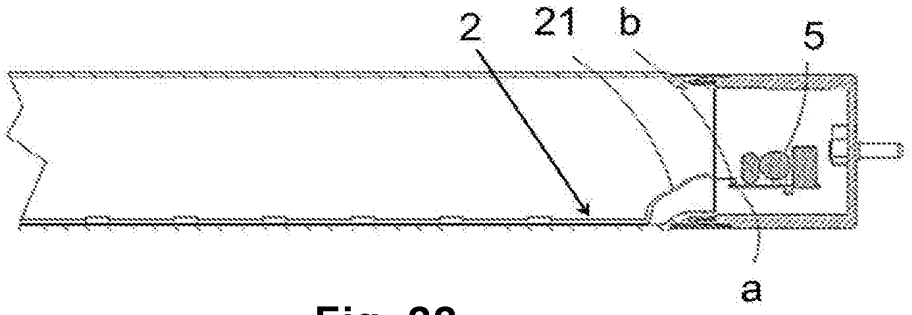

Fig. 22

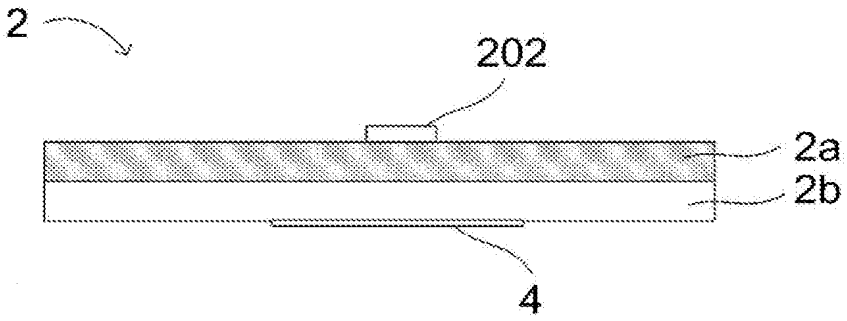

Fig. 23

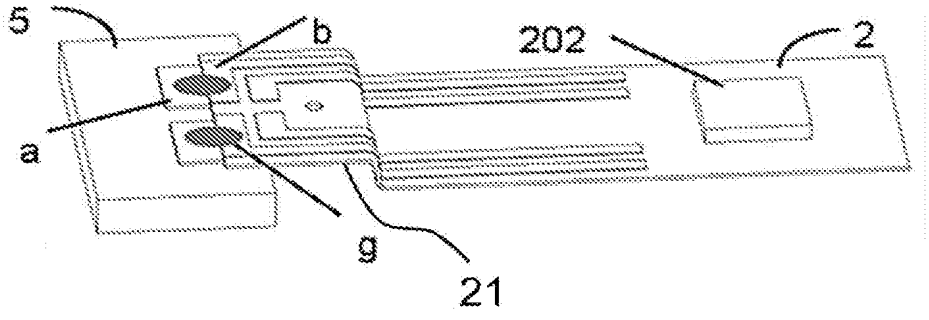

Fig. 24

5

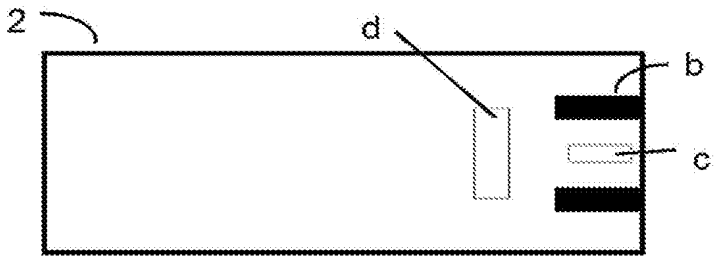

Fig. 25

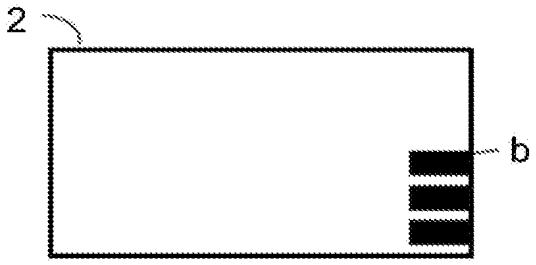

Fig. 26

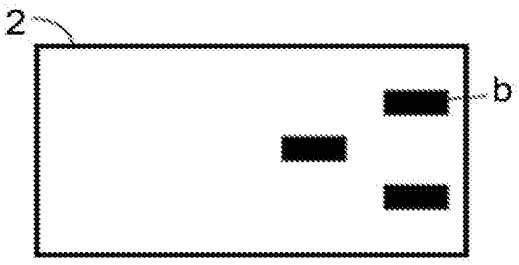

Fig. 27

Fig. 28

Fig. 29

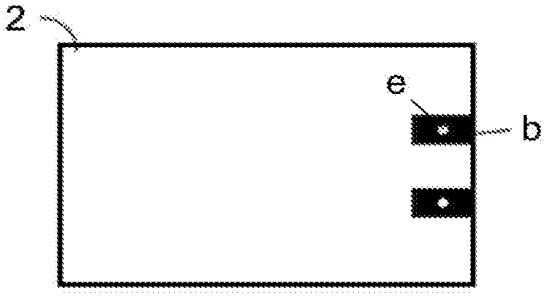

Fig. 30

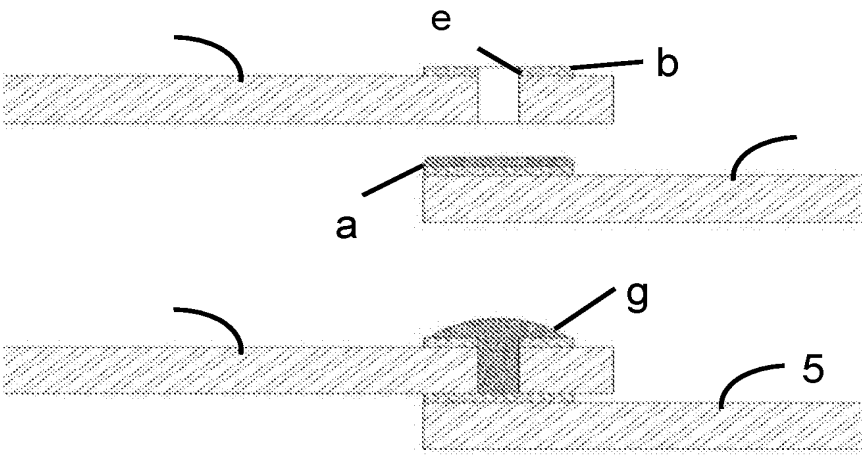

Fig. 31

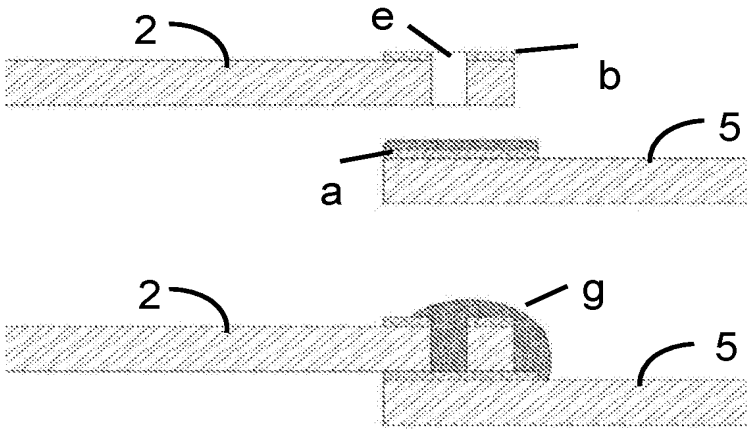

Fig. 32

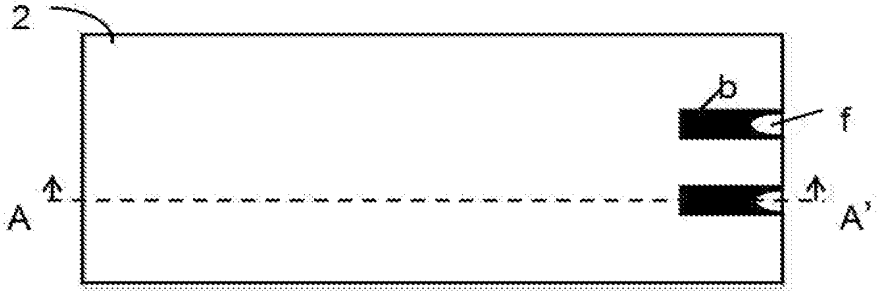

Fig. 33

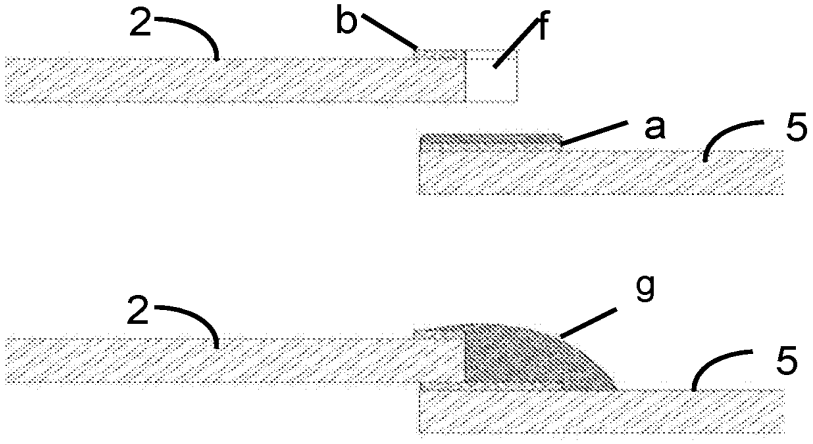

Fig. 34

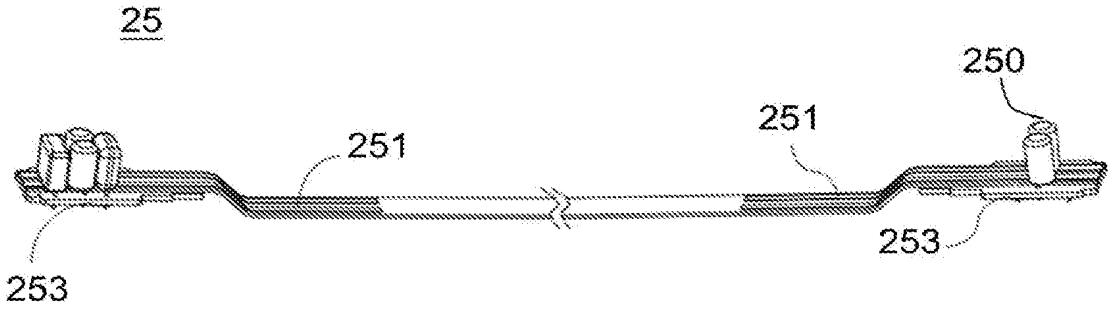

Fig. 35

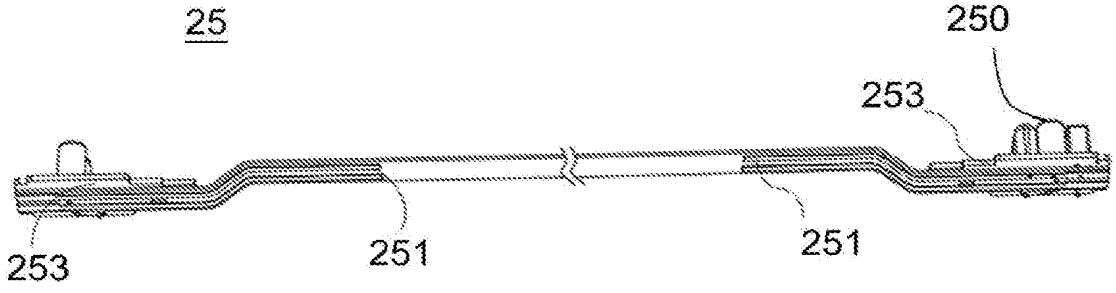

Fig. 36

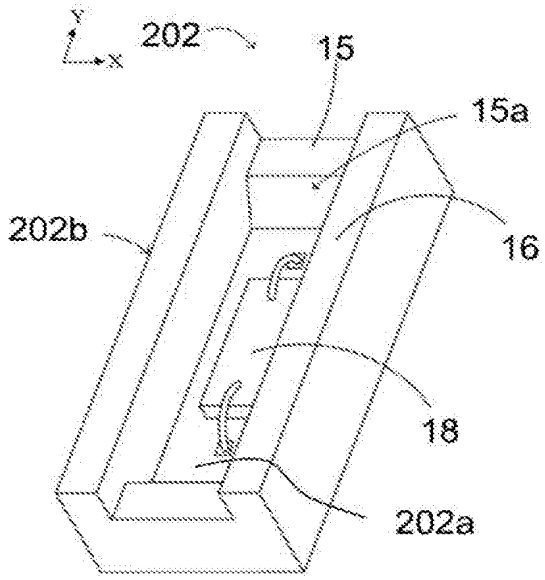

Fig. 37

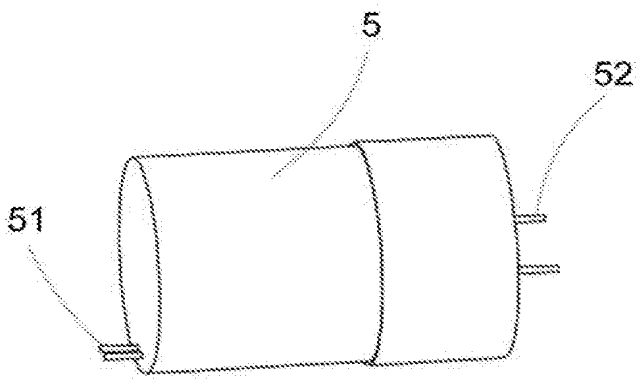

Fig. 38

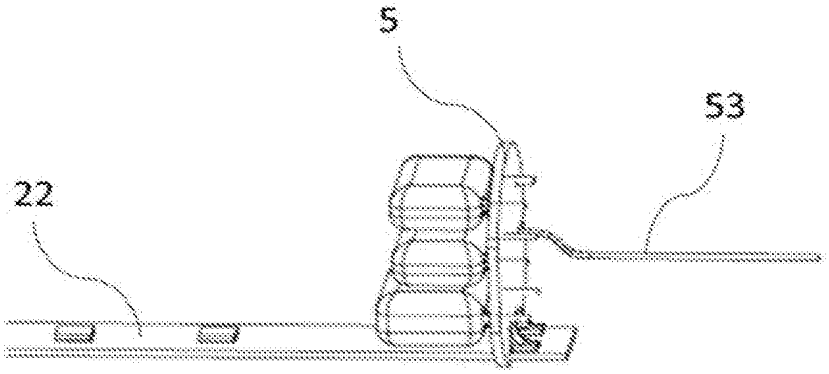

Fig. 39

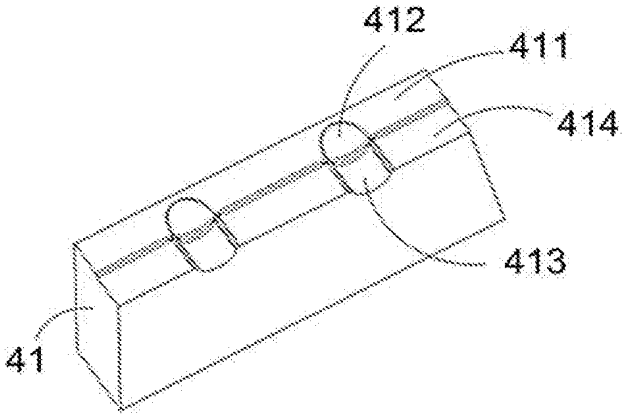

Fig. 40

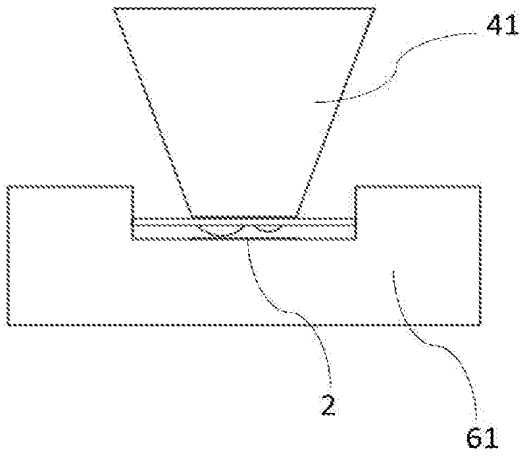

Fig. 41

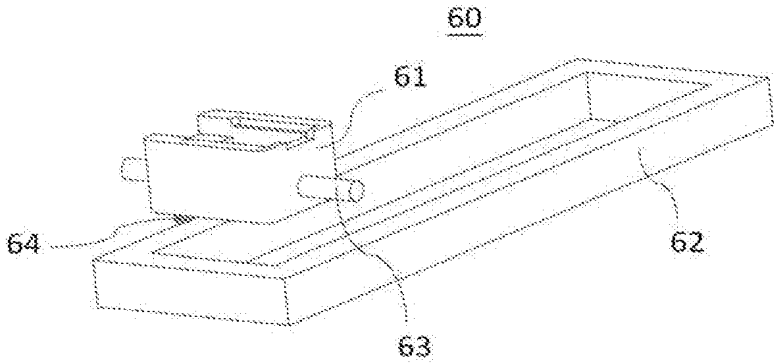

Fig. 42

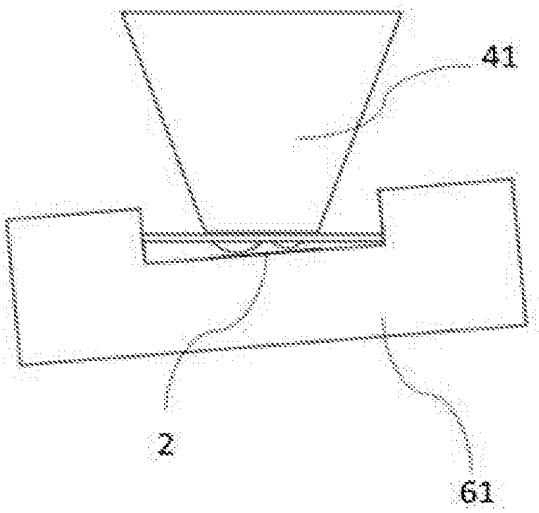

Fig. 43

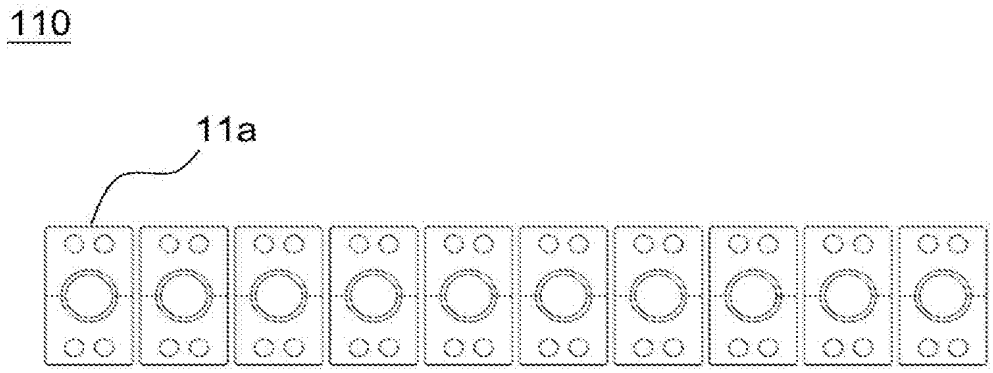

Fig. 44

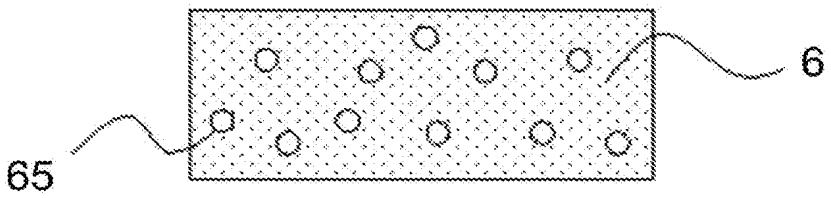

Fig. 45

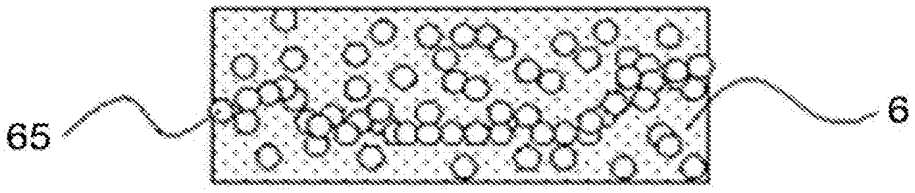

Fig. 46

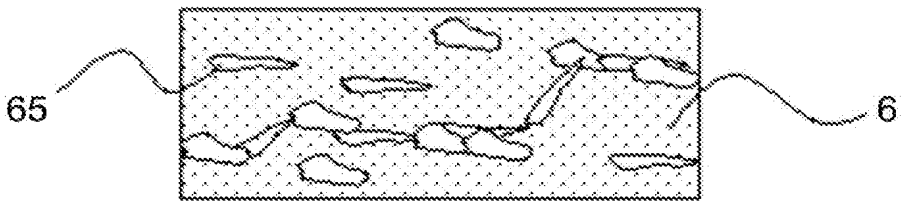

Fig. 47

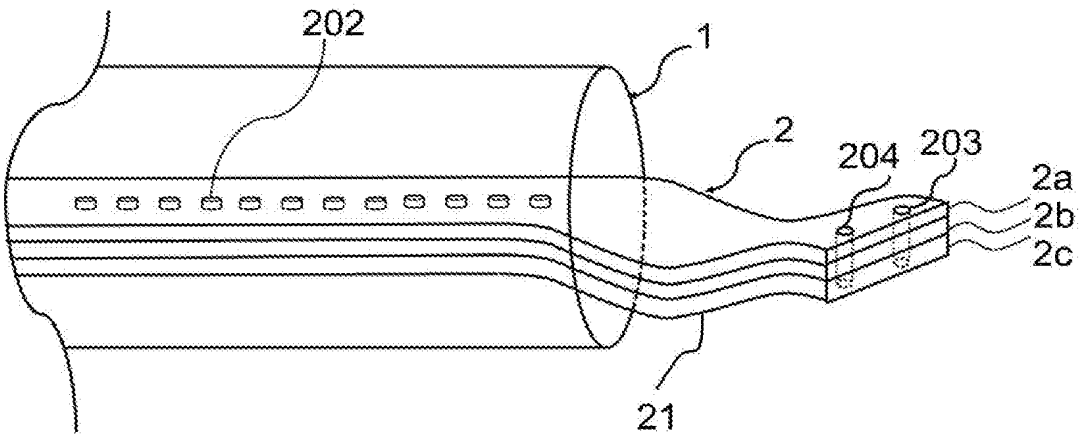

Fig. 48

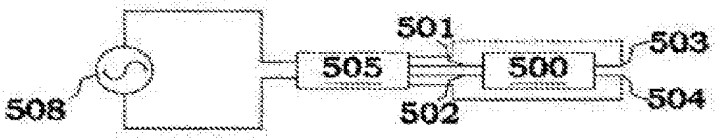

Fig. 49A

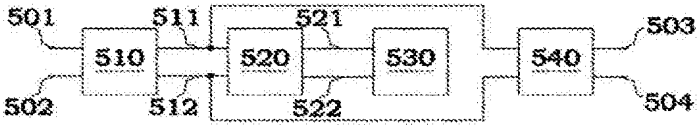

Fig. 49B

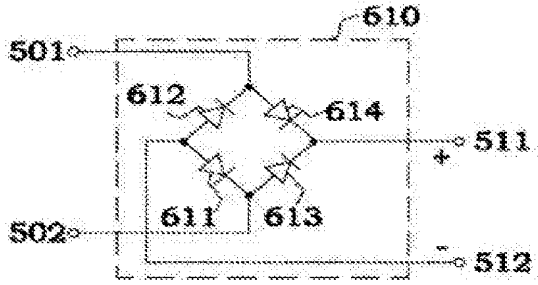

Fig. 50A

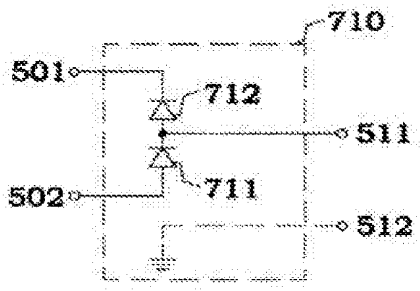

Fig. 50B

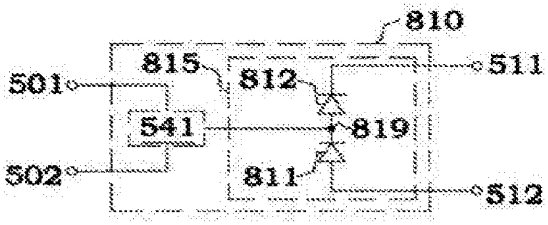

Fig. 50C

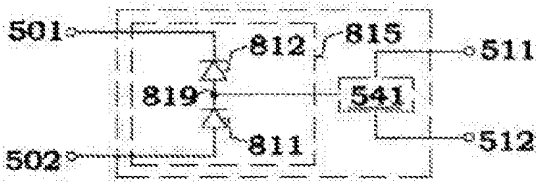

Fig. 50D

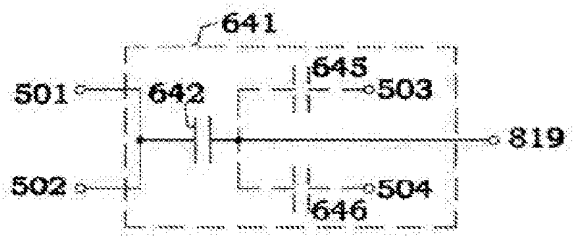

Fig. 51A

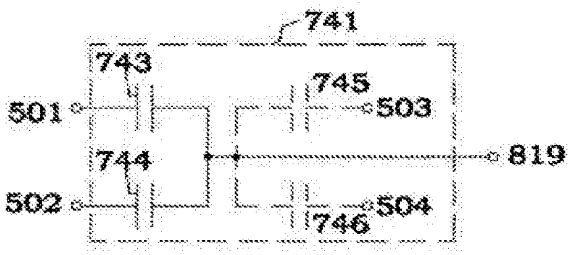

Fig. 51B

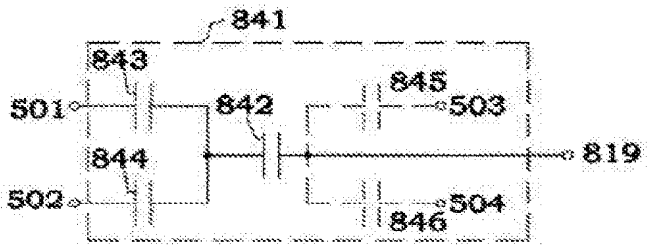

Fig. 51C

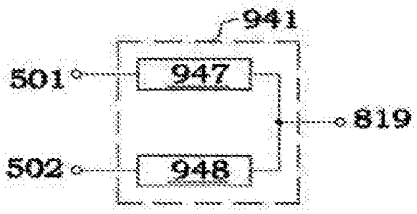

Fig. 51D

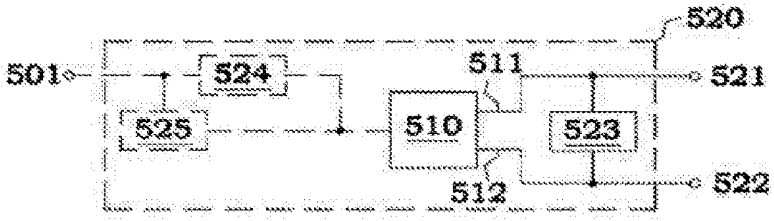

Fig. 52A

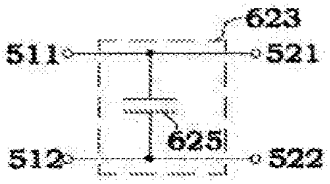

Fig. 52B

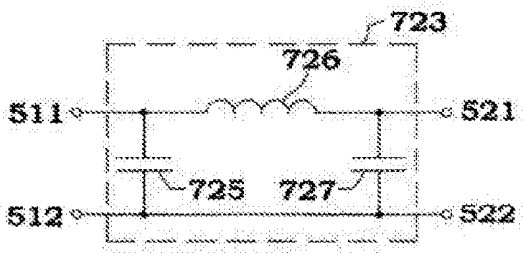

Fig. 52C

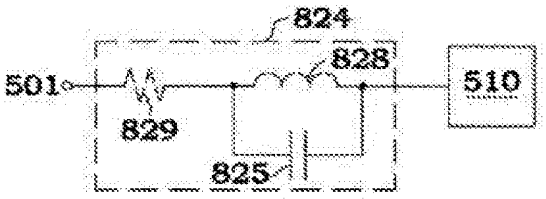

Fig. 52D

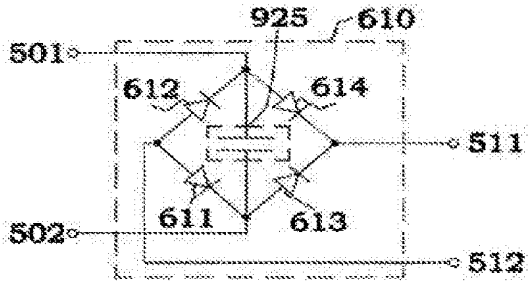

Fig. 52E

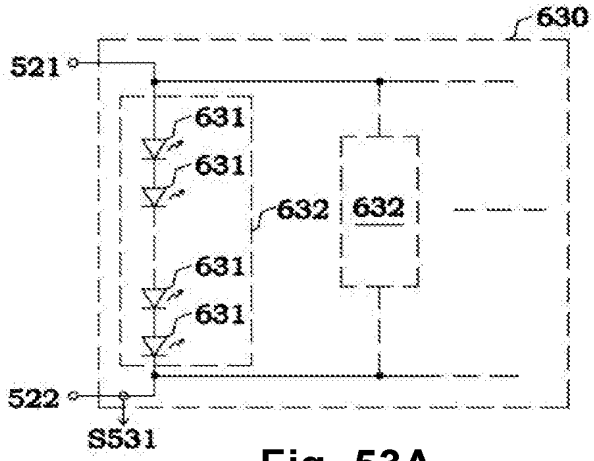

Fig. 53A

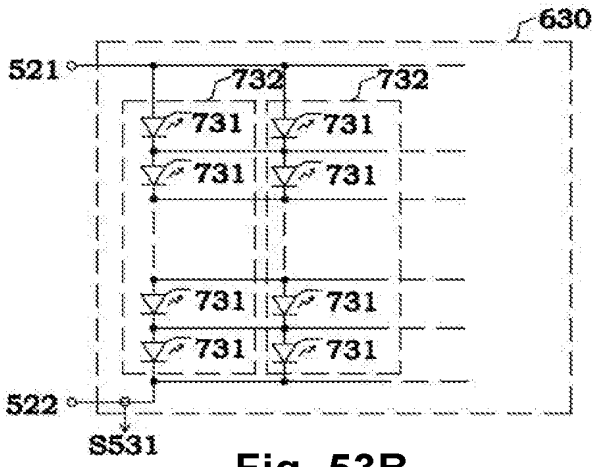

Fig. 53B

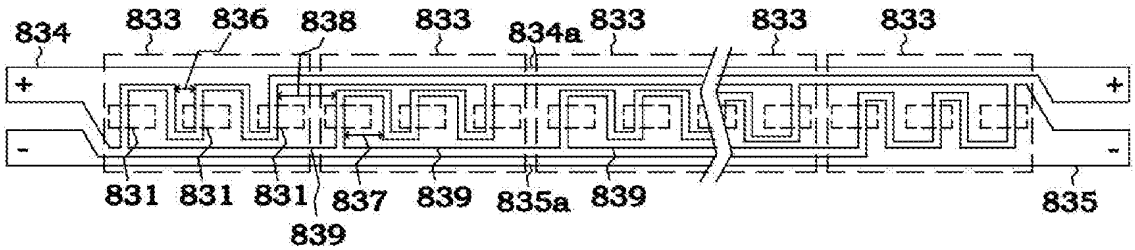

Fig. 53C

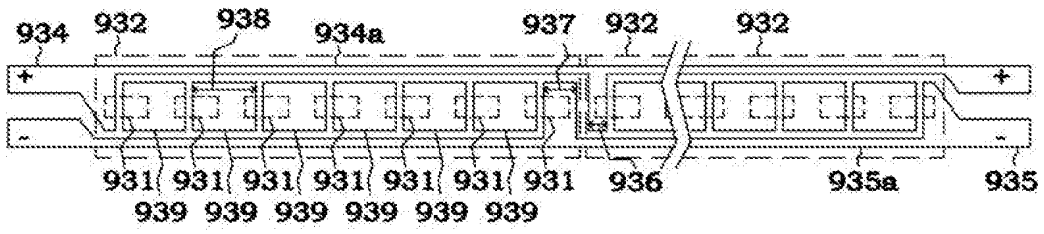

Fig. 53D

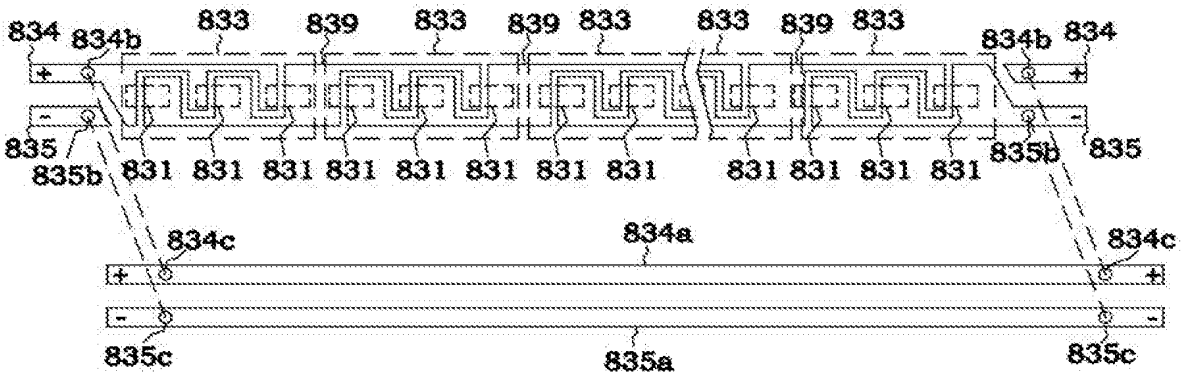

Fig. 53E

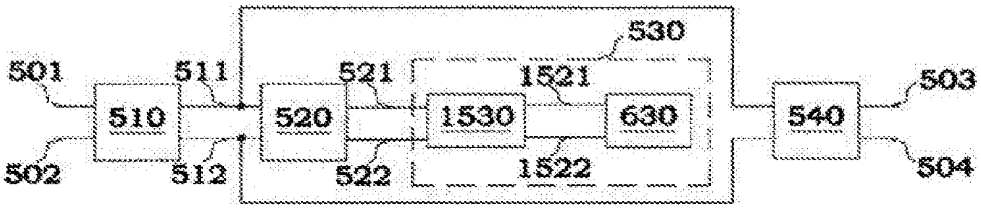

Fig. 54A

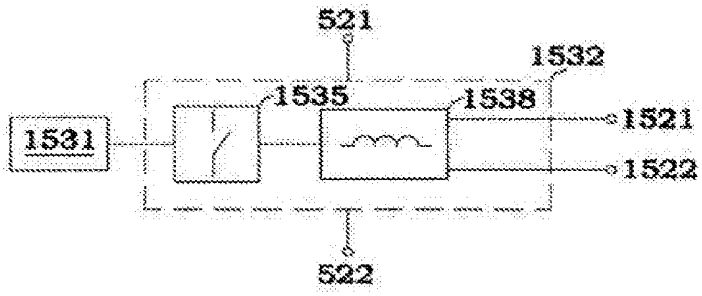

Fig. 54B

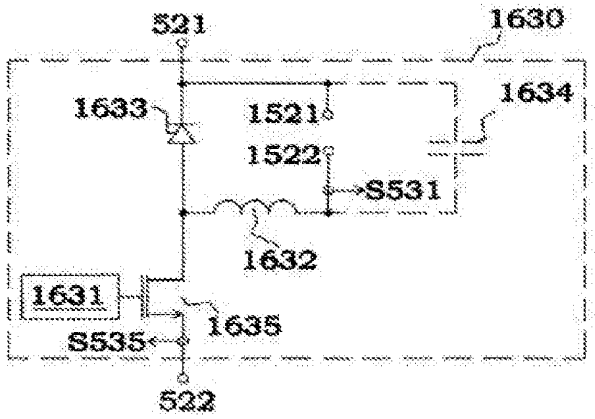

Fig. 54C

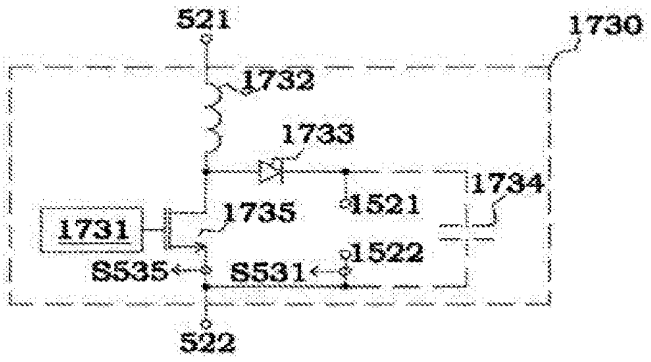

Fig. 54D

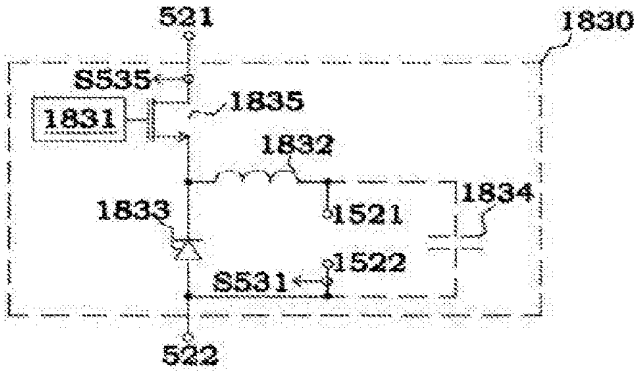

Fig. 54E

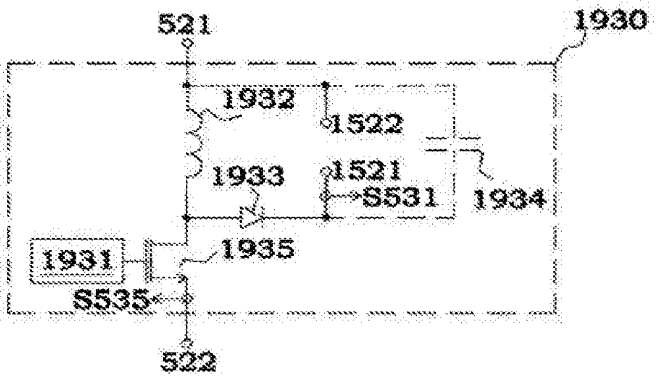

Fig. 54F

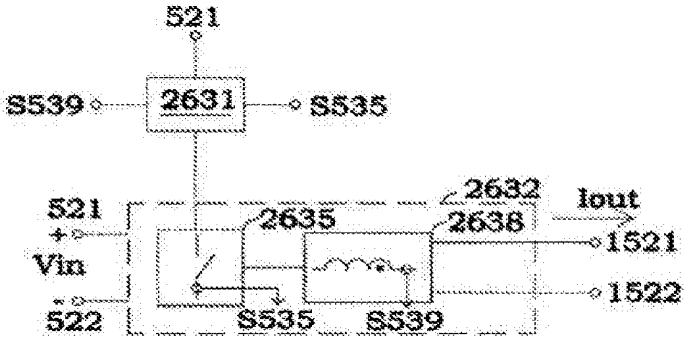

Fig. 54G

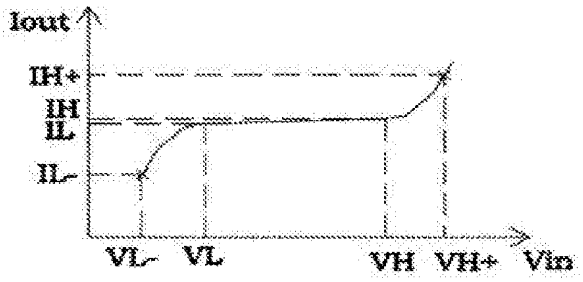

Fig. 54H

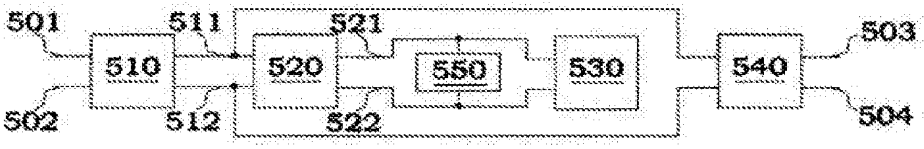

Fig. 55A

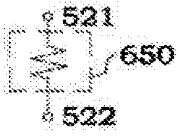

Fig. 55B

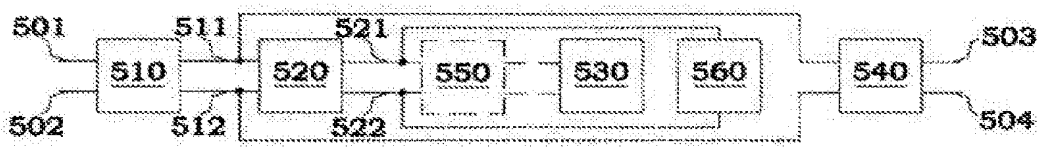

Fig. 56A

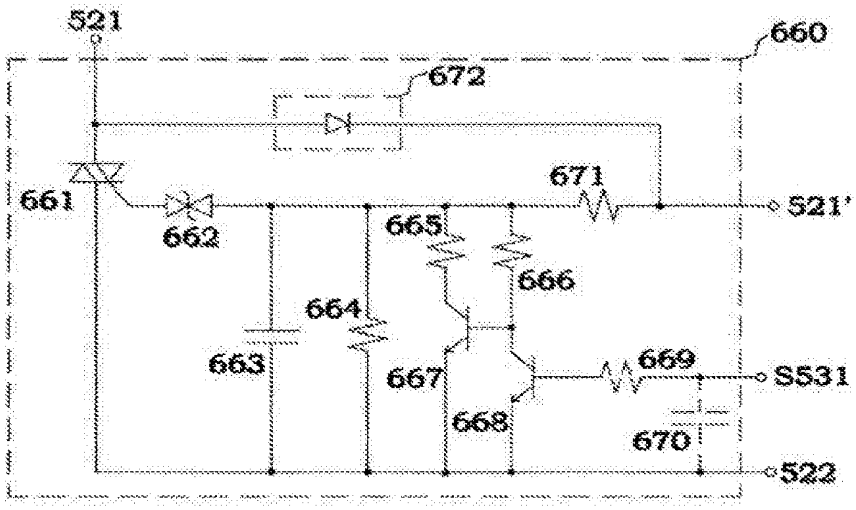

Fig. 56B

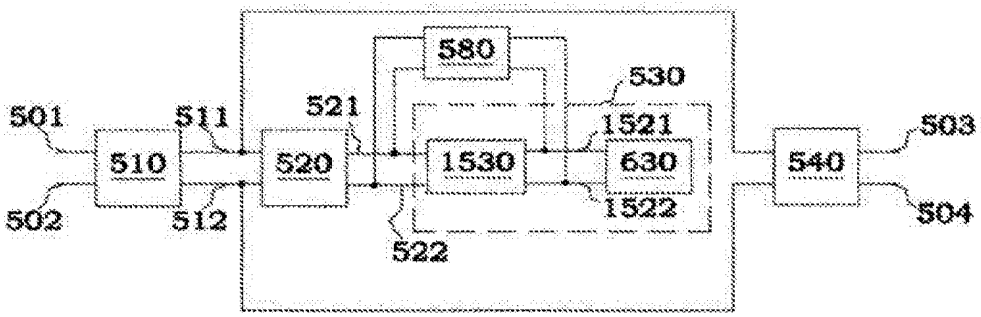

Fig. 57A

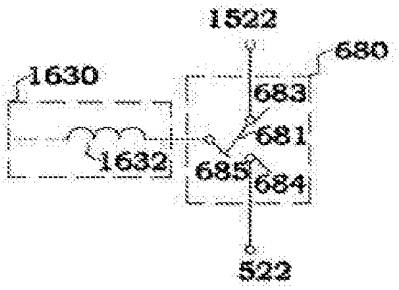

Fig. 57B

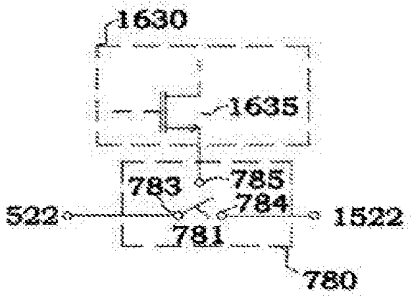

Fig. 57C

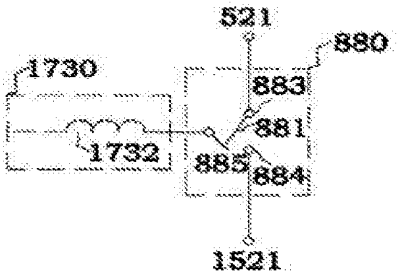

Fig. 57D

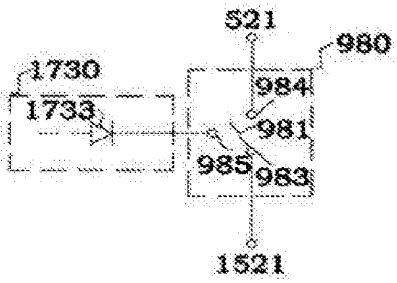

Fig. 57E

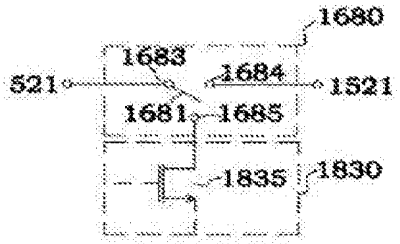

Fig. 57F

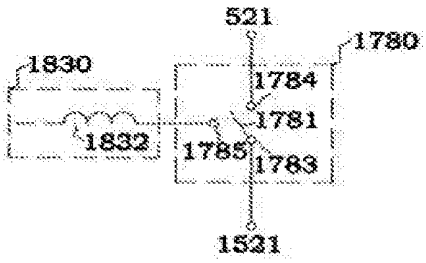

Fig. 57G

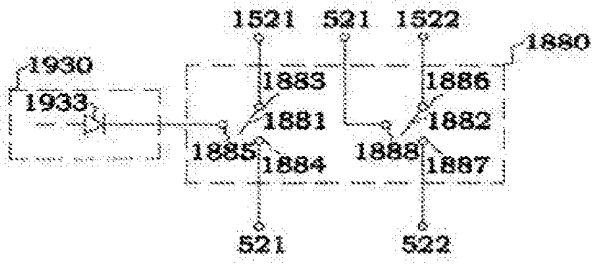

Fig. 57H

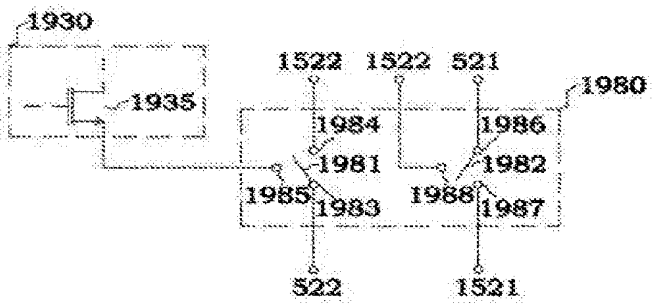

Fig. 57I

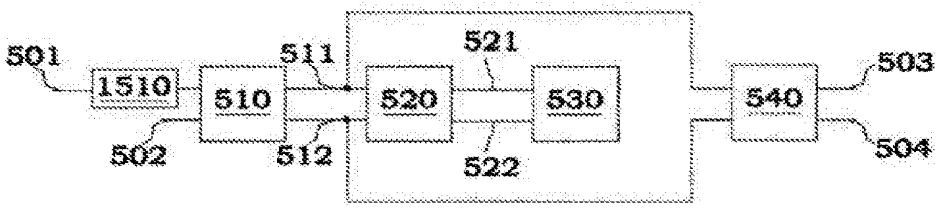

Fig. 58A

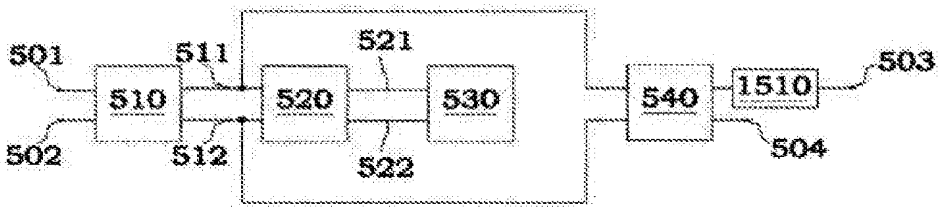

Fig. 58B

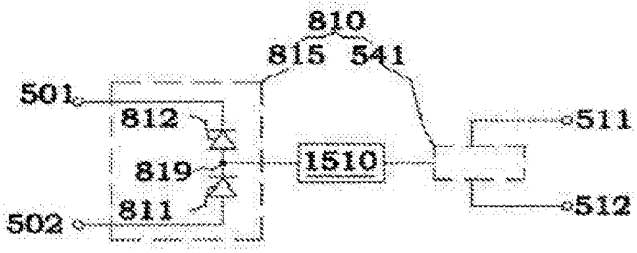

Fig. 58C

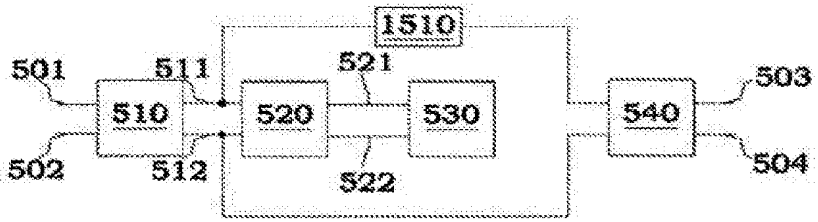

Fig. 58D

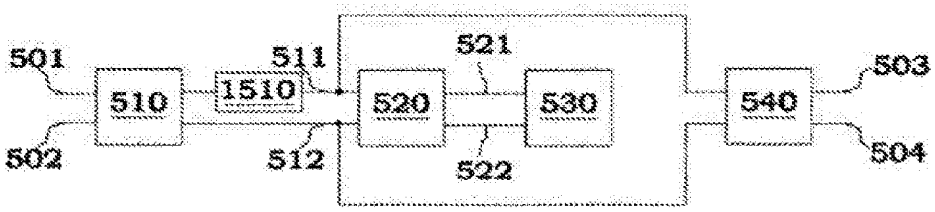

Fig. 58E

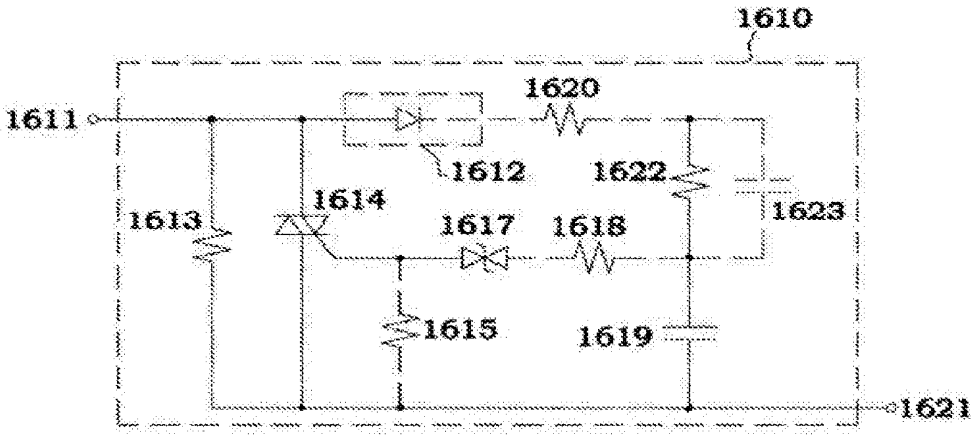

Fig. 58F

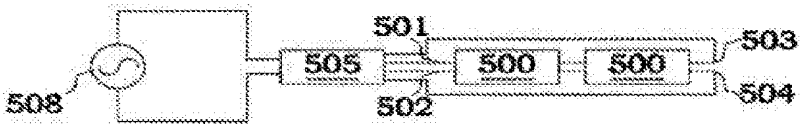

Fig. 58G

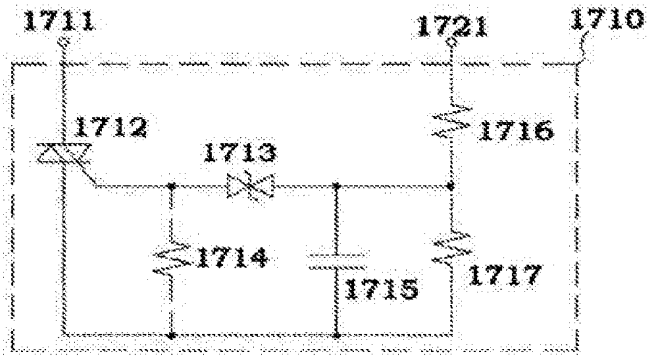

Fig. 58H

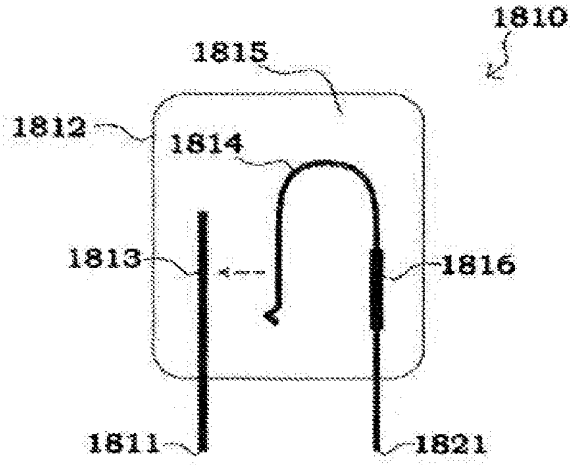

Fig. 58I

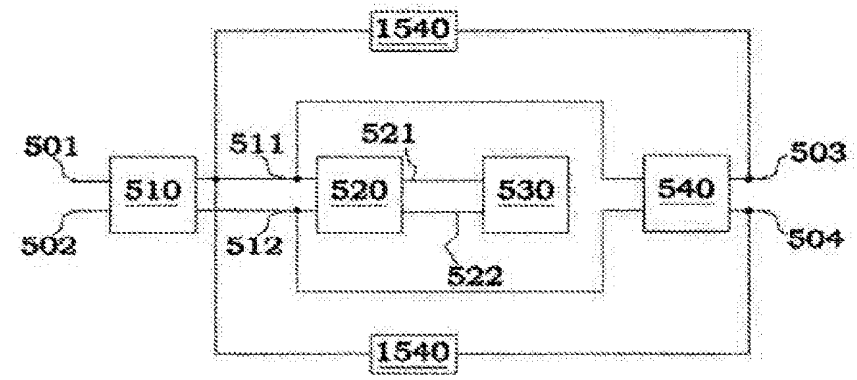

Fig. 59A

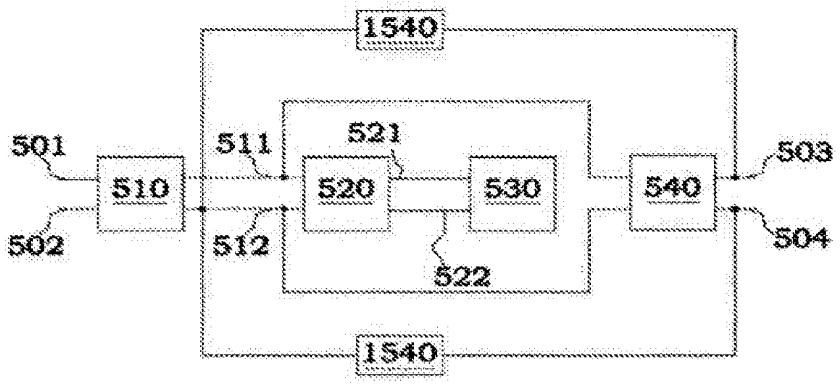

Fig. 59B

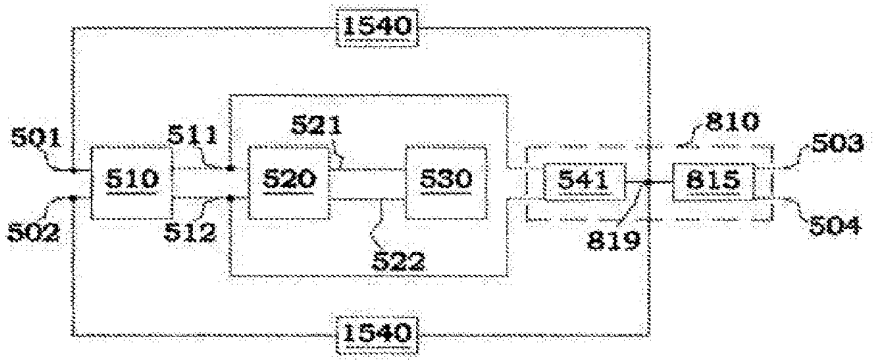

Fig. 59C

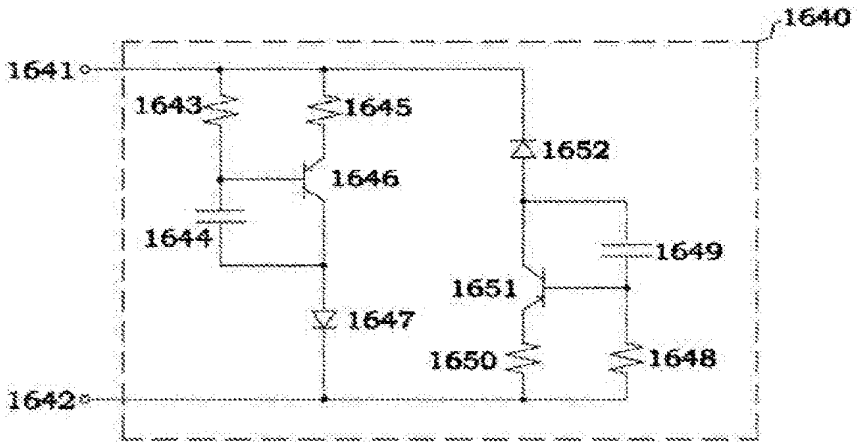

Fig. 59D

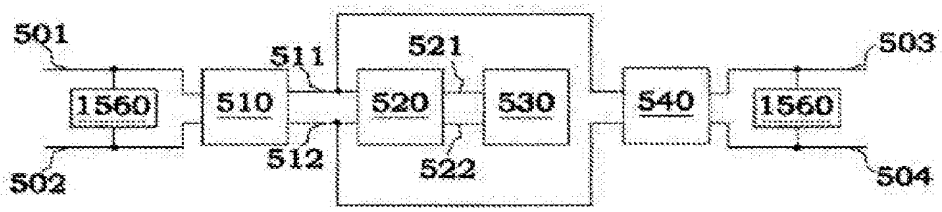

Fig. 60A

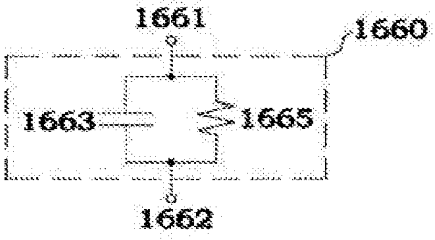

Fig. 60B

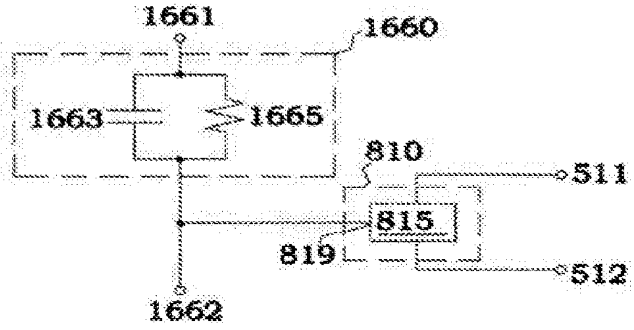

Fig. 60C

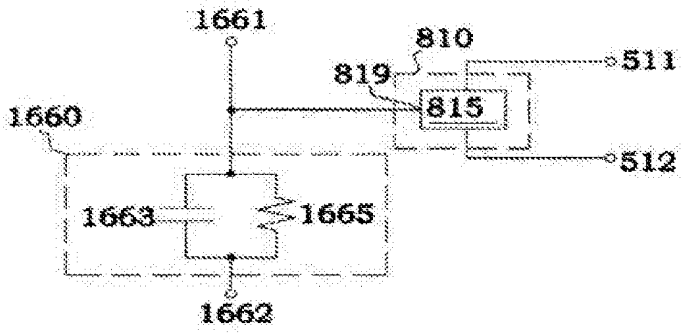

Fig. 60D

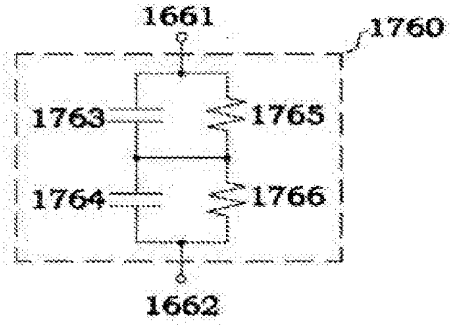

Fig. 60E

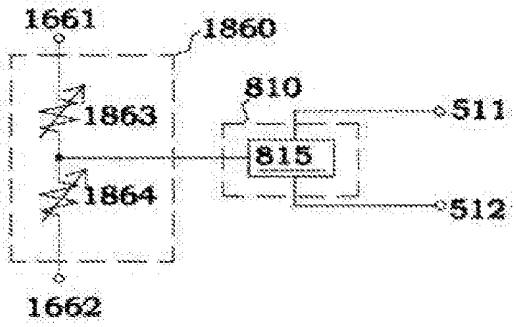

Fig. 60F

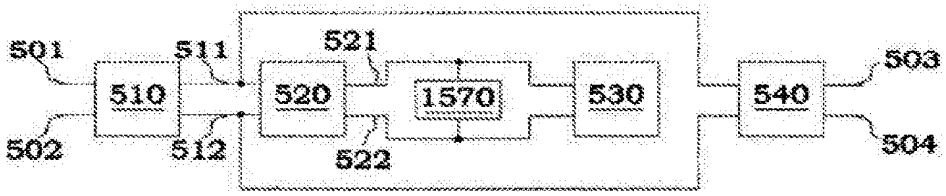

Fig. 61A

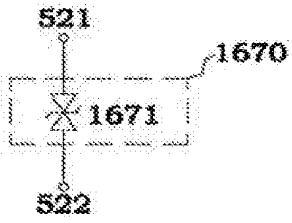

Fig. 61B

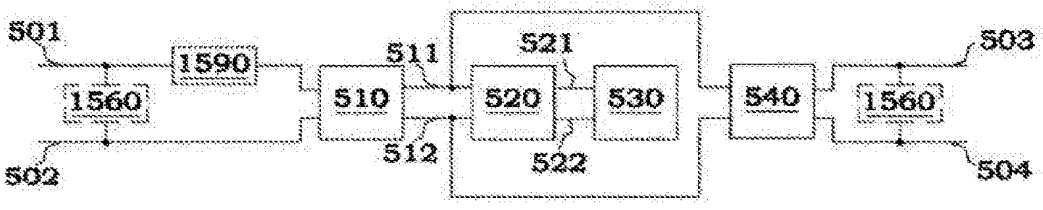

Fig. 62A

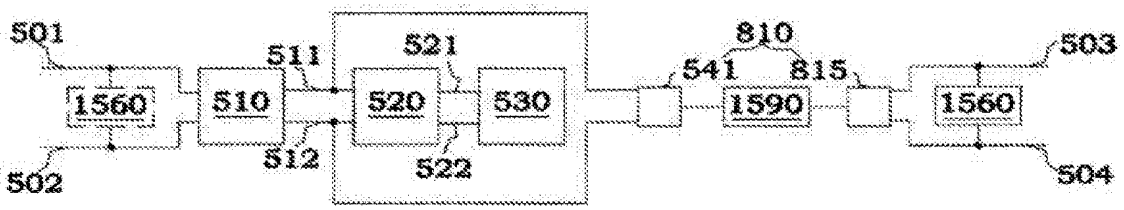

Fig. 62B

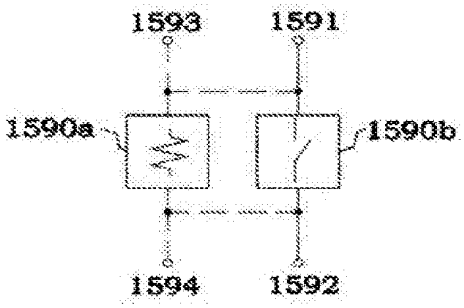

Fig. 62C

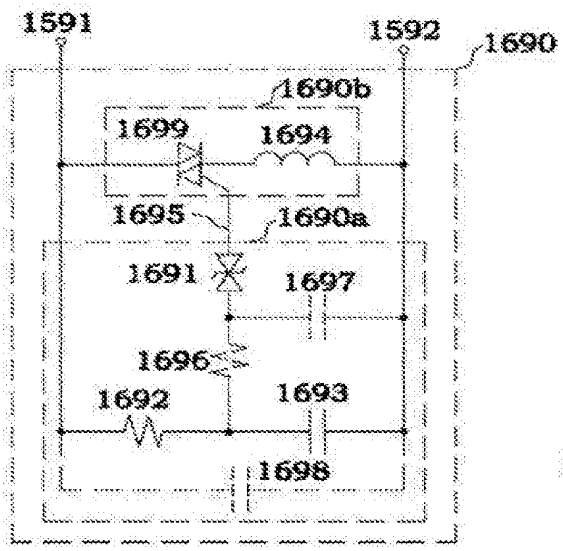

Fig. 62D

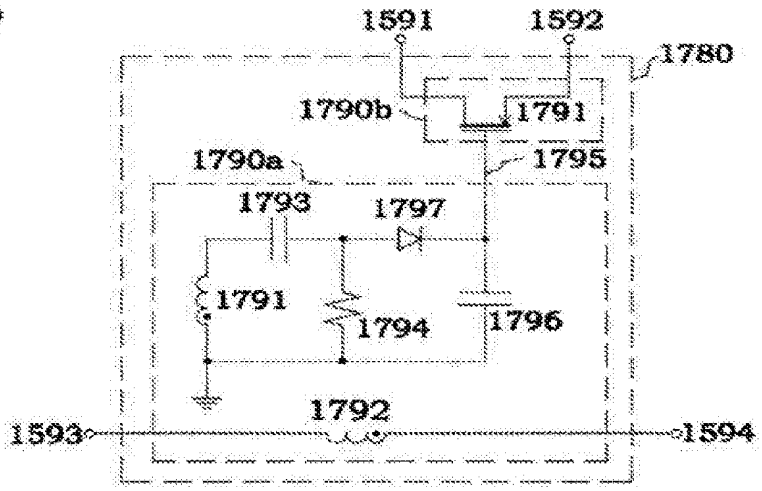

Fig. 62E

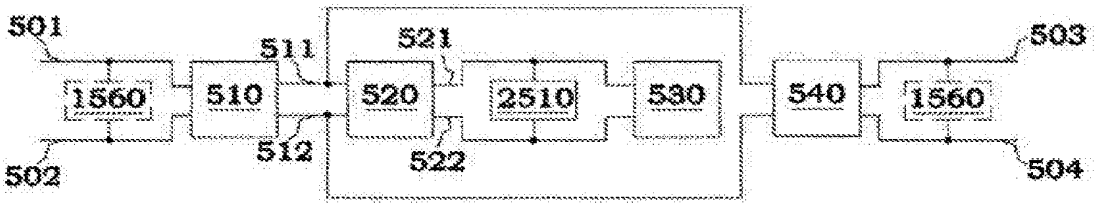

Fig. 63A

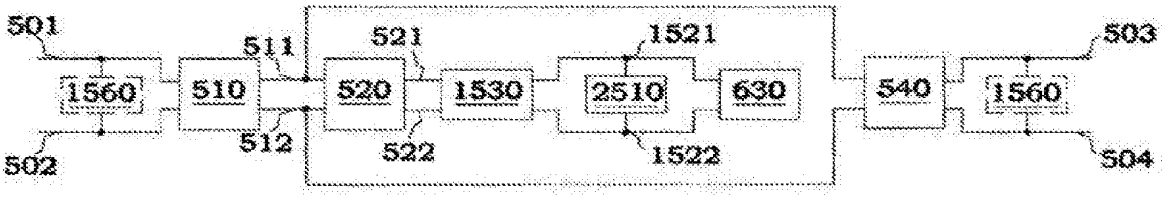

Fig. 63B

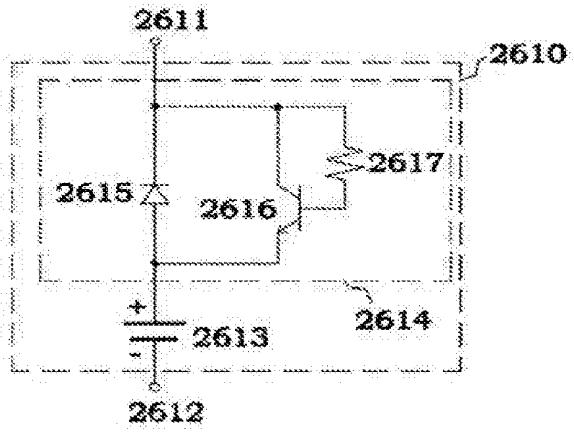

Fig. 63C

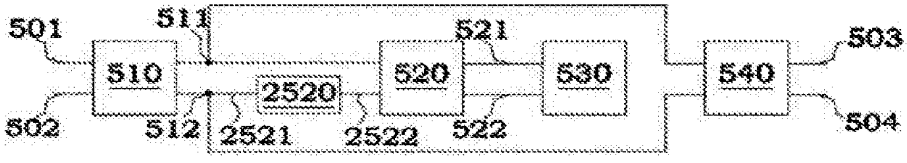

Fig. 64A

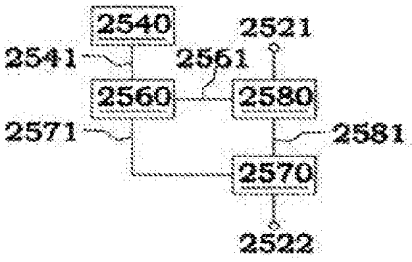

Fig. 64B

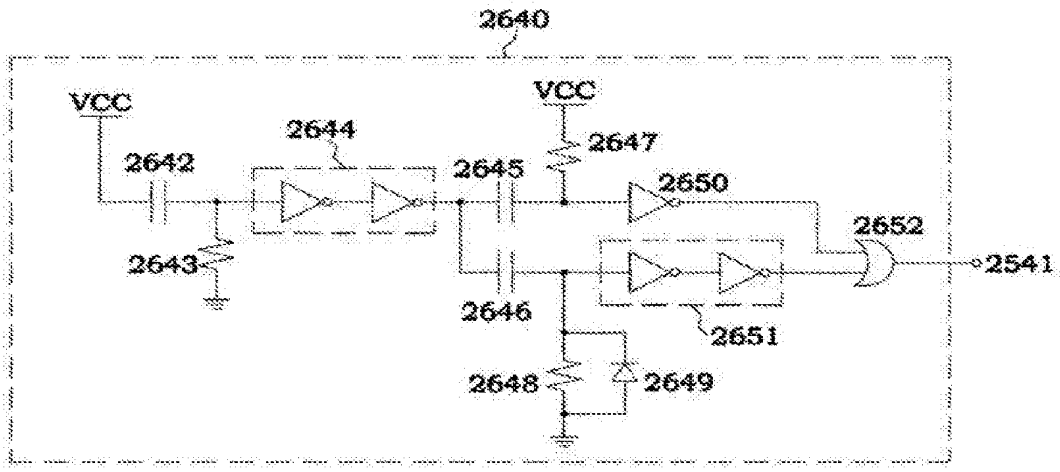

Fig. 64C

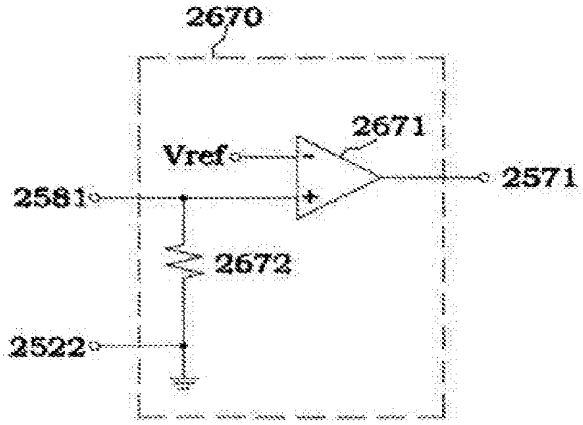

Fig. 64D

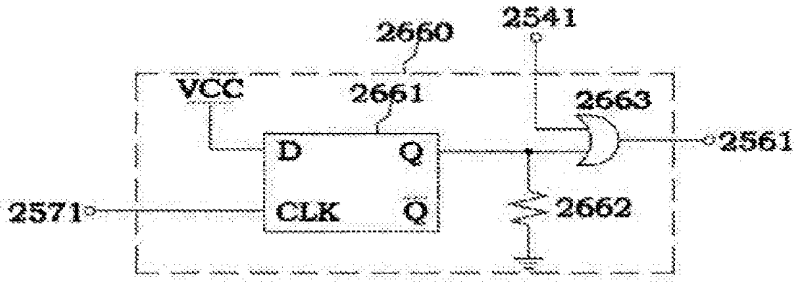

Fig. 64E

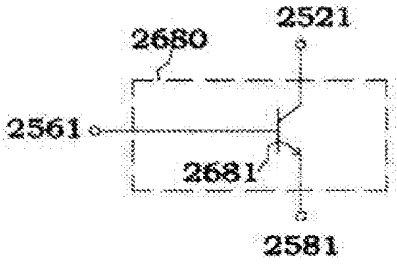

Fig. 64F

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	10288272	B2	2019-05-14	ZHEJIANG SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	
	2	9288867	B2	2016-03-15	LIGHTEL TECHNOLOGIES INC	
	3	9794990	B2	2017-10-17	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD	
	4	10208898	B2	2019-02-19	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	
	5	9360188	B2	2016-06-07	IDEAL INDUSTRIES, LLC	
	6	7399429	B2	2008-07-15	SAMSUNG ELECTRONICS CO., LTD.	
	7	9723662	B2	2017-08-01	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	
	8	7815338	B2	2010-10-19	Dennis Siemiet et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	9	9864438	B2	2018-01-09	SEO JOON KYU et al.	
	10	9445463	B2	2016-09-13	HIDEEP INC.	
	11	8360599	B2	2013-01-29	Ilumisys, Inc.	
	12	7067032	B1	2006-06-27	A RAYMOND & CIE	
	13	9609711	B2	2017-03-28	Jiaxing Super Lighting Electric Applicane Co., Ltd	
	14	9448660	B2	2016-09-20	SEO JOON KYU et al.	
	15	9228727	B2	2016-01-05	MAY, MICHAEL, W.	
	16	9526133	B2	2016-12-20	PHILIPS LIGHTING HOLDING B. V.	
	17	8456075	B2	2013-06-04	AURALIGHT INTERNATIONAL AB	
	18	1088142	A	1914-02-24	GARDNER JESSE O	
	19	8896207	B2	2014-11-25	ELECTRALED INC.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	20	9488767	B2	2016-11-08	Dante P. Nava et al.	
	21	8240875	B2	2012-08-14	Cree, Inc.	
	22	10021742	B2	2018-07-10	Tao JIANG	
	23	9756698	B2	2017-09-05	XIONG, AIMING et al.	
	24	9629215	B2	2017-04-18	Jiaxing Super Lighting Electric Appliance Co. Ltd	
	25	6246167	B1	2001-06-12	SICA, MICHAEL F.	
	26	10161569	B2	2018-12-25	XU HONG et al.	
	27	9000668	B2	2015-04-07	Ningbo Futai Electric Limited	
	28	9820341	B2	2017-11-14	Aiming Xiong et al.	
	29	6118072	A	2000-09-12	TELEDYNE TECHNOLOGIES INCORP	
	30	9885449	B2	2018-02-06	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	31	9989200	B2	2018-06-05	Zhang Yingchun	
	32	6853151	B2	2005-02-08	PHILIPS LIGHTING HOLDING B. V.	
	33	7611260	B1	2009-11-03	Kuo-Len LIN et al.	
	34	7067992	B2	2006-06-27	PHILIPS LIGHTING HOLDING B. V.	
	35	7482059	B2	2009-01-27	SAMSUNG ELECTRONICS CO., LTD.	
	36	9625137	B2	2017-04-18	Li-Qin, Li et al.	
	37	8870415	B2	2014-10-28	iLumysis, Inc.	
	38	9210774	B2	2015-12-08	ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUT	
	39	9322531	B2	2016-04-26	Chun-wei Liang et al.	
	40	8729809	B2	2014-05-20	DENOVO LIGHTING, L.L.C.	
	41	9629216	B2	2017-04-18	Jiaxing Super Lighting Electric Applicane Co., Ltd	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	42	8796943	B2	2014-08-05	M-SYSTEM CO., LTD.	
	43	7594738	B1	2009-09-29	KITAGAWA HOLDINGS, LLC	
	44	9016890	B2	2015-04-28	KIM KYUNG RYE et al.	
	45	6762562	B2	2004-07-13	PHILIPS LIGHTING HOLDING B. V.	
	46	5964518	A	1999-10-12	YA-KUANG SHEN	
	47	9810384	B2	2017-11-07	Zhang Yingchun	
	48	7380961	B2	2008-06-03	MORIYAMA SANGYO KABUSHIKI KAISHA	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20120300445	A1	2012-11-29	GT BIOMESCILT LIGHT LIMITED	
	2	20130050998	A1	2013-02-28	GT BIOMESCILT LIGHT	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	3	20150195889	A1	2015-07-09	DELTA ELECTRONICS	
	4	20140035463	A1	2014-02-06	M-SYSTEMS CO.,LTD.,	
	5	20140331532	A1	2014-11-13	ALMAX MFG CORP	
	6	20120248989	A1	2012-10-04	IKAMI SEISHI	
	7	20110084608	A1	2011-04-14	I/O CONTROLS CORPORATION	
	8	20140117853	A1	2014-05-01	M-SYSTEMS CO.,LTD.,	
	9	20100201269	A1	2010-08-12	LEXTAR ELECTRONICS CORP.	
	10	20150366008	A1	2015-12-17	LUNERA LIGHTING, INC.	
	11	20080055894	A1	2008-03-06	DENG JIA H. et al.	
	12	20160178137	A1	2016-06-23	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LTD	
	13	20040189218	A1	2004-09-30	LEONG SUSAN J., et al	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	14	20110279063	A1	2011-11-17	ORION ENERGY SYSTEMS, INC.	
	15	20160341414	A1	2016-11-24	Tao Jiang	
	16	20050162850	A1	2005-07-28	LUK JOHN F. & ALTMAN ROBERT M.	
	17	20140225519	A1	2014-08-14	POESEN ELECTRONIC CO., LTD.	
	18	20120146503	A1	2012-06-14	CREE Inc.,	
	19	20130301255	A1	2013-11-14	Lumirich Co., Ltd.	
	20	20050281030	A1	2005-12-22	LEONG SUSAN J	
	21	20140062320	A1	2014-03-06	RICOH COMPANY, LTD.	
	22	20100253226	A1	2010-10-07	OKI ISAMU	
	23	20150345755	A1	2015-12-03	PURDY STEVEN	
