July 23, 1935. F. ABSHAGEN 2,009,215

ELECTRIC DISCHARGE DEVICE

Filed Jan. 2, 1932

Fig. 1

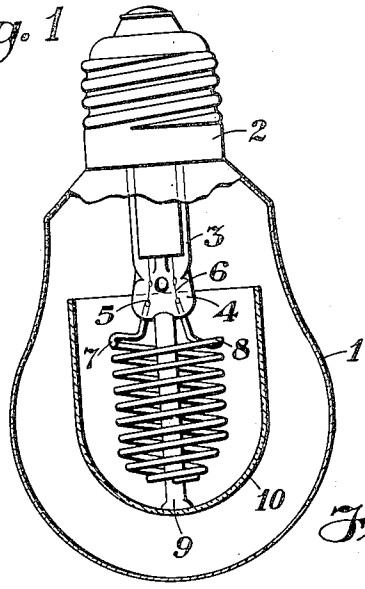


Fig. 3

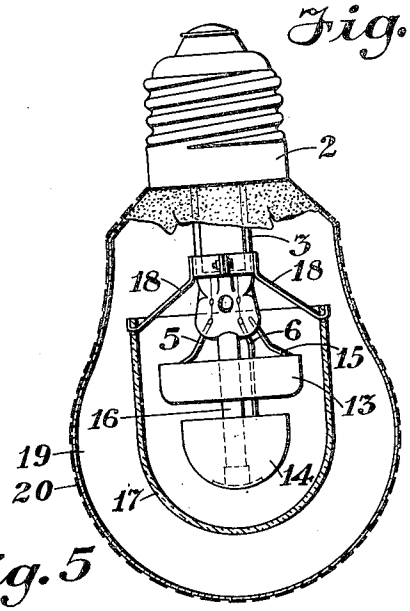


Fig. 5

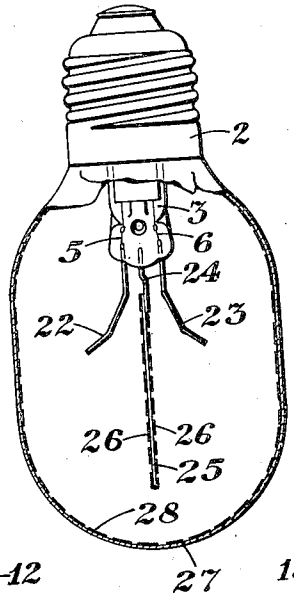


Fig. 2

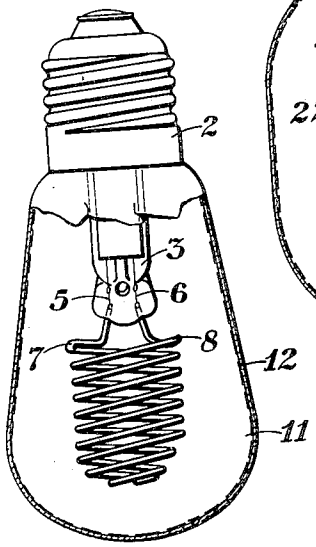
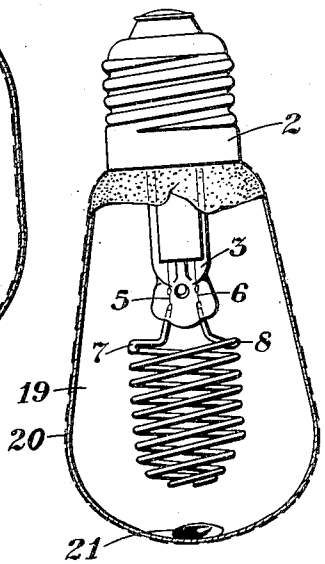


Fig. 4



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ELECTRIC DISCHARGE DEVICE

Franz Abshagen, Berlin, Germany, assignor to General Electric Company, a corporation of New York

Application January 2, 1932, Serial No. 584,544
In Germany January 6, 1931

1 Claim. (Cl. 176—122)

The present invention relates to electric discharge devices generally and more particularly the invention relates to such devices useful as a dark room lamp in the developing processes of the photographic art.

It is now known in the art that photographic developing emulsions are least sensitive to green light and that light of this wave length may be used in a photographic dark room at sufficient intensity to render visibility to the developing process without injuriously affecting the photographic films and plates being developed, this being true even in the case of panchromatic films and plates. The object of this invention is to provide a light source for a photographic dark room. Another object of the invention is to provide a light source rich in light within the spectral range least harmful to photographic developing emulsions. A further object of the invention is to provide such a light source of great efficiency and of great simplicity in structure and in operation. Still further objects and advantages attaching to the device and to its use and operation will be aparent to those skilled in the art from the following particular description and from the appended claim.

