

1 Gary F. Wang, SBN 195,656
Email: garywang@gfwanglaw.com
2 Franklin E. Gibbs, SBN 189,015
Email: fgibbs@gfwanglaw.com
3 Law Offices of Gary F. Wang
215 N. Marengo Avenue, Suite 352
4 Pasadena, California 91101-1503
Telephone: (626) 585-8001
5 Facsimile: (626) 585-8002

6 Attorney for Plaintiff
Chao Tai Electronic Co., Ltd.
7

8 UNITED STATES DISTRICT COURT
9 CENTRAL DISTRICT OF CALIFORNIA

12 NOV 28 AM 10:55
CLERK U.S. DISTRICT COURT
CENTRAL DIST. OF CALIF.
LOS ANGELES

FILED

10 CHAO TAI ELECTRON CO., LTD., a
11 Taiwanese corporation,

12 Plaintiff,

13 vs.

14 LEDUP ENTERPRISE, INC., a
California corporation; LOWE'S
15 COMPANIES, INC., a North Carolina
Corporation; THE HOME DEPOT,
16 INC., a Delaware corporation;
MARTHA STEWART LIVING
17 OMNIMEDIA, INC., a Delaware
corporation; and DOES 1 through 10,
18 inclusive,

19 Defendant.

Case No.: No. **CV 12-10137 P (MPWx)**

COMPLAINT PATENT
INFRINGEMENT

REQUEST FOR JURY TRIAL

20
21 Comes now, Plaintiff, CHAO TAI ELECTRONIC CO., LTD., and for cause of
22 action against Defendants, LEDUP ENTERPRISE, INC., LF, LLC, THE HOME
23 DEPOT, INC., MARTHA STEWART LIVING OMNIMEDIA, INC., alleges as
24 follows:

25 **Jurisdiction**

26 1. This cause of action arises under the Act of June 25, 1948, 62 Stat. 931,
27 U.S.C., Title 28, Section 1338(a) for infringement of United States Letters Patent Nos.
28 7,301,287 and 8,134,298 as hereinafter more fully appears.

1 2. Plaintiff Chao Tai Electron Co., Ltd. (hereinafter referred as “Chao Tai”)
2 is a Taiwan corporation which resides within Taipei, Taiwan, and has a place of
3 business in Taipei, Taiwan, Republic of China.

4 3. Defendant Ledup Enterprise, Inc. (hereinafter referred as “Ledup”) is a
5 California corporation which conducts regular business activity within California, and
6 resides within the Central District of California within the meaning of 28 U.S.C.
7 §1391(b) and §1391(c), and has a place of business at 5321 Derry Avenue, Suite B,
8 Agoura Hills, California.

9 4. Defendant Lowe’s Companies, Inc. (hereinafter referred as “Lowe’s”) is
10 a Delaware limited liability company which conducts regular business activity within
11 California, and has a place of business in Los Angeles, California within the meaning
12 of 28 U.S.C. §1391(b) and §1391(c).

13 5. Defendant The Home Depot, Inc. (hereinafter referred as “Home Depot”)
14 is a Delaware corporation which conducts regular business activity within California,
15 and has a place of business in Los Angeles, California within the meaning of 28
16 U.S.C. §1391(b) and §1391(c).

17 6. Defendant Martha Stewart Living Omnimedia, Inc. (hereinafter referred
18 as “Martha Stewart”) is a Delaware corporation which conducts regular business
19 activity within California, and has a place of business in Los Angeles, California
20 within the meaning of 28 U.S.C. §1391(b) and §1391(c).

21 7. The true names and capacities, whether individual, corporate, associate
22 or otherwise of defendants named herein Does 1 through 10, inclusive, are unknown
23 to Chao Tai at this time. Chao Tai will amend this complaint when the same become
24 fully ascertained.

25 ///

26 ///

27 ///

28 ///

1 **FIRST CAUSE OF ACTION**

2 **Patent Infringement**

3 **For U.S. Patent No. 7,301,287 Against Defendant Lowe's**

4 8. On November 27, 2007, United States Patent No. 7,301,287 (hereinafter
5 "the '287 Patent,") entitled High Power Light String Device was duly and legally
6 issued to Chong Ying Lu as inventor. The '287 Patent describes and claims a circuit
7 for LED light string. Attached hereto as Exhibit 1 is a copy of U.S. Patent No.
8 7,301,287.

9 9. Plaintiff Chao Tai Electron Co., Ltd. is the assignee of record, and the
10 owner by assignment of all of the inventor's and assignor's right, title and interest in
11 and to the invention of the '287 Patent, and has given written notice to Defendant
12 Lowe's of their infringement.

13 10. On or about November 24, 2010 Plaintiff, through its attorney, sent a
14 letter to Defendant Lowe's demanding Lowe's, among other things, to immediately
15 cease and desist its acts of infringement of the '287 Patent. A true and correct copy of
16 such a letter is attached hereto as Exhibit 2.

17 11. Defendant Lowe's has been and still is infringing the '287 Patent by
18 making, importing, distributing, selling, offering for sale and using systems and
19 components embodying the patented invention, and will continue to do so unless
20 enjoined by this Court.

21 12. On information and belief, Defendant has acted willfully, knowingly and
22 deliberately with full knowledge of Plaintiff's patent rights and in the absence of any
23 good faith basis for a belief of non-infringement or invalidity of Plaintiff's '287
24 Patent.

25 **SECOND CAUSE OF ACTION**

26 **Patent Infringement For U.S. Patent No. 8,134,298**

27 **Against Defendants Ledup, Home Depot and Martha Stewart**

28 13. Plaintiff re-alleges paragraphs 1 through 12.

1 14. On November 27, 2007, United States Patent No. 8,134,298 (hereinafter
2 “the ‘298 Patent,”) entitled Decretive Light String Device was duly and legally issued
3 to Chen-Sheng Yang as inventor. The ‘298 Patent describes and claims a circuit for
4 LED light string. Attached hereto as Exhibit 3 is a copy of U.S. Patent No. 8.134.298.

5 15. Plaintiff Chao Tai Electron Co., Ltd. is the assignee of record, and the
6 owner by assignment of all of the inventor’s and assignor’s right, title and interest in
7 and to the invention of the ‘298 Patent, and has given written notice to some
8 defendants of their infringement.

9 16. On or about July 13, 2012, Plaintiff, through its attorney, sent a letter to
10 Defendant Home Depot demanding Defendant, among other things, to immediately
11 cease and desist its acts of infringement of the ‘298 Patent. A true and correct copy of
12 such a letter is attached hereto as Exhibit 4.

13 17. Defendants Ledup, Home Depot and Martha Stewart have been and still
14 are infringing the ‘298 Patent by making, importing, distributing, selling, offering for
15 sale and using systems and components embodying the patented invention, and will
16 continue to do so unless enjoined by this Court.

17 18. On information and belief, Defendant has acted willfully, knowingly and
18 deliberately with full knowledge of Plaintiff’s patent rights and in the absence of any
19 good faith basis for a belief of non-infringement or invalidity of Plaintiff’s ‘298
20 Patent.

21 WHEREFORE, Plaintiff prays that this Court:

22 1. Enter judgment that Plaintiff’s U.S. Letters Patent 7,301,287 is
23 valid and enforceable and has been infringed by Defendant Lowe’s;

24 2. Enter judgment that Plaintiff’s U.S. Letters Patent 8,134,298 is
25 valid and enforceable and has been infringed by Defendant Ledup, Home Depot and
26 Martha Stewart.