	24	20120026761	A1	2012-02-02	YOUNG JAMES ROY	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	25	20030189829	A1	2003-10-09	Matsushita Electric Industrial Co., Ltd	
	26	20150022114	A1	2015-01-22	SAMSUNG ELECTRONICS CO., LTD.	
	27	20160084455	A1	2016-03-24	HUNG-CHANG CHEN	
	28	20080192476	A1	2008-08-14	KABUSHIKIKAISHA MIRAI	
	29	20110291592	A1	2011-12-01	OSRAM SYLVANIA	
	30	20170211753	A1	2017-07-27	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LT	
	31	20130051008	A1	2013-02-28	SHEW LARRY N	
	32	20180335200	A1	2018-11-22	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LT	
	33	20110084554	A1	2011-04-14	TIAN FENG	
	34	20130147350	A1	2013-06-13	GIO OPTOELECTRONICS CORP.	
	35	20130256704	A1	2013-10-03	TANG GUOFU & HSIAO YUCHUN	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	36	20160286621	A1	2016-09-29	PHILIPS LIGHTING HOLDING B. V.	
	37	20170318678	A1	2017-11-02	Chris Wh MIAO et al.	
	38	20110057572	A1	2011-03-10	DENOVO LIGHTING, L.L.C.	
	39	20140239834	A1	2014-08-28	CHOI JAEYOUNG et al.	
	40	20120313540	A1	2012-12-13	LIN CHUNG JYH et al.	
	41	20160369952	A1	2016-12-22	SIGNIFY HOLDING B.V.	
	42	20170089530	A1	2017-03-30	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LT	
	43	20040095078	A1	2004-05-20	LEONG SUSAN J	
	44	20070001709	A1	2007-01-04	SHEN YU-NUNG	
	45	20120319150	A1	2012-12-20	Kabushiki Kaisha Toshiba	
	46	20070267976	A1	2007-11-22	GELCORE LLC	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	47	20100135009	A1	2010-06-03	SAMSUNG ELECTRONICS CO., LTD.	
	48	20090040415	A1	2009-02-12	SAMSUNG DISPLAY CO., LTD.	
	49	20110175536	A1	2011-07-21	IRIS OHYAMA INC.	
	50	20110121756	A1	2011-05-26	ELECTRALED INC.	
	51	20110084627	A1	2011-04-14	THE SLOAN COMPANY, INC. DBA SLOANLED	
	52	20140265899	A1	2014-09-18	SADWICK LAURENCE P	
	53	20130141890	A1	2013-06-06	STEVEN W. CARLIN et al.	
	54	20050185396	A1	2005-08-25	KUTLER MURRAY	
	55	20110043127	A1	2011-02-24	YAMASAKI SHIGEAKI	
	56	20170290119	A1	2017-10-05	XIONG AIMING et al.	
	57	20150070885	A1	2015-03-12	PETRO, ALFRED et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	58	20170094746	A1	2017-03-30	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO, LTD	
	59	20120051039	A1	2012-03-01	CHANG SHAO HAN	
	60	20170059096	A1	2017-03-02	HONG XU et al.	
	61	20130215609	A1	2013-08-22	LIU, CHUN-CHEN et al.	
	62	2016034141	A1	2016-11-24	Tao Jiang	
	63	20050162101	A1	2005-07-28	LEONG SUSAN J. et al.	
	64	20150077001	A1	2015-03-19	TAKAHASHI AKIRA et al.	
	65	20100188001	A1	2010-07-29	BROITZMAN TROY RICHARD et al.	
	66	20130003346	A1	2013-01-03	CREE, INC.	
	67	20120299501	A1	2012-11-29	KONINKLIJKE PHILIPS N.V.	
	68	20100102729	A1	2010-04-29	KATZIR WESLEY et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	69	20120162965	A1	2012-06-28	PANASONIC INTELLECTUAL PROPERTY MANAGEMENT CO., L	
	70	20190137047	A1	2019-05-09	SUZHOU INDUSTRIAL PARK HEXIN CLEAN ELECTRIC APPLI	
	71	20110305021	A1	2011-12-15	Shao-Han Chang	
	72	20130021809	A1	2013-01-24	OSRAM GMBH	
	73	20130033888	A1	2013-02-07	KONINKLIJKE PHILIPS ELECTRONICS N V	
	74	20140009923	A1	2014-01-09	FIN-CORE CORPORATION & TONG HONG INVESTMENT CO., L	
	75	20130250565	A1	2013-09-26	DELTA ELECTRONICS, INC	
	76	20100066230	A1	2010-03-18	Kuo-Len LIN et al.	
	77	20100220469	A1	2010-09-02	ILUMISYS, INC.	
	78	20130182425	A1	2013-07-18	PANASONIC INTELLECTUAL PROPERTY MANAGEMENT CO., LT	
	79	20100181925	A1	2010-07-22	ILUMISYS, INC.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	80	20120069556	A1	2012-03-22	OSRAM GMBH	
	81	20150176770	A1	2015-06-25	Cree, Inc.	
	82	20150173138	A1	2015-06-18	GENERAL ELECTRIC	
	83	20130235570	A1	2013-09-12	HOOD, WILLIAM et al.	
	84	20160081147	A1	2016-03-17	GUANG LUO HUA	
	85	20140306599	A1	2014-10-16	EDWARDS CHARLES et al.	
	86	20160113091	A1	2016-04-21	TAO HAIMIN	
	87	20140185269	A1	2014-07-03	INTEMATIX CORPORATION	
	88	20110149563	A1	2011-06-23	LIGHTEL TECHNOLOGIES INC.	
	89	20140203717	A1	2014-07-24	CREE, INC.	
	90	20110176297	A1	2011-07-21	LIGHTEL TECHNOLOGIES INC.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	91	20140192526	A1	2014-07-10	NINGBO FUTAI ELECTRIC LIMITED	
	92	20090159919	A1	2009-06-25	ALTAIR ENGINEERING, INC.	
	93	20130223053	A1	2013-08-29	VERTICIL ELECTRONICS CORPORATION	
	94	20130335959	A1	2013-12-19	LIGHTEL TECHNOLOGIES INC.	
	95	20090160369	A1	2009-06-25	CYPRESS SEMICONDUCTOR CORP	
	96	20130135857	A1	2013-05-30	CHEN, CHIA-CHIN et al.	
	97	20160381760	A1	2016-12-29	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO, LTD	
	98	20130229104	A1	2013-09-05	GREEN, ADAM et al.	
	99	20080290814	A1	2008-11-27	Susan J. Leong & John Kit	
	100	20160091147	A1	2016-03-31	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD	
	101	20120049684	A1	2012-03-01	AVANTIS LTD.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	102	20130127327	A1	2013-05-23	PHILIPS LIGHTING HOLDING B. V.	
	103	20120181952	A1	2012-07-19	ROEER NORBERT	
	104	20120212951	A1	2012-08-23	Chung-Ming, Lai et al.	
	105	20100124054	A1	2010-05-20	TAIWAN RODAN CO., LTD.	
	106	20130313983	A1	2013-11-28	PHILIPS LIGHTING HOLDING B. V.	
	107	20160316533	A1	2016-10-27	LIGHTEL TECHNOLOGIES, INC.	
	108	20170105263	A1	2017-04-13	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO, LTD	
	109	20140153231	A1	2014-06-05	OSRAM GMBH	
	110	20130293098	A1	2013-11-07	LI, YI-QUN et al.	
	111	20130033881	A1	2013-02-07	SHARP KABUSHIKI KAISHA	
	112	20110228526	A1	2011-09-22	TEKNOWARE OY	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	113	20140055029	A1	2014-02-27	PHILIPS LIGHTING HOLDING B. V.	
	114	20110309745	A1	2011-12-22	LEDS AMERICA, INC.	
	115	20190277484	A1	2019-09-12	SIGNIFY HOLDING B.V.	
	116	20130069538	A1	2013-03-21	YU-SHENG SO	
	117	20130258650	A1	2013-10-03	SHARRAH RAYMOND L.	
	118	20130135852	A1	2013-05-30	HONG KONG PATENT EXCHANGE LIMITED	
	119	20150181661	A1	2015-06-25	Lightel Technologies, Inc.,	
	120	20100277918	A1	2010-11-04	CHEN CHIEN-YUAN	
	121	20090219713	A1	2009-09-03	Dennis Siemiet et al.	
	122	20130230995	A1	2013-09-05	ILUMISYS, INC.	
	123	20110038146	A1	2011-02-17	Yancheng Haomai Lighting Science&Technology Co.Ltd	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	124	20140265900	A1	2014-09-18	SADWICK, LAURENCE P. et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	203202740	CN	U	2013-09-18	FUZHOU SUNLIGHT LIGHTING ELECTRICAL APPLIANCE CO.		☒
	2	2014045523	WO	A1	2014-03-27	PANASONIC CORP		☒
	3	204879985	CN	U	2015-12-16	PANASONIC IP MAN CO LTD		☒
	4	2014154479	JP	A	2014-08-25	EREBAMU KK		☒
	5	204693095	CN	U	2015-10-07	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒
	6	104633491	CN	A	2015-05-20	LIQUN HOU		☒
	7	2017012512	WO	A1	2017-01-26	Jiaxing Super Lighting Electric Appliance Co., Ltd		☐
	8	205447315	CN	U	2016-08-10	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LTD		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	9	104735873	CN	A	2015-06-24	JINGSAM ILLUMINATION CO LTD		☒
	10	201954350	CN	U	2011-08-31	YUANGUI LIU		☒
	11	101787255	CN	A	2010-07-28	JIANGSU WENRUN PHOTOELECTRIC C		☒
	12	102359697	CN	A	2012-02-22	HUAHUI CONSTRUCTION GROUP CO LTD		☒
	13	2008117666	JP	A	2008-05-22	SHARP CORP.		☒
	14	2016086901	WO	A3	2016-06-09	Jiaxing Super Lighting Electric Appliance Co., Ltd		☐
	15	103270618	CN	A	2013-08-28	TESA SE		☒
	16	204291454	CN	U	2015-04-22	ZHAO GUOSONG		☒
	17	201661897	CN	U	2010-12-01	JIAHAO ZHANG		☒
	18	202884614	CN	U	2013-04-17	HE ZHONGLIANG		☒
	19	2015028329	WO	A1	2015-03-05	KONINKLIJKE PHILIPS N.V.		☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	20	2013125803	WO	A1	2013-08-29	RYU, Dae Young		☒
	21	202660350	CN	U	2013-01-09	CHENYI ZHEJIANG ELECTRONIC IND CO LTD		☒
	22	2533683	GB	A	2016-06-29	Ricoh Company Limited; O2 Micro Inc		☐
	23	104776332	CN	A	2015-07-15	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒
	24	2014118754	WO	A1	2014-08-07	KONINKLIJKE PHILIPS N.V.		☐
	25	203036285	CN	U	2013-07-03	SHENZHEN UNIBOND ELECTRICAL AND LIGHTING CO LTD		☒
	26	203202766	CN	U	2013-09-18	ZHOU SHUNLONG		☒
	27	202546288	CN	U	2012-11-21	BO ZHAN		☒
	28	202132647	CN	U	2012-02-01	MENG YANG		☒
	29	2498692	CN	Y	2002-07-03	LIYADE ELECTRONICS SCIENCE & T		☒
	30	2013150417	WO	A1	2013-10-10	KONINKLIJKE PHILIPS N.V.		☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	31	104515014	CN	A	2015-04-15	JIANGMEN POTOP OPTO ELECTRONIC TECHNOLOGY CO LTD		☒
	32	201796567	CN	U	2011-04-13	SHENZHEN LIANTRONICS CO LTD		☒
	33	201515528	CN	U	2010-06-23	HESHAN LIDE ELECTRONIC ENTPR CO LTD		☒
	34	204573639	CN	U	2015-08-19	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒
	35	202546330	CN	U	2012-11-21	OPTO TECH CORP		☒
	36	203857296	CN	U	2014-10-01	SHENZHEN GUANGJU LIGHTING CO LTD		☒
	37	104565931	CN	A	2015-04-29	JIANGXI OUTRACE TECHNOLOGY CO LTD		☒
	38	2011061056	JP	A	2011-03-24	STANLEY ELECTRIC CO. LTD.		☒
	39	2014103000	JP	A	2014-06-05	ONO TETSUYA		☒
	40	102159867	CN	A	2011-08-17	EMABOND SOLUTIONS LLC		☒
	41	103195999	CN	A	2013-07-10	LI WENZHONG		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	42	2015081809	WO	A1	2015-06-11	CHEN HONGCHANG		☒
	43	103411140	CN	B	2015-05-20	DALIAN THERMALWAY HEAT TRANSFER TECHNOLOGY CO LTD;		☒
	44	204268162	CN	U	2015-04-15	SI WENYUN		☒
	45	201014273	CN	Y	2008-01-30	GUOZHONG WANG		☒
	46	2911390	CN	Y	2007-06-13	SUN PINGRU		☒
	47	102777788	CN	A	2012-11-14	SUZHOU VELARIUM LANDSCAPE DECO		☒
	48	203963553	CN	U	2014-11-26	HESHAN NEO NEON LIGHTING CO LTD		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

