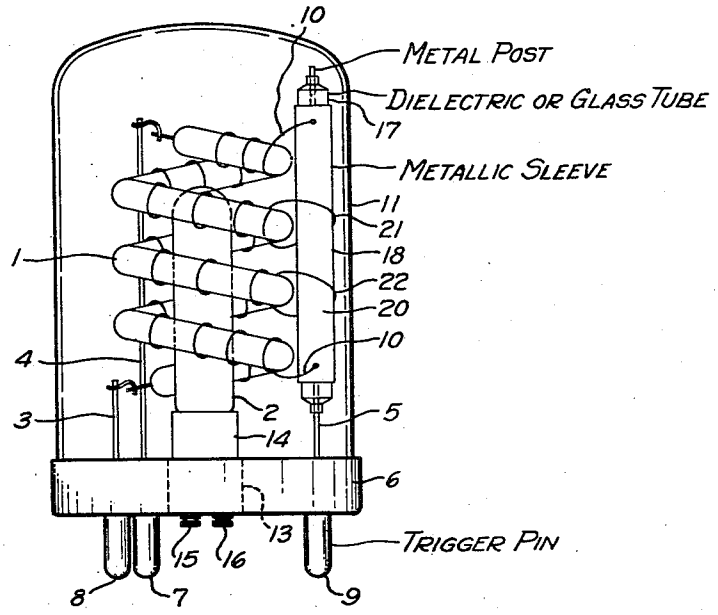
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PHOTOGRAPHIC LIGHT UNIT

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PHOTOGRAPHIC LIGHT UNIT

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2 Claims. (Cl. 315—60)

This invention relates to electric discharge lamps which are utilized to produce intense flashes of light of highly actinic value for photographic purposes.

Such lamps are now well known as flashtubes and comprise a tubular discharge envelope having electrodes and a filling of gas, frequently xenon, at a pressure of several centimeters. It is necessary to initiate a discharge in such a lamp by the provision of an auxiliary electrode to which a momentary high voltage is applied while the operating voltage is present between the main electrodes.

In order to provide a source suitable for photographic purposes it is customary to form the tubular envelope of the lamp into convolutions so that the lamp presents a more compact light source. It is also usual to provide the auxiliary electrode for discharge initiation in the form of a wire wound around the external periphery of the envelope so that it acts capacitively on the discharge space.

If such a lamp becomes unduly heated before operation there is a tendency that the imposition on the external starting wire of the high voltage necessary for initiating the discharge may puncture the vitreous envelope of the lamp because the resistivity of the envelope has been lowered. A puncture of the envelope terminates the useful life of the lamp.

It is an object of the present invention to provide means for reducing this possibility. Further objects and advantages of the invention will appear from the following description of a species thereof, from the accompanying drawing and the appended claims.

In an electric discharge lamp having an elongated tubular envelope formed into convolutions so as to present a light source of small dimensions, according to the invention, the envelope is supported by metal posts, at least one of the posts being constructed to form a component of a capacitor in the starting electrode circuit whereby to limit the capacitive current in the starting circuit.

In carrying out the invention the light transmitting envelope of the lamp is conveniently wound into a helical form and supported from and mounted on a base from which extend the posts which support the envelope, one of the posts being surrounded by a closely fitting glass tube around which is closely wrapped metal foil so that the metal foil and the post together form a capacitor. The wire which constitutes the starting electrode and is wound around the envelope of the lamp is now brought into engagement with the metal foil surrounding the glass tube and is conveniently arranged to embrace the foil so as to maintain it in position on the glass tube. The capacitor so formed is thus in series with the starting electrode wire, and when the transient high potential for initiating a discharge through the lamp is imposed on the starting wire, the capacitor reduces the capacitive current through the tubular envelope of the lamp.

The invention is of particular value in connection with a flash discharge lamp which is used with an incandescent

lamp housed within the helical convolutions of the discharge lamp. The incandescent lamp is supplied with current to form a source of continuous low brightness for modelling purposes, and the flash lamp is energized when required. Since the incandescent lamp may have been in operation for some time prior to the production of the flash from the discharge lamp, the heat generated by the lamp may be sufficient to reduce the resistivity of the vitreous envelope of the lamp forming the discharge tube, whereby liability to puncture when the discharge tube is flashed is increased.

By the provision of the capacitance formed in the manner above described in the starting circuit, the tendency for breakdown of the glass envelope of the discharge tube is materially reduced. The invention is also useful in connection with flash discharge tubes having quartz envelopes even though quartz is less apt than glass to puncture.