27 3. Issue a preliminary and final injunction against continued
28 infringement by Defendants;

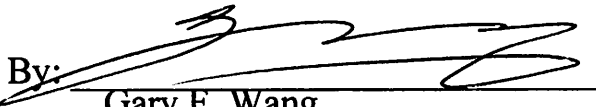
1 4. Award Plaintiff damages adequate to compensate for the
2 infringement, but in no event less than a reasonable royalty for the use made of the
3 invention by the Defendants, as provided in 35 U.S.C. §284, together with interest and
4 costs to be determined by the Court;

5 5. Treble the amount of Plaintiff's damages pursuant to the
6 provisions of 35 U.S.C. §284 by reason of willful infringement;

7 6. Determine that this is an exceptional case pursuant to 35 U.S.C.
8 §285, and award reasonable attorneys fees to the Plaintiff;

9 7. Award such further relief as the Court may deem just and proper.
10

11
12 Date: 11/27/2012

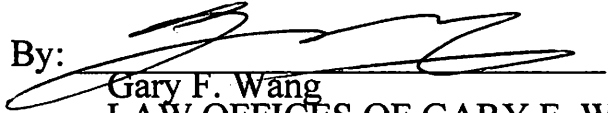
13 By: 

Gary F. Wang
LAW OFFICES OF GARY F. WANG
Attorneys for Plaintiff
CHAO TAI ELECTRON, LTD.

REQUEST FOR JURY TRIAL

Plaintiff hereby Requests trial by jury on all issues triable to a jury.

Date: 11/27/2012

By: 

Gary F. Wang
LAW OFFICES OF GARY F. WANG
Attorneys for Plaintiff
CHAO TAI ELECTRON, LTD.

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

EXHIBIT 1



US007301287B1

(12) **United States Patent**
Lu

(10) **Patent No.:** **US 7,301,287 B1**
(45) **Date of Patent:** **Nov. 27, 2007**

(54) **HIGH POWER LIGHT STRING DEVICE**

(75) **Inventor:** **Chong Ying Lu, Miao-Li Hsien (TW)**

(73) **Assignee:** **Wang Loong Co., Ltd., Miao-Li Hsien (TW)**

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

(21) **Appl. No.:** **11/624,233**

(22) **Filed:** **Jan. 18, 2007**

(51) **Int. Cl.**
H05B 37/00 (2006.01)

(52) **U.S. Cl.** **315/185 R; 315/185 S; 315/51; 362/640; 362/265; 362/800; 362/653**

(58) **Field of Classification Search** **315/185 R, 315/185 S, 51, 169.1, 169.3; 362/226, 227, 362/240, 257, 249, 265, 653, 654, 545, 640, 362/800**

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,675,575 A * 6/1987 Smith et al. 315/185 S

6,072,280 A *	6/2000	Allen	.....	315/185 S
6,461,019 B1 *	10/2002	Allen	.....	362/249
6,830,358 B2 *	12/2004	Allen	.....	362/640
6,853,151 B2 *	2/2005	Leong et al.	.....	315/185 R
2002/0145392 A1 *	10/2002	Hair et al.	.....	315/185 R
2004/0233668 A1 *	11/2004	Telfer et al.	.....	362/252
2007/0008721 A1 *	1/2007	Peng et al.	.....	362/227

* cited by examiner

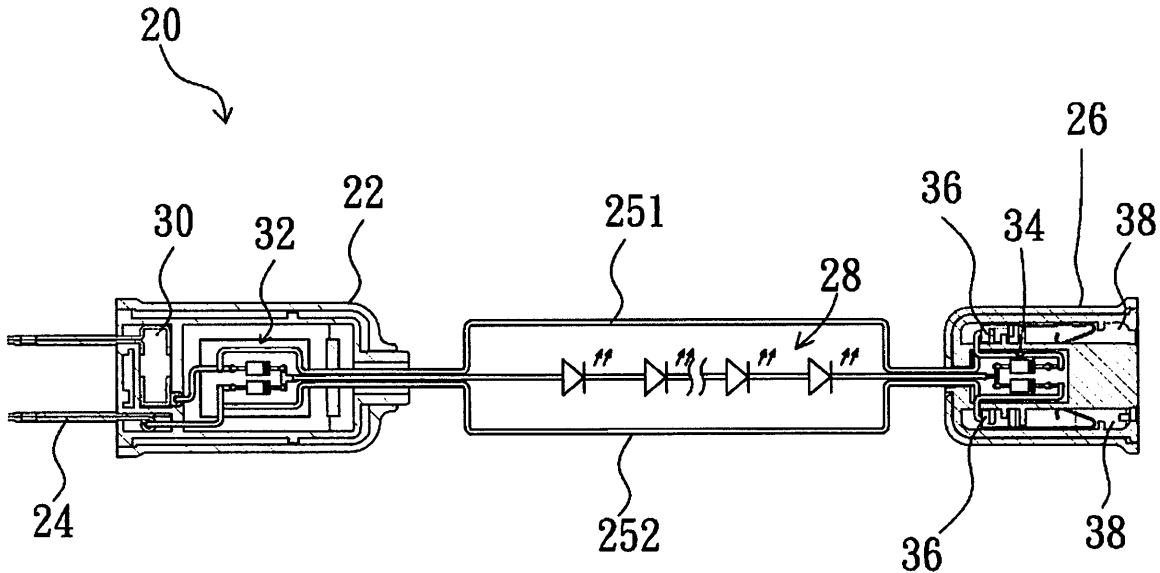
Primary Examiner—Haissa Philogene

(74) *Attorney, Agent, or Firm*—Ming Chow; Sinorica, LLC

(57) **ABSTRACT**

A high power light string device comprises a plug with a plug blade set, a tail receptacle, and at least an LED string, wherein a first power adaptor disposed in the plug converts an AC voltage through the plug blade set to a high DC voltage, and a second power adaptor disposed in the tail receptacle converts the AC voltage through the plug blade set to a low DC voltage. Two ends of the LED string are respectively connected to the first and second power adaptors to receive the high and lower DC voltages so that the LED string is turned on to emit light. The power adaptors are directly disposed respectively in the plug and the tail receptacle to simplify the whole light string device so as to enhance the decorating effect of the light string device.