EXAMINER SIGNATURE			
Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2020-04-01
Name/Print	Simon Kuang Lu	Registration Number	51974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	LI-QIN		LI	

Residence Information (Select One) US Residency ● Non US Residency Active US Military Service

City	Jiaxing	Country of Residence i	CN

Mailing Address of Inventor:

Address 1	No.1288 Jiachuang Rd. Xiuzhou Area
Address 2	Jiaxing City, Zhejiang, China
City	Jiaxing City
State/Province	
Postal Code	
Country i	CN

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	TAO		JIANG	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Jiaxing	Country of Residence i	CN

Mailing Address of Inventor:

Address 1	No.1288 Jiachuang Rd. Xiuzhou Area
Address 2	Jiaxing City, Zhejiang, China
City	Jiaxing City
State/Province	
Postal Code	
Country i	CN

Inventor 3 Remove

Legal Name

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Prefix	Given Name	Middle Name	Family Name	Suffix
	CHANG		YANG	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Jiaxing	Country of Residence i	CN

Mailing Address of Inventor:

Address 1	No.1288 Jiachuang Rd. Xiuzhou Area
Address 2	Jiaxing City, Zhejiang, China
City	Jiaxing City
State/Province	
Postal Code	
Country i	CN

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	BAO		WANG	

Residence Information (Select One) US Residency ◉ Non US Residency Active US Military Service

City	Jiaxing	Country of Residence i	CN

Mailing Address of Inventor:

Address 1	No.1288 Jiachuang Rd. Xiuzhou Area
Address 2	Jiaxing City, Zhejiang, China
City	Jiaxing City
State/Province	
Postal Code	
Country i	CN

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	147274		
Email Address		Add Email	Remove Email

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Application Information:

Title of the Invention	LED TUBE LAMP		
Attorney Docket Number	S20003USUC01T	**Small Entity Status Claimed** ☐	
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	31	**Suggested Figure for Publication (if any)**	33

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	147274		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)	
	Continuation of	16399004	2019-04-30	

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16399004	Continuation of	16012320	2018-06-19	10295125	2019-05-21

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16012320	Continuation of	15441789	2017-02-24	10024503	2018-07-17

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15441789	Continuation of	14865387	2015-09-25	9609711	2017-03-28

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201410507660.9	CN	2014-09-28	

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201410508899.8	CN	2014-09-28	

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201410623355.6	CN	2014-11-06	
201410734425.5	CN	2014-12-05	
201510075925.7	CN	2015-02-12	
201510104823.3	CN	2015-03-10	
201510134586.5	CN	2015-03-26	
201510136796.8	CN	2015-03-27	
201510155807.7	CN	2015-04-03	
201510173861.4	CN	2015-04-14	
201510193980.6	CN	2015-04-22	
201510259151.3	CN	2015-05-19	
201510268927.8	CN	2015-05-22	
201510338027.6	CN	2015-06-17	

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201510364735.7	CN	2015-06-26	
201510372375.5	CN	2015-06-26	
201510373492.3	CN	2015-06-26	
201510378322.4	CN	2015-06-29	
201510391910.1	CN	2015-07-02	
201510406595.5	CN	2015-07-10	
201510428680.1	CN	2015-07-20	
201510482944.1	CN	2015-08-07	
201510483475.5	CN	2015-08-08	
201510486115.0	CN	2015-08-08	
201510555543.4	CN	2015-09-02	
201510557717.0	CN	2015-09-06	

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)	Remove
201510595173.7	CN	2015-09-18		Remove
201510133689.X	CN	2015-03-25		Remove
201510284720.X	CN	2015-05-29		Remove
201510315636.X	CN	2015-06-10		

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD		
Mailing Address Information For Applicant:			
Address 1	No.1288 Jiachuang Rd., Xiuzhou Area		
Address 2	Jiaxing City, Zhejiang, China		
City	Jiaxing	**State/Province**	
Country	CN	Postal Code	314031
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/SIMON KUANG LU/			Date (YYYY-MM-DD)	2020-04-01
First Name	SIMON KUANG	Last Name	LU	Registration Number	51,974

Additional Signature may be generated within this form by selecting the Add button. Add

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9775215	B2	2017-09-26	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20130320869	A1	2013-12-05	KONINKLIJKE PHILIPS N.V.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	102932997	CN	B	2014-08-27	ZHEJIANG HENGMAN PHOTOELECTRIC TECHNOLOGY CO LTD		☓
	2	200965185	CN	Y	2007-10-24	YAOHAN LIU		☒
	3	103016984	CN	A	2013-04-03	ZHANG JING		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	4	102376843	CN	A	2012-03-14	WENBIN CHEN		☒
	5	104033772	CN	A	2014-09-10	NINGBO LAE ELECTRONIC CO LTD		☒
	6	204534210	CN	U	2015-08-05	ELEC TECH INT CO LTD		☒
	7	2015074917	WO	A1	2015-05-28	KONINKLIJKE PHILIPS N.V.		☐
	8	101715265	CN	B	2013-08-14	OCEANS KING LIGHTING SCI & TECH; SHENZHEN OCEANS KI		☒
	9	2015028639	WO	A1	2015-03-05	KONINKLIJKE PHILIPS N.V.		☐
	10	102116460	CN	A	2011-07-06	GANQIANG CAI		☒
	11	202125774	CN	U	2012-01-25	GUANGZHOU THERMOKING TECHNOLOGY INTERNAT CO LTD		☒
	12	204420636	CN	U	2015-06-24	SHENHZEN BOSHIN LED LIGHTING CO LTD		☒
	13	102889446	CN	A	2013-01-23	LI WENZHONG		☒
	14	3147313	JP	U	2008-12-25	Kuo-Len LIN et.al		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	15	202302841	CN	U	2012-07-04	NINGBO RUIKANG PHOTOELECTRIC CO LTD & SHENZHEN REF		☒
	16	103968272	CN	A	2014-08-06	WU RONGFENG		☒
	17	2519258	GB	A	2015-04-15	UNITY OPTO TECHNOLOGY CO. LTD		☐
	18	2013243132	JP	A	2013-12-05	OKI ISAMU		☒
	19	203549435	CN	U	2014-04-16	HU FEILIN		☒
	20	H01204982	JP	A	1989-08-17	Kanbayashi Tomio et al.		☒
	21	2014206785	WO	A1	2014-12-31	TAO HAIMIN		☐
	22	203848055	CN	U	2014-09-24	CHEN JINZHANG		☒
	23	200980183	CN	Y	2007-11-21	WANG GUOZHONG		☒
	24	204042527	CN	U	2014-12-24	JIANGSU INKIN OPTOELECTRIC TECHNOLOGY DEV CO LTD		☒
	25	205877791	CN	U	2017-01-11	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	26	103851547	CN	A	2014-06-11	OSRAM GMBH		☒
	27	104990041	CN	A	2015-10-21	ZHAO XING; LU LIBING		☒
	28	2012155880	JP	A	2012-08-16	SEKI KATSUSH et al.		☒
	29	2015066566	WO	A1	2015-05-07	INNOSYS, INC.		☐
	30	203771102	CN	U	2014-08-13	SUZHOU ARES INTERNAT CO LTD		☒
	31	103943752	CN	A	2014-07-23	LEXTAR ELECTRONICS CORP		☒
	32	202216003	CN	U	2012-05-09	BEIJING TONGFANG LANSEN LIGHTING TECHNOLOGY CO LTD		☒
	33	203240337	CN	U	2013-10-16	ZHEJIANG SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒
	34	101352105	CN	A	2009-01-21	GENERAL ELECTRIC		☒
	35	104832813	CN	A	2015-08-12	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒
	36	201954169	CN	U	2011-08-31	HUANSONG XU; QUEMING WANG		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	37	1914458	CN	A	2007-02-14	KONINKL PHILIPS ELECTRONICS NV		☒
	38	203686635	CN	U	2014-07-02	JIANGSU TIWIN OPTOELECTRONIC TECHNOLOGY CO LTD		☒
	39	2005122906	JP	A	2005-05-12	HITACHI LIGHTING LTD		☒
	40	203162856	CN	U	2013-08-28	RONG SHENG		☒
	41	2554899	EP	A2	2013-02-06	QBAS TECH CO LTD		☐
	42	101922640	CN	A	2010-12-22	FUJIAN XIANGYUN PHOTOELECTRIC TECHNOLOGY CO LTD		☒
	43	1292930	CN	A	2001-04-25	KONINKL PHILIPS ELECTRONICS NV		☒
	44	104470086	CN	B	2017-06-06	ZHAO GUOSONG		☒
	45	204083927	CN	U	2015-01-07	LU YING et al.		☒
	46	2531425	GB	A	2016-04-20	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☐
	47	101228393	CN	A	2008-07-23	LEMNIS LIGHTING IP GMBH		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	48	203927469	CN	U	2014-11-05	SUZHOU LINKE LIGHTING TECHNOLOGY CO LTD		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2020-04-01
Name/Print	Simon Kuang Lu	Registration Number	51974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7380961	B2	2008-06-03	MORIYAMA SANGYO KABUSHIKI KAISHA	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20120248986	A1	2012-10-04	GIBBS DUANE	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2013254667	JP	A	2013-12-19	MITSUBISHI ELEC LIGHTING CORP		☓
	2	2014117435	WO	A1	2014-08-07	CHEN YUAN HSING YEH CO LTD		☒
	3	204573684	CN	U	2015-08-19	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	4	103822121	CN	A	2014-05-28	LEXTAR ELECTRONICS CORP; LEXTAR ELECTRONICS SUZHOU		☒
	5	204741593	CN	U	2015-11-04	XIE JIANG et al.		☒
	6	101092545	CN	A	2007-12-26	HONG BAI		☒
	7	201255393	CN	Y	2009-06-10	ZHONG YING		☒
	8	2914065	EP	A2	2015-09-02	RICOH COMPANY, LTD		☐
	9	204300737	CN	U	2015-04-29	LIU MEICHAN		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2020-04-01
Name/Print	Simon Kuang Lu	Registration Number	51974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9629211	B2	2017-04-18	Jiaxing Super Lighting Electric Appliance Co., Ltd	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20140218892	A1	2014-08-07	INTEMATIX CORPORATION	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	101182919	CN	A	2008-05-21	ZHENHANG YANG		☒
	2	3146803	EP	A1	2017-03-29	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☐
	3	104595765	CN	A	2015-05-06	WUXI HYPERION ENERGY CONSERVATIONS CO LTD		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	4	102932997	CN	A	2013-02-13	ZHEJIANG HENGMAN PHOTOELECTRIC TECHNOLOGY CO LTD		☒
	5	103742875	CN	A	2014-04-23	KUANG ZHENGFANG		☒
	6	102155642	CN	A	2011-08-17	CHANGGUI LIU		☒
	7	102226504	CN	A	2011-10-26	SHANGHAI XINKAIYUAN LIGHTING TECHNOLOGY CO LTD		☒
	8	101806444	CN	A	2010-08-18	OCEANS KING LIGHTING SCIENCE		☒
	9	104033772	CN	B	2016-06-08	NINGBO LIAN ELECTRONIC CO LTD		☒
	10	20090118147	KR	A	2009-11-18	NAM KI HO et al,		☒
	11	203615157	CN	U	2014-05-28	PANASONIC CORP		☒
	12	201866575	CN	U	2011-06-15	SHENZHEN XINRUI OPTOELECTRONICS CO LTD		☒
	13	2009111098	WO	A2	2009-09-11	ALTAIR ENG INC		☒
	14	202120982	CN	U	2012-01-18	SHENZHEN JUFEI OPTOELECTRONIC CO LTD		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	15	101715265	CN	A	2010-05-26	OCEANS KING LIGHTING SCI & TECH; SHENZHEN OCEANS KI		☒
	16	201555053	CN	U	2010-08-18	PEILING LIAO		☒
	17	204795749	CN	U	2015-11-18	XIE JIANG et al.		☒
	18	201363601	CN	Y	2009-12-16	YINGCHENG RUILU TECHNOLOGY CO		☒
	19	2016187846	WO	A1	2016-12-01	DIALOG SEMICONDUCTOR (UK) Limited		☐
	20	202392485	CN	U	2012-08-22	KANG WANG		☒
	21	2016086900	WO	A2	2016-06-09	HONG XU et al.		☐
	22	102355780	CN	A	2012-02-15	ZHEJIANG SHIMING OPTICS TECHNOLOGY CO LTD		☒
	23	203068187	CN	U	2013-07-17	HUANG YINGFENG		☒
	24	103563490	CN	A	2014-02-05	GENERAL ELECTRIC		☒
	25	202852551	CN	U	2013-04-03	YANTAI GELINRUIDE OPTOELECTRONIC ENGINEERING CO LT	AA	☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	26	203464014	CN	U	2014-03-05	ZHANG WEI et al.		☒
	27	103411140	CN	A	2013-11-27	DALIAN THERMALWAY HEAT TRANSFER TECHNOLOGY CO LTD		☒
	28	203131520	CN	U	2013-08-14	JIANGSU DONGLIN ELECTRONICS CO LTD		☒
	29	101787273	CN	A	2010-07-28	ANHUI ZERUN OPTOELECTRONIC CO		☒
	30	102738355	CN	A	2012-10-17	SILICONWARE PREC IND CO LTD		☒
	31	102121690	CN	A	2011-07-13	NANJING ZHONGYA OPTO ELECTRICAL SCIENCE AND TECHNO		☒
	32	203240362	CN	U	2013-10-16	SUZHOU MONT LIGHTING CO LTD		☒
	33	102016661	CN	A	2011-04-13	NITTA CORP		☒
	34	204573700	CN	U	2015-08-19	FUJIAN QUANZHOU SIGOLED LIGHTING TECHN CO LTD		☒
	35	202100985	CN	U	2012-01-04	YUNJIE XU		☒
	36	1460165	CN	A	2003-12-03	KONINKL PHILIPS ELECTRONICS NV		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	37	2012139691	WO	A1	2012-10-18	STEINBERG LEUCHTMITTELWERKE ; SZWAICZYK MICHAEL		☐
	38	102155642	CN	B	2013-02-27	CHANGGUI LIU		☒
	39	102518972	CN	A	2012-06-27	SEEWILL OPTOELECTRONICS TECHNOLOGY CO LTD		☒
	40	20120055349	KR	A	2012-05-31	AMOLUXE CO LTD		☒
	41	2523275	GB	A	2015-08-19	The Wand Lite Company Limited		☐
	42	203517629	CN	U	2014-04-02	ZHANG JING		☒
	43	201739830	CN	U	2011-02-09	GEM SUN TECHNOLOGIES CO LTD		☒
	44	2012129301	WO	A1	2012-09-27	ELECTRALED INC.		☐
	45	201437921	CN	U	2010-04-14	SHENZHEN SEVEN COLOR STAR OPTOELECTRONICS TECHNOLO		☒
	46	202012011550	DE	U1	2013-06-27	BERNDT BENJAMIN		☒
	47	204573682	CN	U	2015-08-19	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	48	202281101	CN	U	2012-06-20	LIXIA LIU		☒
	49	102720901	CN	A	2012-10-10	MENG YANG		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2020-04-01
Name/Print	Simon Kuang Lu	Registration Number	51974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT6043095

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
LI-QIN LI	02/23/2017
TAO JIANG	02/23/2017
CHANG YANG	02/23/2017
BAO WANG	02/22/2017

RECEIVING PARTY DATA

Name:	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD
Street Address:	1288 JIACHUANG RD., XIUZHOU AREA, ZHEJIANG
City:	JIAXING
State/Country:	CHINA
Postal Code:	314031

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	16838012

CORRESPONDENCE DATA

Fax Number:

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 650-315-4468
Email: jin@atipm.com
Correspondent Name: SIMON KUANG LU
Address Line 1: 1380 CHARLES WILLARD ST.
Address Line 4: CARSON, CALIFORNIA 90746

ATTORNEY DOCKET NUMBER:	S20003USUC01T
NAME OF SUBMITTER:	SIMON KUANG LU
SIGNATURE:	/Simon Kuang Lu/
DATE SIGNED:	04/02/2020
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 3
source=S19009USUC01T_Combinedoathdeclaration_S16122USUC01T#page1.tif

source=S19009USUC01T_Combinedoathdeclaration_S16122USUC01T#page2.tif
source=S19009USUC01T_Combinedoathdeclaration_S16122USUC01T#page3.tif

COMBINED DECLARATION AND ASSIGNMENT

Title of Invention: LED TUBE LAMP

As a below named inventor, I hereby declare that:

This declaration is directed to:
☒ The attached application; or
☐ United States application number or PCT international application number _____, filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LTD of No.1288 Jiachuang Rd. Xiuzhou Area, Jiaxing, Zhejiang, China, its heirs, successors, legal representatives and assigns (hereinafter designated as the Assignee) is desirous of acquiring the entire right, title and interest in and to said invention and in and to any Letters Patent(s) that may be granted therefor in the United States of America and ☐ in any foreign countries.

NOW, THEREFORE, in consideration of the sum of Ten Dollars ($10.00) to the undersigned in hand paid, the receipt of which is hereby acknowledged, and other good and valuable consideration, the undersigned has (have) sold, assigned and transferred, and by these presents does sell, assign and transfer unto said Assignee the full and exclusive right to the said invention in the United States of America, its territories, dependencies and possessions and the entire right, title and interest in and to any and all Letters Patent(s) which may be granted therefor in the United States of America, its territories, dependencies and possessions, and if the box above is designated, in any and all foreign countries; and to any and all divisions, reissues,

continuations, conversions and extensions thereof for the full term or terms for which the same may be granted.

The undersigned agree(s) to execute all papers necessary in connection with this application and any continuing, divisional, conversion or reissue applications thereof and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

The undersigned agree(s) to execute all papers necessary in connection with any interference which may be declared concerning this application or continuation, division, conversion or reissue thereof or Letter Patent(s) or reissue patent issued thereon and to cooperate with the Assignee in every way possible in obtaining and producing evidence and proceeding with such interference.

The undersigned agree(s) to execute all papers and documents and to perform any act which may be necessary in connection with claims or provisions of the International Convention for the Protection of Industrial Property or similar agreements.

The undersigned agree(s) to perform all affirmative acts which may be necessary to obtain a grant of a valid United States of America patent(s) or a grant of a valid United States of America and any foreign patent(s) to the Assignee and to vest all rights therein hereby conveyed to said Assignee as fully and entirely as the same would have been held by the undersigned if this Assignment and sale had not been made.

The undersigned hereby authorize(s) and request(s) the Patent and Trademark Office Officials in the United States of America and in any foreign countries to issue any and all Letters Patents resulting from said application or any continuing, divisional, conversion or reissue applications thereof to the said Assignee, as Assignee of the entire interest, and hereby covenants that he has (they have) the full right to convey the entire interest herein assigned, and that he has (they have) not executed, and will not execute, any agreement in conflict herewith.

The undersigned hereby covenant(s) that no assignment, sale, agreement or encumbrance has been or will be made or entered into which would conflict with this assignment.

In witness whereof, executed by the undersigned on the date(s) opposite the undersigned name(s).

LEGAL NAME OF FIRST OR SOLE INVENTOR:

LI, LIQIN

Signature: LI LIQIN Date: 2/23/2017

LEGAL NAME OF ADDITIONAL JOINT INVENTOR, IF ANY:

JIANG, TAO

Signature: JiangTao Date: 2/23/2017

LEGAL NAME OF ADDITIONAL JOINT INVENTOR, IF ANY:

YANG, CHANG

Signature: YANG CHANG Date: 2/23/2017

LEGAL NAME OF ADDITIONAL JOINT INVENTOR, IF ANY:

WANG, BAO

Signature: WANG BAO Date: 2/22/2017

☐ Additional inventors are being named on separately numbered sheets attached hereto

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT6049007

SUBMISSION TYPE:	RESUBMISSION
NATURE OF CONVEYANCE:	ASSIGNMENT
RESUBMIT DOCUMENT ID:	505996385

CONVEYING PARTY DATA

Name	Execution Date
LI-QIN LI	02/23/2017
TAO JIANG	02/23/2017
CHANG YANG	02/23/2017
BAO WANG	02/22/2017

RECEIVING PARTY DATA

Name:	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD
Street Address:	1288 JIACHUANG RD., XIUZHOU AREA, ZHEJIANG
City:	JIAXING
State/Country:	CHINA
Postal Code:	314031

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	16838012

CORRESPONDENCE DATA

Fax Number:

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 650-315-4468
Email: jin@atipm.com
Correspondent Name: SIMON KUANG LU
Address Line 1: 1380 CHARLES WILLARD ST.
Address Line 4: CARSON, CALIFORNIA 90746

ATTORNEY DOCKET NUMBER:	S20003USUC01T
NAME OF SUBMITTER:	SIMON KUANG LU
SIGNATURE:	/Simon Kuang Lu/
DATE SIGNED:	04/06/2020
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 3

source=S19009USUC01T_Combinedoathdeclaration_S16122USUC01T#page1.tif
source=S19009USUC01T_Combinedoathdeclaration_S16122USUC01T#page2.tif
source=S19009USUC01T_Combinedoathdeclaration_S16122USUC01T#page3.tif

COMBINED DECLARATION AND ASSIGNMENT

Title of Invention: LED TUBE LAMP

As a below named inventor, I hereby declare that:

This declaration is directed to:

☒ The attached application; or

☐ United States application number or PCT international application number _____, filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LTD of No.1288 Jiachuang Rd. Xiuzhou Area, Jiaxing, Zhejiang, China, its heirs, successors, legal representatives and assigns (hereinafter designated as the Assignee) is desirous of acquiring the entire right, title and interest in and to said invention and in and to any Letters Patent(s) that may be granted therefor in the United States of America and ☐ in any foreign countries.

NOW, THEREFORE, in consideration of the sum of Ten Dollars ($10.00) to the undersigned in hand paid, the receipt of which is hereby acknowledged, and other good and valuable consideration, the undersigned has (have) sold, assigned and transferred, and by these presents does sell, assign and transfer unto said Assignee the full and exclusive right to the said invention in the United States of America, its territories, dependencies and possessions and the entire right, title and interest in and to any and all Letters Patent(s) which may be granted therefor in the United States of America, its territories, dependencies and possessions, and if the box above is designated, in any and all foreign countries; and to any and all divisions, reissues,

continuations, conversions and extensions thereof for the full term or terms for which the same may be granted.

The undersigned agree(s) to execute all papers necessary in connection with this application and any continuing, divisional, conversion or reissue applications thereof and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

The undersigned agree(s) to execute all papers necessary in connection with any interference which may be declared concerning this application or continuation, division, conversion or reissue thereof or Letter Patent(s) or reissue patent issued thereon and to cooperate with the Assignee in every way possible in obtaining and producing evidence and proceeding with such interference.

The undersigned agree(s) to execute all papers and documents and to perform any act which may be necessary in connection with claims or provisions of the International Convention for the Protection of Industrial Property or similar agreements.

The undersigned agree(s) to perform all affirmative acts which may be necessary to obtain a grant of a valid United States of America patent(s) or a grant of a valid United States of America and any foreign patent(s) to the Assignee and to vest all rights therein hereby conveyed to said Assignee as fully and entirely as the same would have been held by the undersigned if this Assignment and sale had not been made.

The undersigned hereby authorize(s) and request(s) the Patent and Trademark Office Officials in the United States of America and in any foreign countries to issue any and all Letters Patents resulting from said application or any continuing, divisional, conversion or reissue applications thereof to the said Assignee, as Assignee of the entire interest, and hereby covenants that he has (they have) the full right to convey the entire interest herein assigned, and that he has (they have) not executed, and will not execute, any agreement in conflict herewith.

The undersigned hereby covenant(s) that no assignment, sale, agreement or encumbrance has been or will be made or entered into which would conflict with this assignment.

In witness whereof, executed by the undersigned on the date(s) opposite the undersigned name(s).

LEGAL NAME OF FIRST OR SOLE INVENTOR:

LI, LIQIN

Signature: LI LIQIN Date: 2/23/2017

LEGAL NAME OF ADDITIONAL JOINT INVENTOR, IF ANY:

JIANG, TAO

Signature: JiangTao Date: 2/23/2017

LEGAL NAME OF ADDITIONAL JOINT INVENTOR, IF ANY:

YANG, CHANG

Signature: YANG CHANG Date: 2/23/2017

LEGAL NAME OF ADDITIONAL JOINT INVENTOR, IF ANY:

WANG, BAO

Signature: WANG BAO Date: 2/22/2017

☐ Additional inventors are being named on separately numbered sheets attached hereto

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	10161569	B2	2020-12-25	Xu et al.	
	2	10560989	B2	2020-02-11	Tao Jiang et al.	
	3	9894732	B2	2018-02-13	Xiong Aiming et.al	
	4	9777891	B2	2017-10-03	Yusaku Kawabata et al.	
	5	9574717	B2	2017-02-21	James R. Scapa et al.	
	6	9462658	B1	2016-10-04	Jeahoon Kim	
	7	8791650	B2	2014-07-29	XinXin Shan	
	8	9839081	B2	2017-12-05	Jong June Park	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	9	9883555	B2	2018-01-30	Jinsheng Deng et al.	
	10	9338853	B2	2016-05-10	Luo Hua Guang	
	11	8304993	B2	2012-11-06	Hua-Lung Tzou et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20150198291	A1	2015-07-16	Ching-Feng Lin et al.	
	2	20150049473	A1	2015-02-19	Pan et al.	
	3	20090045715	A1	2009-02-19	Totada R. Shantha et al.	
	4	20130119869	A1	2013-05-16	Chunghang Peng	
	5	20060146527	A1	2006-07-06	Carl R. VanderSchuit	
	6	20140084800	A1	2014-07-29	Bong Jin LEE	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	7	20150173138	A1	2015-06-18	Bruce Richard Roberts	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2012114096	WO	A1	2012-08-30	WADE, Scott et al.		
	2	202100985	CN	U	2012-01-04	YUNJIE XU		×
	3	104633491	CN	A	2015-05-20	HOU LIQUN		☒
	4	203628340	CN	U	2014-06-04	LIU TIANMING et al.		☒
	5	2014068335	WO	A1	2014-05-08	EVITT, Jonathan		☐
	6	201851921	CN	U	2011-06-01	WANG LIAN et al.		☒
	7	204437746	CN	U	2015-07-01	ZHANG, SHUHUA et al.		☒
	8	2015110306	WO	A1	2015-07-30	YUAN et al.		☐

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	9	2608761	DE	A1	1977-09-08	MUTZHAS MAXIMILIAN FRIEDRICH D		☒
	10	203322772	CN	U	2013-12-04	QIAN, FENGTAO et al.		☒
	11	2009129689	WO	A1	2009-10-29	Chen Zhonglie		☒
	12	204005873	CN	U	2014-12-10	HANGZHOU SANGDI LIGHTING ELECTRIC APPLIANCE CO LT		☒
	13	203162690	CN	U	2013-08-28	LIANG YOUQING et al.		☒
	14	203500909	CN	U	2014-03-26	WANG JUN		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2020-07-05
Name/Print	Simon Kuang Lu	Registration Number	51,974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/838,012	04/01/2020	LI-QIN LI	S20003USUC01T

CONFIRMATION NO. 6416

147274
Jiaxing Super Lighting Electric Appliance Co., Ltd
IP Department
No. 1288 Jiachuang Road, Xiuzhou Area
Jiaxing, Zhejiang
Jiaxing City, 314031
CHINA

PUBLICATION NOTICE

Title:LED TUBE LAMP

Publication No.US-2020-0232609-A1
Publication Date:07/23/2020

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7914193	B2	2011-03-29	Donald A. PEIFER et al.	
	2	9551463	B2	2017-01-24	Don Barnetson et al.	
	3	9239157	B2	2016-01-19	Rasit Özgüc et al.	
	4	9360188	B2	2016-06-07	Deborah Kircher et al.	
	5	8866396	B2	2014-10-21	Jos Timmermans et al.	
	6	7399429	B2	2008-07-15	Wei Liu et al.	
	7	8358056	B2	2013-01-22	Myung Koo Park	
	8	8773031	B2	2014-07-08	Laurence P. Sadwick	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	9	9618168	B1	2017-04-11	Tao Jiang et al.	
	10	7482059	B2	2009-01-27	Adam Peng et al.	
	11	9668308	B2	2017-05-30	Chungho Hsia	
	12	9468054	B2	2016-10-11	Don Barnetson et al.	
	13	8740410	B3	2014-06-03	Donald A. PEIFER et al.	
	14	9587817	B2	2017-03-07	Xintong Liu et al.	
	15	9103953	B2	2015-08-11	Robert C. Gardner et al.	
	16	7086747	B2	2006-08-08	Lyman O. Nielson et al.	
	17	9033545	B2	2015-05-19	Donald Barnetson et al.	
	18	8608351	B2	2013-12-17	Donald A. PEIFER	
	19	9243757	B2	2016-01-26	Donald Barnetson et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	20	8931918	B2	2015-01-13	Chun-Chen Liu et al.	
	21	9585221	B1	2017-02-28	Zhong Chen	
	22	8915611	B2	2014-12-23	John X. Zhang	
	23	7766536	B2	2010-08-03	Donald Allen Peifer et al.	
	24	6860628	B2	2005-03-01	Jonas J. Robertson et al.	
	25	8907556	B2	2014-12-09	Myung Koo Park	
	26	9795001	B2	2017-10-17	Qifeng Ye et al.	
	27	9028105	B2	2015-05-12	Don Barnetson et al.	
	28	7049761	B2	2006-05-23	Jos Timmermans et al.	
	29	9897265	B2	2018-02-20	Aiming Xiong et al.	
	30	8093823	B1	2012-01-10	John Ivey et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	31	7918598	B2	2011-04-05	Donald A. PEIFER et al.	
	32	8602604	B2	2013-12-10	John X. Zhang et al.	
	33	9480109	B2	2016-10-25	Qi Feng Ye et al.	
	34	9006993	B1	2015-04-14	Jos Timmermans et al.	
	35	9622317	B2	2017-04-11	Bernd Ackermann	
	36	8427070	B2	2013-04-23	Mitsuhiro Matsuda	
	37	9468046	B2	2016-10-11	Donald Barnetson et al.	
	38	8789970	B2	2014-07-29	Peter H. Mahowald	
	39	9468060	B2	2016-10-11	Don Barnetson et al.	
	40	8092863	B2	2012-01-10	Schmid et al.	
	41	9497821	B1	2016-11-15	Xintong Liu	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	42	5920465	A	1999-07-06	TANAKA KAZUHISA	
	43	8482212	B1	2013-07-09	John Ivey et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100103673	A1	2010-04-29	IVEY JOHN	
	2	20160010804	A1	2016-01-14	Don Barnetson et al.	
	3	20140328065	A1	2014-11-06	Donald Barnetson et al.	
	4	20170089525	A1	2017-03-30	Aiming Xiong et al.	
	5	20120161666	A1	2012-06-28	Biju Antony et al.	
	6	20120162965	A1	2012-06-28	Nobuyoshi Takeuchi et al.	
	7	20110260614	A1	2011-10-27	HARTIKKA et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	8	20160369952	A1	2016-12-22	JOHANNES WILHELMUS WEEKAMP	
	9	20190137047	A1	2019-05-09	Yiwen Hu	
	10	20170094748	A1	2017-03-30	Jong June PARK	
	11	20130010453	A1	2013-01-10	Peter Mahowald	
	12	20120092856	A1	2012-04-19	John X. Zhang et al.	
	13	20100289428	A1	2010-11-18	Joseph E. Frazier et al.	
	14	20120230019	A1	2012-09-13	Donald A. PEIFER	
	15	20180310370	A1	2018-10-25	Heilman et al.	
	16	20160018061	A1	2016-01-21	Donald Barnetson et al.	
	17	20140328066	A1	2014-11-06	Don Barnetson et al.	
	18	20120113659	A1	2012-05-10	HERMITTE MICHEL et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	19	20120008316	A1	2012-01-12	IVEY JOHN	
	20	20150195880	A1	2015-07-09	Donald Barnetson et al.	
	21	20150252958	A1	2015-09-10	Don Barnetson et al.	
	22	20110205738	A1	2011-08-25	Donald A. PEIFER et al.	
	23	20070267976	A1	2007-11-22	Christopher L. Bohler et al.	
	24	20100135009	A1	2010-06-03	David Duncan et al.	
	25	20120176784	A1	2012-07-12	Donald A. PEIFER et al.	
	26	20120257383	A1	2012-10-11	John X. Zhang	
	27	20160262220	A1	2016-09-08	Don Barnetson et al.	
	28	20190277484	A1	2019-09-12	Cornelis Wilhelmus KWISTHOUT	
	29	20150223303	A1	2015-08-06	Hsia et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	30	20150021988	A1	2015-01-22	Donald Barnetson et al.	
	31	20150241000	A1	2015-08-27	Don Barnetson et al.	
	32	20140185269	A1	2014-07-03	Yi-Qun Li	
	33	20130048342	A1	2013-02-28	MALSTROM CHARLES RANDALL et al.	
	34	20040007980	A1	2004-01-15	SHIBATA YOSHIHIKO	
	35	20150049490	A1	2015-02-19	Donald Barnetson et al.	
	36	20150359059	A1	2015-12-10	Don Barnetson et al.	
	37	20120201908	A1	2012-08-09	Kirk Patrick Miller	
	38	20120170260	A1	2012-07-05	Robert C. Gardner et al.	
	39	20160128154	A1	2016-05-05	Don Barnetson et al.	
	40	20170006672	A1	2017-01-05	Donald Barneston et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	41	20150022114	A1	2015-01-22	Chang-seob KIM	
	42	20130058080	A1	2013-03-07	Ge et al.	
	43	20140226320	A1	2014-08-14	HALLIWELL BRIAN et al.	
	44	20120155116	A1	2012-06-21	Robert C. Gardner	
	45	20110006688	A1	2011-01-13	Hyun-seop Shim	
	46	20140218892	A1	2014-08-07	Charles Edwards et al.	
	47	20130003346	A1	2013-01-03	RONAN LETOQUIN et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	101968168	CN	A	2011-02-09	PETER BISHOP et al.		☒
	2	5383939	JP	B1	2014-01-08	NAITO SOSUKE		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	3	103982782	CN	A	2014-08-13	ZHAO YIJUN et al.		☒
	4	102287737	CN	A	2011-12-21	QIU FUJUN		☒
	5	202972731	CN	U	2013-06-05	FAN BANGYANG		☒
	6	105465640	CN	A	2016-04-06	JIANG TAO		☒
	7	206555763	CN	U	2017-10-13	Xintong Liu		☒
	8	101629750	KR	B1	2016-06-24	WOO JONG KOO		☒
	9	103822121	CN	A	2014-04-09	WANG SONG		☒
	10	201030277	TW	A	2010-08-16	TZOU HUA-LUNG et al.		☒
	11	203176871	CN	U	2013-09-04	YANG DEYUAN et al.		☒
	12	204442771	CN	U	2015-07-01	Qiangfei Duan		☒
	13	103511892	CN	A	2014-01-15	HUANG JINCHAO et al.		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	14	103574331	CN	A	2014-02-12	YAO ZHIFENG		☒
	15	203533269	CN	U	2014-04-09	YANG XINZHANG et al.		☒
	16	203477954	CN	U	2014-03-12	WANG YUEMIN et al.		☒
	17	206908891	CN	U	2018-01-19	Aiming Xiong et al.		☒
	18	103096586	CN	A	2013-05-08	LIU DAFAN et al.		☒
	19	202469638	CN	U	2012-10-03	YINGCHUN ZHANG et al.		☒
	20	201247758	CN	Y	2009-05-27	WEIPING SHAO et al.		☒
	21	201377712	CN	Y	2010-01-06	TONGFENG GUO		☒
	22	103313472	CN	A	2013-09-18	KUANG NAIXING et al.		☒
	23	202493914	CN	U	2012-10-17	CAISHUANG HU et al.		☒
	24	103094451	CN	A	2013-05-08	YEH WEI-YU		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	25	203240353	CN	U	2013-10-16	ZHANG YINGCHUN et al.		☒
	26	2010129382	JP	A	2010-06-10	NAKAMURA HIDEYOSHI et al.		☒
	27	205716559	CN	U	2016-11-23	LU ZHOUBE		☒
	28	203797382	CN	U	2014-08-27	CAI YAHUI et al.		☒
	29	2615357	EP	A2	2013-07-17	CHIEN WEN-HSIANG et al.		☐
	30	101320669	CN	A	2008-12-10	MINGRONG HUANG		☒
	31	1171839	CN	A	1998-01-28	BJORNARD E J et al.		☒
	32	206908890	CN	U	2018-01-19	Aiming Xiong		☒
	33	102635804	CN	A	2012-08-15	LIGUANG HOU		☒
	34	102162583	CN	A	2011-08-24	QIZHI LI et al.		☒
	35	103925487	CN	A	2014-07-16	HUANG XIANXIONG et al.		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	36	202955542	CN	U	2013-05-29	RUAN SHENGDE et al.		☒
	37	103672530	CN	A	2014-03-26	GU YITIAN		☒
	38	209445322	CN	U	2019-09-27	MIAO WEIHUA et al.		☒
	39	106941746	CN	A	2017-07-11	Jun Zeng		☒
	40	203686730	CN	U	2014-07-02	FAN BANGHONG		☒
	41	2727521	EP	A1	2014-05-07	YANG CHANGMING et al.		☐
	42	203115646	CN	U	2013-08-07	WU HAIBO		☒
	43	102818213	CN	A	2012-12-12	SHAN WENLONG		☒
	44	203615126	CN	U	2014-05-28	ZHANG JING		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	1	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2021-03-15
Name/Print	Simon Kuang Lu	Registration Number	51,974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7914193	B2	2011-03-29	Donald A. PEIFER et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100103673	A1	2010-04-29	IVEY JOHN	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	1	Philips InstantFit LED T8 Lamps data sheet	
	2	Keystone KT-LED18T8-48G-850-D T8 LED LAMP Data Sheet	
	3	MaxLite LED T8 - LINEAR REPLACEMENT LAMP DirectFit G SERIES Data Sheet	
	4	Lenk, R. et al., Practical Lighting Design with LEDs, IEEE Press, A John Wiley & Sons, Inc., 2011, pp. 103-106	
	5	Declaration of Regan Zane, Ph.D., November 18, 2019	
	6	CV of Dr. Regan Zane, November 18, 2019	
	7	Petition for Inter Parte Review of U.S. Patent No. 9,897,265 Under 35 U.S.C.311-319 and 37 C.F.R. 42.1-080, 42.100-.123.	
	8	DEFENDANT MAXLITE, INC.'S PRELIMINARY NONINFRINGEMENT AND INVALIDITY CONTENTIONS PURSUANT TO COURT'S ORDER, May 19, 2020	
	9	DEFENDANT MAXLITE, INC.'S PRELIMINARY NONINFRINGEMENT AND INVALIDITY CONTENTIONS FOR PLAINTIFFS' 35 ELECTED CLAIMS PURSUANT TO COURT'S ORDER, July 20, 2020	
	10	Cree LED T8 Replacement Lamp - General Information, July 20, 2020	
	11	Cree announces residential-targeted LED T8, new rural outdoor, July 20, 2020	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	12	SHOW COLORS TRUE AND NATURAL, July 20, 2020
	13	Hands-on testing of popular LED T8 lamps and linear fixtures reveals promises and pitfalls (MAGAZINE), July 20, 2020
	14	CREE Recalls LED T8 Lamps Due to Burn Hazard; Includes T8 Lamps Provided as Replacements in Previous Recall, July 20, 2020

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2021-03-15
Name/Print	Simon Kuang Lu	Registration Number	51,974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

147274 7590 04/20/2021

Jiaxing Super Lighting Electric Appliance Co., Ltd
IP Department
No. 1288 Jiachuang Road, Xiuzhou Area
Jiaxing, Zhejiang
Jiaxing City, 314031
CHINA

EXAMINER
TRAN, ANH Q

ART UNIT	PAPER NUMBER
2844	

DATE MAILED: 04/20/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/838,012	04/01/2020	LI-QIN LI	S20003USUC01T	6416

TITLE OF INVENTION: LED TUBE LAMP

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	07/20/2021

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

147274 7590 04/20/2021

Jiaxing Super Lighting Electric Appliance Co., Ltd
IP Department
No. 1288 Jiachuang Road, Xiuzhou Area
Jiaxing, Zhejiang
Jiaxing City, 314031
CHINA

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/838,012	04/01/2020	LI-QIN LI	S20003USUC01T	6416

TITLE OF INVENTION: LED TUBE LAMP

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	07/20/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
TRAN, ANH Q	2844	362-221000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/838,012	04/01/2020	LI-QIN LI	S20003USUC01T	6416

147274 7590 04/20/2021

Jiaxing Super Lighting Electric Appliance Co., Ltd
IP Department
No. 1288 Jiachuang Road, Xiuzhou Area
Jiaxing, Zhejiang
Jiaxing City, 314031
CHINA

EXAMINER	
TRAN, ANH Q	

ART UNIT	PAPER NUMBER
2844	

DATE MAILED: 04/20/2021

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/838,012	Applicant(s) LI et al.	
	Examiner ANH Q TRAN	Art Unit 2844	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to 4/1/20.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-45 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☑ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☑ All b) ☐ Some *c) ☐ None of the:

   1. ☑ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☑ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/ANH Q TRAN/
Primary Examiner, Art Unit 2844

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. The application has been amended as follows:

Claim 1, line 18, replace the word "ant" with the word --and--.

Allowable Subject Matter

3. Claims 1-45 are allowed.

4. The following is an examiner's statement of reasons for allowance:

with respect to claims 1, 16, and 31, in addition to other limitations in the claims, the prior art fails to teach, disclose or render obvious the applicant's invention as claimed, particularly the feature describing:

Claim 1, at least two notches are formed at an edge of the end of the LED light strip, each of the notches is further formed at one of the first soldering pads; a protective layer disposed on a surface of the LED light strip, the protective layer comprising at least two openings to expose the two first soldering pads; a power supply module

comprising a printed circuit board and configured to drive the plurality of LED light sources, the printed circuit board comprising at least two second soldering pads, each of the two first soldering pad soldered to the respective second soldering pad by a solder, and the solder is disposed on the first soldering pad, the corresponding second soldering pad and in the corresponding notch.

Claim 16, at least two first soldering pads arranged at one end of the LED light strip; at least two through holes in the LED light strip, each of the two through holes penetrating the respective first soldering pad and the LED light strip; a protective layer disposed on a surface of the LED light strip, the protective layer comprising at least two opening to expose the two first soldering pads; a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources, the printed circuit board comprising at least two second soldering pads, each of the two first soldering pad soldered to the respective second soldering pad by a solder, wherein the power supply module at least comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit, the solder is disposed on the first soldering pad, the corresponding second soldering pad and in the corresponding through hole.