In the single figure of the drawing accompanying and forming part of this specification, a lamp unit embodying the invention is shown in an elevational, partly sectional view.

Referring to the drawing, the arrangement of parts in the embodiment shown is as follows:

The glass envelope 1 of the flash discharge tube, which is shown schematically, is formed as a helix within the convolutions of which the incandescent modelling lamp 2 is mounted or housed. Metal posts 3, 4 and 5 supporting the discharge tube extend upward from an electrically insulating annular base 6 in a direction parallel to the axis of the helically coiled discharge tube envelope 1. One of the posts 4 serves to connect the electrode (usually the cathode) sealed within the end of the envelope of the discharge tube more remote from the base 6 to the contact pin 7 of the group of spaced metal contact pins 7, 8 and 9 secured to the base 6. Another post 3 serves to connect the electrode (usually the anode) sealed into the opposite end of the envelope 1 to the contact pin 8 while the remaining post 5 is connected to the pin 9 and constitutes part of the capacitor which, in accordance with the present invention, is connected in series with the starting wire 10 wound around each of the turns of the envelope 1. The base 6 also supports the external protective light transmitting glass envelope or jacket 11 enclosing both the flashtube and the incandescent lamp and the base 6 closes the open end of said jacket. The center portion of the base 6 has an opening therein, indicated at 13, accommodating the incandescent lamp socket 14 which is removably attached to the base 6 and which is provided with spaced electrical contact members 15 and 16. A suitable arrangement of the base and socket parts of the unit is disclosed and claimed in the E. B. Noel Patent 2,549,330, dated April 17, 1951, and assigned to the assignee of this application.

As shown in the drawing, the supporting post 5 extends through a dielectric tube 17 mounted thereon. The tube 17, which may be a glass tube, is wrapped with metal foil 20, such as aluminum foil, which forms a metallic sleeve of the capacitor made up of the elements 5, 17 and 18. The starting wire or triggering electrode 10 is connected in series with the said capacitor and the envelope 1 of the flashtube is tied to the capacitor by metal wire loops 21 and 22 so as to be supported at least in part thereby.

By way of example, the capacitor 5, 17 and 18 in the above-described unit may have a capacitance of the order of about 10 microfarads and is effective for minimizing the tendency for breakdown of the glass envelope 1 of a flashtube known commercially as the FT-403 connected to a flashtube circuit of the type disclosed in U. S. Patent 2,277,697 to H. E. Grier and wherein the

circuit includes a transformer, known in the trade as a "trigger coil" or "ionizing transformer" capable of supplying, in the absence of the capacitor 5, 17 and 18 of the present invention a potential of about 10 kilovolts to the starting wire 10 of the flashtube for ionizing the gaseous atmosphere within the envelope 1.

While I have shown and described a specific embodiment of the invention, it will be understood of course that I contemplate that changes in the form and details of the device may be made without departure from the invention; for example, the electrode 10 may be in the form of a conductive strip or strips on the outer surface of the envelope 1 or may be in the form of a transparent conductive coating.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A photographic light unit comprising in combination, a supporting base of electrically insulating material, conductive supports upstanding from and attached to said base and a flashtube attached to said supports and having a tubular vitreous envelope containing an ionizable atmosphere and subject to puncture by passage of a high capacitive current through the wall thereof, an external electrode on said envelope for ionizing the atmosphere therein by capacitive action through said envelope wall to flash the flashtube, one of said conductive supports constituting a capacitor and being connected in series with said external starting electrode for minimizing the tendency for breakdown of the vitreous envelope by reducing the capacitive current through the said envelope wall, a part of the tubular envelope of said flashtube between the ends thereof being secured to said capacitor support.

2. A photographic light unit comprising in combination, an annular supporting base of electrically insulating material providing an opening for receiving a socket for an incandescent modelling lamp and having conductive supports upstanding from and attached to said base around said socket opening, a flashtube attached to said supports and having an helically coiled tubular vitreous envelope disposed with the axis of the helix extending through the center of said socket opening, said envelope containing an ionizable atmosphere and being subject to puncture by passage of a high capacity current through the wall thereof, an external electrode on said envelope for ionizing the atmosphere therein by capacitive action through said envelope wall to flash the flashtube, one of said conductive supports comprising a metal post extending through a dielectric tube attached thereto and a metal sleeve on said dielectric tube, said support constituting a capacitor and being connected in series with said external starting electrode for minimizing the tendency for breakdown of the vitreous envelope by reducing the capactive current through the said envelope wall, the turns of said helically coiled tubular envelope of said flashtube being secured to said capacitor support.

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