8 Claims, 3 Drawing Sheets



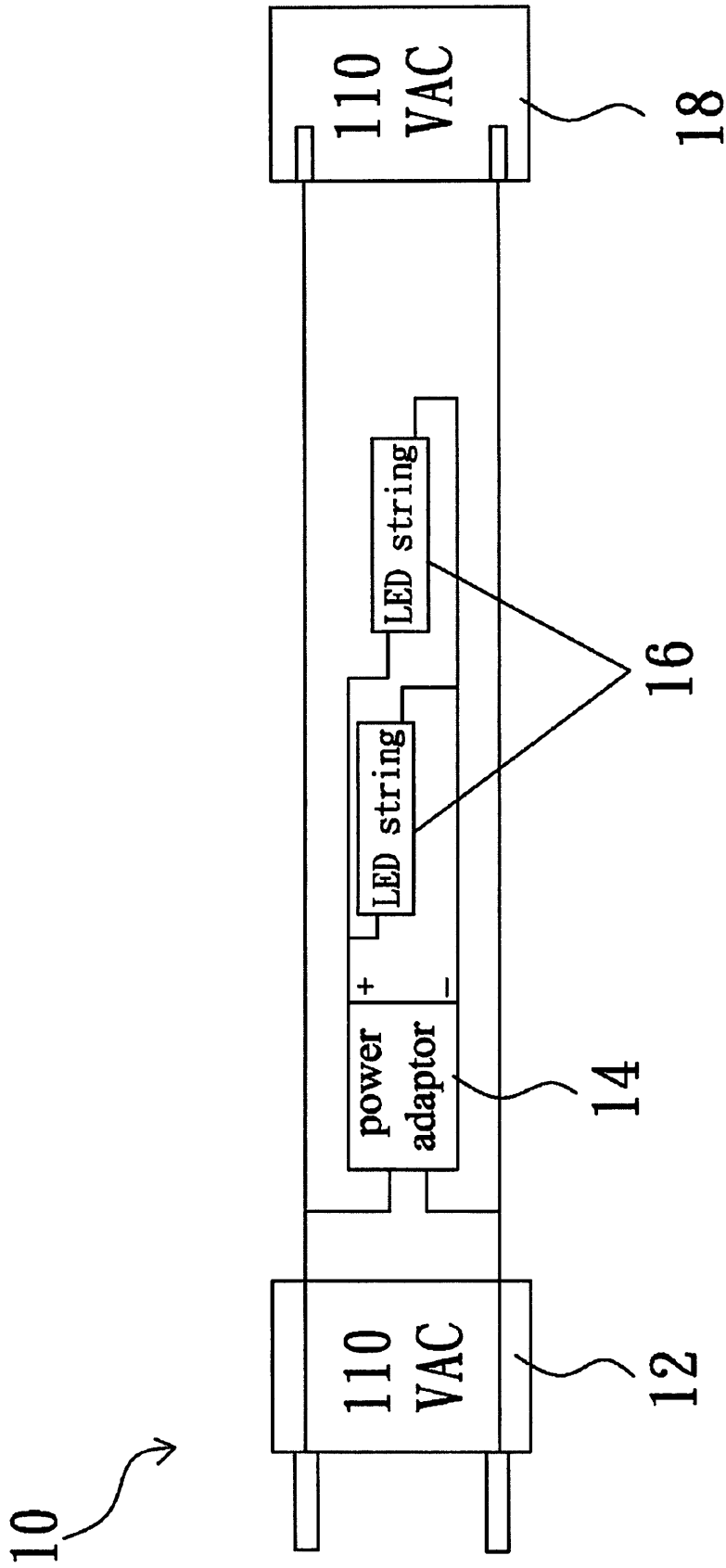


Fig. 1
(Prior Art)