Claim 31, at least two first soldering pads arranged at one end of the LED light strip; a protective layer disposed on a surface of the LED light strip, the protective layer comprising at least two opening to expose the two first soldering pads; a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources, the printed circuit board comprising at least two second soldering pads, each of the two first soldering pad soldered to the respective second soldering pad by a solder, wherein the power supply module at least comprises a rectifying circuit and a

filtering circuit coupled to the rectifying circuit, the solder is disposed on the first soldering pad and the corresponding second soldering pad and covering an edge of the end of the LED light strip.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ivey et al. (9,184,518), Wu et al. (2014/0009923), and Mostoller et al. (2010/0201239) disclose an LED tube lamp, comprising: a glass tube; two end caps, each of the two end caps coupled to a respective end of the glass tube; an LED light strip attached to an inner circumferential surface of the glass tube; a plurality of LED light sources mounted on the LED light strip; at least two first soldering pads arranged at an end of the LED light strip; a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources, the printed circuit board connected to the two first soldering pad by contact pins; but there is no teaching of a solder, notches or through holes at the pads and the allowable subject matter described above.

Huang et al. (2013/0170196) disclose an LED tube lamp, comprising: a glass tube; two end caps, each of the two end caps coupled to a respective end of the glass

tube; an LED light strip attached to an inner circumferential surface of the glass tube; a plurality of LED light sources mounted on the LED light strip; at least two through-holes arranged at an end of the LED light strip; and a protective layer on a surface of the LED light strip; but there is no solder pad and the allowable subject matter described above.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANH Q TRAN whose telephone number is (571)272-1813. The examiner can normally be reached on M-F: 9AM - 5PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander H Taningco can be reached on 571-272-8048. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ANH Q TRAN/
Primary Examiner, Art Unit 2844
4/15/21

Notice of References Cited	Application/Control No. 16/838,012	Applicant(s)/Patent Under Reexamination LI et al.	
	Examiner ANH Q TRAN	Art Unit 2844	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-9184518-B2	11-2015	Ivey; John	F21K9/278	1/1
*	B	US-20100201239-A1	08-2010	MOSTOLLER; MATTHEW EDWARD	F21S8/031	313/1
*	C	US-20130170196-A1	07-2013	HUANG; JEN-MIN	F21V23/00	362/221
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/838,012	LI et al.
	Examiner	**Art Unit**
	ANH Q TRAN	2844

CPC						
Symbol					**Type**	**Version**
F21K	/	9	/	278	F	2016-08-01
F21V	/	3	/	061	I	2018-02-01
F21V	/	3	/	10	I	2018-02-01
F21V	/	29	/	83	I	2013-01-01
F21K	/	9	/	23	I	2016-08-01
H05B	/	45	/	37	I	2020-01-01
H05B	/	45	/	50	I	2020-01-01
F21K	/	9	/	27	I	2016-08-01
F21V	/	7	/	28	I	2018-02-01
F21V	/	7	/	22	I	2013-01-01
F21V	/	23	/	009	I	2013-01-01
F21V	/	15	/	015	I	2013-01-01
F21V	/	17	/	101	I	2013-01-01
F21V	/	23	/	02	I	2013-01-01
F21K	/	9	/	272	I	2016-08-01
B23K	/	3	/	047	I	2013-01-01
F21K	/	9	/	235	I	2016-08-01
B23K	/	1	/	0016	I	2013-01-01
H05B	/	6	/	105	I	2013-01-01
F21K	/	9	/	275	I	2016-08-01
F21V	/	25	/	02	I	2013-01-01
B23K	/	2101	/	42	A	2018-08-01
F21Y	/	2101	/	00	A	2013-01-01
F21Y	/	2115	/	10	A	2016-08-01
F21Y	/	2103	/	00	A	2013-01-01
F21Y	/	2103	/	10	A	2016-08-01
F21V	/	25	/	04	A	2013-01-01
F21V	/	29	/	70	A	2015-01-15
F21K	/	9	/	68	A	2016-08-01
C03C	/	21	/	002	A	2013-01-01
C03C	/	27	/	048	A	2013-01-01

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	45	
/ANH Q TRAN/ Primary Examiner, Art Unit 2844	15 April 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	31 - 33

U.S. Patent and Trademark Office

Part of Paper No.: 20210415

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/838,012	LI et al.
	Examiner	**Art Unit**
	ANH Q TRAN	2844

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	45	
/ANH Q TRAN/ Primary Examiner, Art Unit 2844	15 April 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	31 - 33

U.S. Patent and Trademark Office

Part of Paper No.: 20210415

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/838,012	LI et al.
	Examiner	Art Unit
	ANH Q TRAN	2844

INTERNATIONAL CLASSIFICATION				
CLAIMED				
F21K	/	9	/	23
F21K	/	9	/	272
F21K	/	9	/	235
F21K	/	9	/	275
F21K	/	9	/	278
F21V	/	3	/	06
F21V	/	3	/	10
F21V	/	7	/	22
F21V	/	15	/	015
F21V	/	17	/	10
F21V	/	23	/	00
F21V	/	23	/	02
F21V	/	25	/	02
F21V	/	29	/	83
H05B	/	45	/	37
H05B	/	45	/	50
B23K	/	1	/	00
B23K	/	3	/	047
	/		/	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	45	
/ANH Q TRAN/ Primary Examiner, Art Unit 2844	15 April 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	31 - 33

U.S. Patent and Trademark Office

Part of Paper No.: 20210415

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/838,012	LI et al.
	Examiner	Art Unit
	ANH Q TRAN	2844

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10		19		28		37						
	2		11		20		29		38						
	3		12		21		30		39						
	4		13		22		31		40						
	5		14		23		32		41						
	6		15		24		33		42						
	7		16		25		34		43						
	8		17		26		35		44						
	9		18		27		36		45						

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	45	
/ANH Q TRAN/ Primary Examiner, Art Unit 2844	15 April 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	31 - 33

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/838,012	LI et al.
	Examiner	Art Unit
	ANH Q TRAN	2844

CPC - Searched*		
Symbol	Date	Examiner
F21K9/$.CPC. OR F21V$/$.CPC. OR F21V7/28.CPC. H05B45/$.CPC. F21Y$/$.CPC. OR B23K2101/42.CPC. OR C03C21/002.CPC. OR C03C27/048.CPC. Text search- see printout	04/14/2021	AT

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
315 & 362	Text search- see printout	04/14/2021	AT

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
East search- see printout	04/14/2021	AT

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
CPC	F21K9/$.CPC. OR F21V$/$.CPC. OR F21V7/28.CPC. H05B45/$.CPC. F21Y$/$.CPC. OR B23K2101/42.CPC. OR C03C21/002.CPC. OR C03C27/048.CPC. Text search- see printout	04/14/2021	AT
All	All- text search- see printout	04/14/2021	AT

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/838,012	LI et al.
	Examiner	Art Unit
	ANH Q TRAN	2844

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	04/15/2021								
	1	=								
	2	=								
	3	=								
	4	=								
	5	=								
	6	=								
	7	=								
	8	=								
	9	=								
	10	=								
	11	=								
	12	=								
	13	=								
	14	=								
	15	=								
	16	=								
	17	=								
	18	=								
	19	=								
	20	=								
	21	=								
	22	=								
	23	=								
	24	=								
	25	=								
	26	=								
	27	=								
	28	=								
	29	=								
	30	=								
	31	=								
	32	=								
	33	=								
	34	=								
	35	=								
	36	=								
	37	=								
	38	=								
	39	=								
	40	=								
	41	=								
	42	=								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/838,012	LI et al.
	Examiner	**Art Unit**
	ANH Q TRAN	2844

CLAIM		DATE								
Final	Original	04/15/2021								
	43	=								
	44	=								
	45	=								

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7914193	B2	2011-03-29	Donald A. PEIFER et al.	
	2	9551463	B2	2017-01-24	Don Barnetson et al.	
	3	9239157	B2	2016-01-19	Rasit Özgüc et al.	
	4	9360188	B2	2016-06-07	Deborah Kircher et al.	
	5	8866396	B2	2014-10-21	Jos Timmermans et al.	
	6	7399429	B2	2008-07-15	Wei Liu et al.	
	7	8358056	B2	2013-01-22	Myung Koo Park	
	8	8773031	B2	2014-07-08	Laurence P. Sadwick	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	9	9618168	B1	2017-04-11	Tao Jiang et al.	
	10	7482059	B2	2009-01-27	Adam Peng et al.	
	11	9668308	B2	2017-05-30	Chungho Hsia	
	12	9468054	B2	2016-10-11	Don Barnetson et al.	
	13	8740410	B3	2014-06-03	Donald A. PEIFER et al.	
	14	9587817	B2	2017-03-07	Xintong Liu et al.	
	15	9103953	B2	2015-08-11	Robert C. Gardner et al.	
	16	7086747	B2	2006-08-08	Lyman O. Nielson et al.	
	17	9033545	B2	2015-05-19	Donald Barnetson et al.	
	18	8608351	B2	2013-12-17	Donald A. PEIFER	
	19	9243757	B2	2016-01-26	Donald Barnetson et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	20	8931918	B2	2015-01-13	Chun-Chen Liu et al.	
	21	9585221	B1	2017-02-28	Zhong Chen	
	22	8915611	B2	2014-12-23	John X. Zhang	
	23	7766536	B2	2010-08-03	Donald Allen Peifer et al.	
	24	6860628	B2	2005-03-01	Jonas J. Robertson et al.	
	25	8907556	B2	2014-12-09	Myung Koo Park	
	26	9795001	B2	2017-10-17	Qifeng Ye et al.	
	27	9028105	B2	2015-05-12	Don Barnetson et al.	
	28	7049761	B2	2006-05-23	Jos Timmermans et al.	
	29	9897265	B2	2018-02-20	Aiming Xiong et al.	
	30	8093823	B1	2012-01-10	John Ivey et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	31	7918598	B2	2011-04-05	Donald A. PEIFER et al.	
	32	8602604	B2	2013-12-10	John X. Zhang et al.	
	33	9480109	B2	2016-10-25	Qi Feng Ye et al.	
	34	9006993	B1	2015-04-14	Jos Timmermans et al.	
	35	9622317	B2	2017-04-11	Bernd Ackermann	
	36	8427070	B2	2013-04-23	Mitsuhiro Matsuda	
	37	9468046	B2	2016-10-11	Donald Barnetson et al.	
	38	8789970	B2	2014-07-29	Peter H. Mahowald	
	39	9468060	B2	2016-10-11	Don Barnetson et al.	
	40	8092863	B2	2012-01-10	Schmid et al.	
	41	9497821	B1	2016-11-15	Xintong Liu	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	42	5920465	A	1999-07-06	TANAKA KAZUHISA	
	43	8482212	B1	2013-07-09	John Ivey et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100103673	A1	2010-04-29	IVEY JOHN	
	2	20160010804	A1	2016-01-14	Don Barnetson et al.	
	3	20140328065	A1	2014-11-06	Donald Barnetson et al.	
	4	20170089525	A1	2017-03-30	Aiming Xiong et al.	
	5	20120161666	A1	2012-06-28	Biju Antony et al.	
	6	20120162965	A1	2012-06-28	Nobuyoshi Takeuchi et al.	
	7	20110260614	A1	2011-10-27	HARTIKKA et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	8	20160369952	A1	2016-12-22	JOHANNES WILHELMUS WEEKAMP	
	9	20190137047	A1	2019-05-09	Yiwen Hu	
	10	20170094748	A1	2017-03-30	Jong June PARK	
	11	20130010453	A1	2013-01-10	Peter Mahowald	
	12	20120092856	A1	2012-04-19	John X. Zhang et al.	
	13	20100289428	A1	2010-11-18	Joseph E. Frazier et al.	
	14	20120230019	A1	2012-09-13	Donald A. PEIFER	
	15	20180310370	A1	2018-10-25	Heilman et al.	
	16	20160018061	A1	2016-01-21	Donald Barnetson et al.	
	17	20140328066	A1	2014-11-06	Don Barnetson et al.	
	18	20120113659	A1	2012-05-10	HERMITTE MICHEL et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	19	20120008316	A1	2012-01-12	IVEY JOHN	
	20	20150195880	A1	2015-07-09	Donald Barnetson et al.	
	21	20150252958	A1	2015-09-10	Don Barnetson et al.	
	22	20110205738	A1	2011-08-25	Donald A. PEIFER et al.	
	23	20070267976	A1	2007-11-22	Christopher L. Bohler et al.	
	24	20100135009	A1	2010-06-03	David Duncan et al.	
	25	20120176784	A1	2012-07-12	Donald A. PEIFER et al.	
	26	20120257383	A1	2012-10-11	John X. Zhang	
	27	20160262220	A1	2016-09-08	Don Barnetson et al.	
	28	20190277484	A1	2019-09-12	Cornelis Wilhelmus KWISTHOUT	
	29	20150223303	A1	2015-08-06	Hsia et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	30	20150021988	A1	2015-01-22	Donald Barnetson et al.	
	31	20150241000	A1	2015-08-27	Don Barnetson et al.	
	32	20140185269	A1	2014-07-03	Yi-Qun Li	
	33	20130048342	A1	2013-02-28	MALSTROM CHARLES RANDALL et al.	
	34	20040007980	A1	2004-01-15	SHIBATA YOSHIHIKO	
	35	20150049490	A1	2015-02-19	Donald Barnetson et al.	
	36	20150359059	A1	2015-12-10	Don Barnetson et al.	
	37	20120201908	A1	2012-08-09	Kirk Patrick Miller	
	38	20120170260	A1	2012-07-05	Robert C. Gardner et al.	
	39	20160128154	A1	2016-05-05	Don Barnetson et al.	
	40	20170006672	A1	2017-01-05	Donald Barneston et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	41	20150022114	A1	2015-01-22	Chang-seob KIM	
	42	20130058080	A1	2013-03-07	Ge et al.	
	43	20140226320	A1	2014-08-14	HALLIWELL BRIAN et al.	
	44	20120155116	A1	2012-06-21	Robert C. Gardner	
	45	20110006688	A1	2011-01-13	Hyun-seop Shim	
	46	20140218892	A1	2014-08-07	Charles Edwards et al.	
	47	20130003346	A1	2013-01-03	RONAN LETOQUIN et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	101968168	CN	A	2011-02-09	PETER BISHOP et al.		☒
	2	5383939	JP	B1	2014-01-08	NAITO SOSUKE		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	3	103982782	CN	A	2014-08-13	ZHAO YIJUN et al.		☒
	4	102287737	CN	A	2011-12-21	QIU FUJUN		☒
	5	202972731	CN	U	2013-06-05	FAN BANGYANG		☒
	6	105465640	CN	A	2016-04-06	JIANG TAO		☒
	7	206555763	CN	U	2017-10-13	Xintong Liu		☒
	8	101629750	KR	B1	2016-06-24	WOO JONG KOO		☒
	9	103822121	CN	A	2014-04-09	WANG SONG		☒
	10	201030277	TW	A	2010-08-16	TZOU HUA-LUNG et al.		☒
	11	203176871	CN	U	2013-09-04	YANG DEYUAN et al.		☒
	12	204442771	CN	U	2015-07-01	Qiangfei Duan		☒
	13	103511892	CN	A	2014-01-15	HUANG JINCHAO et al.		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	14	103574331	CN	A	2014-02-12	YAO ZHIFENG		☒
	15	203533269	CN	U	2014-04-09	YANG XINZHANG et al.		☒
	16	203477954	CN	U	2014-03-12	WANG YUEMIN et al.		☒
	17	206908891	CN	U	2018-01-19	Aiming Xiong et al.		☒
	18	103096586	CN	A	2013-05-08	LIU DAFAN et al.		☒
	19	202469638	CN	U	2012-10-03	YINGCHUN ZHANG et al.		☒
	20	201247758	CN	Y	2009-05-27	WEIPING SHAO et al.		☒
	21	201377712	CN	Y	2010-01-06	TONGFENG GUO		☒
	22	103313472	CN	A	2013-09-18	KUANG NAIXING et al.		☒
	23	202493914	CN	U	2012-10-17	CAISHUANG HU et al.		☒
	24	103094451	CN	A	2013-05-08	YEH WEI-YU		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

	25	203240353	CN	U	2013-10-16	ZHANG YINGCHUN et al.		☒
	26	2010129382	JP	A	2010-06-10	NAKAMURA HIDEYOSHI et al.		☒
	27	205716559	CN	U	2016-11-23	LU ZHOUBE		☒
	28	203797382	CN	U	2014-08-27	CAI YAHUI et al.		☒
	29	2615357	EP	A2	2013-07-17	CHIEN WEN-HSIANG et al.		☐
	30	101320669	CN	A	2008-12-10	MINGRONG HUANG		☒
	31	1171839	CN	A	1998-01-28	BJORNARD E J et al.		☒
	32	206908890	CN	U	2018-01-19	Aiming Xiong		☒
	33	102635804	CN	A	2012-08-15	LIGUANG HOU		☒
	34	102162583	CN	A	2011-08-24	QIZHI LI et al.		☒
	35	103925487	CN	A	2014-07-16	HUANG XIANXIONG et al.		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	36	202955542	CN	U	2013-05-29	RUAN SHENGDE et al.		☒
	37	103672530	CN	A	2014-03-26	GU YITIAN		☒
	38	209445322	CN	U	2019-09-27	MIAO WEIHUA et al.		☒
	39	106941746	CN	A	2017-07-11	Jun Zeng		☒
	40	203686730	CN	U	2014-07-02	FAN BANGHONG		☒
	41	2727521	EP	A1	2014-05-07	YANG CHANGMING et al.		☐
	42	203115646	CN	U	2013-08-07	WU HAIBO		☒
	43	102818213	CN	A	2012-12-12	SHAN WENLONG		☒
	44	203615126	CN	U	2014-05-28	ZHANG JING		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	1	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/ANH Q TRAN/	Date Considered	04/14/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2021-03-15
Name/Print	Simon Kuang Lu	Registration Number	51,974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	10161569	B2	2020-12-25	Xu et al.	
	2	10560989	B2	2020-02-11	Tao Jiang et al.	
	3	9894732	B2	2018-02-13	Xiong Aiming et.al	
	4	9777891	B2	2017-10-03	Yusaku Kawabata et al.	
	5	9574717	B2	2017-02-21	James R. Scapa et al.	
	6	9462658	B1	2016-10-04	Jeahoon Kim	
	7	8791650	B2	2014-07-29	XinXin Shan	
	8	9839081	B2	2017-12-05	Jong June Park	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	9	9883555	B2	2018-01-30	Jinsheng Deng et al.	
	10	9338853	B2	2016-05-10	Luo Hua Guang	
	11	8304993	B2	2012-11-06	Hua-Lung Tzou et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20150198291	A1	2015-07-16	Ching-Feng Lin et al.	
	2	20150049473	A1	2015-02-19	Pan et al.	
	3	20090045715	A1	2009-02-19	Totada R. Shantha et al.	
	4	20130119869	A1	2013-05-16	Chunghang Peng	
	5	20060146527	A1	2006-07-06	Carl R. VanderSchuit	
	6	20140084800	A1	2014-07-29	Bong Jin LEE	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	7	20150173138	A1	2015-06-18	Bruce Richard Roberts	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2012114096	WO	A1	2012-08-30	WADE, Scott et al.		
	2	202100985	CN	U	2012-01-04	YUNJIE XU		×
	3	104633491	CN	A	2015-05-20	HOU LIQUN		☒
	4	203628340	CN	U	2014-06-04	LIU TIANMING et al.		☒
	5	2014068335	WO	A1	2014-05-08	EVITT, Jonathan		☐
	6	201851921	CN	U	2011-06-01	WANG LIAN et al.		☒
	7	204437746	CN	U	2015-07-01	ZHANG, SHUHUA et al.		☒
	8	2015110306	WO	A1	2015-07-30	YUAN et al.		☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	9	2608761	DE	A1	1977-09-08	MUTZHAS MAXIMILIAN FRIEDRICH D		☒
	10	203322772	CN	U	2013-12-04	QIAN, FENGTAO et al.		☒
	11	2009129689	WO	A1	2009-10-29	Chen Zhonglie		☒
	12	204005873	CN	U	2014-12-10	HANGZHOU SANGDI LIGHTING ELECTRIC APPLIANCE CO LT		☒
	13	203162690	CN	U	2013-08-28	LIANG YOUQING et al.		☒
	14	203500909	CN	U	2014-03-26	WANG JUN		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/ANH Q TRAN/	Date Considered	04/14/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2020-07-05
Name/Print	Simon Kuang Lu	Registration Number	51,974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	10288272	B2	2019-05-14	ZHEJIANG SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	
	2	9288867	B2	2016-03-15	LIGHTEL TECHNOLOGIES INC	
	3	9794990	B2	2017-10-17	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD	
	4	10208898	B2	2019-02-19	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	
	5	9360188	B2	2016-06-07	IDEAL INDUSTRIES, LLC	
	6	7399429	B2	2008-07-15	SAMSUNG ELECTRONICS CO., LTD.	
	7	9723662	B2	2017-08-01	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	
	8	7815338	B2	2010-10-19	Dennis Siemiet et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	9	9864438	B2	2018-01-09	SEO JOON KYU et al.	
	10	9445463	B2	2016-09-13	HIDEEP INC.	
	11	8360599	B2	2013-01-29	Ilumisys, Inc.	
	12	7067032	B1	2006-06-27	A RAYMOND & CIE	
	13	9609711	B2	2017-03-28	Jiaxing Super Lighting Electric Applicane Co., Ltd	
	14	9448660	B2	2016-09-20	SEO JOON KYU et al.	
	15	9228727	B2	2016-01-05	MAY, MICHAEL, W.	
	16	9526133	B2	2016-12-20	PHILIPS LIGHTING HOLDING B. V.	
	17	8456075	B2	2013-06-04	AURALIGHT INTERNATIONAL AB	
	18	1088142	A	1914-02-24	GARDNER JESSE O	
	19	8896207	B2	2014-11-25	ELECTRALED INC.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	20	9488767	B2	2016-11-08	Dante P. Nava et al.	
	21	8240875	B2	2012-08-14	Cree, Inc.	
	22	10021742	B2	2018-07-10	Tao JIANG	
	23	9756698	B2	2017-09-05	XIONG, AIMING et al.	
	24	9629215	B2	2017-04-18	Jiaxing Super Lighting Electric Appliance Co. Ltd	
	25	6246167	B1	2001-06-12	SICA, MICHAEL F.	
	26	10161569	B2	2018-12-25	XU HONG et al.	
	27	9000668	B2	2015-04-07	Ningbo Futai Electric Limited	
	28	9820341	B2	2017-11-14	Aiming Xiong et al.	
	29	6118072	A	2000-09-12	TELEDYNE TECHNOLOGIES INCORP	
	30	9885449	B2	2018-02-06	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	31	9989200	B2	2018-06-05	Zhang Yingchun	
	32	6853151	B2	2005-02-08	PHILIPS LIGHTING HOLDING B. V.	
	33	7611260	B1	2009-11-03	Kuo-Len LIN et al.	
	34	7067992	B2	2006-06-27	PHILIPS LIGHTING HOLDING B. V.	
	35	7482059	B2	2009-01-27	SAMSUNG ELECTRONICS CO., LTD.	
	36	9625137	B2	2017-04-18	Li-Qin, Li et al.	
	37	8870415	B2	2014-10-28	iLumysis, Inc.	
	38	9210774	B2	2015-12-08	ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUT	
	39	9322531	B2	2016-04-26	Chun-wei Liang et al.	
	40	8729809	B2	2014-05-20	DENOVO LIGHTING, L.L.C.	
	41	9629216	B2	2017-04-18	Jiaxing Super Lighting Electric Applicane Co., Ltd	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	42	8796943	B2	2014-08-05	M-SYSTEM CO., LTD.	
	43	7594738	B1	2009-09-29	KITAGAWA HOLDINGS, LLC	
	44	9016890	B2	2015-04-28	KIM KYUNG RYE et al.	
	45	6762562	B2	2004-07-13	PHILIPS LIGHTING HOLDING B. V.	
	46	5964518	A	1999-10-12	YA-KUANG SHEN	
	47	9810384	B2	2017-11-07	Zhang Yingchun	
	48	7380961	B2	2008-06-03	MORIYAMA SANGYO KABUSHIKI KAISHA	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20120300445	A1	2012-11-29	GT BIOMESCILT LIGHT LIMITED	
	2	20130050998	A1	2013-02-28	GT BIOMESCILT LIGHT	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	3	20150195889	A1	2015-07-09	DELTA ELECTRONICS	
	4	20140035463	A1	2014-02-06	M-SYSTEMS CO.,LTD.,	
	5	20140331532	A1	2014-11-13	ALMAX MFG CORP	
	6	20120248989	A1	2012-10-04	IKAMI SEISHI	
	7	20110084608	A1	2011-04-14	I/O CONTROLS CORPORATION	
	8	20140117853	A1	2014-05-01	M-SYSTEMS CO.,LTD.,	
	9	20100201269	A1	2010-08-12	LEXTAR ELECTRONICS CORP.	
	10	20150366008	A1	2015-12-17	LUNERA LIGHTING, INC.	
	11	20080055894	A1	2008-03-06	DENG JIA H. et al.	
	12	20160178137	A1	2016-06-23	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LTD	
	13	20040189218	A1	2004-09-30	LEONG SUSAN J., et al	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	14	20110279063	A1	2011-11-17	ORION ENERGY SYSTEMS, INC.	
	15	20160341414	A1	2016-11-24	Tao Jiang	
	16	20050162850	A1	2005-07-28	LUK JOHN F. & ALTMAN ROBERT M.	
	17	20140225519	A1	2014-08-14	POESEN ELECTRONIC CO., LTD.	
	18	20120146503	A1	2012-06-14	CREE Inc.,	
	19	20130301255	A1	2013-11-14	Lumirich Co., Ltd.	
	20	20050281030	A1	2005-12-22	LEONG SUSAN J	
	21	20140062320	A1	2014-03-06	RICOH COMPANY, LTD.	
	22	20100253226	A1	2010-10-07	OKI ISAMU	
	23	20150345755	A1	2015-12-03	PURDY STEVEN	
	24	20120026761	A1	2012-02-02	YOUNG JAMES ROY	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	25	20030189829	A1	2003-10-09	Matsushita Electric Industrial Co., Ltd	
	26	20150022114	A1	2015-01-22	SAMSUNG ELECTRONICS CO., LTD.	
	27	20160084455	A1	2016-03-24	HUNG-CHANG CHEN	
	28	20080192476	A1	2008-08-14	KABUSHIKIKAISHA MIRAI	
	29	20110291592	A1	2011-12-01	OSRAM SYLVANIA	
	30	20170211753	A1	2017-07-27	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LT	
	31	20130051008	A1	2013-02-28	SHEW LARRY N	
	32	20180335200	A1	2018-11-22	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LT	
	33	20110084554	A1	2011-04-14	TIAN FENG	
	34	20130147350	A1	2013-06-13	GIO OPTOELECTRONICS CORP.	
	35	20130256704	A1	2013-10-03	TANG GUOFU & HSIAO YUCHUN	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	36	20160286621	A1	2016-09-29	PHILIPS LIGHTING HOLDING B. V.	
	37	20170318678	A1	2017-11-02	Chris Wh MIAO et al.	
	38	20110057572	A1	2011-03-10	DENOVO LIGHTING, L.L.C.	
	39	20140239834	A1	2014-08-28	CHOI JAEYOUNG et al.	
	40	20120313540	A1	2012-12-13	LIN CHUNG JYH et al.	
	41	20160369952	A1	2016-12-22	SIGNIFY HOLDING B.V.	
	42	20170089530	A1	2017-03-30	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LT	
	43	20040095078	A1	2004-05-20	LEONG SUSAN J	
	44	20070001709	A1	2007-01-04	SHEN YU-NUNG	
	45	20120319150	A1	2012-12-20	Kabushiki Kaisha Toshiba	
	46	20070267976	A1	2007-11-22	GELCORE LLC	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	47	20100135009	A1	2010-06-03	SAMSUNG ELECTRONICS CO., LTD.	
	48	20090040415	A1	2009-02-12	SAMSUNG DISPLAY CO., LTD.	
	49	20110175536	A1	2011-07-21	IRIS OHYAMA INC.	
	50	20110121756	A1	2011-05-26	ELECTRALED INC.	
	51	20110084627	A1	2011-04-14	THE SLOAN COMPANY, INC. DBA SLOANLED	
	52	20140265899	A1	2014-09-18	SADWICK LAURENCE P	
	53	20130141890	A1	2013-06-06	STEVEN W. CARLIN et al.	
	54	20050185396	A1	2005-08-25	KUTLER MURRAY	
	55	20110043127	A1	2011-02-24	YAMASAKI SHIGEAKI	
	56	20170290119	A1	2017-10-05	XIONG AIMING et al.	
	57	20150070885	A1	2015-03-12	PETRO, ALFRED et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	58	20170094746	A1	2017-03-30	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO, LTD	
	59	20120051039	A1	2012-03-01	CHANG SHAO HAN	
	60	20170059096	A1	2017-03-02	HONG XU et al.	
	61	20130215609	A1	2013-08-22	LIU, CHUN-CHEN et al.	
	62	2016034141	A1	2016-11-24	Tao Jiang	
	63	20050162101	A1	2005-07-28	LEONG SUSAN J. et al.	
	64	20150077001	A1	2015-03-19	TAKAHASHI AKIRA et al.	
	65	20100188001	A1	2010-07-29	BROITZMAN TROY RICHARD et al.	
	66	20130003346	A1	2013-01-03	CREE, INC.	
	67	20120299501	A1	2012-11-29	KONINKLIJKE PHILIPS N.V.	
	68	20100102729	A1	2010-04-29	KATZIR WESLEY et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	69	20120162965	A1	2012-06-28	PANASONIC INTELLECTUAL PROPERTY MANAGEMENT CO., L	
	70	20190137047	A1	2019-05-09	SUZHOU INDUSTRIAL PARK HEXIN CLEAN ELECTRIC APPLI	
	71	20110305021	A1	2011-12-15	Shao-Han Chang	
	72	20130021809	A1	2013-01-24	OSRAM GMBH	
	73	20130033888	A1	2013-02-07	KONINKLIJKE PHILIPS ELECTRONICS N V	
	74	20140009923	A1	2014-01-09	FIN-CORE CORPORATION & TONG HONG INVESTMENT CO., L	
	75	20130250565	A1	2013-09-26	DELTA ELECTRONICS, INC	
	76	20100066230	A1	2010-03-18	Kuo-Len LIN et al.	
	77	20100220469	A1	2010-09-02	ILUMISYS, INC.	
	78	20130182425	A1	2013-07-18	PANASONIC INTELLECTUAL PROPERTY MANAGEMENT CO., LT	
	79	20100181925	A1	2010-07-22	ILUMISYS, INC.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	80	20120069556	A1	2012-03-22	OSRAM GMBH	
	81	20150176770	A1	2015-06-25	Cree, Inc.	
	82	20150173138	A1	2015-06-18	GENERAL ELECTRIC	
	83	20130235570	A1	2013-09-12	HOOD, WILLIAM et al.	
	84	20160081147	A1	2016-03-17	GUANG LUO HUA	
	85	20140306599	A1	2014-10-16	EDWARDS CHARLES et al.	
	86	20160113091	A1	2016-04-21	TAO HAIMIN	
	87	20140185269	A1	2014-07-03	INTEMATIX CORPORATION	
	88	20110149563	A1	2011-06-23	LIGHTEL TECHNOLOGIES INC.	
	89	20140203717	A1	2014-07-24	CREE, INC.	
	90	20110176297	A1	2011-07-21	LIGHTEL TECHNOLOGIES INC.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	91	20140192526	A1	2014-07-10	NINGBO FUTAI ELECTRIC LIMITED	
	92	20090159919	A1	2009-06-25	ALTAIR ENGINEERING, INC.	
	93	20130223053	A1	2013-08-29	VERTICIL ELECTRONICS CORPORATION	
	94	20130335959	A1	2013-12-19	LIGHTEL TECHNOLOGIES INC.	
	95	20090160369	A1	2009-06-25	CYPRESS SEMICONDUCTOR CORP	
	96	20130135857	A1	2013-05-30	CHEN, CHIA-CHIN et al.	
	97	20160381760	A1	2016-12-29	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO, LTD	
	98	20130229104	A1	2013-09-05	GREEN, ADAM et al.	
	99	20080290814	A1	2008-11-27	Susan J. Leong & John Kit	
	100	20160091147	A1	2016-03-31	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD	
	101	20120049684	A1	2012-03-01	AVANTIS LTD.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	102	20130127327	A1	2013-05-23	PHILIPS LIGHTING HOLDING B. V.	
	103	20120181952	A1	2012-07-19	ROEER NORBERT	
	104	20120212951	A1	2012-08-23	Chung-Ming, Lai et al.	
	105	20100124054	A1	2010-05-20	TAIWAN RODAN CO., LTD.	
	106	20130313983	A1	2013-11-28	PHILIPS LIGHTING HOLDING B. V.	
	107	20160316533	A1	2016-10-27	LIGHTEL TECHNOLOGIES, INC.	
	108	20170105263	A1	2017-04-13	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO, LTD	
	109	20140153231	A1	2014-06-05	OSRAM GMBH	
	110	20130293098	A1	2013-11-07	LI, YI-QUN et al.	
	111	20130033881	A1	2013-02-07	SHARP KABUSHIKI KAISHA	
	112	20110228526	A1	2011-09-22	TEKNOWARE OY	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	113	20140055029	A1	2014-02-27	PHILIPS LIGHTING HOLDING B. V.	
	114	20110309745	A1	2011-12-22	LEDS AMERICA, INC.	
	115	20190277484	A1	2019-09-12	SIGNIFY HOLDING B.V.	
	116	20130069538	A1	2013-03-21	YU-SHENG SO	
	117	20130258650	A1	2013-10-03	SHARRAH RAYMOND L.	
	118	20130135852	A1	2013-05-30	HONG KONG PATENT EXCHANGE LIMITED	
	119	20150181661	A1	2015-06-25	Lightel Technologies, Inc.,	
	120	20100277918	A1	2010-11-04	CHEN CHIEN-YUAN	
	121	20090219713	A1	2009-09-03	Dennis Siemiet et al.	
	122	20130230995	A1	2013-09-05	ILUMISYS, INC.	
	123	20110038146	A1	2011-02-17	Yancheng Haomai Lighting Science&Technology Co.Ltd	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	124	20140265900	A1	2014-09-18	SADWICK, LAURENCE P. et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	203202740	CN	U	2013-09-18	FUZHOU SUNLIGHT LIGHTING ELECTRICAL APPLIANCE CO.		☒
	2	2014045523	WO	A1	2014-03-27	PANASONIC CORP		☒
	3	204879985	CN	U	2015-12-16	PANASONIC IP MAN CO LTD		☒
	4	2014154479	JP	A	2014-08-25	EREBAMU KK		☒
	5	204693095	CN	U	2015-10-07	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒
	6	104633491	CN	A	2015-05-20	LIQUN HOU		☒
	7	2017012512	WO	A1	2017-01-26	Jiaxing Super Lighting Electric Appliance Co., Ltd		☐
	8	205447315	CN	U	2016-08-10	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LTD		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	9	104735873	CN	A	2015-06-24	JINGSAM ILLUMINATION CO LTD		☒
	10	201954350	CN	U	2011-08-31	YUANGUI LIU		☒
	11	101787255	CN	A	2010-07-28	JIANGSU WENRUN PHOTOELECTRIC C		☒
	12	102359697	CN	A	2012-02-22	HUAHUI CONSTRUCTION GROUP CO LTD		☒
	13	2008117666	JP	A	2008-05-22	SHARP CORP.		☒
	14	2016086901	WO	A3	2016-06-09	Jiaxing Super Lighting Electric Appliance Co., Ltd		☐
	15	103270618	CN	A	2013-08-28	TESA SE		☒
	16	204291454	CN	U	2015-04-22	ZHAO GUOSONG		☒
	17	201661897	CN	U	2010-12-01	JIAHAO ZHANG		☒
	18	202884614	CN	U	2013-04-17	HE ZHONGLIANG		☒
	19	2015028329	WO	A1	2015-03-05	KONINKLIJKE PHILIPS N.V.		☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	20	2013125803	WO	A1	2013-08-29	RYU, Dae Young		☒
	21	202660350	CN	U	2013-01-09	CHENYI ZHEJIANG ELECTRONIC IND CO LTD		☒
	22	2533683	GB	A	2016-06-29	Ricoh Company Limited; O2 Micro Inc		☐
	23	104776332	CN	A	2015-07-15	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒
	24	2014118754	WO	A1	2014-08-07	KONINKLIJKE PHILIPS N.V.		☐
	25	203036285	CN	U	2013-07-03	SHENZHEN UNIBOND ELECTRICAL AND LIGHTING CO LTD		☒
	26	203202766	CN	U	2013-09-18	ZHOU SHUNLONG		☒
	27	202546288	CN	U	2012-11-21	BO ZHAN		☒
	28	202132647	CN	U	2012-02-01	MENG YANG		☒
	29	2498692	CN	Y	2002-07-03	LIYADE ELECTRONICS SCIENCE & T		☒
	30	2013150417	WO	A1	2013-10-10	KONINKLIJKE PHILIPS N.V.		☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

	31	104515014	CN	A	2015-04-15	JIANGMEN POTOP OPTO ELECTRONIC TECHNOLOGY CO LTD		☒
	32	201796567	CN	U	2011-04-13	SHENZHEN LIANTRONICS CO LTD		☒
	33	201515528	CN	U	2010-06-23	HESHAN LIDE ELECTRONIC ENTPR CO LTD		☒
	34	204573639	CN	U	2015-08-19	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒
	35	202546330	CN	U	2012-11-21	OPTO TECH CORP		☒
	36	203857296	CN	U	2014-10-01	SHENZHEN GUANGJU LIGHTING CO LTD		☒
	37	104565931	CN	A	2015-04-29	JIANGXI OUTRACE TECHNOLOGY CO LTD		☒
	38	2011061056	JP	A	2011-03-24	STANLEY ELECTRIC CO. LTD.		☒
	39	2014103000	JP	A	2014-06-05	ONO TETSUYA		☒
	40	102159867	CN	A	2011-08-17	EMABOND SOLUTIONS LLC		☒
	41	103195999	CN	A	2013-07-10	LI WENZHONG		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	42	2015081809	WO	A1	2015-06-11	CHEN HONGCHANG		☒
	43	103411140	CN	B	2015-05-20	DALIAN THERMALWAY HEAT TRANSFER TECHNOLOGY CO LTD;		☒
	44	204268162	CN	U	2015-04-15	SI WENYUN		☒
	45	201014273	CN	Y	2008-01-30	GUOZHONG WANG		☒
	46	2911390	CN	Y	2007-06-13	SUN PINGRU		☒
	47	102777788	CN	A	2012-11-14	SUZHOU VELARIUM LANDSCAPE DECO		☒
	48	203963553	CN	U	2014-11-26	HESHAN NEO NEON LIGHTING CO LTD		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

EXAMINER SIGNATURE			
Examiner Signature	/ANH Q TRAN/	Date Considered	04/14/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2020-04-01
Name/Print	Simon Kuang Lu	Registration Number	51974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9775215	B2	2017-09-26	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20130320869	A1	2013-12-05	KONINKLIJKE PHILIPS N.V.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	102932997	CN	B	2014-08-27	ZHEJIANG HENGMAN PHOTOELECTRIC TECHNOLOGY CO LTD		☒
	2	200965185	CN	Y	2007-10-24	YAOHAN LIU		☒
	3	103016984	CN	A	2013-04-03	ZHANG JING		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	4	102376843	CN	A	2012-03-14	WENBIN CHEN		☒
	5	104033772	CN	A	2014-09-10	NINGBO LAE ELECTRONIC CO LTD		☒
	6	204534210	CN	U	2015-08-05	ELEC TECH INT CO LTD		☒
	7	2015074917	WO	A1	2015-05-28	KONINKLIJKE PHILIPS N.V.		☐
	8	101715265	CN	B	2013-08-14	OCEANS KING LIGHTING SCI & TECH; SHENZHEN OCEANS KI		☒
	9	2015028639	WO	A1	2015-03-05	KONINKLIJKE PHILIPS N.V.		☐
	10	102116460	CN	A	2011-07-06	GANQIANG CAI		☒
	11	202125774	CN	U	2012-01-25	GUANGZHOU THERMOKING TECHNOLOGY INTERNAT CO LTD		☒
	12	204420636	CN	U	2015-06-24	SHENHZEN BOSHIN LED LIGHTING CO LTD		☒
	13	102889446	CN	A	2013-01-23	LI WENZHONG		☒
	14	3147313	JP	U	2008-12-25	Kuo-Len LIN et.al		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	15	202302841	CN	U	2012-07-04	NINGBO RUIKANG PHOTOELECTRIC CO LTD & SHENZHEN REF		☒
	16	103968272	CN	A	2014-08-06	WU RONGFENG		☒
	17	2519258	GB	A	2015-04-15	UNITY OPTO TECHNOLOGY CO. LTD		☐
	18	2013243132	JP	A	2013-12-05	OKI ISAMU		☒
	19	203549435	CN	U	2014-04-16	HU FEILIN		☒
	20	H01204982	JP	A	1989-08-17	Kanbayashi Tomio et al.		☒
	21	2014206785	WO	A1	2014-12-31	TAO HAIMIN		☐
	22	203848055	CN	U	2014-09-24	CHEN JINZHANG		☒
	23	200980183	CN	Y	2007-11-21	WANG GUOZHONG		☒
	24	204042527	CN	U	2014-12-24	JIANGSU INKIN OPTOELECTRIC TECHNOLOGY DEV CO LTD		☒
	25	205877791	CN	U	2017-01-11	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	26	103851547	CN	A	2014-06-11	OSRAM GMBH		☒
	27	104990041	CN	A	2015-10-21	ZHAO XING; LU LIBING		☒
	28	2012155880	JP	A	2012-08-16	SEKI KATSUSH et al.		☒
	29	2015066566	WO	A1	2015-05-07	INNOSYS, INC.		☐
	30	203771102	CN	U	2014-08-13	SUZHOU ARES INTERNAT CO LTD		☒
	31	103943752	CN	A	2014-07-23	LEXTAR ELECTRONICS CORP		☒
	32	202216003	CN	U	2012-05-09	BEIJING TONGFANG LANSEN LIGHTING TECHNOLOGY CO LTD		☒
	33	203240337	CN	U	2013-10-16	ZHEJIANG SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒
	34	101352105	CN	A	2009-01-21	GENERAL ELECTRIC		☒
	35	104832813	CN	A	2015-08-12	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒
	36	201954169	CN	U	2011-08-31	HUANSONG XU; QUEMING WANG		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	37	1914458	CN	A	2007-02-14	KONINKL PHILIPS ELECTRONICS NV		☒
	38	203686635	CN	U	2014-07-02	JIANGSU TIWIN OPTOELECTRONIC TECHNOLOGY CO LTD		☒
	39	2005122906	JP	A	2005-05-12	HITACHI LIGHTING LTD		☒
	40	203162856	CN	U	2013-08-28	RONG SHENG		☒
	41	2554899	EP	A2	2013-02-06	QBAS TECH CO LTD		☐
	42	101922640	CN	A	2010-12-22	FUJIAN XIANGYUN PHOTOELECTRIC TECHNOLOGY CO LTD		☒
	43	1292930	CN	A	2001-04-25	KONINKL PHILIPS ELECTRONICS NV		☒
	44	104470086	CN	B	2017-06-06	ZHAO GUOSONG		☒
	45	204083927	CN	U	2015-01-07	LU YING et al.		☒
	46	2531425	GB	A	2016-04-20	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☐
	47	101228393	CN	A	2008-07-23	LEMNIS LIGHTING IP GMBH		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	48	203927469	CN	U	2014-11-05	SUZHOU LINKE LIGHTING TECHNOLOGY CO LTD		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/ANH Q TRAN/	Date Considered	04/14/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2020-04-01
Name/Print	Simon Kuang Lu	Registration Number	51974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	319,646	((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 19:41
L2	909	L1 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or terminal or contact$2) NEAR3 (solder$3 or weld$3 or connection)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 19:43
L3	199	L2 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (pad WITH (notch$2 or (through ADJ1 hole) or through-hole)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 19:44
L4	183	L2 AND (((tub$4 or elong$4 or cylindrical$2) NEAR2 (hous$3 or cas$3 or body or glass$2 or len$2)) SAME (end-cap$3 or ((end$2 or edge$1) NEAR2 (cap$3 or cover$3 or holder)) or edge-cap$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 19:58
L5	922	L1 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or contact$2 or pin or joint$2 or connection or terminal) WITH solder$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 20:11
L6	192	L5 AND (((tub$4 or elong$4 or cylindrical$2) NEAR2 (hous$3 or cas$3 or body or glass$2 or len$2)) SAME (end-cap$3 or ((end$2 or edge$1) NEAR2 (cap$3 or cover$3 or holder)) or edge-cap$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 20:12

