Jan. 6, 1942. W. B. GREENLEE 2,268,870

ORNAMENTAL LIGHTING SYSTEM

Filed Aug. 10, 1937 2 Sheets-Sheet 1

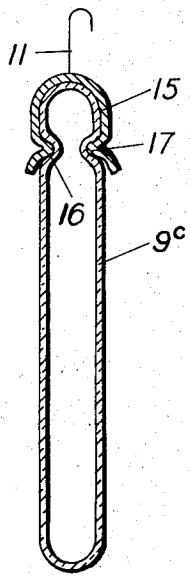


Fig 6

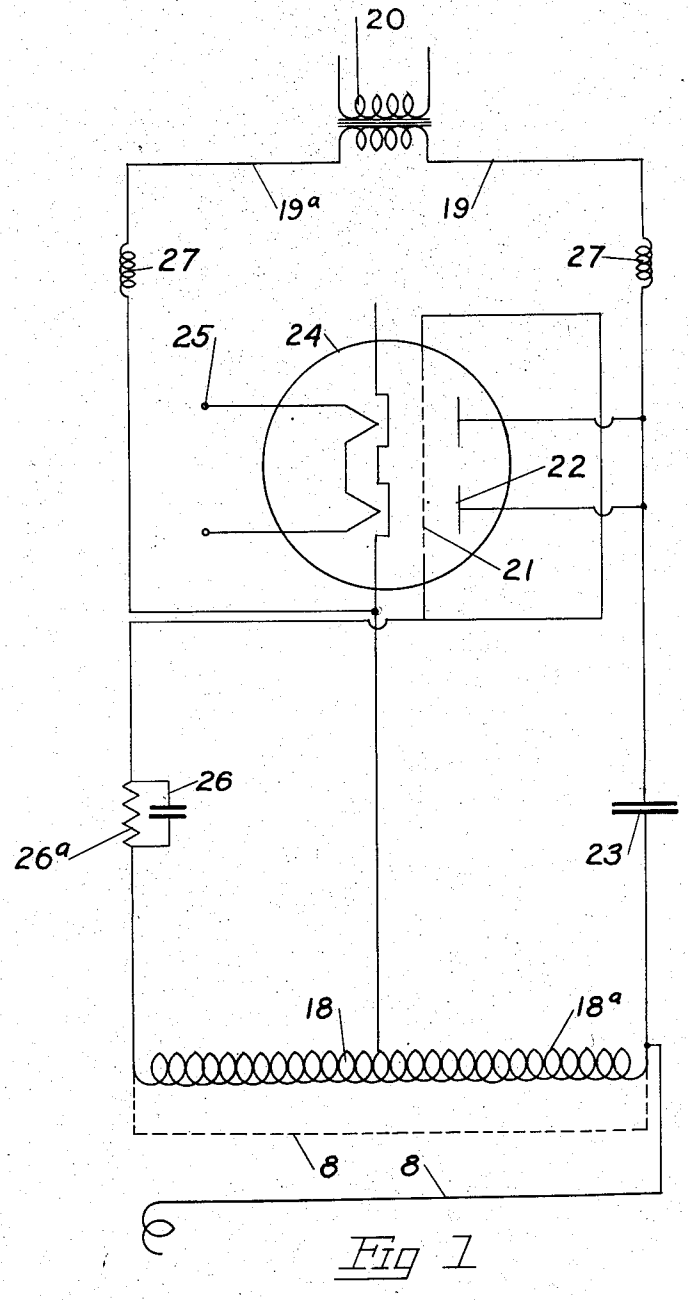


Fig 1

INVENTOR.
WILLIAM B. GREENLEE
BY
ATTORNEY.

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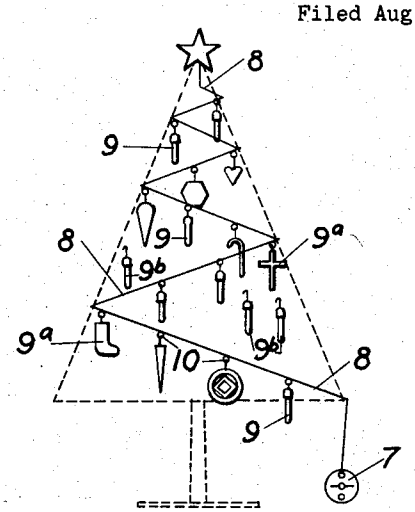