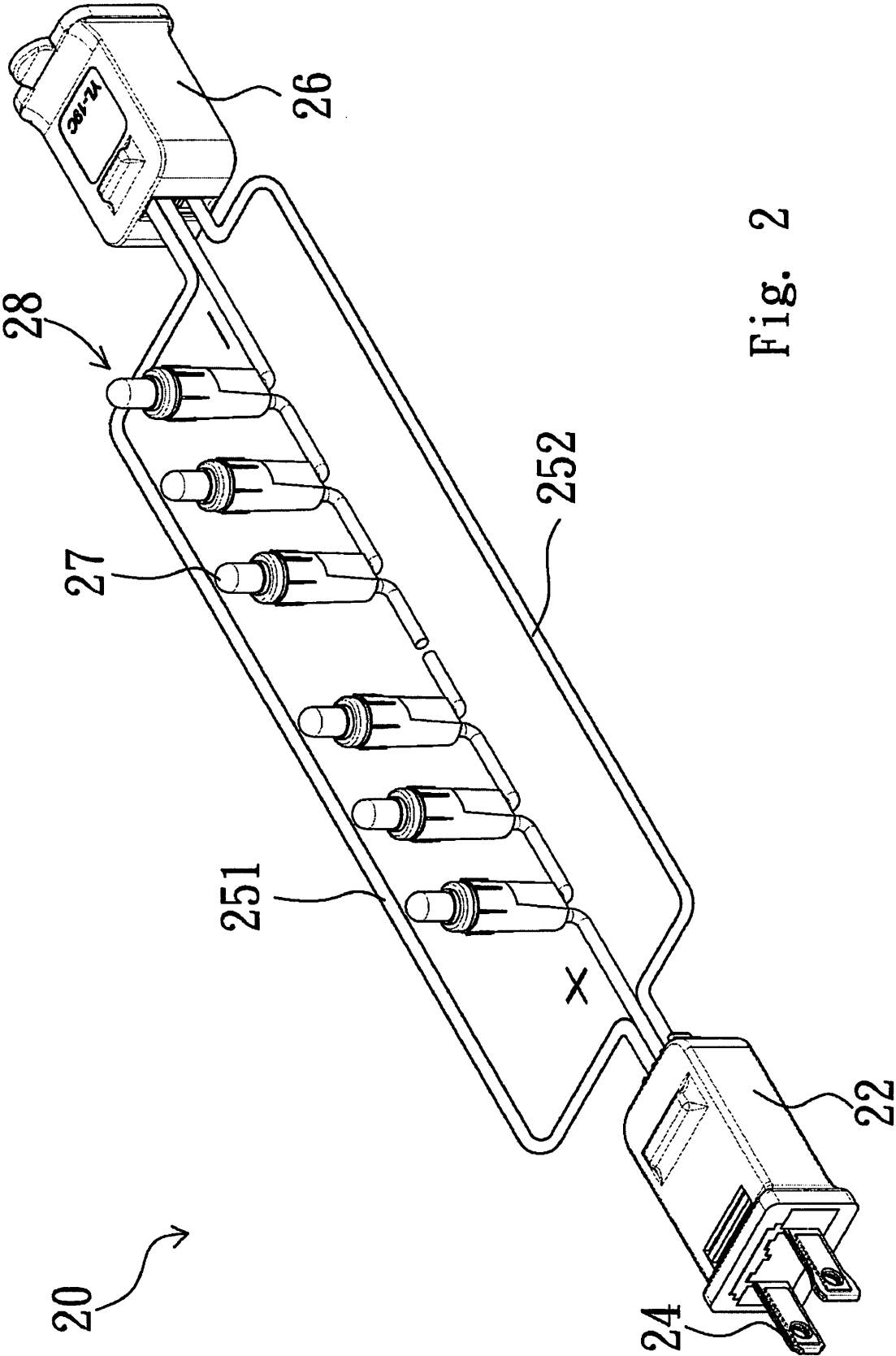


Fig. 2

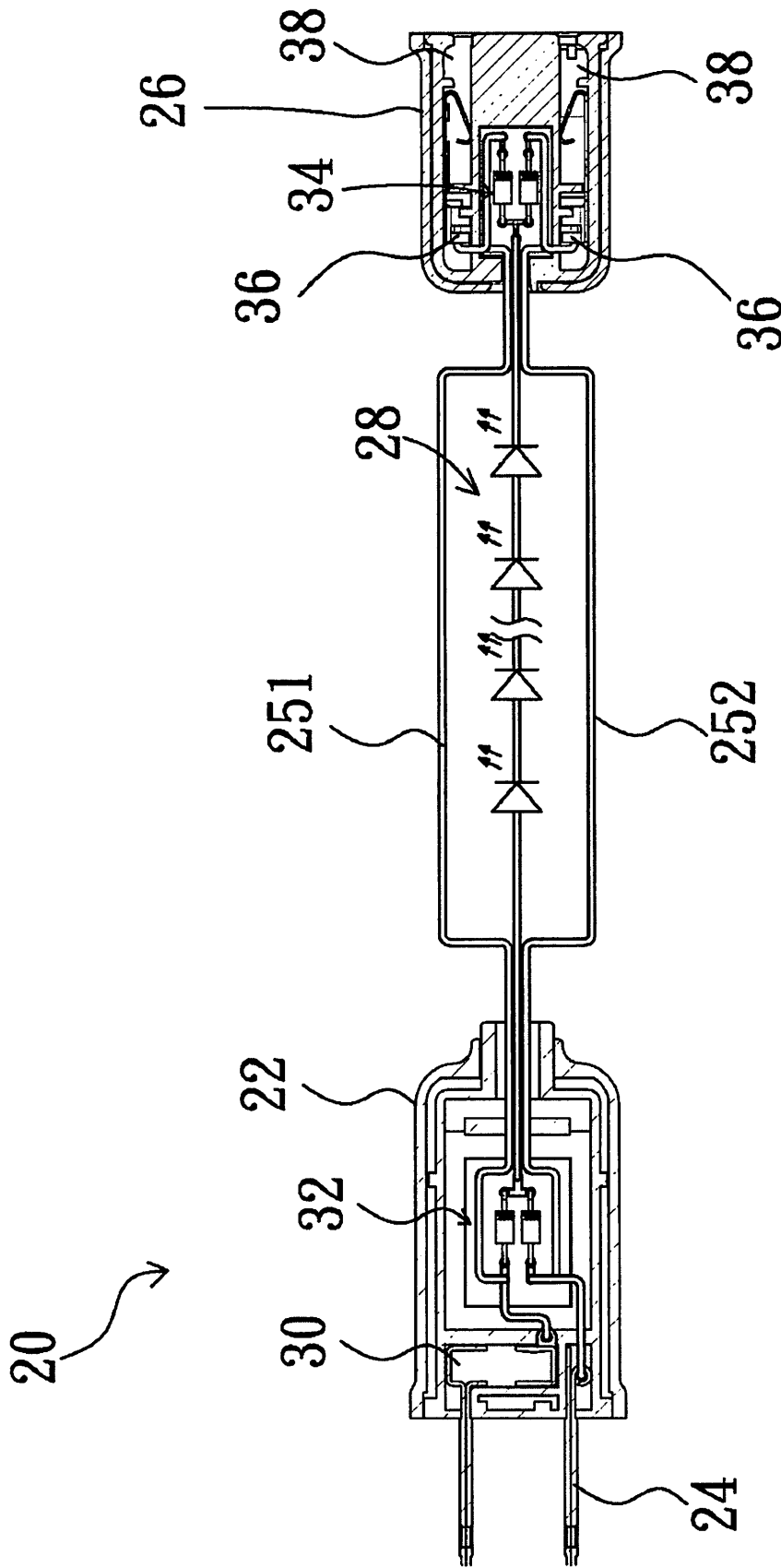


Fig. 3

1

HIGH POWER LIGHT STRING DEVICE**BACKGROUND OF THE INVENTION**

1. Field of the Invention

The present invention relates to a high power light string device and, more particularly, to a light string device composed of LEDs.

2. Description of Related Art

Light emitting diodes (LEDs) have the characteristics of small size, low power consumption, long lifetime, fast response, and luminescence. Moreover, LEDs are recycled to meet the requirement of environmental protection, and cause no problem of mercury pollution to the environment as general fluorescent lights. Besides, LEDs are driven by DC power and thus are easily controlled to reduce the complexity in circuit design. Therefore, LEDs have been widely applied in various kinds of electronic products.

As shown in FIG. 1, U.S. Pat. No. 6,830,358 discloses an LED string device 10, which is commonly used as a decoration light string in several situations such as the Christmas to enhance the festive mood. In FIG. 1, the LED string device 10 comprises a plug 12, a power adaptor 14, two LED strings 16 and a tail receptacle 18. The plug 12 is externally connected to the power adaptor 14 to convert an AC voltage to a DC voltage that is sent to the two LED strings 16. The tail receptacle 18 can be plugged by another plug. However, because the power adaptor 14 has a certain volume, the delicacy of the whole LED string device is usually destroyed.

Accordingly, the present invention provides a more perfect light string device to solve the above problems in the prior art.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a high power light string device that two power adaptors are respectively disposed in a plug and a tail receptacle to simplify the whole light string device so as to enhance the decorating effect and prevent from destroying the delicacy of the whole light string device.

Another object of the present invention is to provide a high power light string device, which makes use of a plurality of LEDs to form a light string structure with high efficiency and power saving.

To achieve the above objects, the present invention provides a high power light string device, which comprises a plug, a tail receptacle, and at least an LED string. The plug has a plug blade set and a first power adaptor. The first power adaptor converts an AC voltage through the plug blade set to a high DC voltage. The tail receptacle has a conducting-strip set and a second power adaptor. The second power adaptor converts the AC voltage through the plug blade set to a low DC voltage. One end of the LED string is connected to the first power adaptor to receive the high DC voltage, and the other end of the LED string is connected to the second power adaptor to receive the low DC voltage so that the LED string is turned on to emit light.

BRIEF DESCRIPTION OF THE DRAWINGS

The various objects and advantages of the present invention will be more readily understood from the following detailed description when read in conjunction with the appended drawing, in which:

FIG. 1 is a diagram of a conventional LED string device;

2

FIG. 2 is a perspective view of the present invention; and FIG. 3 is an internal structure diagram of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A high power light string device 20 in accordance with the present invention is illustrated in FIG. 2. The high power light string device 20 comprises a plug 22, a tail receptacle 26, and an LED string 28. The plug 22 is made of plastic material, and has a plug blade set 24 with two plug blades. The tail receptacle 26 is made of plastic material, and is electrically connected to the plug 22 and the plug blade set 24 via electric wires 251 and 252. The plug 22 and the tail receptacle 26 are driven by the same voltage such as 110 V or 220 V. The LED string 28 is composed of a plurality of LEDs 27. Two ends of the LED string 28 are respectively electrically connected to the plug 22 and the tail receptacle 26.

As shown in FIG. 3, a fuse component 30 and a power adaptor 32 are disposed in the plug 22. Two ends of the fuse component 30 are respectively electrically connected to the plug blade set 24 and the power adaptor 32 to protect the circuit from the influence of over-current events. The power adaptor 32 converts an AC voltage through the plug blade set 24 to a high DC voltage. Another power adaptor 34 and a conducting-strip set 36 are disposed in the tail receptacle 26. The power adaptor 34 receives the AC voltage, such as 110 V or 220 V, through the plug blade set 24 via the electric wires 251 and 252 to convert this AC voltage to a low DC voltage. The conducting-strip set 36 is electrically connected to the power adaptor 34 and the plug blade set 24. The tail receptacle 26 has two slots 38 so that a plug blade set of a plug of another light string device with the same structure can be inserted therein to achieve electric connection with the conducting-strip set 36. Moreover, one end of the LED string 28 is connected to the power adaptor 32 to receive the high DC voltage, and the other end is connected to the power adaptor 34 to receive the low DC voltage so that the LED string 28 is turned on to emit light. Each LED of the LED string 28 is selected among a white LED, a red LED, a blue LED, a green LED, a yellow LED, or a LED of another color.

To sum up, in the high power light string device of the present invention, two power adaptors are respectively disposed in a plug and a tail receptacle to simplify the whole light string device so as to enhance the decorating effect and prevent from destroying the delicacy of the whole light string device.

Although the present invention has been described with reference to the preferred embodiment thereof, it will be understood that the invention is not limited to the details thereof. Various substitutions and modifications have been suggested in the foregoing description, and other will occur to those of ordinary skill in the art. Therefore, all such substitutions and modifications are intended to be embraced within the scope of the invention as defined in the appended claims.

I claim:

1. A high power light string device comprising:
 - a plug having a first plug blade set and a first power adaptor, wherein said first power adaptor is disposed in said plug to convert an AC voltage through said first plug blade set to a high DC voltage;
 - a tail receptacle having a conducting strip set and a second power adaptor disposed interiorly, said second power

3

adaptor converting said AC voltage through said first plug blade set to a low DC voltage; and at least an LED string having a first end and a second end, said first end being connected to said first power adaptor to receive said high DC voltage and said second end being connected to said second power adaptor to receive said low DC voltage so that said LED string is turned on to emit light.

2. The high power light string device as claimed in claim 1, wherein said conducting-strip set is electrically plugged by a second plug blade set of a second plug.

3. The high power light string device as claimed in claim 1, wherein said conducting-strip set is electrically connected to said second power adaptor.

4. The high power light string device as claimed in claim 1, wherein said conducting-strip set is electrically connected to said first plug blade set.