L8	18	L5 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) ADJ1 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 20:26
L9	31	L5 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) NEAR2 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 20:28
S1	12	jiang-tao.in. and yang-chang.in. and wang-bao.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 11:02
S2	0	(jiaxing ADJ1 super ADJ1 lighting) AND (((LED.u/c. or light-emitting-diode or light-emitting) ADJ1 tub$4 ADJ1 lamp) SAME glass$2 SAME (soder$3 NEAR1 pad)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 12:44
S3	0	(jiaxing ADJ1 super ADJ1 lighting) AND (((LED.u/c. or light-emitting-diode or light-emitting) ADJ1 tub$4 ADJ1 lamp) SAME (soder$3 NEAR1 pad)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 12:51
S4	201	(jiaxing ADJ1 super ADJ1 lighting) AND ((LED.u/c. or light-emitting-diode or light-emitting) ADJ1 tub$4 ADJ1 lamp).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 12:53
S5	1	S4 AND ((glass SAME cap) AND (strip SAME pad SAME (notch$2 or (through ADJ1 hole) or through-hole)) AND ((protect$3 ADJ1 layer) SAME open$3)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:00

S6	1	S4 AND ((glass SAME cap) AND (strip SAME pad SAME (notch$2 or (through ADJ1 hole) or through-hole))).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:10
S7	27	S4 AND (glass SAME cap).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:34
S8	1	S7 AND (strip SAME pad SAME (notch$2 or (through ADJ1 hole) or through-hole)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:35
S9	14	S4 AND (strip SAME pad SAME (notch$2 or (through ADJ1 hole) or through-hole)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:35
S10	1	S9 AND ((protect$3 ADJ1 layer) SAME open$3).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:36
S11	715	(315/$.ccls. AND 362/$.ccls.) AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 11:13
S12	11	S11 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or terminal or contact$2) NEAR3 (solder$3 or weld$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 11:25

S13	51	("20100124054" | "20110058365" | "6472823" | "6659622" | "7476004").PN. OR ("8304993").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2021/04/13 11:34
S14	920	(315/$.ccls. AND 362/$.ccls.) AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) SAME (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 13:40
S15	66	S14 AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) SAME (strip or print-board or circuit-board or card or PCB.u/c. or board or carrier) SAME ((pad or terminal or contact$2) NEAR3 (solder$3 or weld$3 or connect$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 13:55
S16	408	S14 AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (strip or print-board or circuit-board or card or PCB.u/c. or board))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 14:14
S17	79	S16 AND (((pad or contact$3 or terminal or plate or pin) NEAR3 (solder$3 or weld$3 or contact$3 or connection)) SAME (strip or print-board or circuit-board or card or PCB.u/c. or board))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 14:20
S18	500,659	F21K9/$.CPC. OR F21V$/$.CPC. OR F21V7/28.CPC. H05B45/$.CPC. F21Y$/$.CPC. OR B23K2101/42.CPC. OR C03C21/002.CPC. OR C03C27/048.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 12:19
S19	38,963	S18 AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 12:21
S20	627	S19 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or terminal or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2021/04/14 12:22

		contact$2) NEAR3 (solder$3 or weld$3 or connection)))	DERWENT; IBM_TDB			
S21	194	S20 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (pad WITH (notch$2 or (through ADJ1 hole) or through-hole)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 12:29
S22	177	S20 AND (((tub$4 or elong$4 or cylindrical$2) NEAR2 (hous$3 or cas$3 or body or glass$2 or len$2)) SAME (end-cap$3 or ((end$2 or edge$1) NEAR2 (cap$3 or cover$3 or holder)) or edge-cap$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 13:53
S23	22	("20070024461" | "20080290814" | "20100201239" | "20130230995" | "20140055043" | "20140253733" | "20140268773" | "20140375204" | "20150008846" | "20150043212" | "20150062889" | "20180112836" | "7938562" | "7946729" | "8214084" | "8398258" | "8444292" | "8454193" | "8596813" | "8633646" | "8981646").PN. OR ("10145516").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2021/04/14 14:11
S24	51	("20100124054" | "20110058365" | "6472823" | "6659622" | "7476004").PN. OR ("8304993").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2021/04/14 15:15
S25	689	S19 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or contact$2 or pin or joint$2 or connection or terminal) WITH solder$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 15:51
S26	188	S25 AND (((tub$4 or elong$4 or cylindrical$2) NEAR2 (hous$3 or cas$3 or body or glass$2 or len$2)) SAME (end-cap$3 or ((end$2 or edge$1) NEAR2 (cap$3 or cover$3 or holder)) or edge-cap$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 15:54
S27	142	("20020044456" | "20030189829" | "20030231485" | "20040095078" | "20040189218" | "20050128751" | "20050162850" | "20050168123" | "20050185396" | "20050207166" | "20050213321" | "20060028837" |	US-PGPUB; USPAT; USOCR	OR	OFF	2021/04/14 16:17

"20070001709" | "20070145915" |
"20070210687" | "20070274084" |
"20080030981" | "20080192476" |
"20080278941" | "20080290814" |
"20090140271" | "20090159919" |
"20090161359" | "20100085772" |
"20100124054" | "20100177532" |
"20100201269" | "20100220469" |
"20100253226" | "20100277918" |
"20110038146" | "20110057572" |
"20110090684" | "20110216538" |
"20120049684" | "20120069556" |
"20120106157" | "20120146503" |
"20120153873" | "20120169968" |
"20120253226" | "20120293991" |
"20120319150" | "20130021809" |
"20130033881" | "20130033888" |
"20130050998" | "20130069538" |
"20130094200" | "20130135852" |
"20130170196" | "20130170245" |
"20130182425" | "20130215609" |
"20130250565" | "20130256704" |
"20130258650" | "20130293098" |
"20140071667" | "20140153231" |
"20140203717" | "20140225519" |
"20140226320" | "20150009688" |
"20150176770" | "20150327368" |
"20160091147" | "20160091156" |
"20160091179" | "20160102813" |
"20160178135" | "20160178137" |
"20160178138" | "20160198535" |
"20160212809" | "20160215936" |
"20160215937" | "20160219658" |
"20160219666" | "20160219672" |
"20160223180" | "20160223182" |
"20160229621" | "20160255694" |
"20160255699" | "20160270163" |
"20160270164" | "20160270165" |
"20160270166" | "20160270173" |
"20160270184" | "20160290566" |
"20160290567").PN. OR
("20160290568" | "20160290569" |
"20160290570" | "20160290598" |
"20160290609" | "20160295706" |
"20160309550" | "20160323948" |
"20160341414" | "20160356472" |
"20160363267" | "20160381746" |
"20160381760" | "20170001793" |
"20170038012" | "20170038013" |
"20170038014" | "20170089521" |
"20170089530" | "20170130911" |
"20170159894" | "20170167664" |
"2454049" | "3294518" | "4156265" |

		"4647399" | "5575459" | "5921660" | "6118072" | "6127783" | "6186649" | "6211262" | "6609813" | "6796680" | "6860628" | "6936855" | "7033239" | "7067032" | "7594738" | "8360599" | "8456075" | "8579463" | "9447929" | "9625137" | "D761216" | "D768891").PN. OR ("9890909").URPN.				
S28	15	S25 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) ADJ1 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 17:14
S29	21	S25 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) NEAR2 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 17:25
S30	133	("20030189829" | "20040189218" | "20050162850" | "20050185396" | "20050280017" | "20070001709" | "20070114555" | "20080192476" | "20080230790" | "20080290814" | "20080302476" | "20090040415" | "20090159919" | "20100085772" | "20100124054" | "20100181925" | "20100201269" | "20100220469" | "20100253226" | "20100277918" | "20110038146" | "20110043127" | "20110057572" | "20110084554" | "20110084608" | "20110084627" | "20110121756" | "20110175536" | "20110176297" | "20110228526" | "20110279063" | "20110286208" | "20110291592" | "20110309745" | "20120049684" | "20120051039" | "20120068604" | "20120069556" | "20120146503" | "20120181952" | "20120212951" | "20120248986" | "20120248989" | "20120299501" | "20120300445" | "20120319150" | "20130021809" | "20130033881" | "20130050998" | "20130051008" | "20130069538" | "20130127327" | "20130135852" | "20130147350" |	US-PGPUB; USPAT; USOCR	OR	OFF	2021/04/14 17:44

		"20130215609" | "20130223053" | "20130230995" | "20130250565" | "20130256704" | "20130258650" | "20130293098" | "20130301255" | "20130313983" | "20130320869" | "20130335959" | "20140009923" | "20140035463" | "20140055029" | "20140062320" | "20140099801" | "20140117853" | "20140153231" | "20140192526" | "20140203717" | "20140225519" | "20140239834" | "20140265899" | "20140265900" | "20140331532" | "20150070885" | "20150173138" | "20150176770" | "20150181661" | "20150195889" | "20150366008" | "20160081147" | "20160091147" | "20160113091" | "20160286621" | "20160316533" | "20160381760" | "20170094746" | "20170105263").PN. OR ("20170290119" | "2454049" | "4059324" | "4156265" | "4935665" | "5706177" | "5803577" | "5964518" | "6246167" | "6762562" | "6853151" | "7067032" | "7067992" | "7135034" | "7380961" | "7594738" | "7611260" | "8057084" | "8240875" | "8360599" | "8421088" | "8456075" | "8729809" | "8796943" | "8870415" | "8896207" | "9022632" | "9210774" | "9322531" | "9445463" | "9448660" | "9526133" | "9609711" | "9625137" | "9629211" | "9629215" | "9629216" | "9794990" | "9864438").PN. OR ("10295125").URPN.				

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L10	135,181	F21K9/$.CPC. OR F21V$/$.CPC. OR F21V7/28.CPC. H05B45/$.CPC. F21Y$/$.CPC. OR B23K2101/42.CPC. OR C03C21/002.CPC. OR C03C27/048.CPC.	US-PGPUB; USPAT	OR	ON	2021/04/14 20:29
L11	28,692	L10 AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:32
L12	672	L11 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board	US-PGPUB; USPAT	OR	ON	2021/04/14 20:32

		or card or PCB.u/c. or board)) SAME ((pad or contact$2 or pin or joint$2 or connection or terminal) WITH solder$3))				
L13	21	L12 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) NEAR2 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:33
L15	197	L12 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (pad WITH (notch$2 or (through ADJ1 hole) or through-hole)))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:38
L16	170,606	((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:40
L17	864	L16 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or contact$2 or pin or joint$2 or connection or terminal) WITH solder$3))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:41
L18	29	L17 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) NEAR2 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:41
L19	198	L17 AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) SAME (strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (pad WITH (notch$2 or (through ADJ1 hole) or through-hole)))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:43

4/14/2021 9:48:06 PM
C:\Users\atran1\Documents\EAST\Workspaces\16838012.wsp

Bibliographic Data

Application No: 16/838,012

Foreign Priority claimed: (●) Yes ( ) No

35 USC 119 (a-d) conditions met: [✓] Yes [ ] No | [ ] Met After Allowance

Verified and Acknowledged: /ANH Q TRAN/ | [ ]

Examiner's Signature | Initials

Title: LED TUBE LAMP

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
04/01/2020	362	2844	S20003USUC01T
RULE			

APPLICANTS

JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD, Jiaxing, CHINA

INVENTORS

LI-QIN LI, Jiaxing, CHINA

TAO JIANG, Jiaxing, CHINA

CHANG YANG, Jiaxing, CHINA

BAO WANG, Jiaxing, CHINA

CONTINUING DATA

This application is a CON of 16399004 04/30/2019 PAT 10670197

16399004 is a CON of 16012320 06/19/2018 PAT 10295125 /A.Q.T/

16012320 is a CON of 15441789 02/24/2017 PAT 10024503

15441789 is a CON of 14865387 09/25/2015 PAT 9609711

FOREIGN APPLICATIONS

CHINA CN201410508899.8 09/28/2014

CHINA CN201410507660.9 09/28/2014 /A.Q.T/

CHINA CN201410623355.6 11/06/2014

CHINA CN201410734425.5 12/05/2014

CHINA CN201510075925.7 02/12/2015

CHINA CN201510104823.3 03/10/2015

CHINA CN201510133689.X 03/25/2015

CHINA CN201510134586.5 03/26/2015

CHINA CN201510136796.8 03/27/2015

CHINA CN201510155807.7 04/03/2015

CHINA CN201510173861.4 04/14/2015

CHINA CN201510193980.6 04/22/2015

CHINA CN201510259151.3 05/19/2015

CHINA CN201510268927.8 05/22/2015

CHINA CN201510284720.X 05/29/2015 /A.Q.T/

CHINA CN201510315636.X 06/10/2015

CHINA CN201510338027.6 06/17/2015

CHINA CN201510373492.3 06/26/2015

CHINA CN201510372375.5 06/26/2015

CHINA CN201510364735.7 06/26/2015

CHINA CN201510378322.4 06/29/2015

CHINA CN201510391910.1 07/02/2015

CHINA CN201510406595.5 07/10/2015

CHINA CN201510428680.1 07/20/2015

CHINA CN201510482944.1 08/07/2015

CHINA CN201510483475.5 08/08/2015

CHINA CN201510486115.0 08/08/2015

CHINA CN201510555543.4 09/02/2015

CHINA CN201510557717.0 09/06/2015

CHINA CN201510595173.7 09/18/2015

IF REQUIRED, FOREIGN LICENSE GRANTED**

04/09/2020

STATE OR COUNTRY

CHINA

ADDRESS

Jiaxing Super Lighting Electric Appliance Co., Ltd
IP Department
No. 1288 Jiachuang Road, Xiuzhou Area
Jiaxing, Zhejiang
Jiaxing City, 314031
CHINA

FILING FEE RECEIVED

$5,020

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9629211	B2	2017-04-18	Jiaxing Super Lighting Electric Appliance Co., Ltd	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20140218892	A1	2014-08-07	INTEMATIX CORPORATION	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	101182919	CN	A	2008-05-21	ZHENHANG YANG		☒
	2	3146803	EP	A1	2017-03-29	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☐
	3	104595765	CN	A	2015-05-06	WUXI HYPERION ENERGY CONSERVATIONS CO LTD		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	4	102932997	CN	A	2013-02-13	ZHEJIANG HENGMAN PHOTOELECTRIC TECHNOLOGY CO LTD		☒
	5	103742875	CN	A	2014-04-23	KUANG ZHENGFANG		☒
	6	102155642	CN	A	2011-08-17	CHANGGUI LIU		☒
	7	102226504	CN	A	2011-10-26	SHANGHAI XINKAIYUAN LIGHTING TECHNOLOGY CO LTD		☒
	8	101806444	CN	A	2010-08-18	OCEANS KING LIGHTING SCIENCE		☒
	9	104033772	CN	B	2016-06-08	NINGBO LIAN ELECTRONIC CO LTD		☒
	10	20090118147	KR	A	2009-11-18	NAM KI HO et al,		☒
	11	203615157	CN	U	2014-05-28	PANASONIC CORP		☒
	12	201866575	CN	U	2011-06-15	SHENZHEN XINRUI OPTOELECTRONICS CO LTD		☒
	13	2009111098	WO	A2	2009-09-11	ALTAIR ENG INC		☒
	14	202120982	CN	U	2012-01-18	SHENZHEN JUFEI OPTOELECTRONIC CO LTD		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	15	101715265	CN	A	2010-05-26	OCEANS KING LIGHTING SCI & TECH; SHENZHEN OCEANS KI		☒
	16	201555053	CN	U	2010-08-18	PEILING LIAO		☒
	17	204795749	CN	U	2015-11-18	XIE JIANG et al.		☒
	18	201363601	CN	Y	2009-12-16	YINGCHENG RUILU TECHNOLOGY CO		☒
	19	2016187846	WO	A1	2016-12-01	DIALOG SEMICONDUCTOR (UK) Limited		☐
	20	202392485	CN	U	2012-08-22	KANG WANG		☒
	21	2016086900	WO	A2	2016-06-09	HONG XU et al.		☐
	22	102355780	CN	A	2012-02-15	ZHEJIANG SHIMING OPTICS TECHNOLOGY CO LTD		☒
	23	203068187	CN	U	2013-07-17	HUANG YINGFENG		☒
	24	103563490	CN	A	2014-02-05	GENERAL ELECTRIC		☒
	25	202852551	CN	U	2013-04-03	YANTAI GELINRUIDE OPTOELECTRONIC ENGINEERING CO LT	AA	☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	26	203464014	CN	U	2014-03-05	ZHANG WEI et al.		☒
	27	103411140	CN	A	2013-11-27	DALIAN THERMALWAY HEAT TRANSFER TECHNOLOGY CO LTD		☒
	28	203131520	CN	U	2013-08-14	JIANGSU DONGLIN ELECTRONICS CO LTD		☒
	29	101787273	CN	A	2010-07-28	ANHUI ZERUN OPTOELECTRONIC CO		☒
	30	102738355	CN	A	2012-10-17	SILICONWARE PREC IND CO LTD		☒
	31	102121690	CN	A	2011-07-13	NANJING ZHONGYA OPTO ELECTRICAL SCIENCE AND TECHNO		☒
	32	203240362	CN	U	2013-10-16	SUZHOU MONT LIGHTING CO LTD		☒
	33	102016661	CN	A	2011-04-13	NITTA CORP		☒
	34	204573700	CN	U	2015-08-19	FUJIAN QUANZHOU SIGOLED LIGHTING TECHN CO LTD		☒
	35	202100985	CN	U	2012-01-04	YUNJIE XU		☒
	36	1460165	CN	A	2003-12-03	KONINKL PHILIPS ELECTRONICS NV		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	37	2012139691	WO	A1	2012-10-18	STEINBERG LEUCHTMITTELWERKE ; SZWAICZYK MICHAEL		☐
	38	102155642	CN	B	2013-02-27	CHANGGUI LIU		☒
	39	102518972	CN	A	2012-06-27	SEEWILL OPTOELECTRONICS TECHNOLOGY CO LTD		☒
	40	20120055349	KR	A	2012-05-31	AMOLUXE CO LTD		☒
	41	2523275	GB	A	2015-08-19	The Wand Lite Company Limited		☐
	42	203517629	CN	U	2014-04-02	ZHANG JING		☒
	43	201739830	CN	U	2011-02-09	GEM SUN TECHNOLOGIES CO LTD		☒
	44	2012129301	WO	A1	2012-09-27	ELECTRALED INC.		☐
	45	201437921	CN	U	2010-04-14	SHENZHEN SEVEN COLOR STAR OPTOELECTRONICS TECHNOLO		☒
	46	202012011550	DE	U1	2013-06-27	BERNDT BENJAMIN		☒
	47	204573682	CN	U	2015-08-19	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	48	202281101	CN	U	2012-06-20	LIXIA LIU		☒
	49	102720901	CN	A	2012-10-10	MENG YANG		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/ANH Q TRAN/	Date Considered	04/14/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2020-04-01
Name/Print	Simon Kuang Lu	Registration Number	51974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7380961	B2	2008-06-03	MORIYAMA SANGYO KABUSHIKI KAISHA	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20120248986	A1	2012-10-04	GIBBS DUANE	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2013254667	JP	A	2013-12-19	MITSUBISHI ELEC LIGHTING CORP		☒
	2	2014117435	WO	A1	2014-08-07	CHEN YUAN HSING YEH CO LTD		☒
	3	204573684	CN	U	2015-08-19	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	4	103822121	CN	A	2014-05-28	LEXTAR ELECTRONICS CORP; LEXTAR ELECTRONICS SUZHOU		☒
	5	204741593	CN	U	2015-11-04	XIE JIANG et al.		☒
	6	101092545	CN	A	2007-12-26	HONG BAI		☒
	7	201255393	CN	Y	2009-06-10	ZHONG YING		☒
	8	2914065	EP	A2	2015-09-02	RICOH COMPANY, LTD		☐
	9	204300737	CN	U	2015-04-29	LIU MEICHAN		☒

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T5
	1		

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/ANH Q TRAN/	Date Considered	04/15/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2020-04-01
Name/Print	Simon Kuang Lu	Registration Number	51974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	319,646	((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 19:41
L2	909	L1 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or terminal or contact$2) NEAR3 (solder$3 or weld$3 or connection)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 19:43
L3	199	L2 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (pad WITH (notch$2 or (through ADJ1 hole) or through-hole)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 19:44
L4	183	L2 AND (((tub$4 or elong$4 or cylindrical$2) NEAR2 (hous$3 or cas$3 or body or glass$2 or len$2)) SAME (end-cap$3 or ((end$2 or edge$1) NEAR2 (cap$3 or cover$3 or holder)) or edge-cap$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 19:58
L5	922	L1 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or contact$2 or pin or joint$2 or connection or terminal) WITH solder$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 20:11
L6	192	L5 AND (((tub$4 or elong$4 or cylindrical$2) NEAR2 (hous$3 or cas$3 or body or glass$2 or len$2)) SAME (end-cap$3 or ((end$2 or edge$1) NEAR2 (cap$3 or cover$3 or holder)) or edge-cap$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 20:12

L8	18	L5 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) ADJ1 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 20:26
L9	31	L5 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) NEAR2 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 20:28
S1	12	jiang-tao.in. and yang-chang.in. and wang-bao.in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 11:02
S2	0	(jiaxing ADJ1 super ADJ1 lighting) AND (((LED.u/c. or light-emitting-diode or light-emitting) ADJ1 tub$4 ADJ1 lamp) SAME glass$2 SAME (soder$3 NEAR1 pad)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 12:44
S3	0	(jiaxing ADJ1 super ADJ1 lighting) AND (((LED.u/c. or light-emitting-diode or light-emitting) ADJ1 tub$4 ADJ1 lamp) SAME (soder$3 NEAR1 pad)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 12:51
S4	201	(jiaxing ADJ1 super ADJ1 lighting) AND ((LED.u/c. or light-emitting-diode or light-emitting) ADJ1 tub$4 ADJ1 lamp).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 12:53
S5	1	S4 AND ((glass SAME cap) AND (strip SAME pad SAME (notch$2 or (through ADJ1 hole) or through-hole)) AND ((protect$3 ADJ1 layer) SAME open$3)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:00

S6	1	S4 AND ((glass SAME cap) AND (strip SAME pad SAME (notch$2 or (through ADJ1 hole) or through-hole))).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:10
S7	27	S4 AND (glass SAME cap).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:34
S8	1	S7 AND (strip SAME pad SAME (notch$2 or (through ADJ1 hole) or through-hole)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:35
S9	14	S4 AND (strip SAME pad SAME (notch$2 or (through ADJ1 hole) or through-hole)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:35
S10	1	S9 AND ((protect$3 ADJ1 layer) SAME open$3).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/09 13:36
S11	715	(315/$.ccls. AND 362/$.ccls.) AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 11:13
S12	11	S11 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or terminal or contact$2) NEAR3 (solder$3 or weld$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 11:25

S13	51	("20100124054" | "20110058365" | "6472823" | "6659622" | "7476004").PN. OR ("8304993").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2021/04/13 11:34
S14	920	(315/$.ccls. AND 362/$.ccls.) AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) SAME (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 13:40
S15	66	S14 AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) SAME (strip or print-board or circuit-board or card or PCB.u/c. or board or carrier) SAME ((pad or terminal or contact$2) NEAR3 (solder$3 or weld$3 or connect$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 13:55
S16	408	S14 AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (strip or print-board or circuit-board or card or PCB.u/c. or board))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 14:14
S17	79	S16 AND (((pad or contact$3 or terminal or plate or pin) NEAR3 (solder$3 or weld$3 or contact$3 or connection)) SAME (strip or print-board or circuit-board or card or PCB.u/c. or board))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/13 14:20
S18	500,659	F21K9/$.CPC. OR F21V$/$.CPC. OR F21V7/28.CPC. H05B45/$.CPC. F21Y$/$.CPC. OR B23K2101/42.CPC. OR C03C21/002.CPC. OR C03C27/048.CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 12:19
S19	38,963	S18 AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 12:21
S20	627	S19 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or terminal or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2021/04/14 12:22

		contact$2) NEAR3 (solder$3 or weld$3 or connection)))	DERWENT; IBM_TDB			
S21	194	S20 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (pad WITH (notch$2 or (through ADJ1 hole) or through-hole)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 12:29
S22	177	S20 AND (((tub$4 or elong$4 or cylindrical$2) NEAR2 (hous$3 or cas$3 or body or glass$2 or len$2)) SAME (end-cap$3 or ((end$2 or edge$1) NEAR2 (cap$3 or cover$3 or holder)) or edge-cap$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 13:53
S23	22	("20070024461" | "20080290814" | "20100201239" | "20130230995" | "20140055043" | "20140253733" | "20140268773" | "20140375204" | "20150008846" | "20150043212" | "20150062889" | "20180112836" | "7938562" | "7946729" | "8214084" | "8398258" | "8444292" | "8454193" | "8596813" | "8633646" | "8981646").PN. OR ("10145516").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2021/04/14 14:11
S24	51	("20100124054" | "20110058365" | "6472823" | "6659622" | "7476004").PN. OR ("8304993").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2021/04/14 15:15
S25	689	S19 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or contact$2 or pin or joint$2 or connection or terminal) WITH solder$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 15:51
S26	188	S25 AND (((tub$4 or elong$4 or cylindrical$2) NEAR2 (hous$3 or cas$3 or body or glass$2 or len$2)) SAME (end-cap$3 or ((end$2 or edge$1) NEAR2 (cap$3 or cover$3 or holder)) or edge-cap$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 15:54
S27	142	("20020044456" | "20030189829" | "20030231485" | "20040095078" | "20040189218" | "20050128751" | "20050162850" | "20050168123" | "20050185396" | "20050207166" | "20050213321" | "20060028837" |	US-PGPUB; USPAT; USOCR	OR	OFF	2021/04/14 16:17

"20070001709" | "20070145915" |
"20070210687" | "20070274084" |
"20080030981" | "20080192476" |
"20080278941" | "20080290814" |
"20090140271" | "20090159919" |
"20090161359" | "20100085772" |
"20100124054" | "20100177532" |
"20100201269" | "20100220469" |
"20100253226" | "20100277918" |
"20110038146" | "20110057572" |
"20110090684" | "20110216538" |
"20120049684" | "20120069556" |
"20120106157" | "20120146503" |
"20120153873" | "20120169968" |
"20120253226" | "20120293991" |
"20120319150" | "20130021809" |
"20130033881" | "20130033888" |
"20130050998" | "20130069538" |
"20130094200" | "20130135852" |
"20130170196" | "20130170245" |
"20130182425" | "20130215609" |
"20130250565" | "20130256704" |
"20130258650" | "20130293098" |
"20140071667" | "20140153231" |
"20140203717" | "20140225519" |
"20140226320" | "20150009688" |
"20150176770" | "20150327368" |
"20160091147" | "20160091156" |
"20160091179" | "20160102813" |
"20160178135" | "20160178137" |
"20160178138" | "20160198535" |
"20160212809" | "20160215936" |
"20160215937" | "20160219658" |
"20160219666" | "20160219672" |
"20160223180" | "20160223182" |
"20160229621" | "20160255694" |
"20160255699" | "20160270163" |
"20160270164" | "20160270165" |
"20160270166" | "20160270173" |
"20160270184" | "20160290566" |
"20160290567").PN. OR
("20160290568" | "20160290569" |
"20160290570" | "20160290598" |
"20160290609" | "20160295706" |
"20160309550" | "20160323948" |
"20160341414" | "20160356472" |
"20160363267" | "20160381746" |
"20160381760" | "20170001793" |
"20170038012" | "20170038013" |
"20170038014" | "20170089521" |
"20170089530" | "20170130911" |
"20170159894" | "20170167664" |
"2454049" | "3294518" | "4156265" |

		"4647399" | "5575459" | "5921660" | "6118072" | "6127783" | "6186649" | "6211262" | "6609813" | "6796680" | "6860628" | "6936855" | "7033239" | "7067032" | "7594738" | "8360599" | "8456075" | "8579463" | "9447929" | "9625137" | "D761216" | "D768891").PN. OR ("9890909").URPN.				
S28	15	S25 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) ADJ1 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 17:14
S29	21	S25 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) NEAR2 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/04/14 17:25
S30	133	("20030189829" | "20040189218" | "20050162850" | "20050185396" | "20050280017" | "20070001709" | "20070114555" | "20080192476" | "20080230790" | "20080290814" | "20080302476" | "20090040415" | "20090159919" | "20100085772" | "20100124054" | "20100181925" | "20100201269" | "20100220469" | "20100253226" | "20100277918" | "20110038146" | "20110043127" | "20110057572" | "20110084554" | "20110084608" | "20110084627" | "20110121756" | "20110175536" | "20110176297" | "20110228526" | "20110279063" | "20110286208" | "20110291592" | "20110309745" | "20120049684" | "20120051039" | "20120068604" | "20120069556" | "20120146503" | "20120181952" | "20120212951" | "20120248986" | "20120248989" | "20120299501" | "20120300445" | "20120319150" | "20130021809" | "20130033881" | "20130050998" | "20130051008" | "20130069538" | "20130127327" | "20130135852" | "20130147350" |	US-PGPUB; USPAT; USOCR	OR	OFF	2021/04/14 17:44

		"20130215609" | "20130223053" | "20130230995" | "20130250565" | "20130256704" | "20130258650" | "20130293098" | "20130301255" | "20130313983" | "20130320869" | "20130335959" | "20140009923" | "20140035463" | "20140055029" | "20140062320" | "20140099801" | "20140117853" | "20140153231" | "20140192526" | "20140203717" | "20140225519" | "20140239834" | "20140265899" | "20140265900" | "20140331532" | "20150070885" | "20150173138" | "20150176770" | "20150181661" | "20150195889" | "20150366008" | "20160081147" | "20160091147" | "20160113091" | "20160286621" | "20160316533" | "20160381760" | "20170094746" | "20170105263").PN. OR ("20170290119" | "2454049" | "4059324" | "4156265" | "4935665" | "5706177" | "5803577" | "5964518" | "6246167" | "6762562" | "6853151" | "7067032" | "7067992" | "7135034" | "7380961" | "7594738" | "7611260" | "8057084" | "8240875" | "8360599" | "8421088" | "8456075" | "8729809" | "8796943" | "8870415" | "8896207" | "9022632" | "9210774" | "9322531" | "9445463" | "9448660" | "9526133" | "9609711" | "9625137" | "9629211" | "9629215" | "9629216" | "9794990" | "9864438").PN. OR ("10295125").URPN.				

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L10	135,181	F21K9/$.CPC. OR F21V$/$.CPC. OR F21V7/28.CPC. H05B45/$.CPC. F21Y$/$.CPC. OR B23K2101/42.CPC. OR C03C21/002.CPC. OR C03C27/048.CPC.	US-PGPUB; USPAT	OR	ON	2021/04/14 20:29
L11	28,692	L10 AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:32
L12	672	L11 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board	US-PGPUB; USPAT	OR	ON	2021/04/14 20:32

		or card or PCB.u/c. or board)) SAME ((pad or contact$2 or pin or joint$2 or connection or terminal) WITH solder$3))				
L13	21	L12 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) NEAR2 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:33
L15	197	L12 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (pad WITH (notch$2 or (through ADJ1 hole) or through-hole)))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:38
L16	170,606	((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) WITH (retrofit$4 or tub$4 or elong$4 or straight or cylindrical$2 or fluorescen$3))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:40
L17	864	L16 AND (((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) NEAR3 (strip or print-board or circuit-board or card or PCB.u/c. or board)) SAME ((pad or contact$2 or pin or joint$2 or connection or terminal) WITH solder$3))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:41
L18	29	L17 AND ((strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (((protect$3 or resist$4 or solder-resist$4 or insulat$4) NEAR2 (layer or resin or coat$3)) WITH (hole or open$3)))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:41
L19	198	L17 AND ((LED.u/c. or light-emitting-diode or (light$3 ADJ1 diode) or light-emitting) SAME (strip or print-board or circuit-board or card or PCB.u/c. or board) SAME (pad WITH (notch$2 or (through ADJ1 hole) or through-hole)))	US-PGPUB; USPAT	OR	ON	2021/04/14 20:43

4/14/2021 8:50:48 PM
C:\Users\atran1\Documents\EAST\Workspaces\16838012.wsp

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7914193	B2	2011-03-29	Donald A. PEIFER et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20100103673	A1	2010-04-29	IVEY JOHN	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	1	Philips InstantFit LED T8 Lamps data sheet	
	2	Keystone KT-LED18T8-48G-850-D T8 LED LAMP Data Sheet	
	3	MaxLite LED T8 - LINEAR REPLACEMENT LAMP DirectFit G SERIES Data Sheet	
	4	Lenk, R. et al., Practical Lighting Design with LEDs, IEEE Press, A John Wiley & Sons, Inc., 2011, pp. 103-106	
	5	Declaration of Regan Zane, Ph.D., November 18, 2019	
	6	CV of Dr. Regan Zane, November 18, 2019	
	7	Petition for Inter Parte Review of U.S. Patent No. 9,897,265 Under 35 U.S.C.311-319 and 37 C.F.R. 42.1-080, 42.100-.123.	
	8	DEFENDANT MAXLITE, INC.'S PRELIMINARY NONINFRINGEMENT AND INVALIDITY CONTENTIONS PURSUANT TO COURT'S ORDER, May 19, 2020	
	9	DEFENDANT MAXLITE, INC.'S PRELIMINARY NONINFRINGEMENT AND INVALIDITY CONTENTIONS FOR PLAINTIFFS' 35 ELECTED CLAIMS PURSUANT TO COURT'S ORDER, July 20, 2020	
	10	Cree LED T8 Replacement Lamp - General Information, July 20, 2020	
	11	Cree announces residential-targeted LED T8, new rural outdoor, July 20, 2020	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

	12	SHOW COLORS TRUE AND NATURAL, July 20, 2020
	13	Hands-on testing of popular LED T8 lamps and linear fixtures reveals promises and pitfalls (MAGAZINE), July 20, 2020
	14	CREE Recalls LED T8 Lamps Due to Burn Hazard; Includes T8 Lamps Provided as Replacements in Previous Recall, July 20, 2020

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/ANH Q TRAN/	Date Considered	04/14/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2021-03-15
Name/Print	Simon Kuang Lu	Registration Number	51,974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/838,012	04/01/2020	LI-QIN LI	S20003USUC01T	6416

147274 7590 04/29/2021

Jiaxing Super Lighting Electric Appliance Co., Ltd
IP Department
No. 1288 Jiachuang Road, Xiuzhou Area
Jiaxing, Zhejiang
Jiaxing City, 314031
CHINA

EXAMINER	
TRAN, ANH Q	

ART UNIT	PAPER NUMBER
2844	

NOTIFICATION DATE	DELIVERY MODE
04/29/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

sl-ip@super-lamps.com
jin@atipm.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 16838012
Applicant : Li
Filing Date : 04/01/2020
Date Mailed : 04/29/2021

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Quang Nguyen/
Publication Branch
Office of Data Management
(571) 272-4200

IDENTIFICATION OF DRAWING DEFICIENCIES

- [ ] There is a hole or the image thereof within the illustration. FIG(s)
- [ ] The illustration is penetrated or traversed by a solid or broken line that is not intended to be part of the drawing, such as a dark line caused by a flaw in the copying process. FIG(s)
- [ ] An ink stamp or the image thereof obscures part of the illustration. FIG(s)
- [ ] The drawing is marred by black smudges, obliterations, or fax/copier marks (for example, speckles or dots in a substantial portion of the drawing). FIG(s)
- [ ] Figure numbers are duplicated or missing. FIG(s)
- [ ] Drawing sheet or figure is missing. FIG(s)
- [ ] Numbers, letters, or reference characters in the drawing have been crossed out or are illegibly handwritten. FIG(s)
- [ ] The character of the lines, numbers, and letters is poor. FIG(s)
- [ ] The drawing's background shows that the original drawing was made on graph paper or other paper with a pattern or decoration. FIG(s)
- [ ] The FIG. number label is placed in a location that causes the drawing to be read upside down. FIG(s)
- [X] Data, a reference number, or part of the drawing is truncated or missing, or a lead line has no reference number. FIG(s) 31
- [ ] The drawing and/or the FIG. label contain(s) foreign language. FIG(s)
- [ ] This utility application contains a photograph of a view that is capable of being illustrated as a line drawing. FIG(s)
- [ ] A petition under 37 CFR 1.84(a)(2) to accept color drawings has been granted, but the brief description of the drawings in the specification does not contain (or has not been amended to contain) the paragraph required by 37 CFR 1.84(a)(2)(iii).
- [ ] This reissue application contains added and/or amended drawings that are not labeled as “New” or “Amended” or “Canceled” as required by 37 CFR 1.173(b)(3). FIG(s)
- [ ] This Design reissue application contains a drawing that is labeled as “Canceled” but is not surrounded by brackets, or a drawing that is surrounded by brackets but is not labeled as “Canceled.” See 37 CFR 1.173(b)(3). FIG(s)
- [ ] OTHER:
- [ ] COMMENTS:

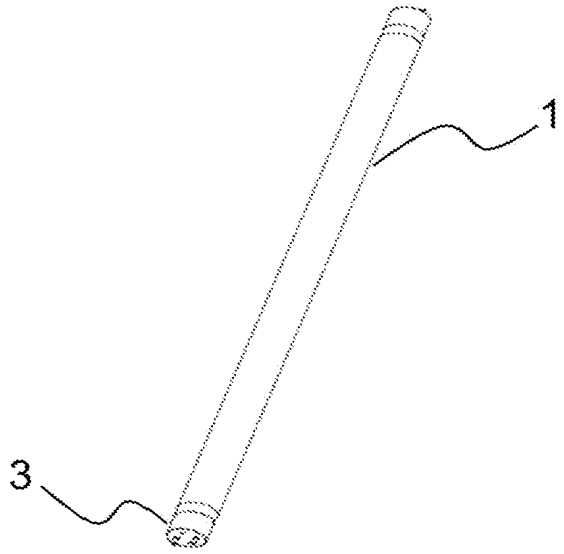

Fig. 1

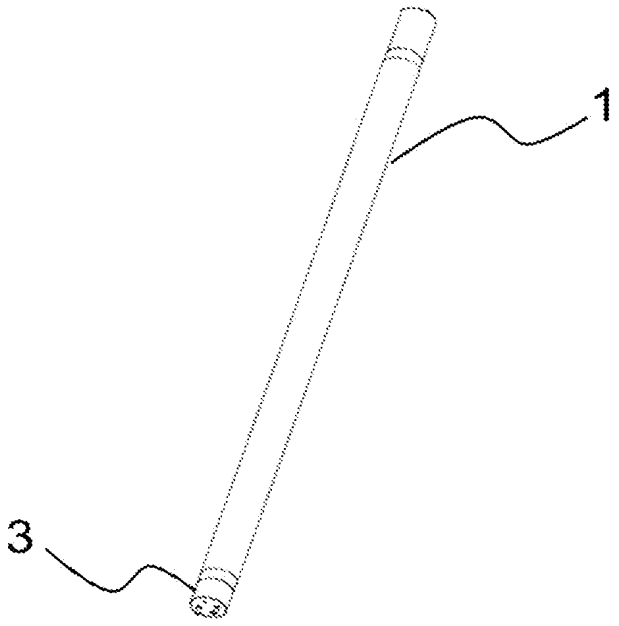

Fig. 1A

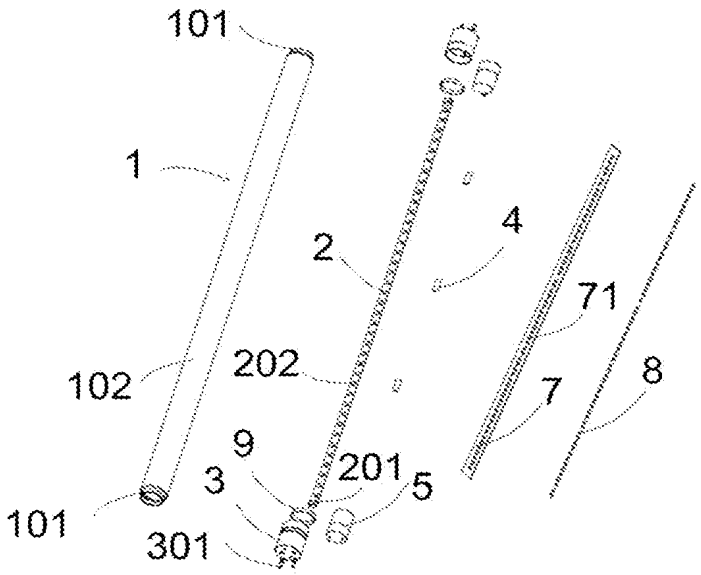

Fig. 2

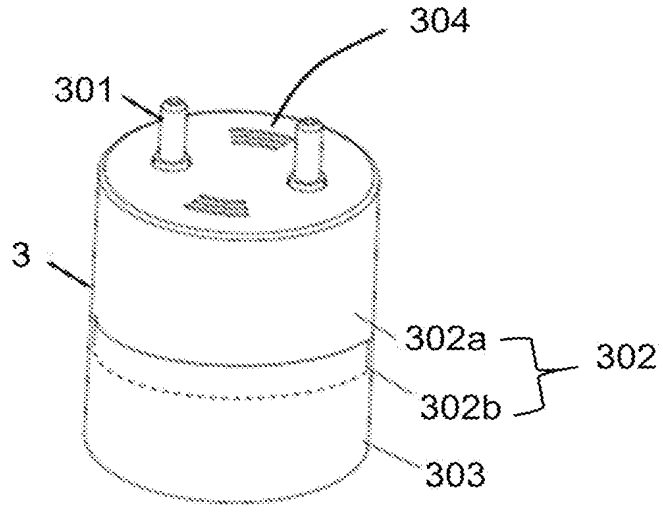

Fig. 3

5

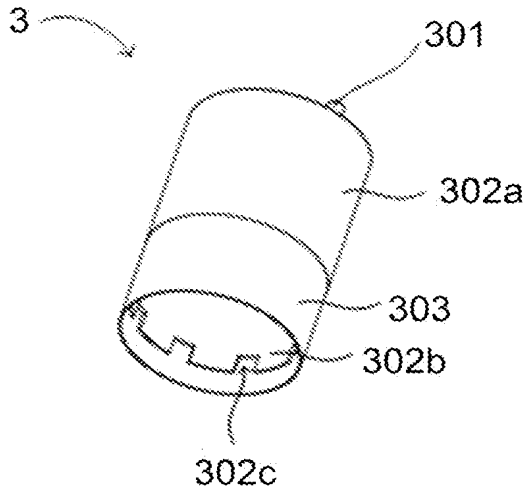

Fig. 4

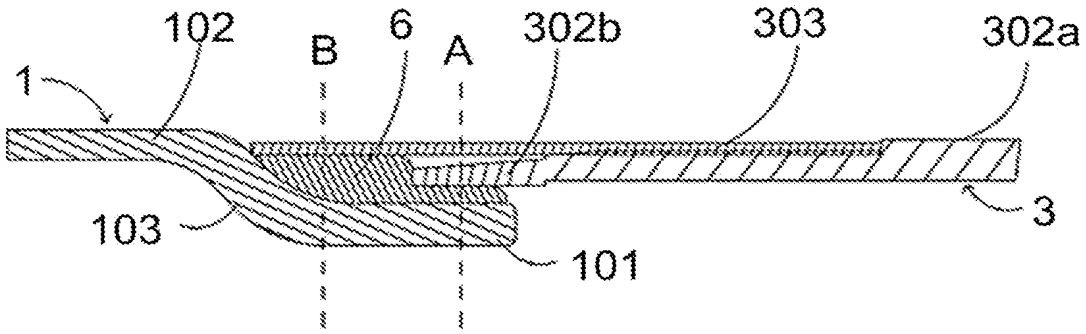

Fig. 5

5

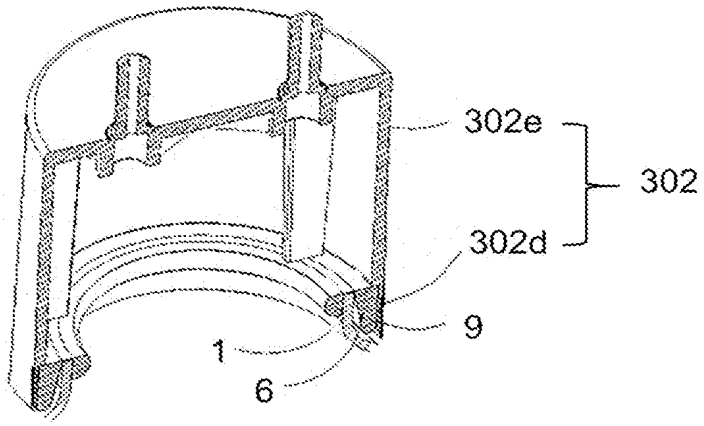

Fig. 6

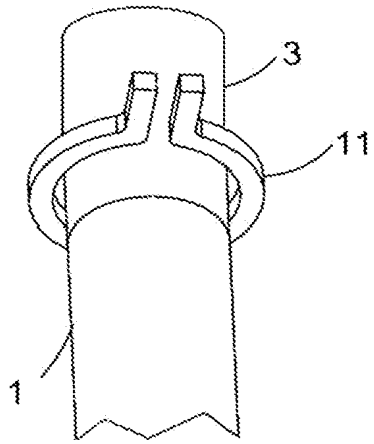

Fig. 7

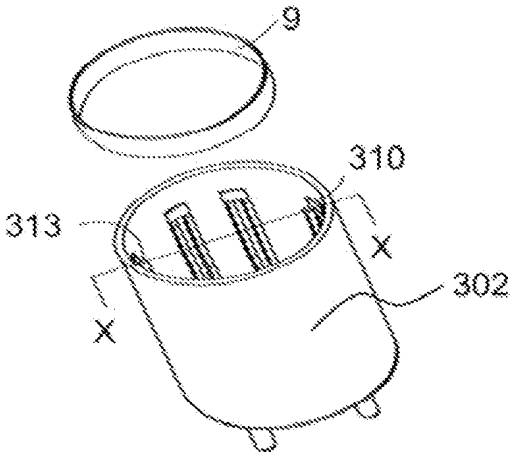

Fig. 8

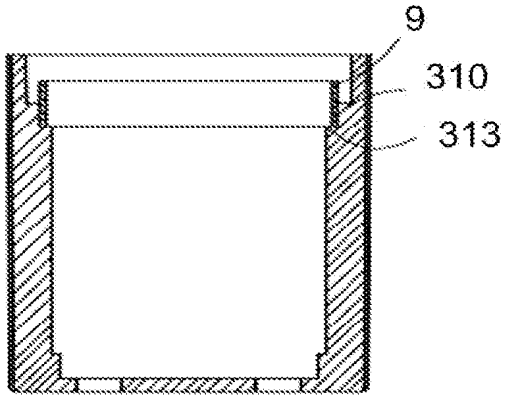

Fig. 9

5

Fig. 10

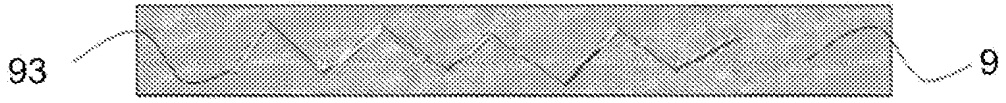

Fig. 11

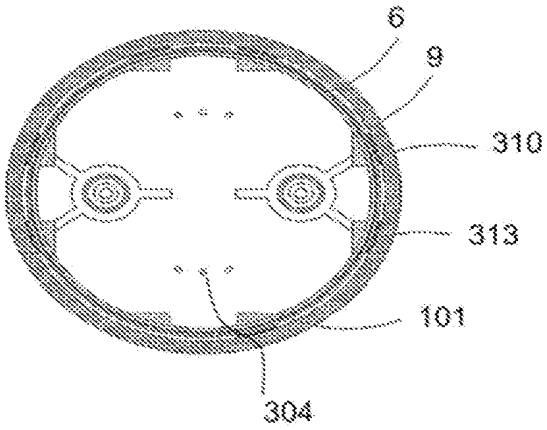

Fig. 12

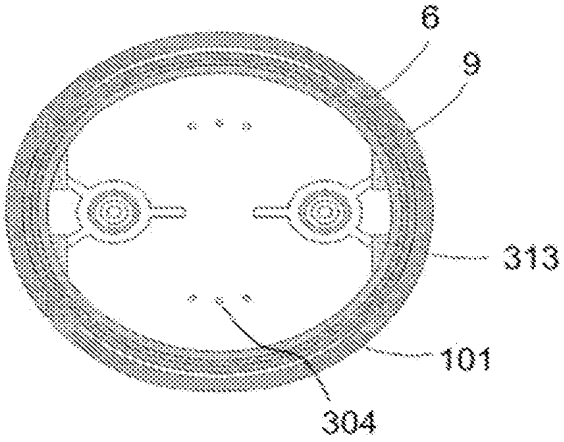

Fig. 13

5

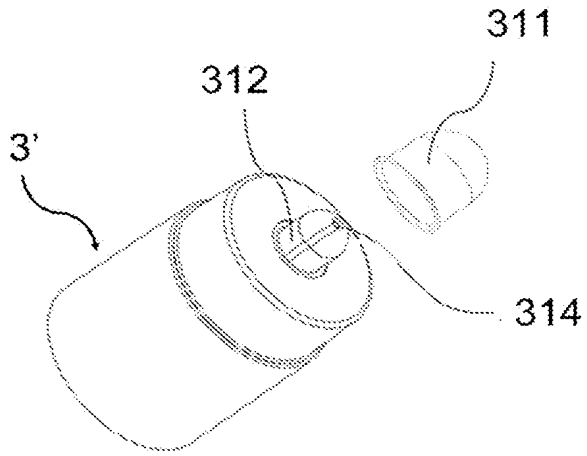

Fig. 14

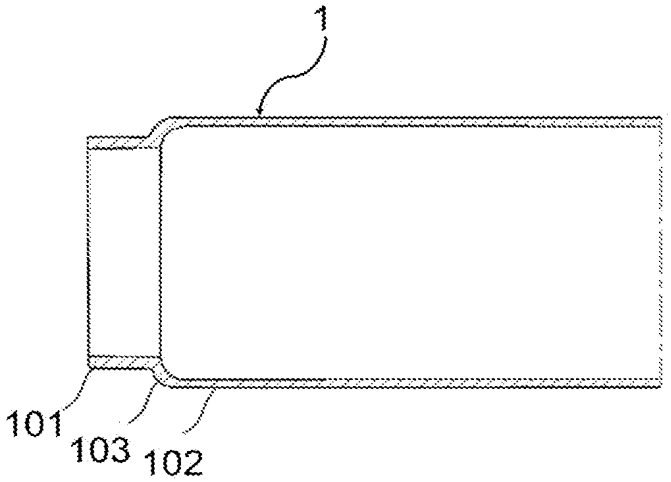

Fig. 15

5

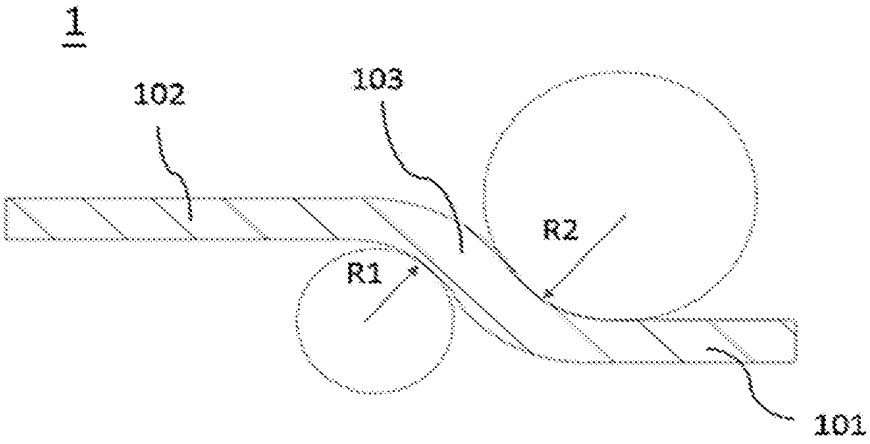

Fig. 16

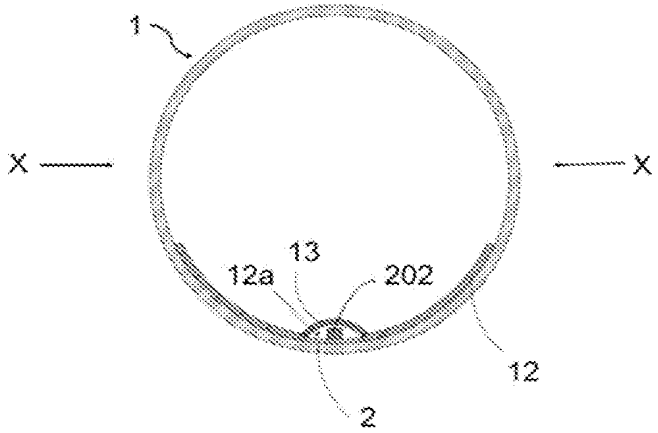

Fig. 17

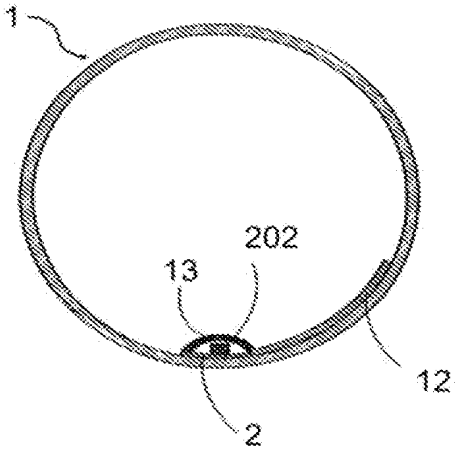

Fig. 18

5

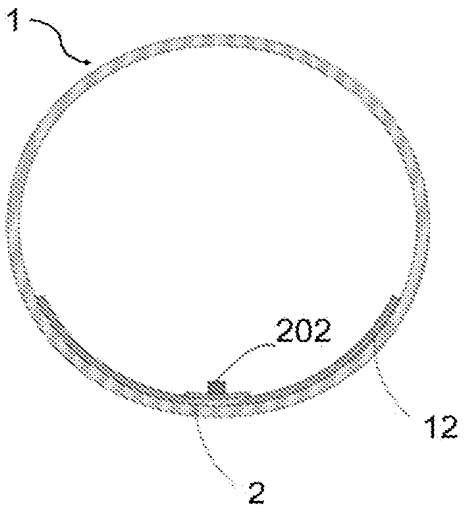

Fig. 19

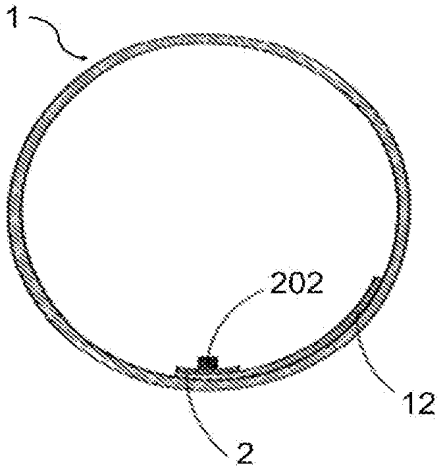

Fig. 20

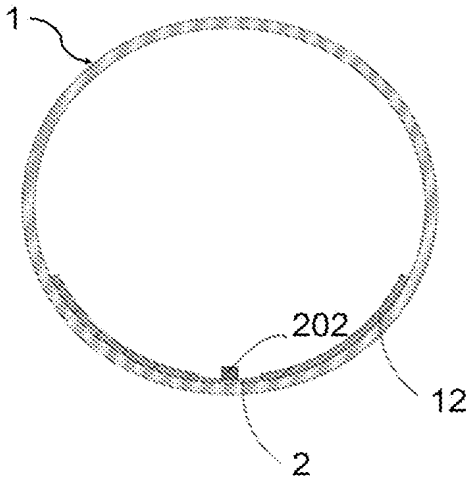

Fig. 21

5

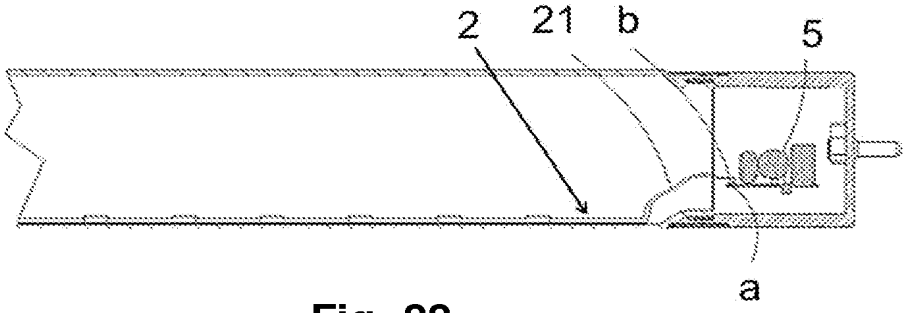

Fig. 22

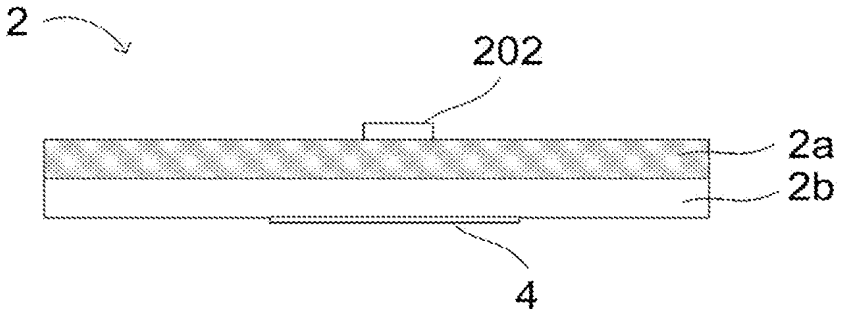

Fig. 23

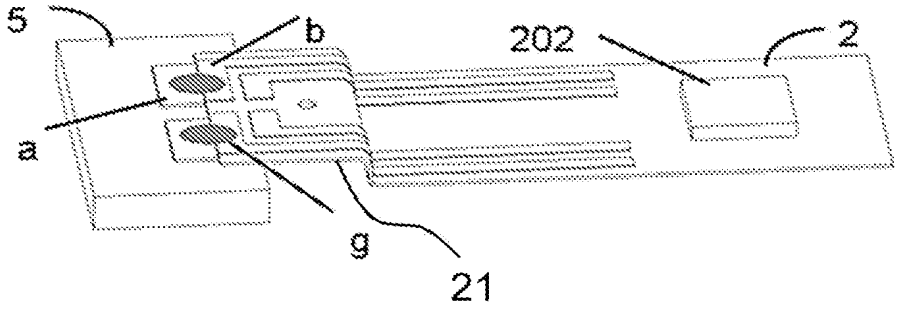

Fig. 24

5

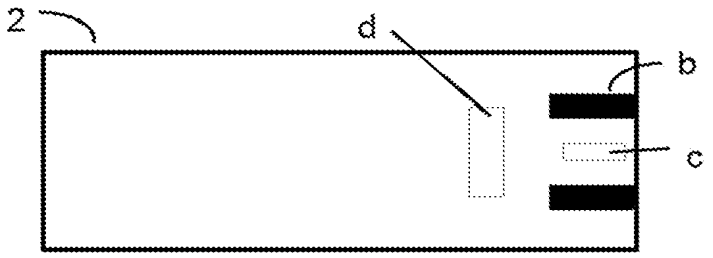

Fig. 25

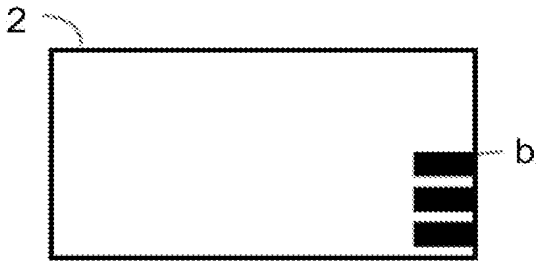

Fig. 26

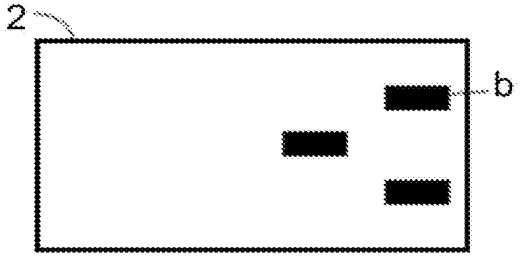

Fig. 27

Fig. 28

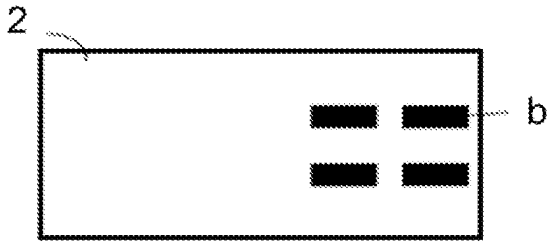

Fig. 29

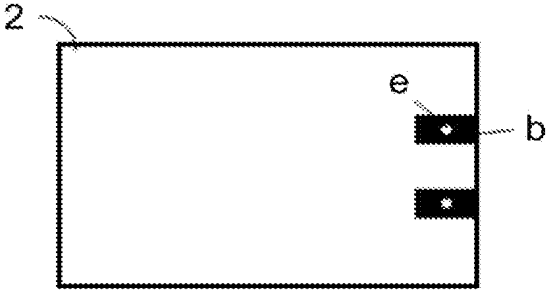

Fig. 30

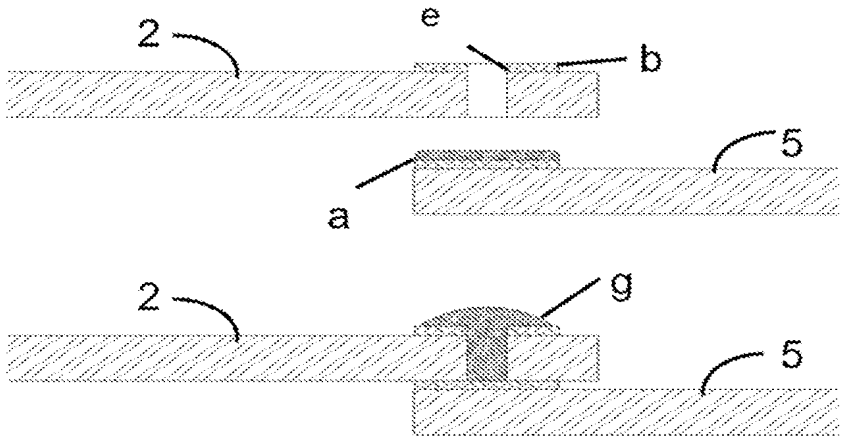

Fig. 31

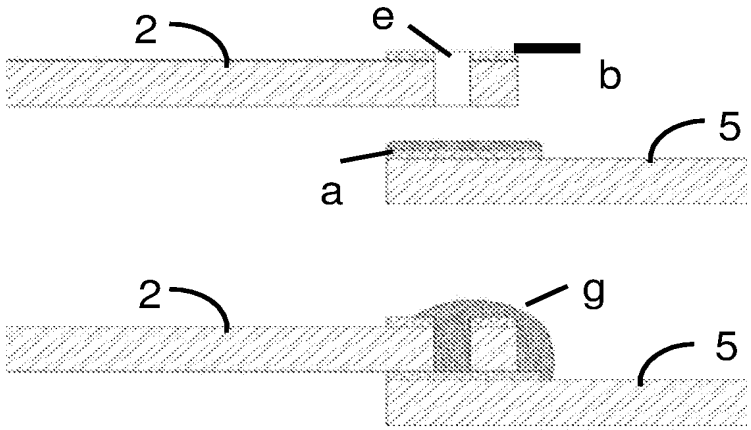

Fig. 32

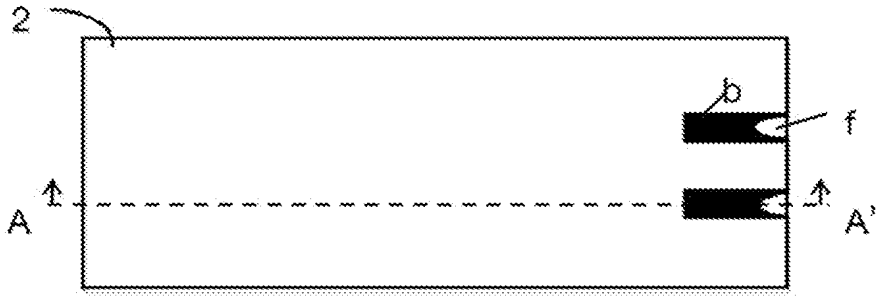

Fig. 33

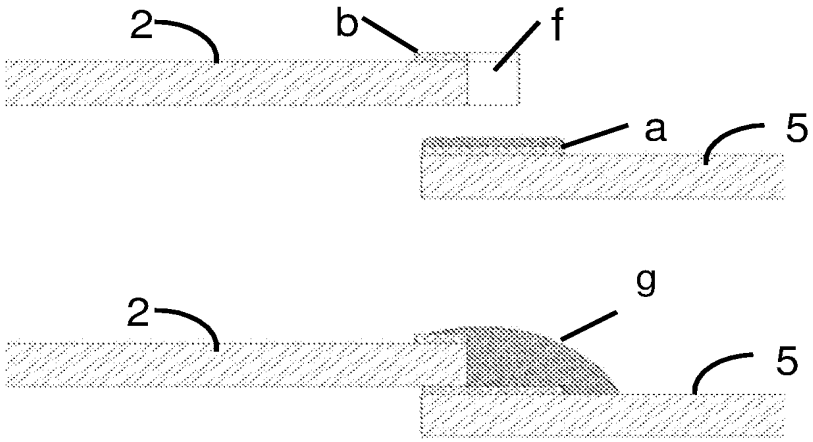

Fig. 34

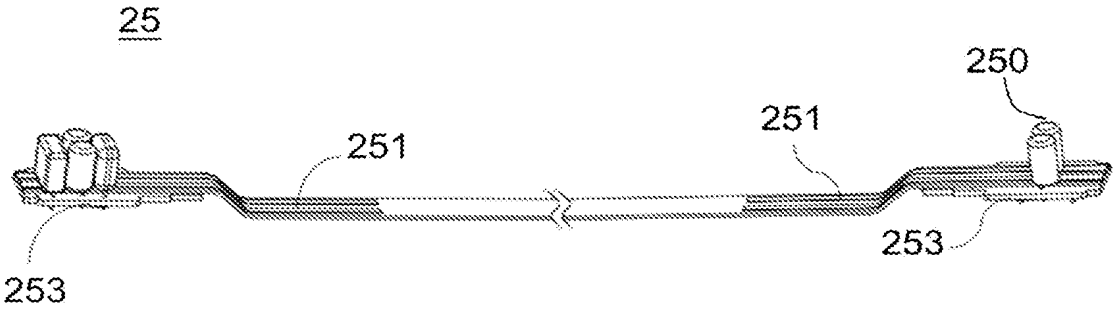

Fig. 35

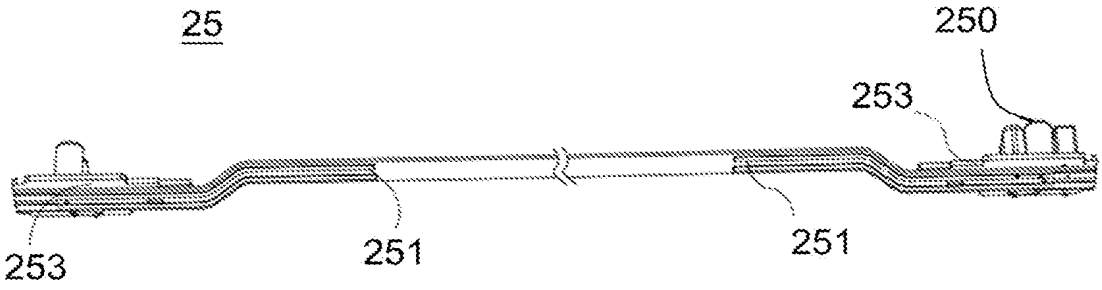

Fig. 36

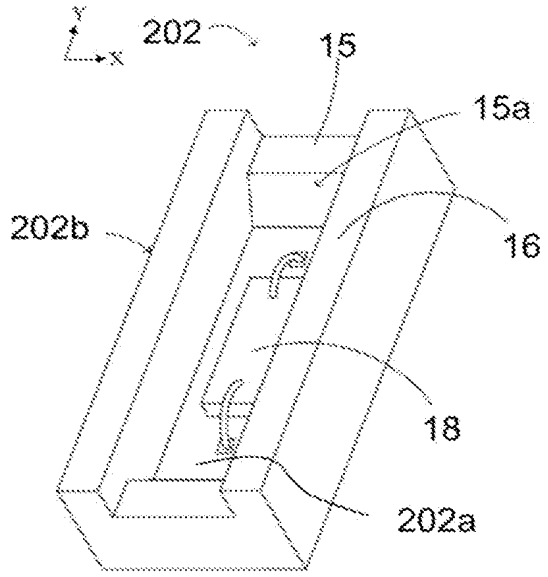

Fig. 37

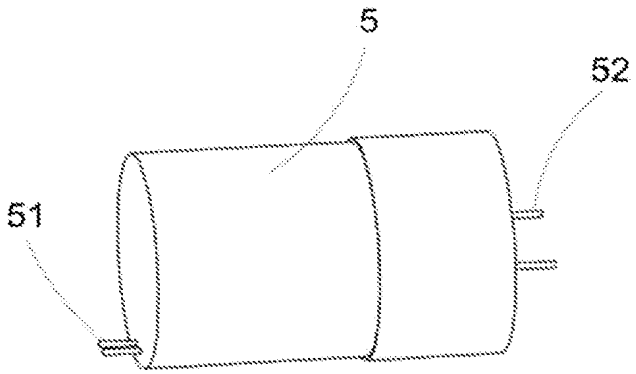

Fig. 38

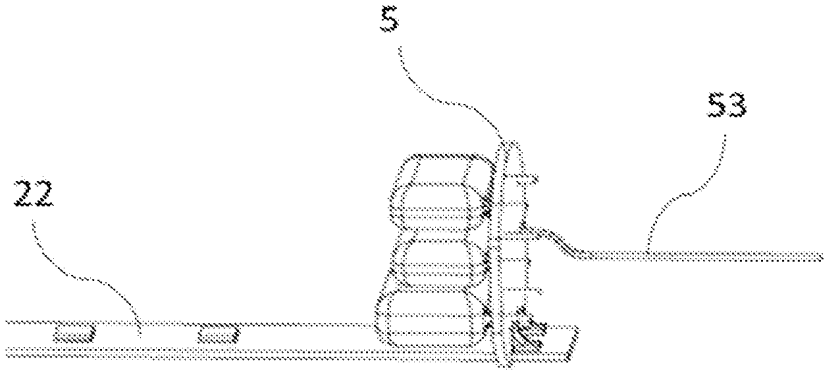

Fig. 39

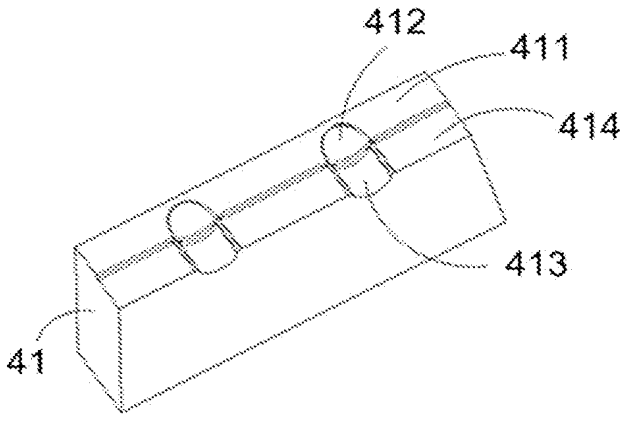

Fig. 40

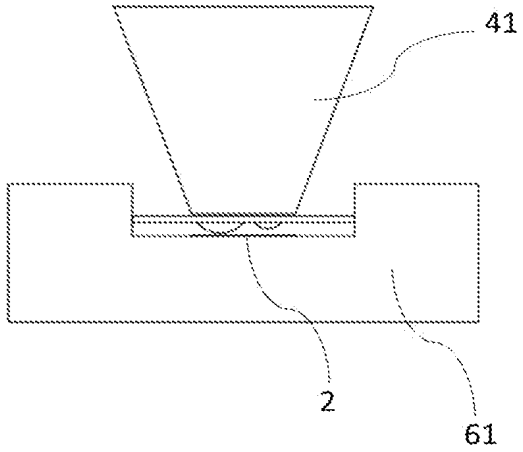

Fig. 41

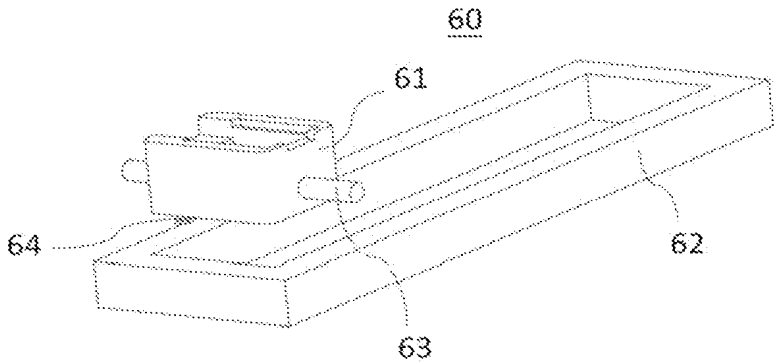

Fig. 42

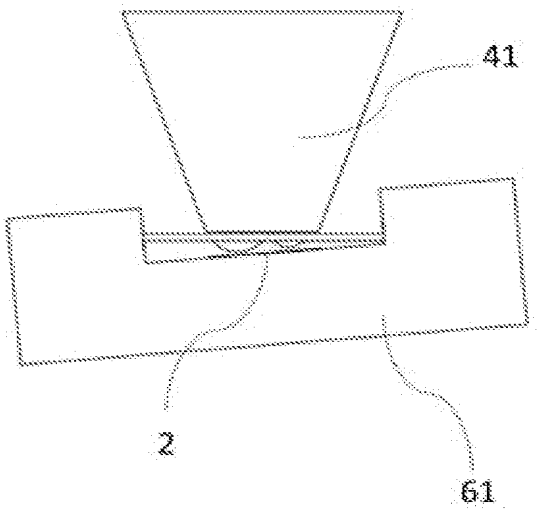

Fig. 43

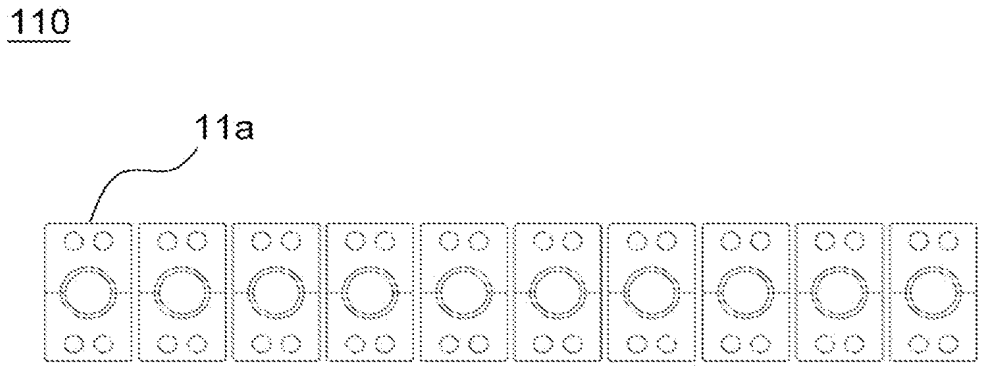

Fig. 44

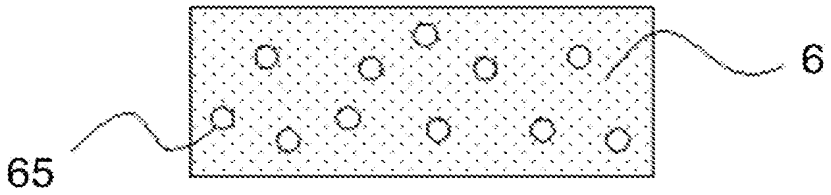

Fig. 45

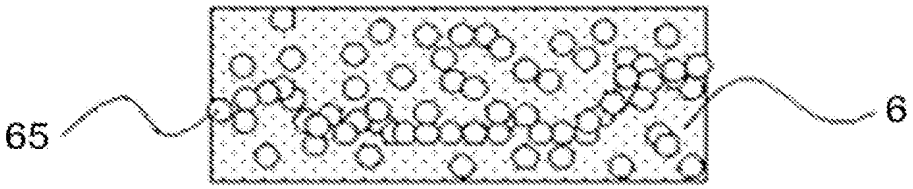

Fig. 46

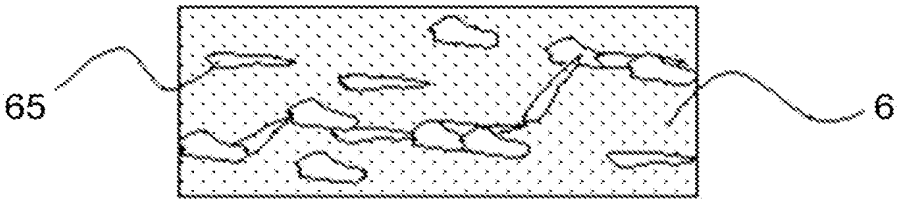

Fig. 47

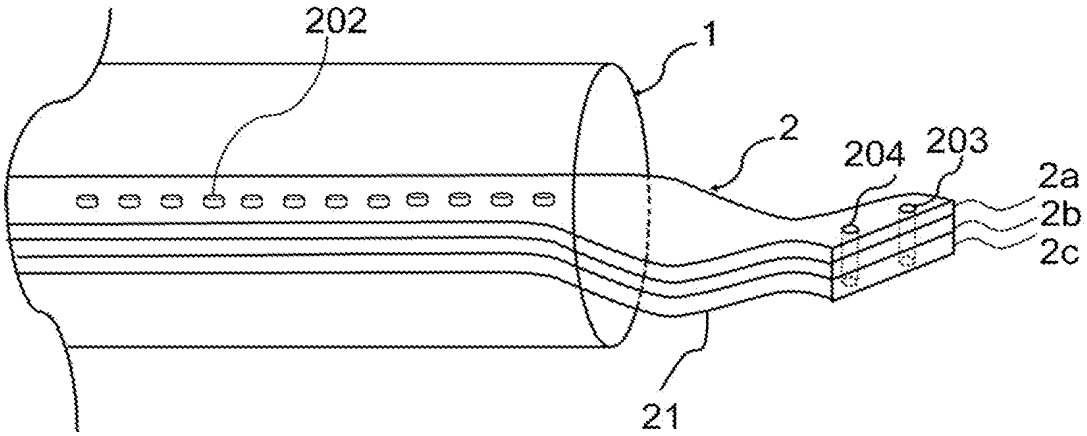

Fig. 48

Fig. 49A

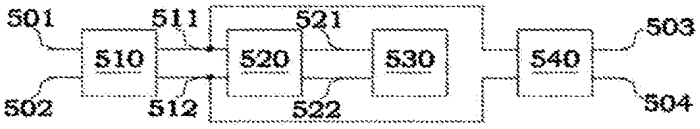

Fig. 49B

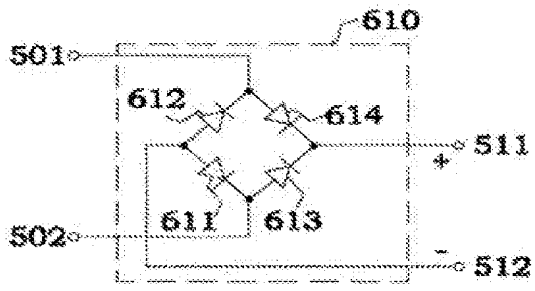

Fig. 50A

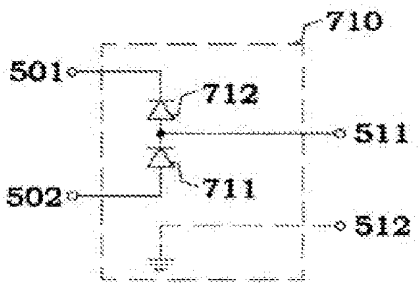

Fig. 50B

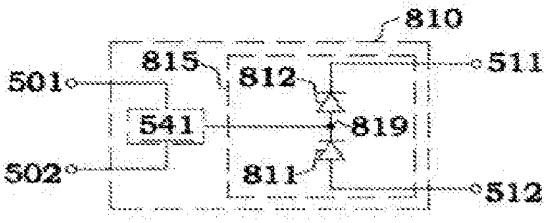

Fig. 50C

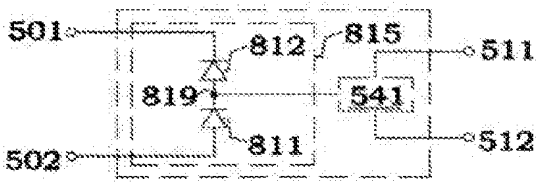

Fig. 50D

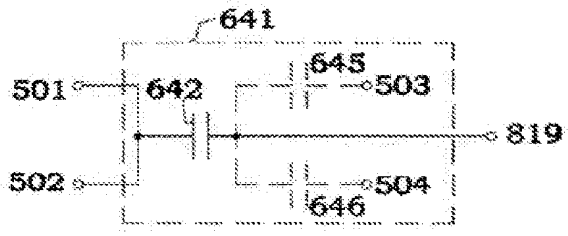

Fig. 51A

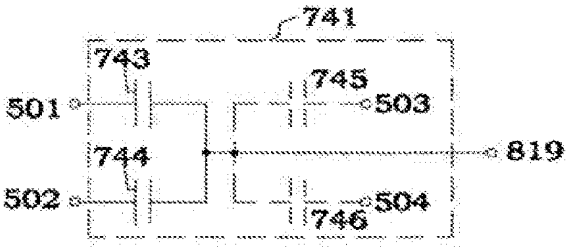

Fig. 51B

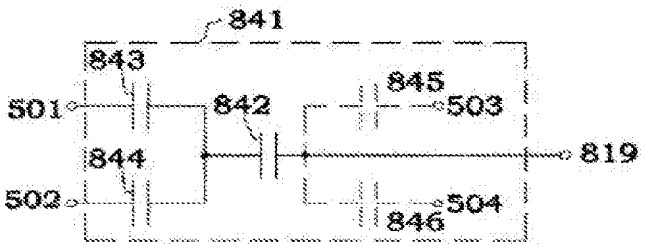

Fig. 51C

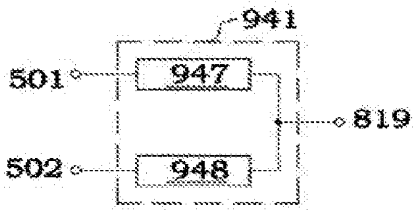

Fig. 51D

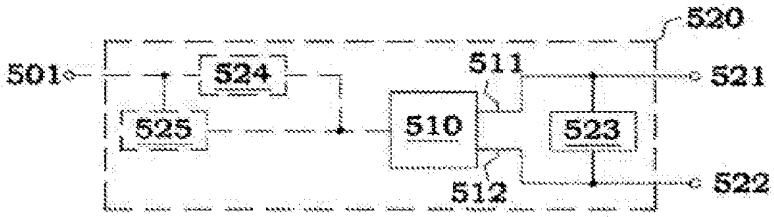

Fig. 52A

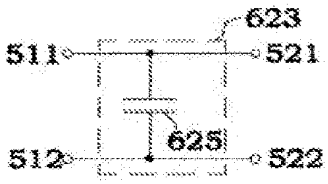

Fig. 52B

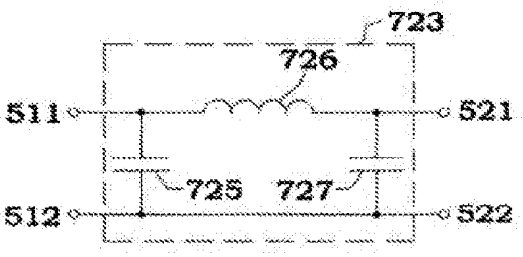

Fig. 52C

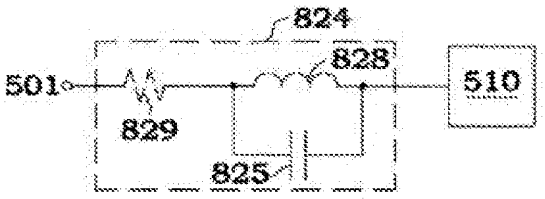

Fig. 52D

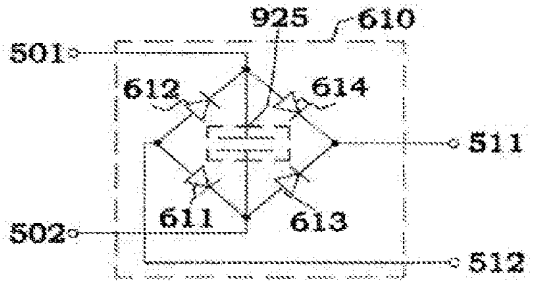

Fig. 52E

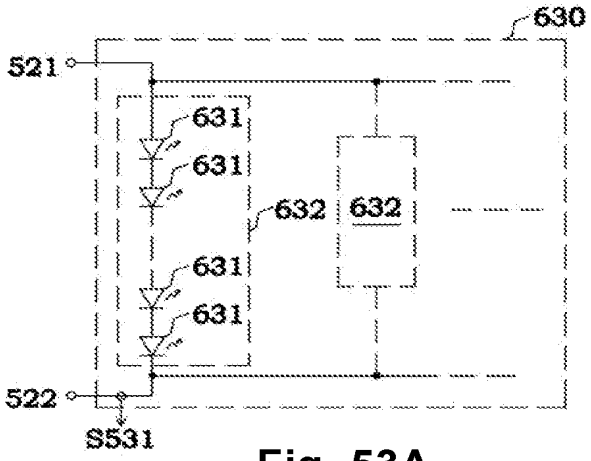

Fig. 53A

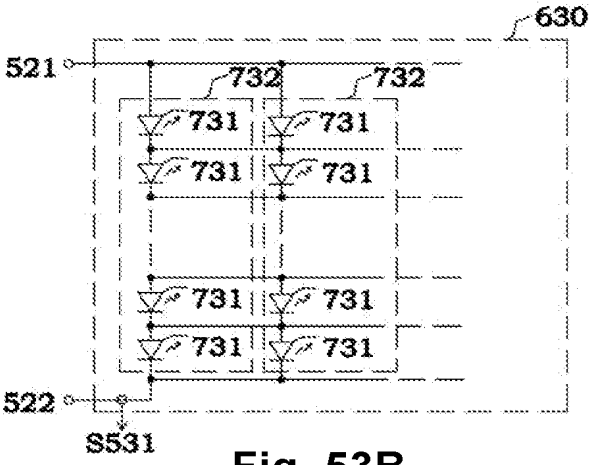

Fig. 53B

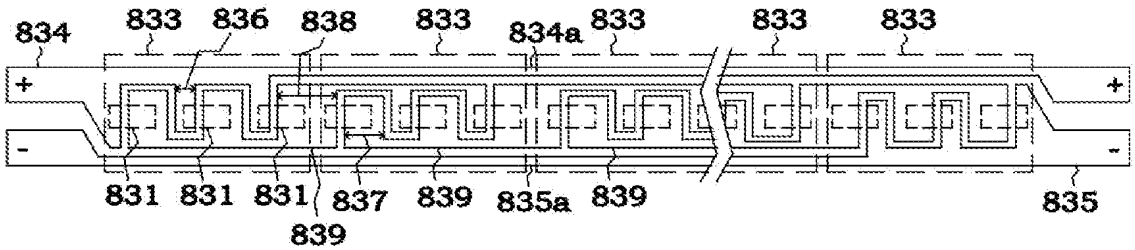

Fig. 53C

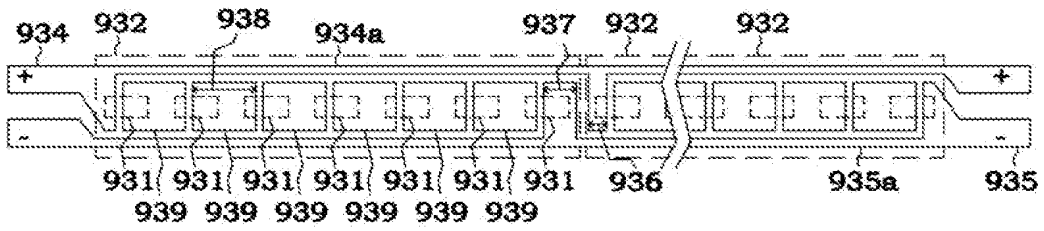

Fig. 53D

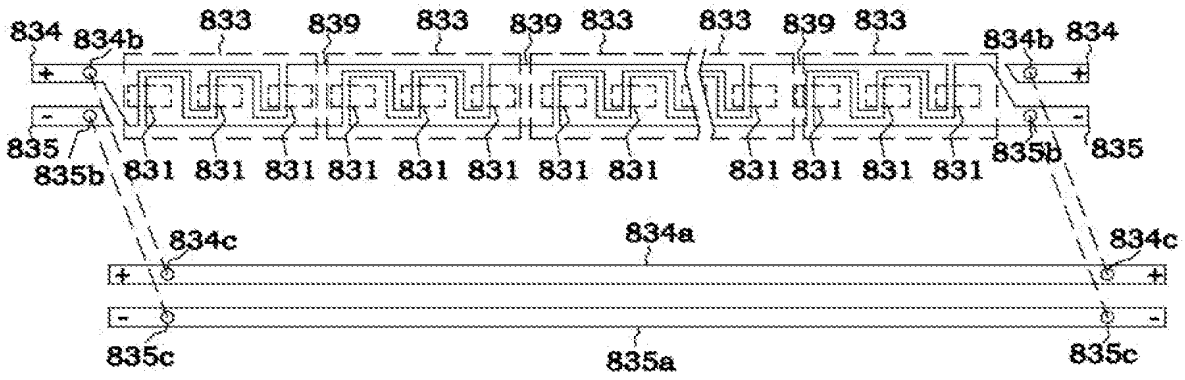

Fig. 53E

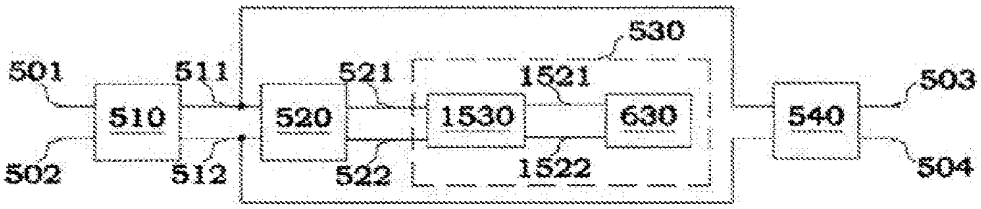

Fig. 54A

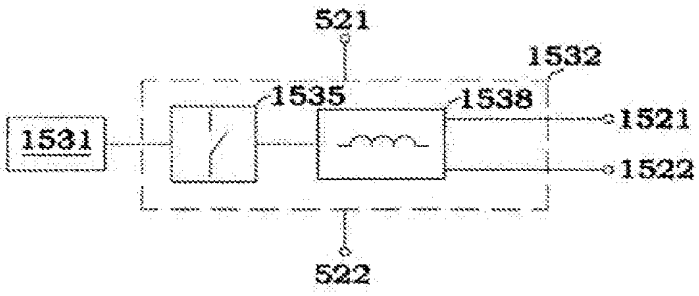

Fig. 54B

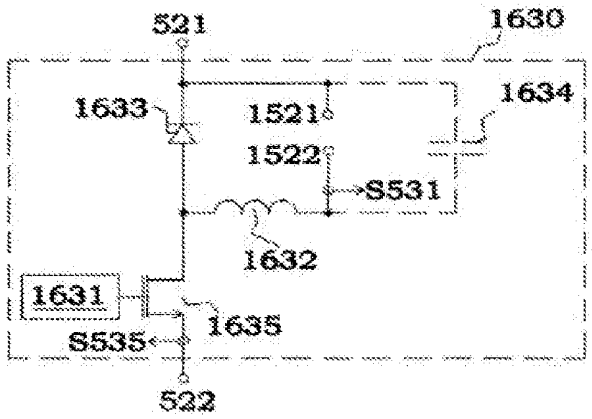

Fig. 54C

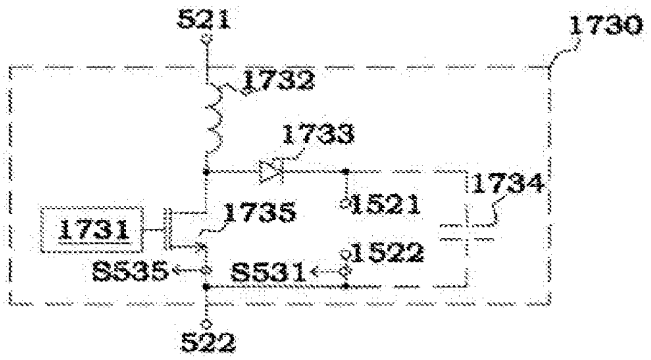

Fig. 54D

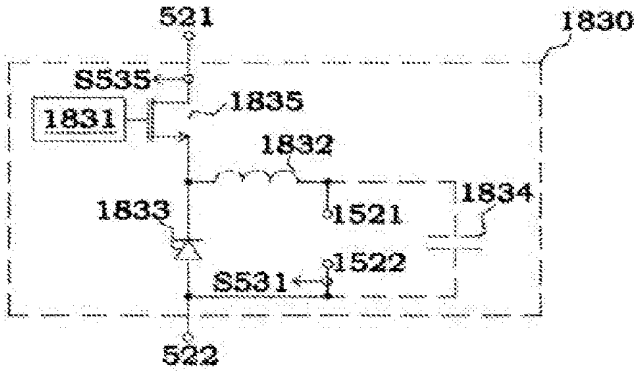

Fig. 54E

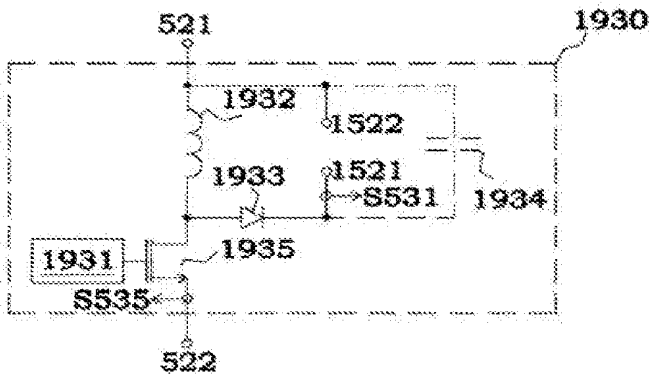

Fig. 54F

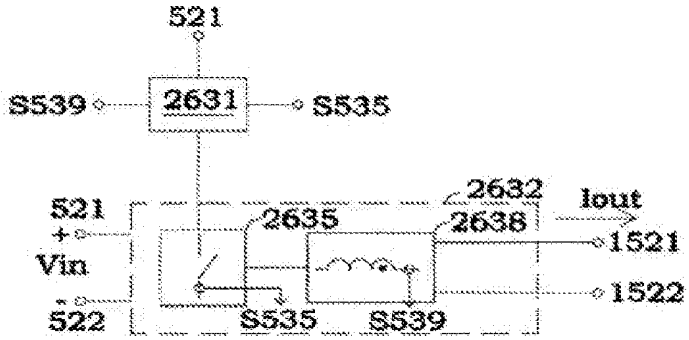

Fig. 54G

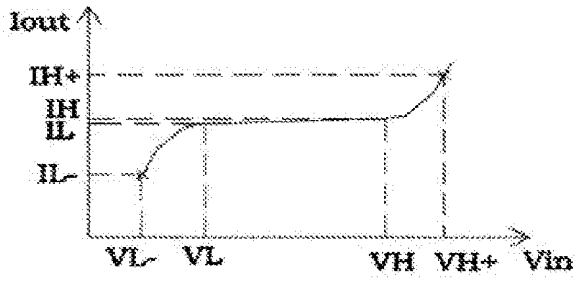

Fig. 54H

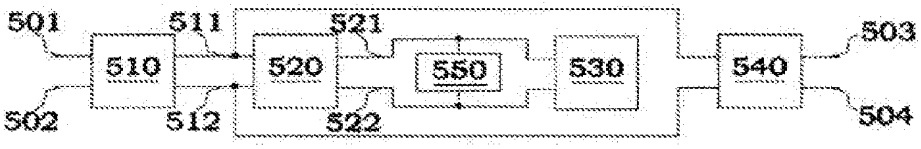

Fig. 55A

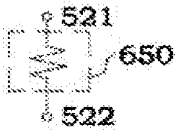

Fig. 55B

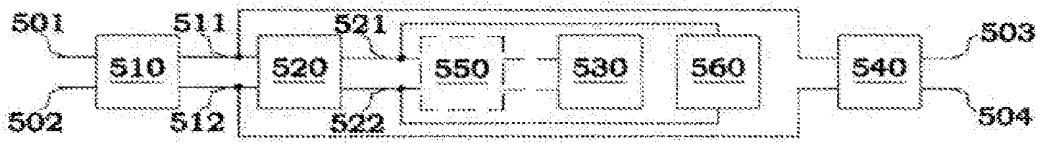

Fig. 56A

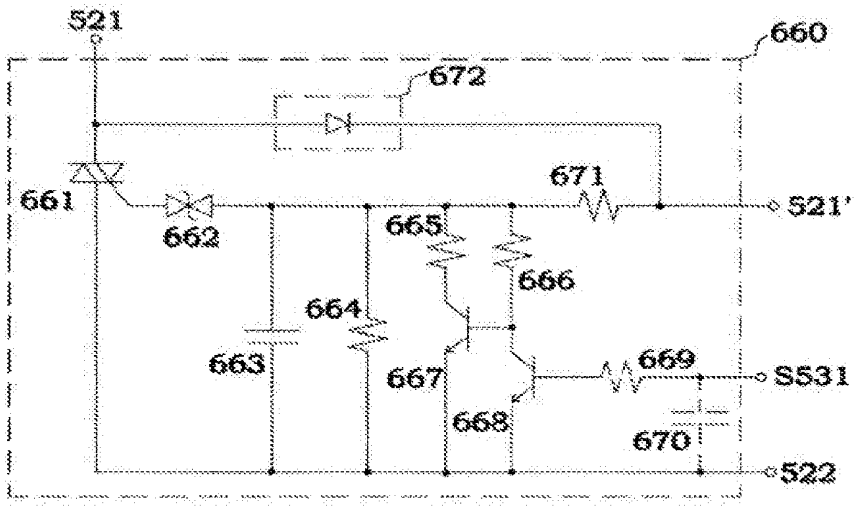

Fig. 56B

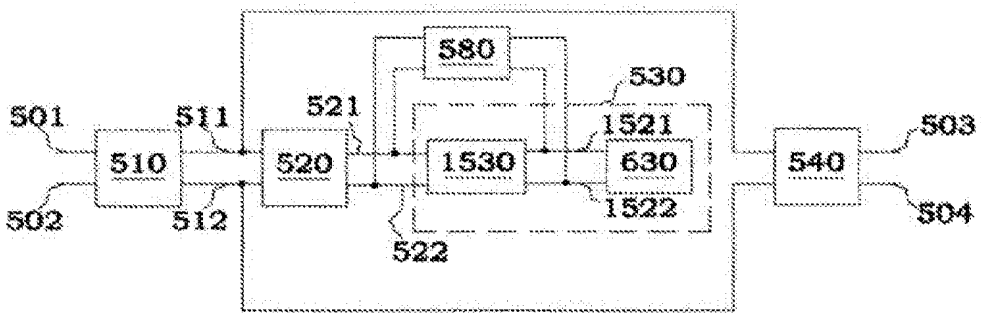

Fig. 57A

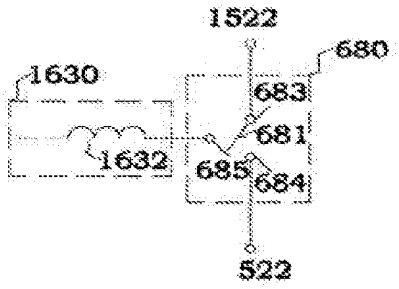

Fig. 57B

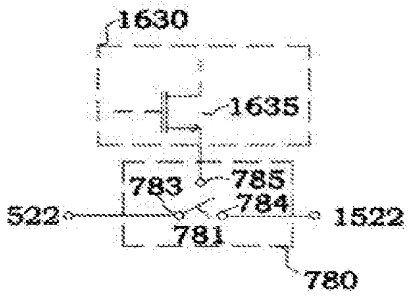

Fig. 57C

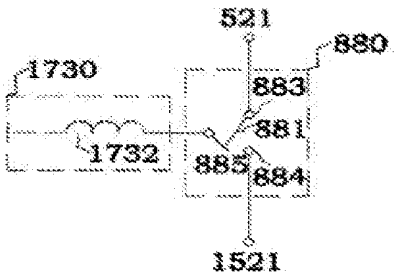

Fig. 57D

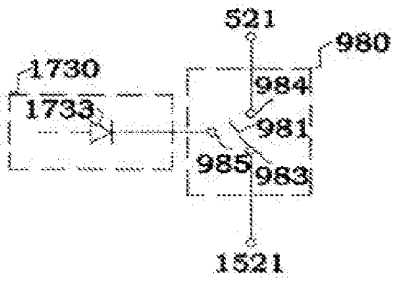

Fig. 57E

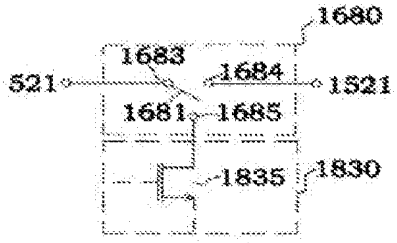

Fig. 57F

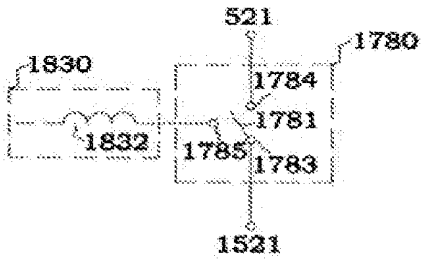

Fig. 57G

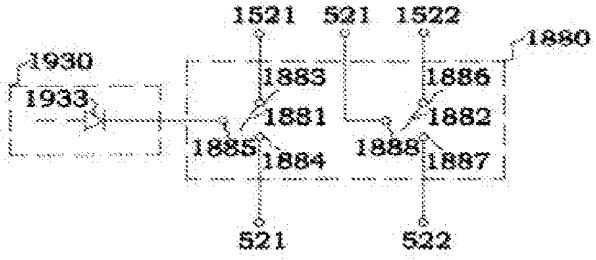

Fig. 57H

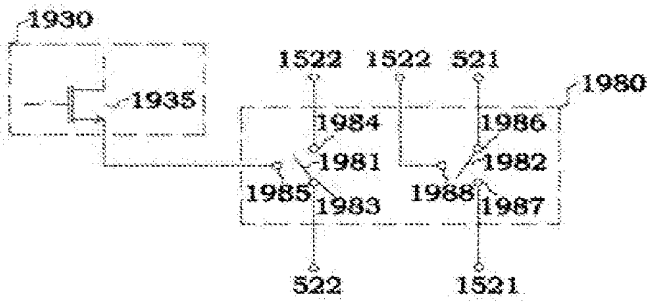

Fig. 57I

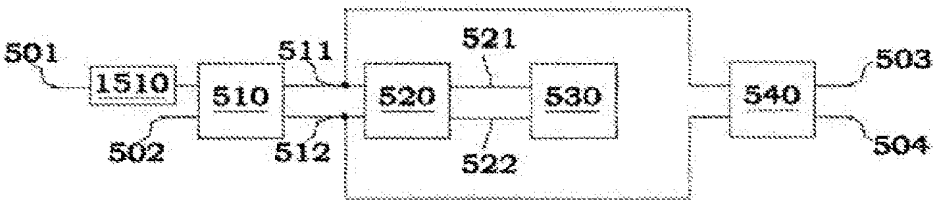

Fig. 58A

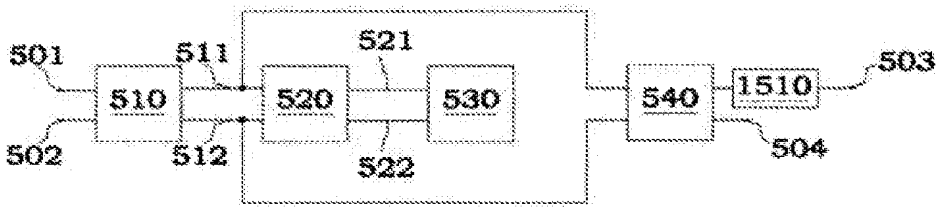

Fig. 58B

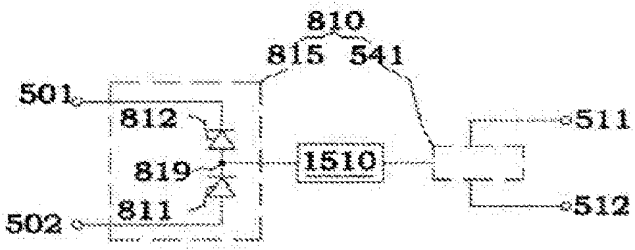

Fig. 58C

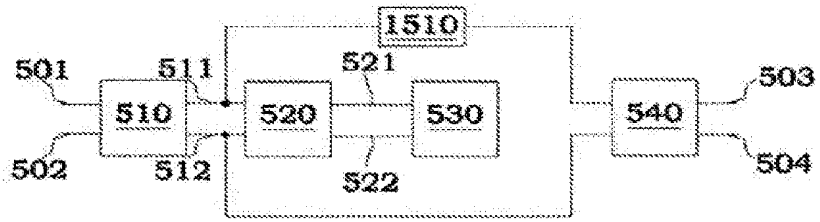

Fig. 58D

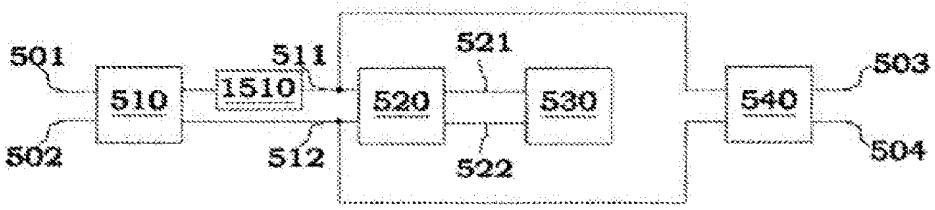

Fig. 58E

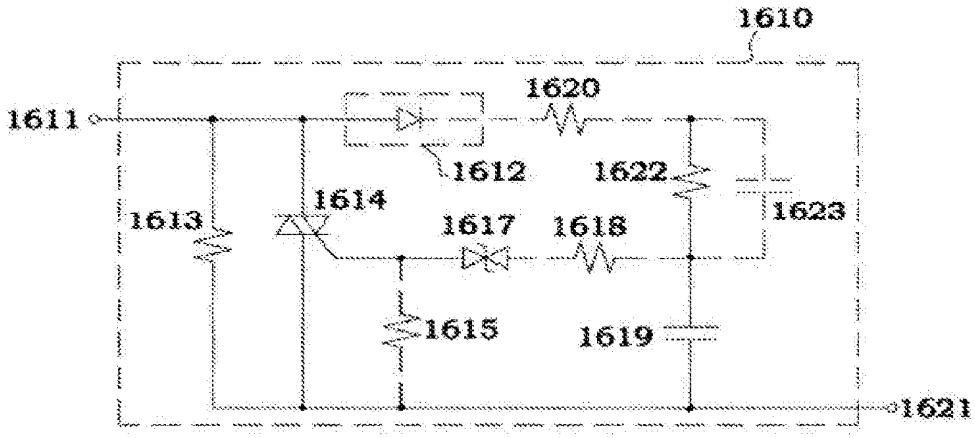

Fig. 58F

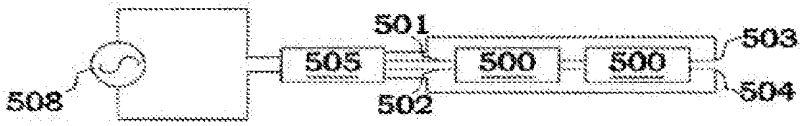

Fig. 58G

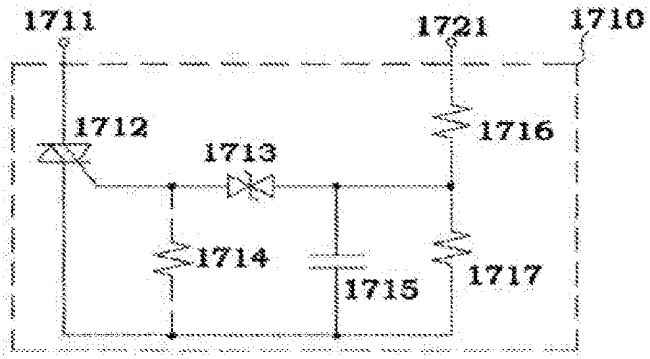

Fig. 58H

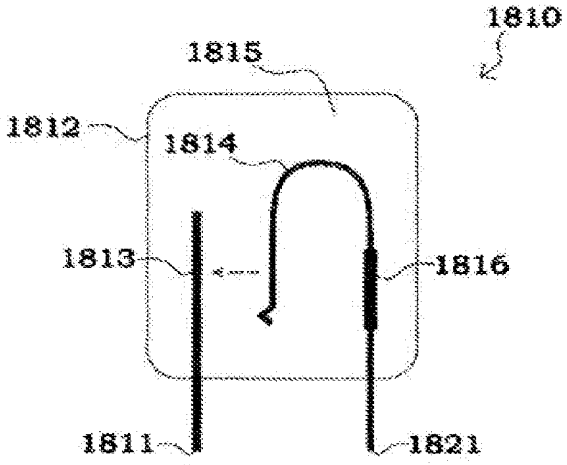

Fig. 58I

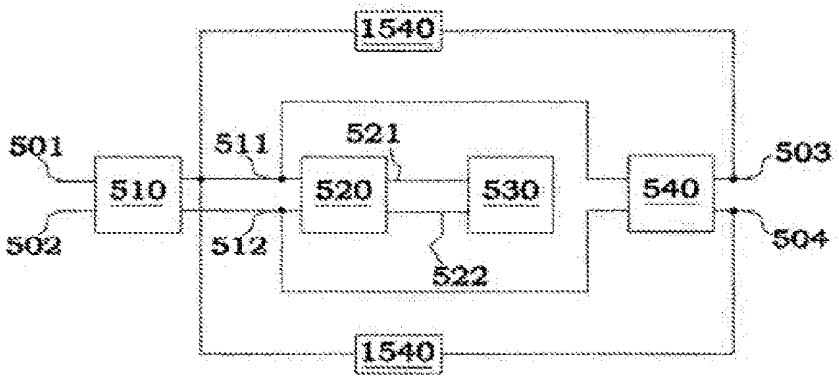

Fig. 59A

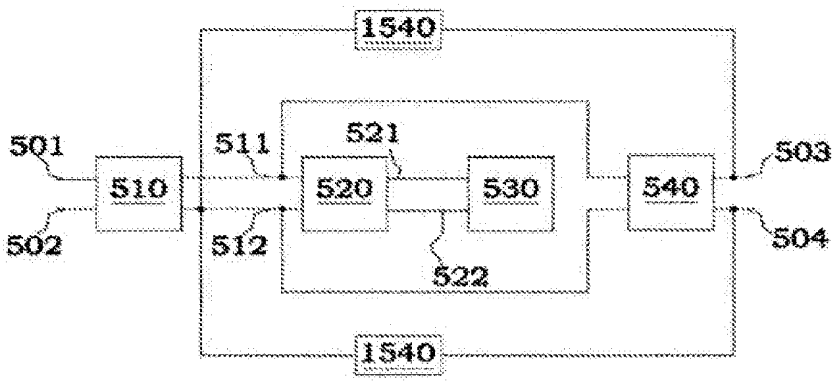

Fig. 59B

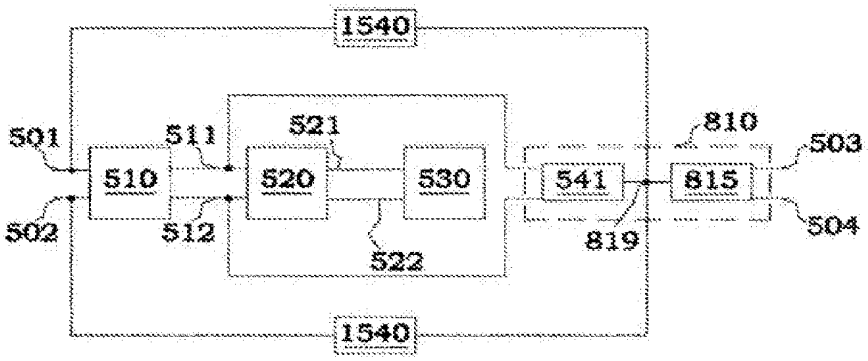

Fig. 59C

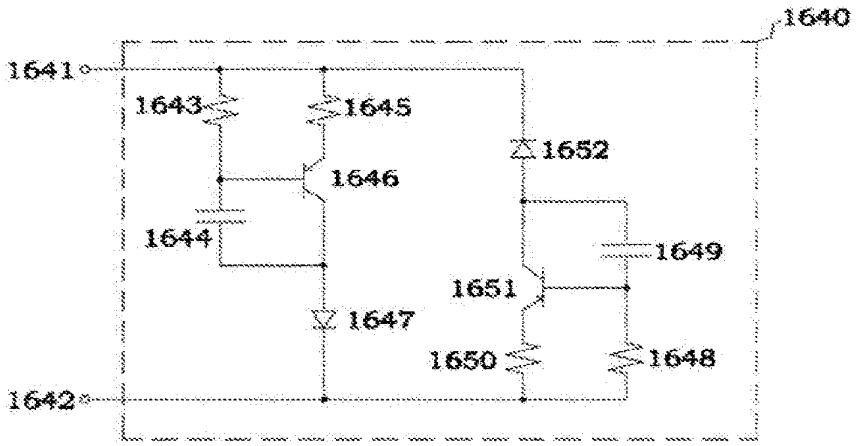

Fig. 59D

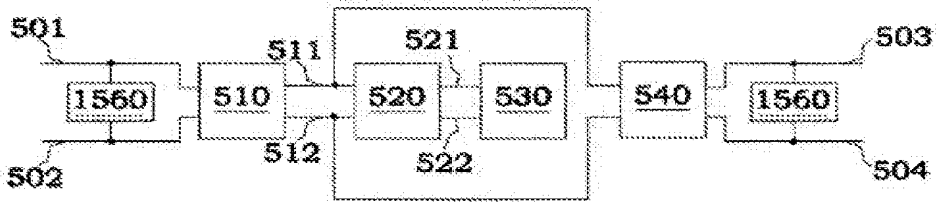

Fig. 60A

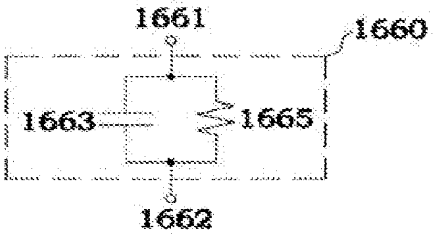

Fig. 60B

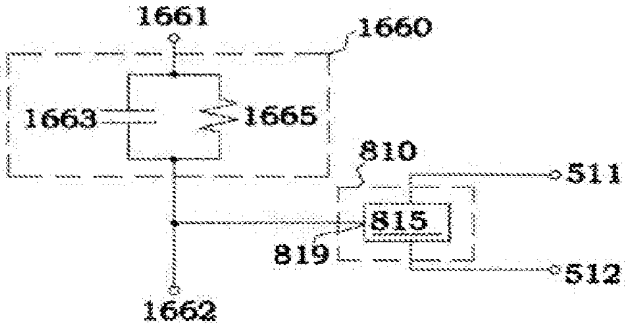

Fig. 60C

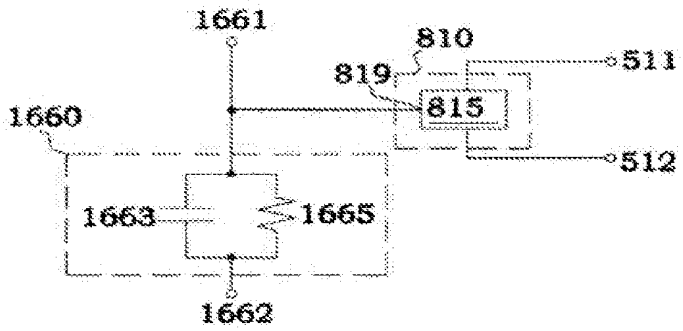

Fig. 60D

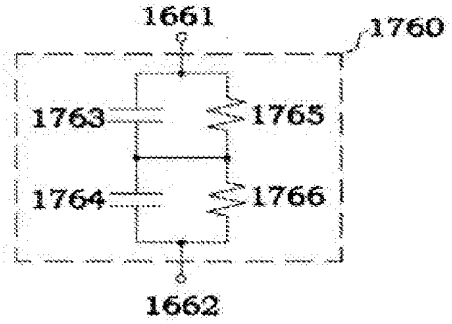

Fig. 60E

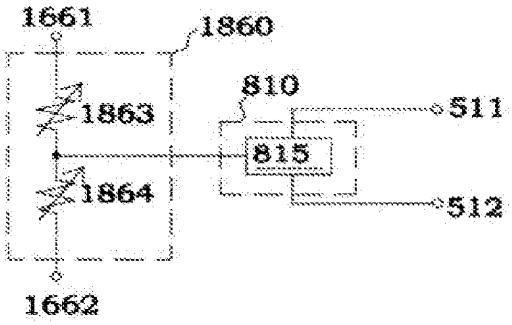

Fig. 60F

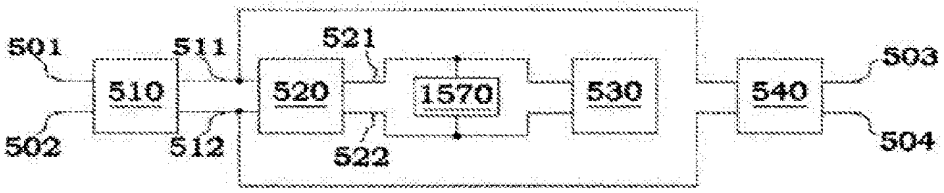

Fig. 61A

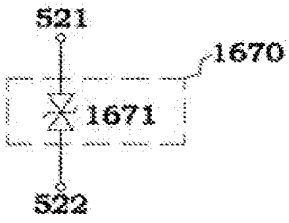

Fig. 61B

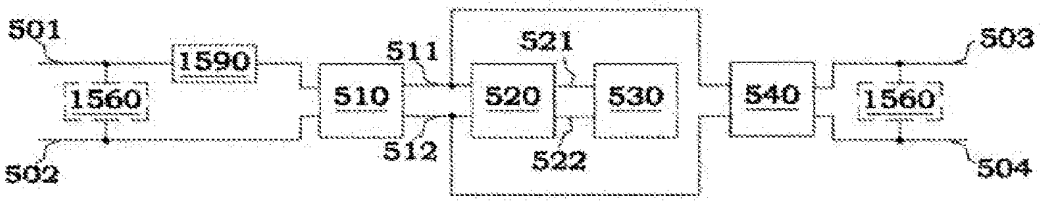

Fig. 62A

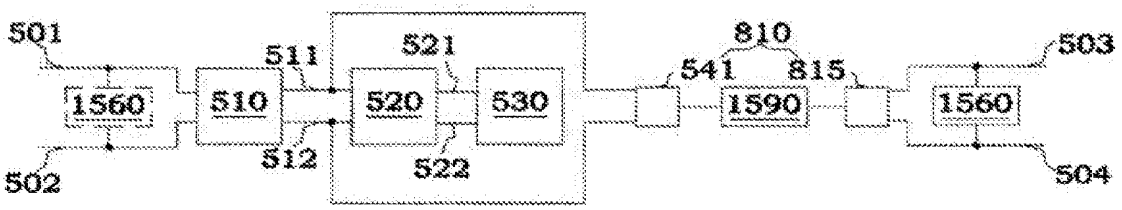

Fig. 62B

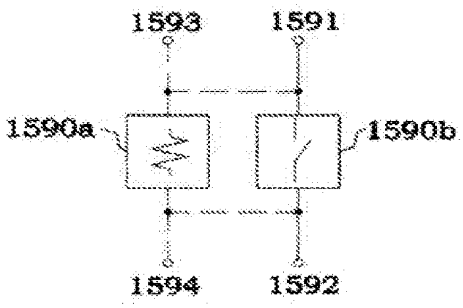

Fig. 62C

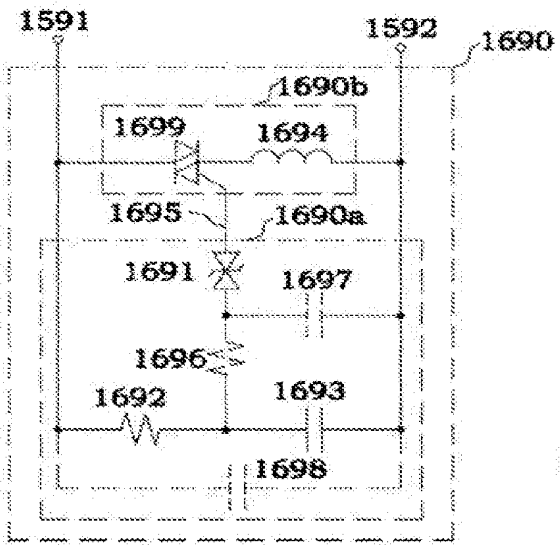

Fig. 62D

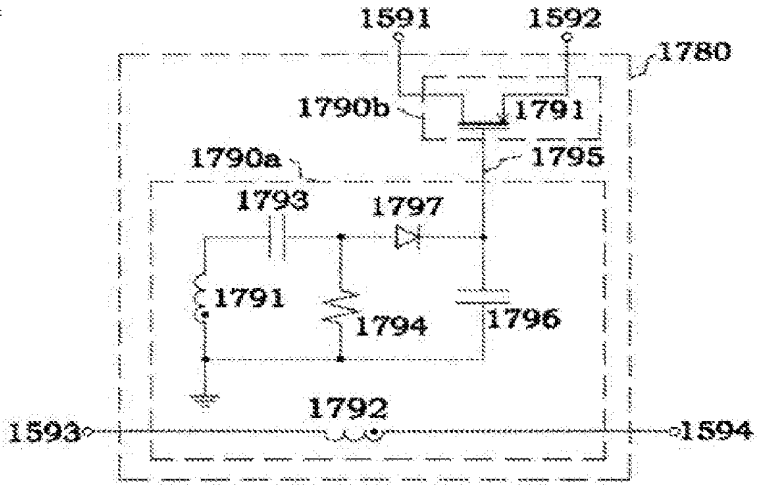

Fig. 62E

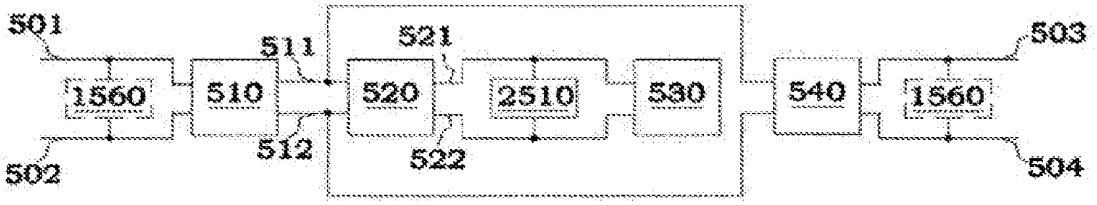

Fig. 63A

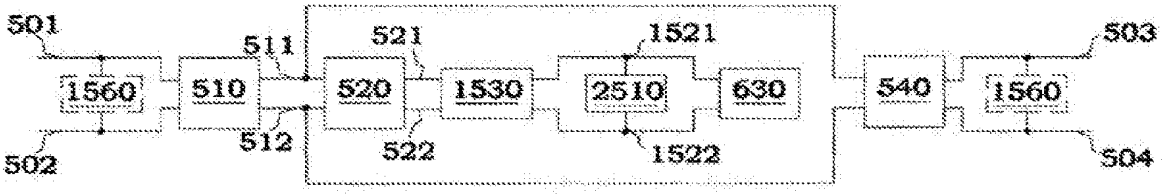

Fig. 63B

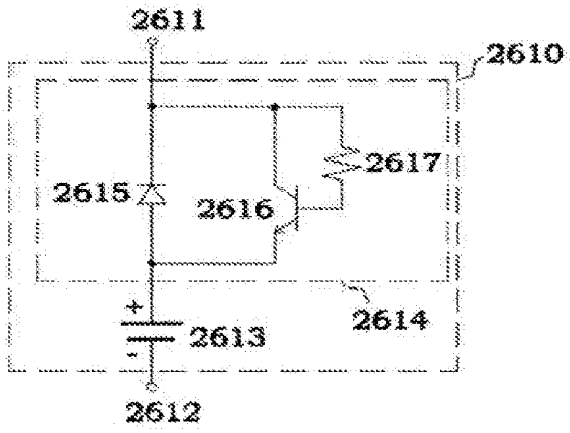

Fig. 63C

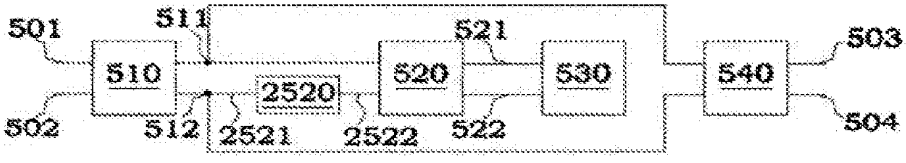

Fig. 64A

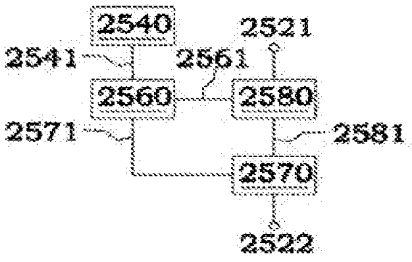

Fig. 64B

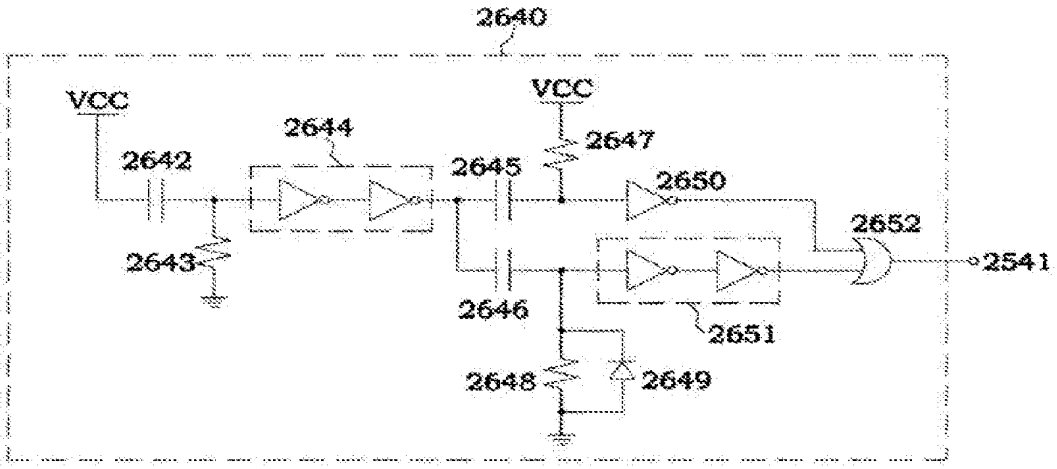

Fig. 64C

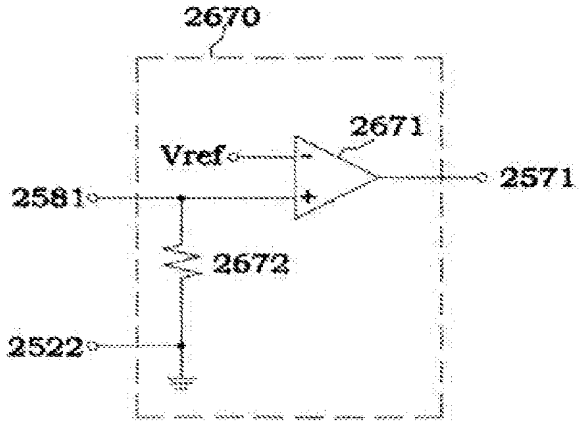

Fig. 64D

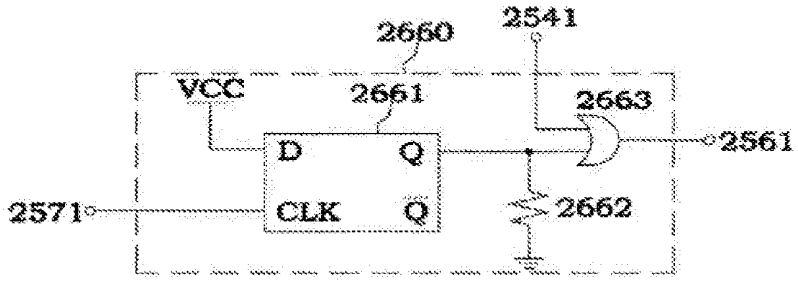

Fig. 64E

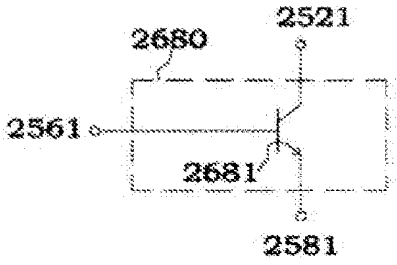

Fig. 64F

SCORE Placeholder Sheet for IFW Content

Application Number: 16838012 Document Date: 06/02/2021

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via DAV or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: LI-QIN LI
Serial Number: 16/838,012
Filed: April 1, 2020
Confirmation Number: 6416

Attorney Docket: S2003USUC01T
Group Art Unit: 2844
Examiner: TRAN, ANH Q

Title: LED TUBE LAMP

AMENDMENT PURSUANT TO RULE 312

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Dear Sir:

This Amendment is filed in response to the Notice of Allowance mailed by the Office Action on April 20, 2021, in which claims 1-45 were allowed. After reviewing the application and the drawings, Applicant noticed the application needed corrections to both the claims and the drawings.