Fig 2

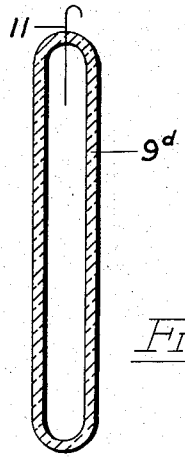


Fig 5

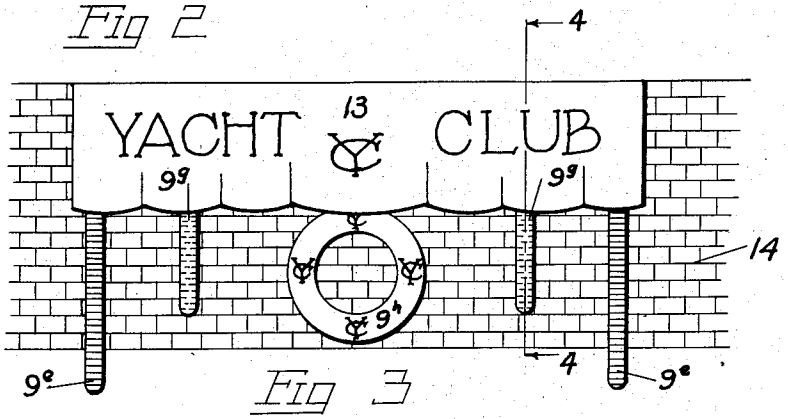


Fig 3

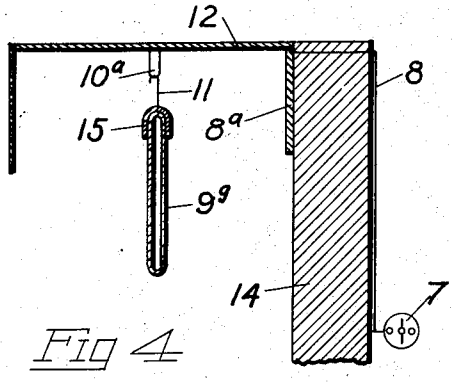


Fig 4

INVENTOR.
WILLIAM B. GREENLEE
BY
ATTORNEY.

Patented Jan. 6, 1942 2,268,870

UNITED STATES PATENT OFFICE

2,268,870

ORNAMENTAL LIGHTING SYSTEM

William B. Greenlee, Denver, Colo.

Application August 10, 1937, Serial No. 158,398

4 Claims. (Cl. 240—10)

This invention relates to ornamental and display lighting and more particularly relates to a lighting system adapted for use on Christmas trees and the like.

It is an object of the present invention to provide a lighting system in which various units to be illuminated may be located at selected positions to satisfy ornamental requirements and which will be effectively illuminated by the system regardless of location.

Another object of the invention is to provide an ornamental lighting system which will permit the illumination of a relatively large number of lamps in the system at a relatively low operating cost.

A further object of the invention is the provision of a lighting system for Christmas trees and the like in which the hazard of electric shock and fire hazard is reduced to a minimum and which may be readily installed and operated by persons inexperienced with electrical equipment.

Other objects reside in novel details of construction and novel arrangements of parts, all of which will appear more fully in the course of the following description.

To afford a better understanding of the invention, reference is made to the accompanying drawings in the several views of which like parts have been designated similarly and in which:

Figure 1 is a diagrammatic representation of a circuit employed for establishing a high frequency field utilized in the present invention;

Figure 2 is a diagrammatic representation of the system of the present invention applied to Christmas tree lighting;

Figure 3 is a front elevation of a display lighting arrangement embodying features of the present invention;

Figure 4 is a section taken along the line 4—4, Figure 3;

Figure 5 is a sectional view of an embodiment of the lamp construction used in the present invention; and

Figure 6 is a sectional view of another embodiment of the lamp construction used in the present invention.

In practicing the present invention, illumination is obtained by locating lamps of the well-known gaseous glow type in a high frequency field in a manner similar to that disclosed in my copending application Ser. No. 741,818, filed August 28, 1934 for Sign. Features disclosed but not claimed herein have been described and claimed in the aforesaid application, of which the present application is a continuation in part.

Referring now to Figure 2 in which a Christmas tree has been represented in dotted lines, the reference numeral 7 designates a switch controlling the energization of a conductive element 8 which in practice preferably comprises a flexible conductive wire of a length sufficient to permit its being wound several times around the tree.

This wire is suitably connected with a source of high frequency current and is energized thereby to set up a high frequency field which envelops the tree or at least a substantial portion of the same.