4

5. The high power light string device as claimed in claim 1, wherein said plug and said tail receptacle are driven at the same voltage.

6. The high power light string device as claimed in claim 1, wherein a fuse component is further disposed in said plug, and said fuse component is electrically connected to said first power adaptor and said first plug blade set.

7. The high power light string device as claimed in claim 1, wherein said plug and said tail receptacle are made of plastic material.

8. The high power light string device as claimed in claim 1, wherein each LED of said LED string is selected among a white LED, a red LED, a blue LED, a green LED, a yellow LED, and a LED of another color.

* * * * *



US007301287C1

(12) EX PARTE REEXAMINATION CERTIFICATE (9073rd)

United States Patent
Lu

(10) Number: US 7,301,287 C1
(45) Certificate Issued: Jun. 12, 2012

(54) HIGH POWER LIGHT STRING DEVICE

(75) Inventor: Chong Ying Lu, Miao-Li Hsien (TW)

(73) Assignee: Chao Tai Electron Co. Ltd., Kaohsiung (TW)

Reexamination Request:

No. 90/011,711, Jun. 27, 2011

Reexamination Certificate for:

Patent No.: 7,301,287
Issued: Nov. 27, 2007
Appl. No.: 11/624,233
Filed: Jan. 18, 2007

(51) Int. Cl.
H05B 37/00 (2006.01)
H05B 39/00 (2006.01)
H05B 41/00 (2006.01)

(52) U.S. Cl. 315/185 R; 315/51; 362/640;
362/265; 362/800; 362/653

(58) Field of Classification Search None
See application file for complete search history.

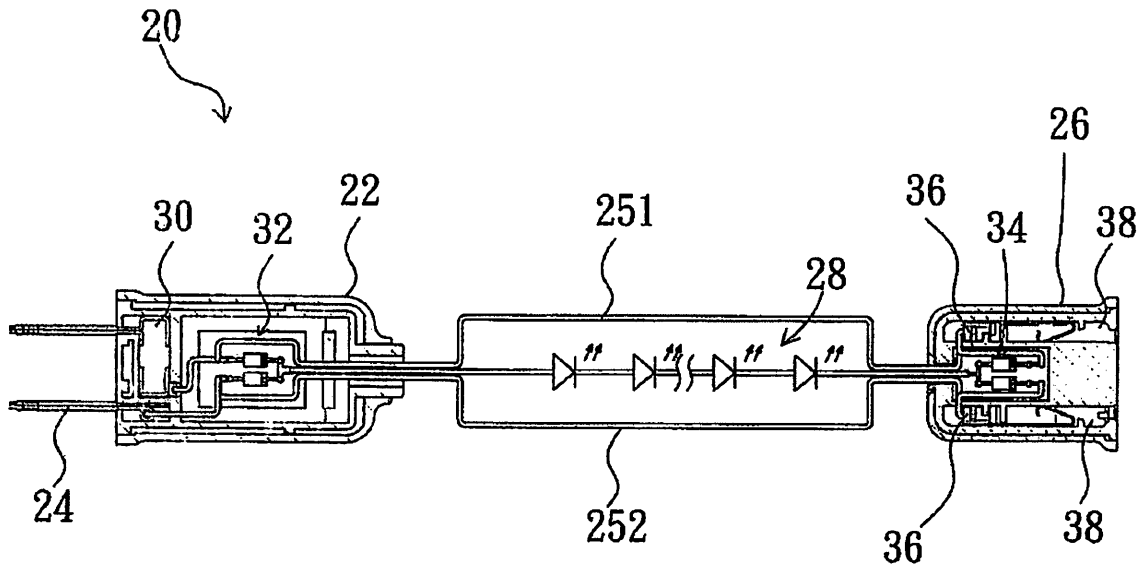
(56) References Cited

To view the complete listing of prior art documents cited during the proceeding for Reexamination Control Number 90/011,711, please refer to the USPTO's public Patent Application Information Retrieval (PAIR) system under the Display References tab.

Primary Examiner—John Heyman

(57) ABSTRACT

A high power light string device comprises a plug with a plug blade set, a tail receptacle, and at least an LED string, wherein a first power adaptor disposed in the plug converts an AC voltage through the plug blade set to a high DC voltage, and a second power adaptor disposed in the tail receptacle converts the AC voltage through the plug blade set to a low DC voltage. Two ends of the LED string are respectively connected to the first and second power adaptors to receive the high and lower DC voltages so that the LED string is turned on to emit light. The power adaptors are directly disposed respectively in the plug and the tail receptacle to simplify the whole light string device so as to enhance the decorating effect of the light string device.



US 7,301,287 C1

1
EX PARTE
REEXAMINATION CERTIFICATE
ISSUED UNDER 35 U.S.C. 307

NO AMENDMENTS HAVE BEEN MADE TO
THE PATENT

2
AS A RESULT OF REEXAMINATION, IT HAS BEEN
DETERMINED THAT:

5 The patentability of claims 1-8 is confirmed.

* * * * *

EXHIBIT 2

Tai E International Patent & Law Office

9F, 112 Section 2, Chang-An East Road
Taipei 104, Taiwan, R.O.C.
P.O. Box 46-478, Taipei 104, Taiwan, R.O.C.

Tel: 886-2-25061023, 25081531
Fax: 886-2-25068147, 25076571, 25064319, 25090804
URL: <http://www.taie.com.tw>
E-mail: 86026@taie.com.tw

By fax Page(s) including this page

November 24, 2009

VIA EXPRESS MAIL

Lowe's Companies, Inc.
P.O. Box 1111 North Wilkesboro,
NC 28656
U.S.A.

Attn. The Chief Executive Officer

Re: A Notification of the U.S. Patent No. 7,301,287 B1 "High Power Light String Device" in the name of Wang Loong Co., Ltd. (Taiwan)
Our Ref: CFL-10611

Dear Sir,

Our firm represents Chao Tai Electron Co., Ltd. (hereinafter called Chao Tai) located in Kaohsiung City, Taiwan, R.O.C. Chao Tai is the assignee of Wang Loong Co., Ltd. for the U.S. Patent No. 7,301,287 B1 "High Power Light String Device" (the Patent). Photocopies of the drawings consisted in the patent application and the notice of recordation of assignment document of the Patent from USPTO are enclosed herewith for your reference.

Chao Tai has put the Patent into practice. The business of the patented product has proven to be a commercial success to our client. Chao Tai highly cherishes the commercial value of the Patent, and will enforce its patent right against any infringer by taking proper legal action available under the law.

It came to our client's attention that you are going to sell, or to cause to be sold, certain sockets used in Christmas light string in the United States, which are imported by G.E. from China for selling, such as one bearing TS and Lu serial indication. By a preliminary examination of a sample of your product, our client found that it is remarkably related in appearance as well as in its circuitry to the Patented product.

We recently contacted General Electric Co. regarding this situation and requested that it paid a special attention to '732 Patent. General Electric has been, and remains, unresponsive despite our demand for a comment. Given this situation Chao Tai has little choice but to also separate cautionary notices to General Electric's distribution partners, such as yourself.

For fear that your company shall incur a risk of litigation for dealing with patented products or engaging in improper investment due to your ignorance of our client's patent protection, we hereby inform you as above. You are welcome to contact us if you are interested in dealing with the patented products of our client.

If you have any question or comment on the contents of this letter, you are welcome to contact our firm or Chao Tai directly as soon as possible. Otherwise we would appreciate receiving your timely confirmation before December 7, 2009 to respect our client's legally protected patent right.

With best regard,

Fan-Jiuan Wei (Miss), Esq.

Henry Guei, Esq.

Encls.