Applicant called Examiner Anh Tran on April 28, 2021 and proposed that dependent claim 5 be amended to depend from claim 2 instead of claim 4; dependent claim 20 to depend from claim 17 instead of claim 19; and dependent claim 35 to depend from claim 32 instead of claim 34. Examiner Anh Tran agreed on the phone call to the above proposed claim

amendments. Further, Applicant believes that the claim amendments do not affect the substance of the application.

Amendments to the claims begin on page 3 of this Amendment.

Applicant also amended the drawings. A statement explaining the drawing amendments begins on page 14 of this Amendment.

Pursuant to Rule 312, applicant respectfully requests that the above application be amended as follows:

CLAIMS

The following is a listing of all claims in the application with their status and the text of all active claims.

1. (CURRENTLY AMENDED) An LED tube lamp, comprising:

a glass tube;

two end caps, each of the two end caps coupled to a respective end of the glass tube;

an LED light strip attached to an inner circumferential surface of the glass tube;

a plurality of LED light sources mounted on the LED light strip;

at least two first soldering pads arranged at an end of the LED light strip;

at least two notches are formed at an edge of the end of the LED light strip, each of the notches is further formed at one of the first soldering pads;

a protective layer disposed on a surface of the LED light strip, the protective layer comprising at least two first openings to expose the two first soldering pads; and

a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources, the printed circuit board comprising at least two second soldering pads, ~~each~~ one of the two first soldering pads soldered to one of the respective second soldering pads by a solder,

wherein the power supply module at least comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit, ~~ant~~ and the solder is disposed on one of the two first soldering pads, one of the ~~corresponding~~ respective second soldering pads and in one of the ~~corresponding~~ respective notches.

2. (ORIGINAL) The LED tube lamp as claimed in claim 1, wherein the protective layer further comprises a plurality of second openings thereon for disposing the plurality of LED light sources.

3. (ORIGINAL) The LED tube lamp as claimed in claim 2, wherein the protective layer further comprises a third opening adjacent to the two first openings.

4. (ORIGINAL) The LED tube lamp as claimed in claim 2, wherein the LED light strip comprises a recognizing mark arranged adjacent to the two first openings.

5. (CURRENTLY AMENDED) The LED tube lamp as claimed in claim ~~4~~ 2, wherein the glass tube comprises a diffusing layer coated on the inner circumferential surface of the glass tube.

6. (ORIGINAL) The LED tube lamp as claimed in claim 5, wherein the end of the LED light strip is detached from the inner circumferential surface of the glass tube and soldered on the printed circuit board.

7. (ORIGINAL) The LED tube lamp as claimed in claim 6, wherein the filtering circuit comprises:

a first capacitor, having an end coupled to a first output terminal of the rectifying circuit, and the other end coupled to a second output terminal of the rectifying circuit.

8. (ORIGINAL) The LED tube lamp as claimed in claim 7, wherein the filtering circuit further comprises:

an EMI-reducing capacitor, coupled between input terminals of the rectifying circuit.

9. (ORIGINAL) The LED tube lamp as claimed in claim 7, wherein the filtering circuit further comprises:

a first resistor, having an end coupled to a pin on one of the end caps; and

a second capacitor, having an end coupled to the other end of the first resistor, and the other end coupled to one of the input terminals of the rectifying circuit.

10. (ORIGINAL) The LED tube lamp as claimed in claim 9, wherein the filtering circuit further comprises:

a passive component, coupled to the second capacitor in parallel.

11. (ORIGINAL) The LED tube lamp as claimed in claim 10, wherein the passive component is an inductor.

12. (ORIGINAL) The LED tube lamp as claimed in claim 7, wherein the rectifying circuit comprises:

a first diode, having an anode connected to the second output terminal, and a cathode connected to a pin on one of the end caps;

a second diode, having an anode connected to the second output terminal, and a cathode connected to a pin on the other one of the end caps;

a third diode, having an anode connected to the pin on the one of the end caps, and a cathode connected to the first output terminal; and

a fourth diode, having an anode connected to the pin on the other one of the end caps, and a cathode connected to the first output terminal.

13. (ORIGINAL) The LED tube lamp as claimed in claim 12, wherein the rectifying circuit further comprises:

a terminal adapter circuit, coupled to the cathode of the first diode, the anode of the second diode and the pins on both of the end caps, and configured to transmit signal received from at least one of the pins to the cathode of the first diode and the anode of the second diode.

14. (ORIGINAL) The LED tube lamp as claimed in claim 13, wherein the terminal adapter circuit comprises:

a third capacitor, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a fourth capacitor, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the third capacitor.

15. (ORIGINAL) The LED tube lamp as claimed in claim 13, wherein the terminal adapter circuit comprises:

a first fuse, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a second fuse, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the first fuse.

16. (CURRENTLY AMENDED) An LED tube lamp, comprising:

a glass tube;

two end caps, each of the two end caps coupled to a respective end of the glass tube;

an LED light strip attached to an inner circumferential surface of the glass tube;

a plurality of LED light sources mounted on the LED light strip;

at least two first soldering pads arranged at one end of the LED light strip;

at least two through holes in the LED light strip, each of the two through holes penetrating the respective first soldering pad and the LED light strip;

a protective layer disposed on a surface of the LED light strip, the protective layer comprising at least two first opening to expose the two first soldering pads; and

a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources, the printed circuit board comprising at least two second soldering pads, ~~each~~ one of the two first soldering pads soldered to one of the respective second soldering pads by a solder,

wherein the power supply module at least comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit, and the solder is disposed on one of the two first soldering pads, one of the ~~corresponding~~ respective second soldering pads and in one of the ~~corresponding~~ respective through holes.