Lamps 9 of the neon type are fastened on the tree in any suitable manner and disposed within the energy field, whereupon they become illuminated. In addition to lamps 9 of the usual tubular type, the lamps 9a of the present invention may be formed into simulations of natural or fanciful objects and characters, and a variety of gases are used in filling the lamps to provide color variations when the lamps are energized, as well as using a variety of glass for the same.

As an example, a tube filled with neon gas will give a red color, helium in a yellow tube will give a gold or golden yellow color, a mercury-argon mixture in a fluorescent white tube will give a white light, the same mixture in a white tube or a shaded tube will give blue or purple, while in a yellow tube it will produce a green color. Various other materials may be used for the same purpose and the foregoing is merely illustrative and in no sense a limitation either of color ranges or means of obtaining the same.

In Figure 2 the reference numeral 9 designates the usual type of tubular lamp which may be constructed in the manner illustrated in Figures 4, 5 and 6, or in any other suitable manner. Preferably, the conductive element 8 is provided at intervals with a series of conductive loops 10, while the tubes 9 and 9a are equipped with conductive hooks 11, or other suitable means, for attachment to the loops of the wire.

The foregoing arrangement provides a simple and convenient means for placing the lamps in selective positions on the tree and assuring positive actuation at all times. However, it should be understood that direct contact is not an essential of the present invention and so long as the tubes are maintained within the energy field they will be illuminated. As an example, in Figure 2 certain tubes have been represented as suspended directly from the tree out of contact with the wiring, as indicated by the reference numeral 9b and these tubes will be effectively illuminated

by reason of their being within the energy field.

In Figures 3 and 4 a display lighting arrangement is illustrated which serves to point out the decorative advantages of the present invention. Two sets of tubes in different colors are illustrated in Figure 3, tubes 9e being lined to indicate a blue color, while tubes 9g are lined to indicate a white or silver color. Intermediate the tubes 9e and 9g another tube 9h simulating a life preserver in appearance is suspended from a support 12 as are the tubes 9e and 9g.

A curtain 13 or other suitable decorative element is hung in front of the upper portion of the tube in this arrangement to conceal the suspension from observers, and any suitable background such as the wall 14 is provided which also functions as an anchor for the support 12.

An unusual feature of the present invention is that the lamps may be movably supported and, as illustrated in Figure 4, this movable arrangement consists in suspending the lamps for swinging movement from a loop 10a on the support 12.

It will be apparent that when there is sufficient movement of the air to impart movement to the lamps 9e, 9g and 9h in the arrangement illustrated in Figure 3, an unusual and effective lighting arrangement is obtained.

Due to the fact it is not essential to have the lamps of the present invention in direct connection with an electrical conductor, many unusual shapes and color arrangements can be obtained.

It will be understood that the embodiments of the invention illustrated in Figures 2 and 3 are merely illustrative of the applications of the invention and are in no sense intended as a limitation of the scope of the invention.

Referring further to Figure 4, the wiring arrangement is also illustrated in which a switch 7 controls the energization of a conductor 8 which has its terminus in a conductive plate 8a placed in proximity to the several lamps 9e, 9g and 9h to establish an energy field effective for illumination of the aforesaid lamps.

Several different forms of tube construction have been shown, all of which may be effectively employed in the present invention. In the simplest form a tube such as the tube 9g, illustrated in section in Figure 4 and similar to the tubes designated 9 in Figure 2, is provided at one end with a cap 15 which fits over an end of the same and carries a hook 11 for its attachment to a support in the manner illustrated herein. The cap may be held on the tube in any suitable manner as by cementing or merely employing a tight fit.

The form of tube 9d illustrated in Figure 5 may be termed the electrode type in which the hook 11 is a conductive element which extends through the glass body of the tube into the gaseous matter with which the tube is filled.

The form of tube 9c shown in Figure 6 involves a grooved surface 16 on the tubular body, and the cap 15 is provided with a detent 17 which fits into the groove to prevent accidental separation of the tube from the cap. While the groove in this form has been illustrated as of annular form, it will be apparent that any groove and detent arrangement other than that illustrated, which will be effective for the intended purpose, is within the contemplation of the invention. Likewise, other structural modifications may be employed and the forms illustrated are described merely to point out satisfactory means for performing the present invention.

While my co-pending application, Serial No. 741,818 discloses a suitable method and means for creation of a high frequency field of the type required in the present invention, it is advisable in cases where low operating cost is a desideratum, such as Christmas tree lighting and various types of display lighting, to employ a circuit in which current consumption is reduced to a minimum.