EXHIBIT 3



US008134298B2

(12) **United States Patent**
Yang

(10) **Patent No.:** **US 8,134,298 B2**
(45) **Date of Patent:** **Mar. 13, 2012**

(54) **DECORATIVE LIGHT STRING DEVICE**

(75) Inventor: **Chen-Sheng Yang**, Kaohsiung (TW)
(73) Assignee: **Wang Loong Co., Ltd.**, Kaohsiung (TW)
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 538 days.

(21) Appl. No.: **12/153,089**
(22) Filed: **May 14, 2008**

(65) **Prior Publication Data**
US 2009/0284159 A1 Nov. 19, 2009

(51) **Int. Cl.**
H05B 37/00 (2006.01)
(52) **U.S. Cl.** **315/185 R**; 315/185 S; 315/187; 315/201; 315/205
(58) **Field of Classification Search** 315/185 R, 315/187-189, 185 S, 200 R, 201, 205; 362/800, 362/806

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,984,984 B2 *	1/2006	Frederick et al.	324/414
7,377,802 B2 *	5/2008	Allen	439/490
7,481,555 B2 *	1/2009	Huang et al.	362/249.06
7,518,316 B2 *	4/2009	Yu	315/200 R
2006/0007679 A1 *	1/2006	Allen	362/227

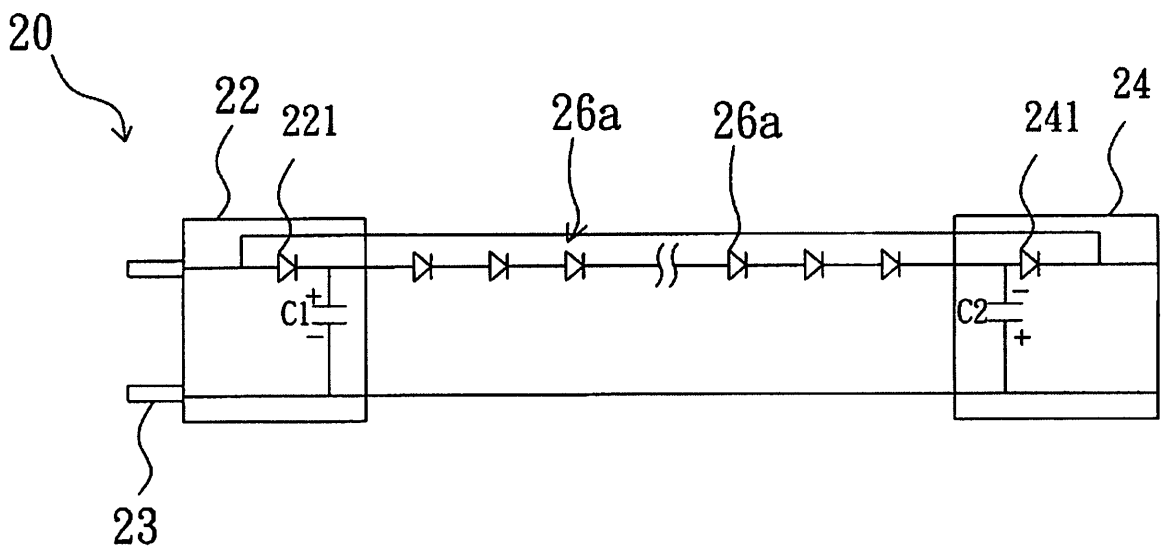
* cited by examiner

Primary Examiner — Thuy Vinh Tran
(74) *Attorney, Agent, or Firm* — Rosenberg, Klein & Lee

(57) **ABSTRACT**

The present invention discloses a decorative light string device, which comprises: a power plug receiving AC power, a tail socket coupled to the power plug, and a LED string with one end thereof coupled to the power plug and the other end thereof coupled to the tail socket, wherein each of the power plug and tail socket has a diode and a capacitor coupled to the diode, whereby a DC voltage, which is twice the peak voltage of the AC power, is output to the LED string.

4 Claims, 3 Drawing Sheets



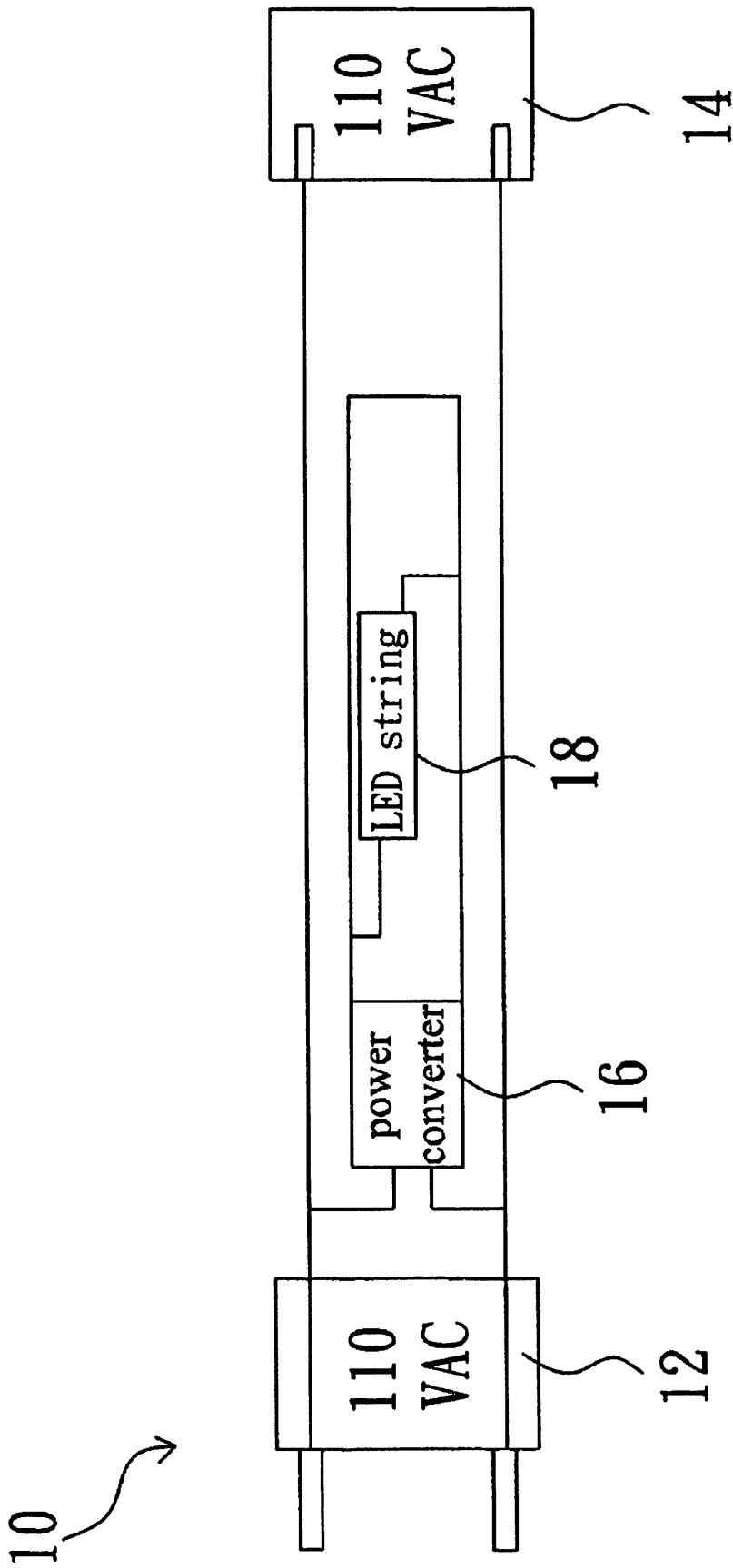


Fig. 1
(prior art)