17. (ORIGINAL) The LED tube lamp as claimed in claim 16, wherein the protective layer further comprises a plurality of second openings thereon for disposing the plurality of LED light sources.

18. (ORIGINAL) The LED tube lamp as claimed in claim 17, wherein the protective layer further comprises a third opening adjacent to the two first openings.

19. (ORIGINAL) The LED tube lamp as claimed in claim 17, wherein the LED light strip comprises a recognizing mark arranged adjacent to the two first openings.

20. (CURRENTLY AMENDED) The LED tube lamp as claimed in claim ~~19~~ 17, wherein the glass tube comprises a diffusing layer coated on the inner circumferential surface of the glass tube.

21. (ORIGINAL) The LED tube lamp as claimed in claim 20, wherein the end of the LED light strip is detached from the inner circumferential surface of the glass tube and soldered on the printed circuit board.

22. (ORIGINAL) The LED tube lamp as claimed in claim 21, wherein the filtering circuit comprises:

a first capacitor, having an end coupled to a first output terminal of the rectifying circuit, and the other end coupled to a second output terminal of the rectifying circuit.

23. (ORIGINAL) The LED tube lamp as claimed in claim 22, wherein the filtering circuit further comprises:

an EMI-reducing capacitor, coupled between input terminals of the rectifying circuit.

24. (ORIGINAL) The LED tube lamp as claimed in claim 22, wherein the filtering circuit further comprises:

a first resistor, having an end coupled to a pin on one of the end caps; and

a second capacitor, having an end coupled to the other end of the first resistor, and the other end coupled to one of the input terminals of the rectifying circuit.

25. (ORIGINAL) The LED tube lamp as claimed in claim 24, wherein the filtering circuit further comprises:

a passive component, coupled to the second capacitor in parallel.

26. (ORIGINAL) The LED tube lamp as claimed in claim 25, wherein the passive component is an inductor.

27. (ORIGINAL) The LED tube lamp as claimed in claim 22, wherein the rectifying circuit comprises:

a first diode, having an anode connected to the second output terminal, and a cathode connected to a pin on one of the end caps;

a second diode, having an anode connected to the second output terminal, and a cathode connected to a pin on the other one of the end caps;

a third diode, having an anode connected to the pin on the one of the end caps, and a cathode connected to the first output terminal; and

a fourth diode, having an anode connected to the pin on the other one of the end caps, and a cathode connected to the first output terminal.

28. (ORIGINAL) The LED tube lamp as claimed in claim 27, wherein the rectifying circuit further comprises:

a terminal adapter circuit, coupled to the cathode of the first diode, the anode of the second diode and the pins on both of the end caps, and configured to transmit signal received from at least one of the pins to the cathode of the first diode and the anode of the second diode.

29. (ORIGINAL) The LED tube lamp as claimed in claim 28, wherein the terminal adapter circuit comprises:

a third capacitor, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a fourth capacitor, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the third capacitor.

30. (ORIGINAL) The LED tube lamp as claimed in claim 28, wherein the terminal adapter circuit comprises:

a first fuse, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a second fuse, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the first fuse.

31. (CURRENTLY AMENDED) An LED tube lamp, comprising:

a glass tube;

two end caps, each of the two end caps coupled to a respective end of the glass tube;

an LED light strip attached to an inner circumferential surface of the glass tube;

a plurality of LED light sources mounted on the LED light strip;

at least two first soldering pads arranged at one end of the LED light strip;

a protective layer disposed on a surface of the LED light strip, the protective layer comprising at least two first opening to expose the two first soldering pads; and

a power supply module comprising a printed circuit board and configured to drive the plurality of LED light sources, the printed circuit board comprising at least two second soldering pads, ~~each~~ one of the two first soldering pads soldered to one of the respective second soldering pads by a solder,

wherein the power supply module at least comprises a rectifying circuit and a filtering circuit coupled to the rectifying circuit, and the solder is disposed on one of the two first soldering pads

and one of the ~~corresponding~~ respective second soldering pads and covering an edge of the end of the LED light strip.

32. (ORIGINAL) The LED tube lamp as claimed in claim 31, wherein the protective layer further comprises a plurality of second openings thereon for disposing the plurality of LED light sources.

33. (ORIGINAL) The LED tube lamp as claimed in claim 32, wherein the protective layer further comprises a third opening adjacent to the two first openings.

34. (ORIGINAL) The LED tube lamp as claimed in claim 32, wherein the LED light strip comprises a recognizing mark arranged adjacent to the two first openings.

35. (CURRENTLY AMENDED) The LED tube lamp as claimed in claim ~~34~~ 32, wherein the glass tube comprises a diffusing layer coated on the inner circumferential surface of the glass tube.

36. (ORIGINAL) The LED tube lamp as claimed in claim 35, wherein the end of the LED light strip is detached from the inner circumferential surface of the glass tube and soldered on the printed circuit board.

37. (ORIGINAL) The LED tube lamp as claimed in claim 36, wherein the filtering circuit comprises:

a first capacitor, having an end coupled to a first output terminal of the rectifying circuit, and the other end coupled to a second output terminal of the rectifying circuit.

38. (ORIGINAL) The LED tube lamp as claimed in claim 37, wherein the filtering circuit further comprises:

an EMI-reducing capacitor, coupled between input terminals of the rectifying circuit.

39. (ORIGINAL) The LED tube lamp as claimed in claim 37, wherein the filtering circuit further comprises:

a first resistor, having an end coupled to a pin on one of the end caps; and

a second capacitor, having an end coupled to the other end of the first resistor, and the other end coupled to one of the input terminals of the rectifying circuit.

40. (ORIGINAL) The LED tube lamp as claimed in claim 39, wherein the filtering circuit further comprises:

a passive component, coupled to the second capacitor in parallel.

41. (ORIGINAL) The LED tube lamp as claimed in claim 40, wherein the passive component is an inductor.

42. (ORIGINAL) The LED tube lamp as claimed in claim 37, wherein the rectifying circuit comprises:

a first diode, having an anode connected to the second output terminal, and a cathode connected to a pin on one of the end caps;

a second diode, having an anode connected to the second output terminal, and a cathode connected to a pin on the other one of the end caps;

a third diode, having an anode connected to the pin on the one of the end caps, and a cathode connected to the first output terminal; and

a fourth diode, having an anode connected to the pin on the other one of the end caps, and a cathode connected to the first output terminal.

43. (ORIGINAL) The LED tube lamp as claimed in claim 42, wherein the rectifying circuit further comprises:

a terminal adapter circuit, coupled to the cathode of the first diode, the anode of the second diode and the pins on both of the end caps, and configured to transmit signal received from at least one of the pins to the cathode of the first diode and the anode of the second diode.

44. (ORIGINAL) The LED tube lamp as claimed in claim 43, wherein the terminal adapter circuit comprises:

a third capacitor, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a fourth capacitor, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the third capacitor.

45. (ORIGINAL) The LED tube lamp as claimed in claim 43, wherein the terminal adapter circuit comprises:

a first fuse, having an end connected to the pin on the other one of the end caps, and the other end connected to the cathode of the first diode and the anode of the second diode; and

a second fuse, having an end connected to the pin on the one of the end caps, and the other end connected to the other end of the first fuse.

DRAWINGS

A reference number next to a lead lines is missing in Fig. 31. In Fig. 31 previously omitted reference numbers has been added. Applicant has submitted replacement drawing sheets.

REMARKS

In the CLAIMS section, Applicant has amended claim 5 to depend from claim 2 instead of claim 4; amended claim 20 to depend from claim 17 instead of claim 19; and amended claim 35 to depend from claim 32 instead of claim 34. Additionally, claims 1, claim 16 and claim 31 were amended through proper word choice and punctuation to improve the clarity and understandability of the claim language.

Also, Applicant has amended the drawings in the attached sheets to add previously omitted reference number 2 in Fig. 31.

If the Examiner has any questions or would like to discuss this application further, Applicant's representative can be reached at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees with this paper, please charge the Deposit Account No. 602062. Please also credit any overpayments to said Deposit Account.

Date: June 02, 2021

Respectfully submitted,
By: /Simon Kuang Lu/
Simon Kuang Lu
Registration No. 51,974
1380 Charles Willard St.,
Carson, CA 90746
(650) 315-4468

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of Tao JIANG et al.

Attorney Docket: S20003USUC01T

Serial Number: 16/838,012

Group Art Unit: 2844

Filed: April 1, 2020

Examiner: TRAN, ANH Q

Confirmation Number: 6416

For: LED TUBE LAMP

REQUEST TO CHANGE INVENTORSHIP UNDER 37 C.F.R. 1.48(c) AND FOR CORRECTED FILING RECEIPT

Commissioner for Patents

P.O. Box 1450, Alexandria, VA 22313

Dear Sir or Madam,

Applicant hereby respectfully requests the change of inventorship in the above identified non-provisional application under 37 C.F.R. 1.48(c) and for an updated filing receipt.

Applicant submits with this filing a.) a marked version of updated ADS where the newly added inventor shall be inserted, b.) the fee of $640. To add timely the fifth inventor of Aiming XIONG is respectfully requested.

If any other deficiencies exist, please notify the Applicant in due course. The USPTO is directed and authorized to charge all required fees with this paper, please charge the

Deposit Account No. 602062. Please also credit any overpayments to said Deposit Account.

Date: June 02, 2021

Respectfully submitted,
By: /Simon Kuang Lu/
Simon Kuang Lu
Registration No. 51,974
1380 Charles Willard St.,
Carson, CA 90746
(650) 315-4468

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	LI-QIN		LI	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Jiaxing	Country of Residence	CN

Mailing Address of Inventor:

Address 1	No.1288 Jiachuang Rd. Xiuzhou Area
Address 2	Jiaxing City, Zhejiang, China

City	Jiaxing City	State/Province	
Postal Code		Country	CN

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	TAO		JIANG	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Jiaxing	Country of Residence	CN

Mailing Address of Inventor:

Address 1	No.1288 Jiachuang Rd. Xiuzhou Area
Address 2	Jiaxing City, Zhejiang, China

City	Jiaxing City	State/Province	
Postal Code		Country	CN

Inventor 3 Remove

Legal Name

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Prefix	Given Name	Middle Name	Family Name	Suffix
	CHANG		YANG	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Jiaxing	Country of Residence	CN

Mailing Address of Inventor:

Address 1	No.1288 Jiachuang Rd. Xiuzhou Area		
Address 2	Jiaxing City, Zhejiang, China		
City	Jiaxing City	**State/Province**	
Postal Code		**Country**	CN

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	BAO		WANG	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Jiaxing	Country of Residence	CN

Mailing Address of Inventor:

Address 1	No.1288 Jiachuang Rd. Xiuzhou Area		
Address 2	Jiaxing City, Zhejiang, China		
City	Jiaxing City	**State/Province**	
Postal Code		**Country**	CN

Inventor 5 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	AIMING		XIONG	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Jiaxing	Country of Residence	CN

Mailing Address of Inventor:

Address 1	No.1288 Jiachuang Rd. Xiuzhou Area		
Address 2	Jiaxing City, Zhejiang, China		
City	Jiaxing City	**State/Province**	
Postal Code		**Country**	CN

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	147274		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	LED TUBE LAMP		
Attorney Docket Number	S20003USUC01T	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	31	**Suggested Figure for Publication (if any)**	33

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	147274		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	16399004	2019-04-30

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16399004	Continuation of	16012320	2018-06-19	10295125	2019-05-21

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16012320	Continuation of	15441789	2017-02-24	10024503	2018-07-17

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15441789	Continuation of	14865387	2015-09-25	9609711	2017-03-28

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[j] (if applicable)
201410507660.9	CN	2014-09-28	
201410508899.8	CN	2014-09-28	
201410623355.6	CN	2014-11-06	
201410734425.5	CN	2014-12-05	
201510075925.7	CN	2015-02-12	
201510104823.3	CN	2015-03-10	
201510134586.5	CN	2015-03-26	
201510136796.8	CN	2015-03-27	
201510155807.7	CN	2015-04-03	
201510173861.4	CN	2015-04-14	
201510193980.6	CN	2015-04-22	
201510259151.3	CN	2015-05-19	

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[j] (if applicable)
201510268927.8	CN	2015-05-22	
201510338027.6	CN	2015-06-17	
201510364735.7	CN	2015-06-26	
201510372375.5	CN	2015-06-26	
201510373492.3	CN	2015-06-26	
201510378322.4	CN	2015-06-29	
201510391910.1	CN	2015-07-02	
201510406595.5	CN	2015-07-10	
201510428680.1	CN	2015-07-20	
201510482944.1	CN	2015-08-07	
201510483475.5	CN	2015-08-08	
201510486115.0	CN	2015-08-08	

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
201510555543.4	CN	2015-09-02	
201510557717.0	CN	2015-09-06	
201510595173.7	CN	2015-09-18	
201510133689.X	CN	2015-03-25	
201510284720.X	CN	2015-05-29	
201510315636.X	CN	2015-06-10	

Remove

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD		
Mailing Address Information For Applicant:			
Address 1	No.1288 Jiachuang Rd., Xiuzhou Area		
Address 2	Jiaxing City, Zhejiang, China		
City	Jiaxing	**State/Province**	
Country	CN	Postal Code	314031
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/SIMON KUANG LU/			Date (YYYY-MM-DD)	2020-04-01
First Name	SIMON KUANG	Last Name	LU	Registration Number	51,974

Additional Signature may be generated within this form by selecting the Add button.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	S20003USUC01T
	Application Number	
Title of Invention	LED TUBE LAMP	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

S20003USUC01T

COMBINED DECLARATION AND ASSIGNMENT

Title of Invention: LED TUBE LAMP

As a below named inventor, I hereby declare that:

This declaration is directed to:

(a) ☐ The attached U.S. non-provisional patent application, or

(b) ☒ was filed in the U.S. Patent & Trademark Office on 03-19-2020 and assigned Serial No.: 16/838,012 and was amended on 04-01-2020 (if applicable).

(c) ☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____ (if any).

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD of No.1288 Jiachuang Rd, Xiuzhou Area, Jiaxing, Zhejiang, China, its heirs, successors, legal representatives and assigns (hereinafter designated as the Assignee) is desirous of acquiring the entire right, title and interest in and to said invention and in and to any Letters Patent(s) that may be granted therefor in the United States of America and ☐ in any foreign countries.

NOW, THEREFORE, in consideration of the sum of Ten Dollars ($10.00) to the undersigned in hand paid, the receipt of which is hereby acknowledged, and other good and valuable consideration, the undersigned has (have) sold, assigned and transferred,

and by these presents does sell, assign and transfer unto said Assignee the full and exclusive right to the said invention in the United States of America, its territories, dependencies and possessions and the entire right, title and interest in and to any and all Letters Patent(s) which may be granted therefor in the United States of America, its territories, dependencies and possessions, and if the box above is designated, in any and all foreign countries; and to any and all divisions, reissues, continuations, conversions and extensions thereof for the full term or terms for which the same may be granted.

The undersigned agree(s) to execute all papers necessary in connection with this application and any continuing, divisional, conversion or reissue applications thereof and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

The undersigned agree(s) to execute all papers necessary in connection with any interference which may be declared concerning this application or continuation, division, conversion or reissue thereof or Letter Patent(s) or reissue patent issued thereon and to cooperate with the Assignee in every way possible in obtaining and producing evidence and proceeding with such interference.

The undersigned agree(s) to execute all papers and documents and to perform any act which may be necessary in connection with claims or provisions of the International Convention for the Protection of Industrial Property or similar agreements.

The undersigned agree(s) to perform all affirmative acts which may be necessary to obtain a grant of a valid United States of America patent(s) or a grant of a valid United States of America and any foreign patent(s) to the Assignee and to vest all rights therein hereby conveyed to said Assignee as fully and entirely as the same would have been held by the undersigned if this Assignment and sale had not been made.

The undersigned hereby authorize(s) and request(s) the Patent and Trademark Office Officials in the United States of America and in any foreign countries to issue any and all Letters Patents resulting from said application or any continuing, divisional, conversion or reissue applications thereof to the said Assignee, as Assignee of the entire interest, and hereby covenants that he has (they have) the full right to convey the entire interest herein assigned, and that he has (they have) not executed, and will not execute, any agreement in conflict herewith.

The undersigned hereby covenant(s) that no assignment, sale, agreement or encumbrance has been or will be made or entered into which would conflict with this assignment.

In witness whereof, executed by the undersigned on the date(s) opposite the undersigned name(s).

LEGAL NAME AND SIGNATURES OF INVENTOR(S)/ ASSIGNOR(S):

LEGAL NAME OF FIRST INVENTOR/ ASSIGNOR	Family Name	Given Name
	XIONG	Aiming
SIGNATURE: Xiong, Aiming DATE: 2021/5/8		

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/838,012	04/01/2020	LI-QIN LI	S20003USUC01T

CONFIRMATION NO. 6416

147274
Jiaxing Super Lighting Electric Appliance Co., Ltd
IP Department
No. 1288 Jiachuang Road, Xiuzhou Area
Jiaxing, Zhejiang
Jiaxing City, 314031
CHINA

37 CFR 1.48 ACKNOWLEDGEMENT LETTER

OC000000126069465

Date Mailed: 06/04/2021

NOTICE OF ACCEPTANCE OF REQUEST UNDER 37 CFR 1.48(a)

This is in response to the applicant's request under 37 CFR 1.48(a) submitted on 06/02/2021.

The request under 37 CFR 1.48(a) to correct the inventorship, to correct or update the name of an inventor, or to correct the order of names of joint inventors is accepted.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/rmohamed/

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT6744635

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
AIMING XIONG	05/08/2021

RECEIVING PARTY DATA

Name:	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD
Street Address:	NO. 1288 JIACHUANG RD., XIUZHOU AREA, ZHEJIANG
City:	JIAXING
State/Country:	CHINA
Postal Code:	314031

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	16838012

CORRESPONDENCE DATA

Fax Number:

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 6503154468
Email: jin@atipm.com
Correspondent Name: SIMON KUANG LU
Address Line 1: 1380 CHARLES WILLARD ST.
Address Line 4: CARSON, CALIFORNIA 90746

ATTORNEY DOCKET NUMBER:	S20003USUC01T
NAME OF SUBMITTER:	SIMON KUANG LU
SIGNATURE:	/Simon Kuang Lu/
DATE SIGNED:	06/04/2021
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 3
source=Declaration_Assignment_Xiong_S20003USUC01T#page1.tif
source=Declaration_Assignment_Xiong_S20003USUC01T#page2.tif
source=Declaration_Assignment_Xiong_S20003USUC01T#page3.tif

COMBINED DECLARATION AND ASSIGNMENT

Title of Invention: LED TUBE LAMP

As a below named inventor, I hereby declare that:

This declaration is directed to:

(a) ☐ The attached U.S. non-provisional patent application, or

(b) ☒ was filed in the U.S. Patent & Trademark Office on 03-19-2020 and assigned Serial No.: 16/838,012 and was amended on 04-01-2020 (if applicable).

(c) ☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____ (if any).

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD of No.1288 Jiachuang Rd. Xiuzhou Area, Jiaxing, Zhejiang, China, its heirs, successors, legal representatives and assigns (hereinafter designated as the Assignee) is desirous of acquiring the entire right, title and interest in and to said invention and in and to any Letters Patent(s) that may be granted therefor in the United States of America and ☐ in any foreign countries.

NOW, THEREFORE, in consideration of the sum of Ten Dollars ($10.00) to the undersigned in hand paid, the receipt of which is hereby acknowledged, and other good and valuable consideration, the undersigned has (have) sold, assigned and transferred,

and by these presents does sell, assign and transfer unto said Assignee the full and exclusive right to the said invention in the United States of America, its territories, dependencies and possessions and the entire right, title and interest in and to any and all Letters Patent(s) which may be granted therefor in the United States of America, its territories, dependencies and possessions, and if the box above is designated, in any and all foreign countries; and to any and all divisions, reissues, continuations, conversions and extensions thereof for the full term or terms for which the same may be granted.

The undersigned agree(s) to execute all papers necessary in connection with this application and any continuing, divisional, conversion or reissue applications thereof and also to execute separate assignments in connection with such applications as the Assignee may deem necessary or expedient.

The undersigned agree(s) to execute all papers necessary in connection with any interference which may be declared concerning this application or continuation, division, conversion or reissue thereof or Letter Patent(s) or reissue patent issued thereon and to cooperate with the Assignee in every way possible in obtaining and producing evidence and proceeding with such interference.

The undersigned agree(s) to execute all papers and documents and to perform any act which may be necessary in connection with claims or provisions of the International Convention for the Protection of Industrial Property or similar agreements.

The undersigned agree(s) to perform all affirmative acts which may be necessary to obtain a grant of a valid United States of America patent(s) or a grant of a valid United States of America and any foreign patent(s) to the Assignee and to vest all rights therein hereby conveyed to said Assignee as fully and entirely as the same would have been held by the undersigned if this Assignment and sale had not been made.

The undersigned hereby authorize(s) and request(s) the Patent and Trademark Office Officials in the United States of America and in any foreign countries to issue any and all Letters Patents resulting from said application or any continuing, divisional, conversion or reissue applications thereof to the said Assignee, as Assignee of the entire interest, and hereby covenants that he has (they have) the full right to convey the entire interest herein assigned, and that he has (they have) not executed, and will not execute, any agreement in conflict herewith.

The undersigned hereby covenant(s) that no assignment, sale, agreement or encumbrance has been or will be made or entered into which would conflict with this assignment.

In witness whereof, executed by the undersigned on the date(s) opposite the undersigned name(s).

LEGAL NAME AND SIGNATURES OF INVENTOR(S)/ ASSIGNOR(S):

LEGAL NAME OF FIRST INVENTOR/ ASSIGNOR	Family Name	Given Name
	XIONG	Aiming
SIGNATURE: Xiong, Aiming DATE: 2021/5/8		

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7806541	B2	2010-10-05	Josef Andreas Schug et al.	
	2	8143803	B2	2012-03-27	Marcel Beij et al.	
	3	9791139	B2	2017-10-17	Martinus Hermanus Wilhelmus Maria Van Delden et al	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20160174329	A1	2016-06-16	Borong SU et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

If you wish to add additional Foreign Patent Document citation information please click the Add button			Add
NON-PATENT LITERATURE DOCUMENTS			Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		
If you wish to add additional non-patent literature document citation information please click the Add button			Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	16838012
	Filing Date	2020-04-01
	First Named Inventor	LI-QIN LI
	Art Unit	2844
	Examiner Name	TRAN, ANH Q
	Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

X See attached certification statement.

X The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2021-07-01
Name/Print	Simon Kuang Lu	Registration Number	51,974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/838,012	04/01/2020	LI-QIN LI	S20003USUC01T	6416

147274 7590 07/14/2021

Jiaxing Super Lighting Electric Appliance Co., Ltd
IP Department
No. 1288 Jiachuang Road, Xiuzhou Area
Jiaxing, Zhejiang
Jiaxing City, 314031
CHINA

EXAMINER	
TRAN, ANH Q	

ART UNIT	PAPER NUMBER
2844	

NOTIFICATION DATE	DELIVERY MODE
07/14/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jin@atipm.com
sl-ip@super-lamps.com

Corrected ***Notice of Allowability***	**Application No.** 16/838,012	**Applicant(s)** LI et al.	
	Examiner ANH Q TRAN	**Art Unit** 2844	**AIA (FITF) Status** Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☐ The allowed claim(s) is/are _____ . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/ANH Q TRAN/ Primary Examiner, Art Unit 2844	7/9/21

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7806541	B2	2010-10-05	Josef Andreas Schug et al.	
	2	8143803	B2	2012-03-27	Marcel Beij et al.	
	3	9791139	B2	2017-10-17	Martinus Hermanus Wilhelmus Maria Van Delden et al	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20160174329	A1	2016-06-16	Borong SU et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

If you wish to add additional Foreign Patent Document citation information please click the Add button [Add]

NON-PATENT LITERATURE DOCUMENTS [Remove]

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		

If you wish to add additional non-patent literature document citation information please click the Add button [Add]

EXAMINER SIGNATURE

Examiner Signature	/ANH Q TRAN/	Date Considered	07/09/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

X See attached certification statement.

X The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Simon Kuang Lu/	Date (YYYY-MM-DD)	2021-07-01
Name/Print	Simon Kuang Lu	Registration Number	51,974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

EFS Web 2.1.17

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

Change(s) applied to document, /Q.N./ 4/30/2021

	58	20170094746	A1	2017-03-30	Xiong et al. ~~JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO, LTD~~	
	59	20120051039	A1	2012-03-01	CHANG SHAO HAN	
	60	20170059096	A1	2017-03-02	HONG XU et al.	
	61	20130215609	A1	2013-08-22	LIU, CHUN-CHEN et al.	
	62	2016034141	A1	2016-11-24	Tao Jiang	
	63	20050162101	A1	2005-07-28	LEONG SUSAN J. et al.	
	64	20150077001	A1	2015-03-19	TAKAHASHI AKIRA et al.	
	65	20100188001	A1	2010-07-29	BROITZMAN TROY RICHARD et al.	
	66	20130003346	A1	2013-01-03	Letoquin et al. ~~CREE, INC.~~	
	67	20120299501	A1	2012-11-29	Kost et al. ~~KONINKLIJKE PHILIPS N.V.~~	
	68	20100102729	A1	2010-04-29	KATZIR WESLEY et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7380961	B2	2008-06-03	~~MORIYAMA SANGYO KABUSHIKI KAISHA~~ Moriyama, et al.	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

Change(s) applied to document, /D.M./ 4/30/2021

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20120248986	A1	2012-10-04	GIBBS DUANE	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	2013254667	JP	A	2013-12-19	MITSUBISHI ELEC LIGHTING CORP		☒
	2	2014117435	WO	A1	2014-08-07	CHEN YUAN HSING YEH CO LTD		☒
	3	204573684	CN	U	2015-08-19	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS

Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9775215	B2	2017-09-26	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD	Xiong, et al.

Change(s) applied to document, /D.M./ 4/28/2020

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS

Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20130320869	A1	2013-12-05	KONINKLIJKE PHILIPS N.V. Jans, et al.	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS

Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	102932997	CN	B	2014-08-27	ZHEJIANG HENGMAN PHOTOELECTRIC TECHNOLOGY CO LTD		☒
	2	200965185	CN	Y	2007-10-24	YAOHAN LIU		☒
	3	103016984	CN	A	2013-04-03	ZHANG JING		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	102	20130127327	A1	2013-05-23	~~PHILIPS LIGHTING HOLDING B. V.~~ Heil, et al.	
Change(s) applied to document, /D.M./ 4/30/2021	103	20120181952	A1	2012-07-19	ROEER NORBERT	
	104	20120212951	A1	2012-08-23	Chung-Ming, Lai et al.	
	105	20100124054	A1	2010-05-20	~~TAIWAN RODAN CO., LTD.~~ Chen, et al.	
	106	20130313983	A1	2013-11-28	~~PHILIPS LIGHTING HOLDING B. V.~~ Radermacher	
	107	20160316533	A1	2016-10-27	~~LIGHTEL TECHNOLOGIES, INC.~~ Hsia	
	108	20170105263	A1	2017-04-13	~~JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO, LTD~~ Xiong, et al.	
	109	20140153231	A1	2014-06-05	~~OSRAM GMBH~~ Bittmann	
	110	20130293098	A1	2013-11-07	LI, YI-QUN et al.	
	111	20130033881	A1	2013-02-07	~~SHARP KABUSHIKI KAISHA~~ Terazawa, et al.	
	112	20110228526	A1	2011-09-22	~~TEKNOWARE OY~~ Hartikka, et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	91	20140192526	A1	2014-07-10	~~NINGBO FUTAI ELECTRIC LIMITED~~ Qiu	
Change(s) applied to document, /D.M./ 4/30/2021	92	20090159919	A1	2009-06-25	~~ALTAIR ENGINEERING, INC.~~ Simon, et al.	
	93	20130223053	A1	2013-08-29	~~VERTICIL ELECTRONICS CORPORATION~~ Liu, et al.	
	94	20130335959	A1	2013-12-19	~~LIGHTEL TECHNOLOGIES INC.~~ Hsia, et al.	
	95	20090160369	A1	2009-06-25	~~CYPRESS SEMICONDUCTOR CORP.~~ Godbole, et al.	
	96	20130135857	A1	2013-05-30	CHEN, CHIA-CHIN et al.	
	97	20160381760	A1	2016-12-29	~~JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO, LTD~~ Xiong, et al.	
	98	20130229104	A1	2013-09-05	GREEN, ADAM et al.	
	99	20080290814	A1	2008-11-27	Susan J. Leong & John Kit	
	100	20160091147	A1	2016-03-31	~~JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD~~ Jiang, et al.	
	101	20120049684	A1	2012-03-01	~~AVANTIS LTD.~~ Bodenstein, et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

	80	20120069556	A1	2012-03-22	Bertram, et al. ~~OSRAM GMBH~~	
Change(s) applied to document, /D.M./ 4/30/2021	81	20150176770	A1	2015-06-25	Wilcox, et al. ~~Cree, Inc~~.	
	82	20150173138	A1	2015-06-18	Roberts ~~GENERAL ELECTRIC~~	
	83	20130235570	A1	2013-09-12	HOOD, WILLIAM et al.	
	84	20160081147	A1	2016-03-17	GUANG LUO HUA	
	85	20140306599	A1	2014-10-16	EDWARDS CHARLES et al.	
	86	20160113091	A1	2016-04-21	TAO HAIMIN	
	87	20140185269	A1	2014-07-03	Li ~~INTEMATIX CORPORATION~~	
	88	20110149563	A1	2011-06-23	Hsia, et al. ~~LIGHTEL TECHNOLOGIES INC~~	
	89	20140203717	A1	2014-07-24	Zhang ~~CREE, INC~~	
	90	20110176297	A1	2011-07-21	Hsia, et al. ~~LIGHTEL TECHNOLOGIES INC~~	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

	69	20120162965	A1	2012-06-28	~~PANASONIC INTELLECTUAL PROPERTY MANAGEMENT CO., L~~ Takeuchi, et al.	
Change(s) applied to document, /D.M./ 4/30/2021	70	20190137047	A1	2019-05-09	~~SUZHOU INDUSTRIAL PARK HEXIN CLEAN ELECTRIC APPLI~~ Hu	
	71	20110305021	A1	2011-12-15	~~Chao-Han Chang~~ Xin	
	72	20130021809	A1	2013-01-24	~~OSRAM GMBH~~ Dellian, et al.	
	73	20130033888	A1	2013-02-07	~~KONINKLIJKE PHILIPS ELECTRONICS N V~~ Van Der Wel, et al.	
	74	20140009923	A1	2014-01-09	~~FIN-CORE CORPORATION & TONG HONG INVESTMENT CO., L~~ Wu, et al.	
	75	20130250565	A1	2013-09-26	~~DELTA ELECTRONICS, INC~~ Chiang, et al.	
	76	20100066230	A1	2010-03-18	Kuo-Len LIN et al.	
	77	20100220469	A1	2010-09-02	~~ILUMISYS, INC.~~ Ivey, et al.	
	78	20130182425	A1	2013-07-18	~~PANASONIC INTELLECTUAL PROPERTY MANAGEMENT CO., LT~~ Seki, et al.	
	79	20100181925	A1	2010-07-22	~~ILUMISYS, INC.~~ Ivey, et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	47	20100135009	A1	2010-06-03	Duncan, et al. ~~SAMSUNG ELECTRONICS CO., LTD.~~	
Change(s) applied to document, /D.M./ 4/30/2021	48	20090040415	A1	2009-02-12	Kim ~~SAMSUNG DISPLAY CO., LTD.~~	
	49	20110175536	A1	2011-07-21	Fujita, et al. ~~IRIS OHYAMA INC.~~	
	50	20110121756	A1	2011-05-26	Thomas, et al. ~~ELECTRALED INC.~~	
	51	20110084627	A1	2011-04-14	Sloan, et al. ~~THE SLOAN COMPANY, INC. DBA SLOANLED~~	
	52	20140265899	A1	2014-09-18	SADWICK LAURENCE P	
	53	20130141890	A1	2013-06-06	STEVEN W. CARLIN et al.	
	54	20050185396	A1	2005-08-25	KUTLER MURRAY	
	55	20110043127	A1	2011-02-24	YAMASAKI SHIGEAKI	
	56	20170290119	A1	2017-10-05	XIONG AIMING et al.	
	57	20150070885	A1	2015-03-12	PETRO, ALFRED et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	36	20160286621	A1	2016-09-29	~~PHILIPS LIGHTING HOLDING B.V.~~ Tao, et al.	
Change(s) applied to document, /D.M./ 4/30/2021	37	20170318678	A1	2017-11-02	Chris Wh MIAO et al.	
	38	20110057572	A1	2011-03-10	~~RENOVO LIGHTING, L.L.C.~~ Kit, et al.	
	39	20140239834	A1	2014-08-28	CHOI JAEYOUNG et al.	
	40	20120313540	A1	2012-12-13	LIN CHUNG JYH et al.	
	41	20160369952	A1	2016-12-22	Weekamp ~~SIGNIFY HOLDING B.V.~~	
	42	20170089530	A1	2017-03-30	Jiang ~~JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LT~~	
	43	20040095078	A1	2004-05-20	LEONG SUSAN J	
	44	20070001709	A1	2007-01-04	SHEN YU-NUNG	
	45	20120319150	A1	2012-12-20	Shimomura, et al. ~~Kabushiki Kaisha Toshiba~~	
	46	20070267976	A1	2007-11-22	Bohler, et al. ~~CELCORE LLC~~	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	14	20110279063	A1	2011-11-17	~~ORION ENERGY SYSTEMS, INC.~~ Wang, et al.	
Change(s) applied to document, /D.M./ 4/30/2021	15	20160341414	A1	2016-11-24	Tao Jiang	
	16	20050162850	A1	2005-07-28	LUK JOHN F. & ALTMAN ROBERT M.	
	17	20140225519	A1	2014-08-14	~~POESEN ELECTRONIC CO., LTD.~~ Yu, et al.	
	18	20120146503	A1	2012-06-14	~~CREE Inc.~~ Negley, et al.	
	19	20130301255	A1	2013-11-14	~~Lumirich Co., Ltd.~~ Kim, et al.	
	20	20050281030	A1	2005-12-22	LEONG SUSAN J	
	21	20140062320	A1	2014-03-06	~~RICOH COMPANY, LTD.~~ Urano, et al.	
	22	20100253226	A1	2010-10-07	OKI ISAMU	
	23	20150345755	A1	2015-12-03	PURDY STEVEN	
	24	20120026761	A1	2012-02-02	YOUNG JAMES ROY	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

Change(s) applied to document, /D.M./ 4/30/2021

	3	20150195889	A1	2015-07-09	Chou, et al. ~~DELTA ELECTRONICS~~	
	4	20140035463	A1	2014-02-06	Miyamichi ~~M-SYSTEMS CO.,LTD.,~~	
	5	20140331532	A1	2014-11-13	Deppiesse ~~ALMAX MFG CORP~~	
	6	20120248989	A1	2012-10-04	IKAMI SEISHI	
	7	20110084608	A1	2011-04-14	Lin, et al. ~~VO CONTROLS CORPORATION~~	
	8	20140117853	A1	2014-05-01	Miyamichi ~~M-SYSTEMS CO.,LTD.,~~	
	9	20100201269	A1	2010-08-12	Tzou, et al. ~~LEXTAR ELECTRONICS CORP.~~	
	10	20150366008	A1	2015-12-17	Barnetson, et al. ~~LUNERA LIGHTING, INC.~~	
	11	20080055894	A1	2008-03-06	DENG JIA H. et al.	
	12	20160178137	A1	2016-06-23	Jiang ~~JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LTD~~	
	13	20040189218	A1	2004-09-30	LEONG SUSAN J., et al	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

Change(s) applied to document, /D.M./ 4/30/2021

	42	8796943	B2	2014-08-05	Miyamichi ~~M-SYSTEM CO., LTD.~~	
	43	7594738	B1	2009-09-29	Lin, et al. ~~KITAGAWA HOLDINGS, LLC~~	
	44	9016890	B2	2015-04-28	KIM KYUNG RYE et al.	
	45	6762562	B2	2004-07-13	Leong ~~PHILIPS LIGHTING HOLDING B. V~~	
	46	5964518	A	1999-10-12	YA-KUANG SHEN	
	47	9810384	B2	2017-11-07	Zhang Yingchun	
	48	7380961	B2	2008-06-03	MORIYAMA SANGYO KABUSHIKI KAISHA	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20120300445	A1	2012-11-29	Chu, et al. ~~OT BIOMESCILT LIGHT LIMITED~~	
	2	20130050998	A1	2013-02-28	Chu, et al. ~~OT BIOMESCILT LIGHT~~	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	31	9989200	B2	2018-06-05	Zhang Yingchun	
	32	6853151	B2	2005-02-08	Leong, et al. ~~PHILIPS LIGHTING HOLDING B. V~~	
Change(s) applied to document, /D.M./ 4/30/2021	33	7611260	B1	2009-11-03	Kuo-Len LIN et al.	
	34	7067992	B2	2006-06-27	Leong, et al. ~~PHILIPS LIGHTING HOLDING B. V~~	
	35	7482059	B2	2009-01-27	Peng, et al. ~~SAMSUNG ELECTRONICS CO., LTD~~	
	36	9625137	B2	2017-04-18	Li-Qin, Li et al.	
	37	8870415	B2	2014-10-28	Ivey ~~Lumysia, Inc.~~	
	38	9210774	B2	2015-12-08	~~ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUT~~	Kim, et al.
	39	9322531	B2	2016-04-26	Chun-wei Liang et al.	
	40	8729809	B2	2014-05-20	Kit, et al. ~~DENOVO LIGHTING, L.L.C.~~	
	41	9629216	B2	2017-04-18	Jiang, et al. ~~Jiaxing Super Lighting Electric Applicance Co., Ltd~~	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	20	9488767	B2	2016-11-08	Dante P. Nava et al.	
	21	8240875	B2	2012-08-14	Roberts, et al. ~~Cree, Inc.~~	
Change(s) applied to document, /D.M./ 4/30/2021	22	10021742	B2	2018-07-10	Tao JIANG	
	23	9756698	B2	2017-09-05	XIONG, AIMING et al.	
	24	9629215	B2	2017-04-18	Xiong, et al. ~~Jiaxing Super Lighting Electric Appliance Co. Ltd~~	
	25	6246167	B1	2001-06-12	SICA, MICHAEL F.	
	26	10161569	B2	2018-12-25	XU HONG et al.	
	27	9000668	B2	2015-04-07	Qiu ~~Ningbo Futai Electric Limited~~	
	28	9820341	B2	2017-11-14	Aiming Xiong et al.	
	29	6118072	A	2000-09-12	Scott ~~TELEDYNE TECHNOLOGIES INCORP~~	
	30	9885449	B2	2018-02-06	Jiang ~~JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD~~	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2020-04-01
	First Named Inventor	Tao JIANG
	Art Unit	
	Examiner Name	
	Attorney Docket Number	S20003USUC01T

	9	9864438	B2	2018-01-09	SEO JOON KYU et al.	
	10	9445463	B2	2016-09-13	Choi, et al. ~~HIDEEP INC.~~	
Change(s) applied to document, /D.M./ 4/30/2021	11	8360599	B2	2013-01-29	Ivey, et al. ~~Numieye, Inc.~~	
	12	7067032	B1	2006-06-27	Bremont, et al. ~~A RAYMOND & CIE~~	
	13	9609711	B2	2017-03-28	Jiang, et al. ~~Jiaxing Super Lighting Electric Applicance Co.~~, Ltd	
	14	9448660	B2	2016-09-20	SEO JOON KYU et al.	
	15	9228727	B2	2016-01-05	MAY, MICHAEL, W.	
	16	9526133	B2	2016-12-20	Tao, et al. ~~PHILIPS LIGHTING HOLDING B. V.~~	
	17	8456075	B2	2013-06-04	Axelsson ~~AURALIGHT INTERNATIONAL AB~~	
	18	1088142	A	1914-02-24	GARDNER JESSE O	
	19	8896207	B2	2014-11-25	Thomas, et al. ~~ELECTRALED INC.~~	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	10288272	B2	2019-05-14	ZHEJIANG SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	Yao, et al.
Change(s) applied to document, /D.M./ 4/30/2021	2	9288867	B2	2016-03-15	LIGHTEL TECHNOLOGIES INC	Hsia, et al.
	3	9794990	B2	2017-10-17	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD	Ye, et al.
	4	10208898	B2	2019-02-19	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	Xiong, et al.
	5	9360188	B2	2016-06-07	IDEAL INDUSTRIES, LLC	Kircher, et al.
	6	7399429	B2	2008-07-15	SAMSUNG ELECTRONICS CO., LTD	Lee, et al.
	7	9723662	B2	2017-08-01	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD	Ye, et al.
	8	7815338	B2	2010-10-19	Dennis Siemiet et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	16838012
Filing Date	2020-04-01
First Named Inventor	LI-QIN LI
Art Unit	2844
Examiner Name	TRAN, ANH Q
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	10161569	B2	2018 ~~2020~~-12-25	Xu et al.	
Change(s) applied to document, /D.M./ 4/30/2021	2	10560989	B2	2020-02-11	Tao Jiang et al.	
	3	9894732	B2	2018-02-13	Xiong Aiming et.al	
	4	9777891	B2	2017-10-03	Yusaku Kawabata et al.	
	5	9574717	B2	2017-02-21	James R. Scapa et al.	
	6	9462658	B1	2016-10-04	Jeahoon Kim	
	7	8791650	B2	2014-07-29	XinXin Shan	
	8	9839081	B2	2017-12-05	Jong June Park	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	9629211	B2	2017-04-18	Xiong et al. Jiaxing Super Lighting Electric Appliance Co., Ltd	

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS Remove

Change(s) applied to document. /C.S./ 5/7/2021

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20140218892	A1	2014-08-07	Edwards et al. ~~INTEMATIX CORPORATION~~	

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	101182919	CN	A	2008-05-21	ZHENHANG YANG		☒
	2	3146803	EP	A1	2017-03-29	JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO LTD		☐
	3	104595765	CN	A	2015-05-06	WUXI HYPERION ENERGY CONSERVATIONS CO LTD		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

Change(s) applied to document,

/C.S./ 5/7/2021	113	20140055029	A1	2014-02-27	~~PHILIPS LIGHTING HOLDING B. V.~~ Jans	
	114	20110309745	A1	2011-12-22	Westermarck et al. ~~LEDS AMERICA, INC.~~	
	115	20190277484	A1	2019-09-12	Kwisthout ~~SIGNIFY HOLDING B.V.~~	
	116	20130069538	A1	2013-03-21	YU-SHENG SO	
	117	20130258650	A1	2013-10-03	SHARRAH RAYMOND L.	
	118	20130135852	A1	2013-05-30	Chan et al. ~~HONG KONG PATENT EXCHANGE LIMITED~~	
	119	20150181661	A1	2015-06-25	Hsia et al. ~~Lightel Technologies, Inc.~~,	
	120	20100277918	A1	2010-11-04	CHEN CHIEN-YUAN	
	121	20090219713	A1	2009-09-03	Dennis Siemiet et al.	
	122	20130230995	A1	2013-09-05	Ivey et al. ~~ILUMISYS, INC.~~	
	123	20110038146	A1	2011-02-17	Chen ~~Yancheng Haomai Lighting Science&Technology Co.Ltd~~	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2020-04-01
First Named Inventor	Tao JIANG
Art Unit	
Examiner Name	
Attorney Docket Number	S20003USUC01T

Change(s) applied to document, /C.S./ 5/7/2021

	25	20030189829	A1	2003-10-09	~~Matsushita Electric Industrial Co., Ltd~~ Shimizu et al	
	26	20150022114	A1	2015-01-22	~~SAMSUNG ELECTRONICS CO., LTD.~~ Kim	
	27	20160084455	A1	2016-03-24	HUNG-CHANG CHEN	
	28	20080192476	A1	2008-08-14	Hiratsuka ~~KABUSHIKIKAISHA MIRAI~~	
	29	20110291592	A1	2011-12-01	Anissimov ~~OSRAM SYLVANIA~~	
	30	20170211753	A1	2017-07-27	~~JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LT~~ Jiang et al.	
	31	20130051008	A1	2013-02-28	SHEW LARRY N	
	32	20180335200	A1	2018-11-22	~~JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO.,LT~~ Jiang et al.	
	33	20110084554	A1	2011-04-14	TIAN FENG	
	34	20130147350	A1	2013-06-13	Yang ~~CIO OPTOELECTRONICS CORP.~~	
	35	20130256704	A1	2013-10-03	TANG GUOFU & HSIAO YUCHUN	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.Q.T/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/838,012	09/07/2021	11112068	S20003USUC01T	6416

147274 7590 08/18/2021

Jiaxing Super Lighting Electric Appliance Co., Ltd
IP Department
No. 1288 Jiachuang Road, Xiuzhou Area
Jiaxing, Zhejiang
Jiaxing City, 314031
CHINA

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

LI-QIN LI, Jiaxing, CHINA;
JIAXING SUPER LIGHTING ELECTRIC APPLIANCE CO., LTD, Jiaxing, CHINA;
TAO JIANG, Jiaxing, CHINA;
CHANG YANG, Jiaxing, CHINA;
BAO WANG, Jiaxing, CHINA;
AIMING XIONG, Jiaxing, CHINA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.