To this end, the circuit of Figure 1 is illustrated as an effective means of maintaining a high frequency field in which a relatively large number of lamps may be energized under nominal operating expense.

The frequency of the circuit is very closely determined by the constants of the inductance and capacitance circuit, which are combined into one unit, the tank coil 18. This arrangement is possible since the frequency is not critical and sufficient capacity can be derived from the tank coil windings 18a and other parts of the circuit to eliminate the necessity of introducing additional capacity in parallel with the tank coil as is usually done in a circuit of this character.

The pulsations of high frequency current are produced in the following manner: An impulse of current enters the circuit from the plate circuit 19, where a transformer 20 is tapped in two places on the secondary as indicated at 19 and 19a to provide a low filament voltage (6.5 v. for example) and a high plate voltage (350 v. for example), and this impulse builds up an inductive field in the tank coil 18.

As soon as this reaches its peak value, the field collapses and produces a surge of current which is built up into a capacity effect in the capacity of the circuit. When this reaches a peak it collapses in like manner and produces a surge of current in the opposite direction. Continuation of this action results in an oscillating current.

The pulsation of current through the grid portion 21 of tank coil 18 varies the grid potential and thereby causes similar pulsations of current to flow to the plate 22 of the tube and into the tank circuit to replace the energy drawn off through the conduction element 8.

The plate blocking condenser 23 is used to provide a low impedance path for radio frequency currents while preventing the plate voltage, which is self-rectified through the action of tube 24, from being short circuited to the filament 25.

The grid condenser 26 insulates the grid 21 from filament 25 to permit the bias voltage to develop in the grid lead 26a. Radio frequency chokes 27 are used to provide a low impedance path for the plate voltage, while preventing the high frequency current of the circuit from leaking back into the line.

From the foregoing, it will be apparent that current entering the circuit through transformer 20 from a suitable source is converted into high frequency current in the circuit which becomes the energy source for illumination of the lamps, as hereinbefore described.

In this connection, it will be understood that either a single pole or a two pole conductive system may be employed in the creation of the energy field. The single pole system is similar to that illustrated in my co-pending application, Serial No. 741,818, and is indicated in solid lines by the reference numeral 8 in Figure 1. The two pole system conforms to standard practice and has been indicated by the dotted line 8 in Figure 1.

In the various applications of the invention, such as are illustrated in Figures 2 and 3, either form may be employed, but since there is no fire

hazard, or danger from "shock," a single exposed wire is usually preferred for this purpose.

The provision of lamps which are not fixed, but adapted for movement independently of their supporting media is considered novel in the art, and by utilizing the feature of the present invention which permits energization of lamps not in direct contact with the conductive element, many unusual and decorative lighting effects may be obtained.

In this connection, a current of air has been described as a means of imparting movement to the lamps, but it will be understood that any mechanism suitable for this purpose may be utilized in connection with the illuminating media.

Changes and modifications may be availed of within the spirit and scope of the invention as defined in the hereunto appended claims.

What I claim and desire to secure by Letters Patent is:

1. An ornamental lighting system, comprising a source of high frequency electrical energy, a flexible conductor connected therewith and adapted to be wound in selective positions about a medium to be illuminated, means at intervals along the conductor for interchangeable connection with gaseous-glow type lamps of different designs, a plurality of gaseous-glow type lamps of different design selectively located along the conductor, and means on each of said lamps cooperative with said first-mentioned means for suspending the lamps therefrom.

2. An ornamental lighting system, comprising a source of high frequency electrical energy, a flexible conductor connected therewith and adapted to be wound in selective positions about a medium to be illuminated, means at intervals along the conductor for interchangeable connection with gaseous-glow type lamps of different designs, a plurality of gaseous-glow type lamps of different design selectively located along the conductor, and means on each of said lamps cooperative with said first-mentioned means for suspending the lamps therefrom in swinging relation thereto.

3. In a lighting system of the character described, a gaseous-glow type lamp inclusive of a non-conductive translucent tube having an indentation adjacent an end thereof, and a cap at the indentation end of the tube with a resilient detent fitted in said indentation and provided with lamp-supporting means.

4. In a lighting system of the character described, a source of high frequency electrical energy, a flexible conductor connected therewith and adapted to be wound in selective positions about a medium to be illuminated to create an energy field thereabout, means at intervals along the conductor for connection with gaseous-glow type lamps, gaseous-glow type lamps of different designs interchangeably mounted on said means in the energy field, and means on each of said lamps cooperative with said first-mentioned means for suspending the lamps therefrom in swinging relation thereto.

WILLIAM B. GREENLEE.