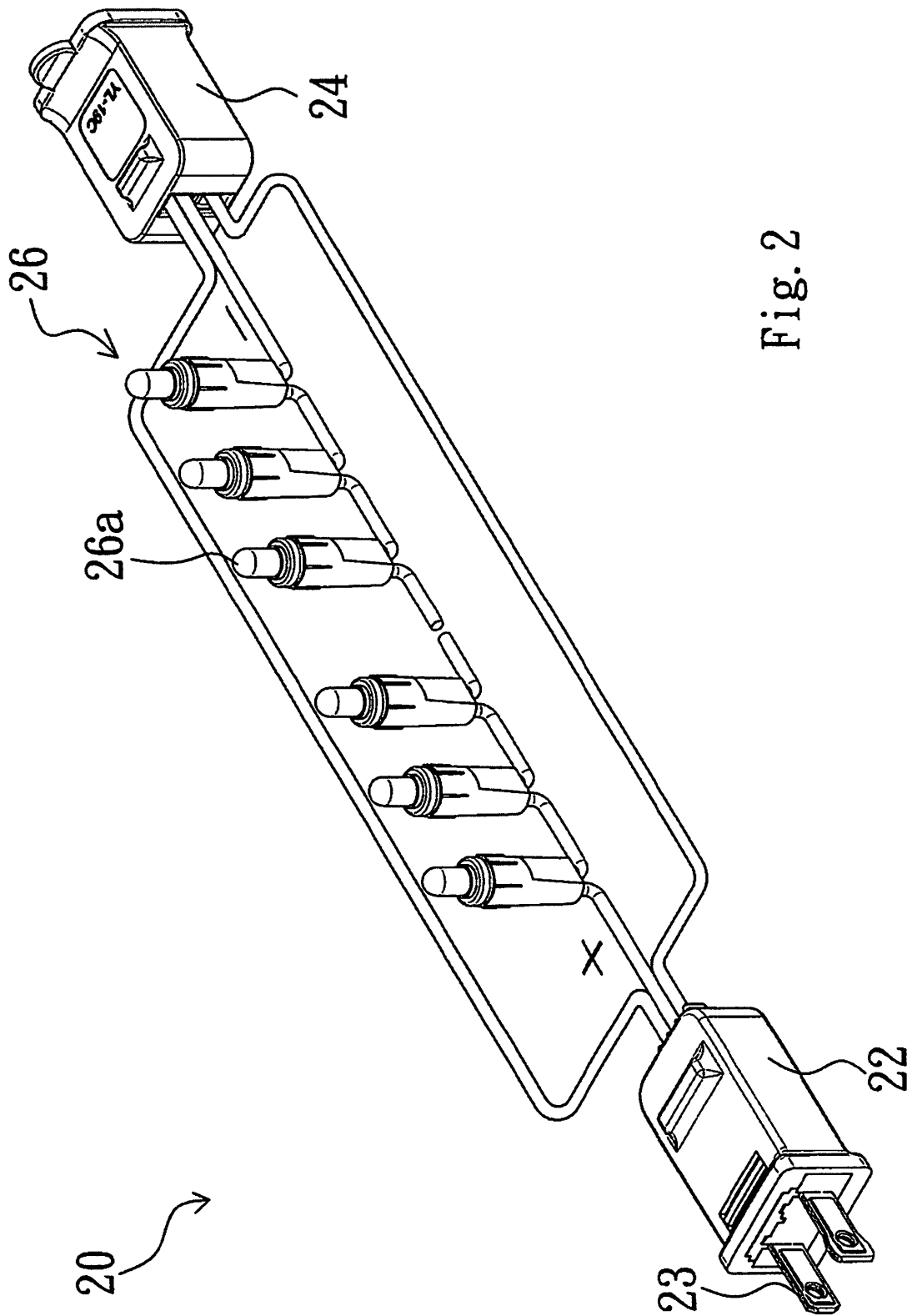


Fig. 2

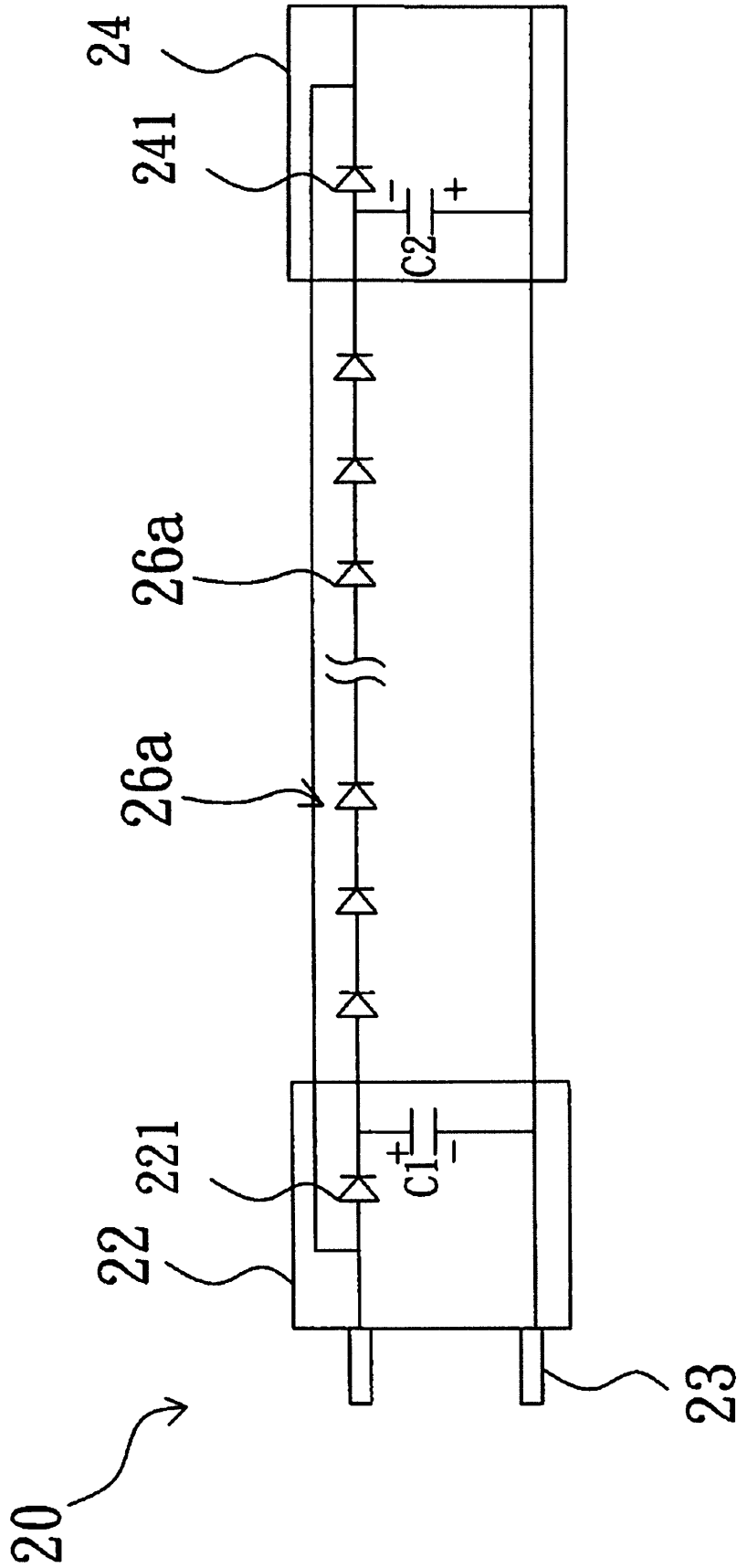


Fig. 3

1

DECORATIVE LIGHT STRING DEVICE**BACKGROUND OF THE INVENTION****1. Field of the Invention**

The present invention relates to a decorative light string device, particularly to a decorative light string device having a voltage-doubling design.

2. Description of the Related Art

LED (Light Emitting Diode) emits light when electrons and holes recombine in a semiconductor material, wherein electrons drop to a lower energy level with light energy released. LEDs with different forbidden bands provide different colors of light. Currently, LEDs have been able to provide lights of a full color spectrum. Compared with the traditional lamp bulbs, LED has the advantages of luminescence, small size, fast response, drop proof, and high power efficiency. Therefore, LED has been extensively used in many products.

For example, LED has been widely used in decorative light strings. Refer to FIG. 1 for a conventional decorative light string device 10, which comprises: a power plug 12, a tail socket 14 coupled to the power plug 12, and a power converter 16 coupled to the power plug 12 and a LED string 18. The power converter 16 converts AC (Alternating Current) power into DC (Direct Current) power, and the DC power is supplied to the LED string 18.

When the original voltage is maintained, increasing the LED number of the LED string will decrease LED brightness. Only via raising voltage can the LED number of the LED string be increased without decreasing LED brightness. However, raising voltage increases power consumption and electric expense.

Accordingly, the present invention proposes a novel decorative light string device to solve the abovementioned problems.

SUMMARY OF THE INVENTION

One objective of the present invention is to provide a decorative light string device, wherein the number of LEDs in the LED string is increased with brightness maintained without increasing the input voltage via a voltage-doubling circuit design, whereby the cost of the decorative light string device is reduced.

The present invention proposes a decorative light string device, which comprises: a power plug receiving AC power, a tail socket coupled to the power plug, and a LED string with one end coupled to the power plug and the other end coupled to the tail socket, wherein the power plug has a first diode and a first capacitor coupled to the first diode, and the tail socket has a second diode and a second capacitor coupled to the second diode, whereby a DC voltage, which is twice the peak voltage of the AC power, is output to the LED string.

This and other objectives of the present invention will become obvious to those of ordinary skill in the art after reading the following detailed description of preferred embodiments.

It is to be understood that both the foregoing general description and the following detailed description are exemplary, and are intended to provide further explanation of the invention as claimed

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram schematically showing the structure of a conventional decorative light string device;

2

FIG. 2 is a perspective view schematically showing a decorative light string device according to the present invention; and

FIG. 3 is a diagram schematically showing the circuit of a decorative light string device according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Refer to FIG. 2 a perspective view schematically showing the appearance of a decorative light string device according to the present invention. The decorative light string device 20 of the present invention comprises: a power plug 22 having a pair of conductive insert plates 23, a tail socket 24 coupled to the power plug 22, and a LED string 26 having a plurality of LEDs 26a with one end thereof coupled to the power plug 22 and the other end thereof coupled to the tail socket 24. The tail socket 24 may be further connected with another plug. The LED 26a is a white-light LED, a red-light LED, a blue-light LED, a green-light LED, a yellow-light LED, or a LED with another color.

Refer to FIG. 3 a diagram schematically showing the circuit of a decorative light string device according to the present invention. The power plug 22 has a diode 221 functioning as a rectifier and a capacitor C1 coupled to the diode 221. The tail socket 24 has a diode 241 functioning as a rectifier and a capacitor C2 coupled to the diode 241, wherein the capacitors C1 and C2 have identical capacitances and are used to store electric charges and filter. The power plug 22 receives AC power via the conductive insert plates 23; the diode 221 rectifies the AC current to charge the capacitor C1 to output a DC voltage, which is twice the peak voltage of the AC power to the LED string 26. Similarly, the tail socket 24 receives AC power from the power plug 22; the diode 241 rectifies the AC current to charge the capacitor C2 to output a DC voltage, which is twice the peak voltage of the AC power to the LED string 26. Thus, the LED number of the LED string 26 can be doubled.

In conclusion, the present invention respectively installs the voltage-doubling circuits consisting of a diode and a capacitor in the power plug and the tail socket to provide a DC voltage which is twice the voltage of the AC power for the LED string, whereby LED brightness is enhanced or the LED number is increased without increasing the input voltage or raising the cost.

The embodiment described above is to exemplify the present invention to enable the persons skilled in the art to understand, make and use the present invention. However, it is not intended to limit the scope of the present invention. Therefore, any equivalent modification or variation according to the spirit of the present invention is to be also included within the scope of the present invention.

What is claimed is:

1. A decorative light string device, comprising:
 - a power plug receiving AC (Alternating Current) power,
 - a tail socket coupled to said power plug, and
 - a LED (Light Emitting Diode) string with one end thereof coupled to said power plug and another end thereof coupled to said tail socket,
- wherein said power plug has a first diode and a first charging capacitor coupled to said first diode to define a first charging polarity thereacross; and said tail socket has a second diode and a second charging capacitor coupled to said second diode to define a second charging polarity opposite said first charging polarity thereacross, each of said first and second diodes having an anode and cathode terminals, one of said first and second charging capaci-

3

tors being coupled to said LED strings and the cathode terminal of said diode corresponding thereto, and the other of said first and second charging capacitors being conversely coupled to said LED string and the anode terminal of said diode corresponding thereto, whereby a DC (Direct Current) voltage substantially twice a peak voltage of said AC power voltage, is generated across said LED string; and,
wherein said first capacitor, said first diode, said second capacitor, and said second diode are directly coupled to said LED string.

2. The decorative light string device according to claim 1, wherein said LED string has a plurality of LEDs and each said

4

LED is a white-light LED, a red-light LED, a blue-light LED, a green-light LED, a yellow-light LED, or an LED of another color.

3. The decorative light string device according to claim 1, wherein said tail socket is coupled to receive the AC power.

4. The decorative light string device according to claim 1, wherein said first charging capacitor is coupled to a cathode terminal of said first diode, and said second charging capacitor is coupled to the anode terminal of said second diode.

* * * * *

EXHIBIT 4



By Express Mail

July 13, 2012

The Home Depot U.S.A., Inc.
2455 Paces Ferry Rd., N.W.
Atlanta, GA 30339-4024
U.S.A.

Re: A Notification of the U.S. Patent No. 8,134,298 "Decorative light string device" in the name of Chao Tai Electron Co., Ltd.

Our Ref: CFL-10697

Dear Sirs/Madam,

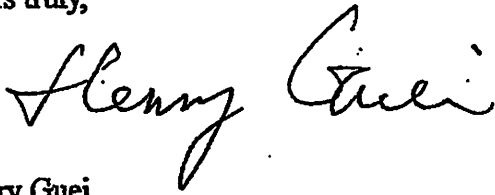
Our firm represents Chao Tai Electron Co., Ltd., (hereinafter referred to as "Chao Tai"), having a business place at No. 266, Er Sen 2nd Rd., Chainjen District, Kaohsiung City, Taiwan. Chao Tai is the patentee of U.S. Patent No. 8,134,298 "Decorative light string device" (the Patent). Photocopies of the Patent are enclosed herewith for your reference (Please refer to exhibit 1).

Chao Tai has put the Patent into practice and is selling and marketing the patented product in various areas including United States. The business of the patented product has proven to be a commercial success to our client. Chao Tai highly cherishes the commercial value of the Patent, and will enforce its patent right against any infringer by taking proper legal action available under the law.

For fear that your company shall incur a risk of litigation for dealing with a product relating to our client's patent or engaging in improper investment due to your ignorance of our client's patent protection, we hereby inform you as above. You are welcome to contact our firm if you are interested in dealing with the patented product of Chao Tai.

If you have any question or comment on the contents of this letter, please contact our firm as soon as possible. Otherwise we would appreciate receiving your timely confirmation to respect our client's legally protected patent right.

Yours truly,

A handwritten signature in cursive script that reads "Henry Guei". The signature is written in black ink and is positioned above the typed name.

Henry Guei
Attorney at Law

Exhibits:

1. A copy of the U.S. Patent No. 8,134,298 "Decorative light string device".