In accordance with these objects the invention comprises an electric discharge device of the negative glow type having a body of green fluorescent material located in the path of the light rays emanating from the gaseous filling in said device. The green fluorescent body transmits the green light rays emanating from said gaseous atmosphere and changes into green light the visible and invisible light rays of shorter wave length than the green light, in particular the blue, violet and ultra violet rays, emanating from said gaseous atmosphere and indeed to light rays within a spectral range corresponding to that most suitable for use in connection with photographic developing processes. The container of the electric discharge device is filled with a gas the spectrum of which is relatively strong in green and weak in light rays of other wave lengths. The stray light rays, other than the green rays, may be cut off by a green filter and for this purpose the container itself may be such a filter consisting of a green glass such as those disclosed in the patent to Taylor, #1,572,625, issued February 9, 1926, or said container may be of a clear glass having a green filter applied thereto. If the container of the device is filled with a gas, such as argon, krypton, or xenon or a mixture of these gases, which is a comparatively weak light emitter the green filter may be omitted. The strength of the green light is increased if a drop of mercury is present in the container of the device together with an easily ionizable principal gas, the spectrum of mercury vapor being rich in green light rays as is well known in the art.

In the drawing accompanying and forming part of this specification several embodiments of the invention are shown in which

Fig. 1 is a front elevational view, partly in section, of one embodiment of the invention.

Fig. 2 is a similar view of another embodiment of the invention.

Fig. 3 is a similar view of another embodiment of the invention.

Fig. 4 is a similar view of another embodiment of the invention, and

Fig. 5 is a similar view of still another embodiment of the invention.

Like numbers denote like parts in all the figures.

Referring to Fig. 1 the new and novel photographic dark room lamp comprises a container 1 having the usual threaded socket member 2 attached thereto. Said container 1 is provided with the usual stem 3 and the ends of coiled wire electrodes 7 and 8 and leads 5 and 6 connected thereto respectively are sealed into pinch-part 4 of said stem 3, said coiled wire electrodes 7 and 8 are equi-distant from each other at all respective parts thereof. Container 1 is filled at a low pressure with an easily ionizable gas such as argon, krypton, xenon or a mixture of such gases. Green glass fluorescent body 10 partly surrounds said electrodes 7 and 8 and is supported in said container 1 by glass rod 9 fused to the pinch-part 4 of said stem 3. Said fluorescent body 10 is of a green fluorescent glass such as uranium glass or Præsodymium glass. Due to its position with respect to said electrodes 7 and 8 practically all the light rays emitted by the glow discharge covering said electrodes 7 and 8 fall upon said green fluorescent body 10 which transmits the green colored light and changes the visible and invisible light rays of shorter wave length than said green colored light into visible green colored light. The stray light rays emanating from the glow discharge which are of different wave length than the green colored light are cut off, if desired by making the container 1 of a green filter glass such as those disclosed in the patent to Taylor referred to hereinbefore and of normal thickness, or said container 1 may be of clear glass of normal thickness and have a thin green filter coating thereon such as a translucent green enamel or a green lacquer, or a Wrattan filter.

The embodiment of the invention shown in

Fig. 2 is in all respects similar to that shown in Fig. 1 except the green fluorescent body 10 and the support rod 9 thereof is omitted and the container itself is a green fluorescent body 12 provided with a green colored filter coating 11 such as a translucent green lacquer. If desired the container may consist of two layers of glass the inner layer being of a green fluorescent glass and the outer layer of a green filter glass.

In the embodiment shown in Fig. 3 current lead 5 is connected to a ring shaped electrode 13 said electrode 13 being supported by support wires 15 sealed in said stem 3, and current lead 6 is connected to a cap shaped electrode 14, said electrode 14 being supported in said device by glass rod 16 fused to said stem 3. Said electrodes 13 and 14 are surrounded by a light filter 17 supported by members 18 attached to a collar around said stem 3. Said filter 17 consists of a glass, such as black uviol glass, well known in the art, which transmits only ultra-violet light rays. Container 19 consists of a green fluorescent glass such as those heretofore disclosed which may be coated with a translucent green lacquer 20 if a particularly green spectral color is desired.

The embodiment shown in Fig. 4 has a container 19 similar to that shown in Fig. 3 and has therein a filling consisting of an easily ionizable gas such as argon, crypton or a mixture of these gases and a drop of mercury 21. During the operation of the device the mercury vaporizes and the spectrum of the light of the mercury vapor predominates the spectrum of the light of the gas filling as is well known in the art. The mercury vapor discharge is on one hand very rich in green rays and on the other hand is rich in other rays of shorter wave length such as the blue and ultra violet rays to evoke a strong green fluorescence in the uranium glass container 19. If desired the embodiments of the invention shown in Figs. 1, 2 and 3 may also have in the container of the device a quantity of mercury.

In the embodiment shown in Fig. 5 the device comprises two plate electrodes 22 and 23 which are placed on opposite sides of a plate 25, said plate 25 being coated on both sides with a green fluorescent substance 26 such as zinc-sulphide, zinc-silicate, or calcium-tungstate. Said plate 25 may consist of any suitable material such as metal, mica, or glass and is supported by rod 24 sealed into stem 3. Container 27 consists of a green glass of normal thickness or said bulb may consist of clear glass of normal thickness having thereon a translucent green internal coating 28. A quantity of mercury may be introduced into the container 27 if desired. Plate 25 itself may be made of a green fluorescent material if desired.

While I have shown and described five particular embodiments of my invention it will of course be understood that numerous substitutions, modifications and changes in the forms and details of the device and in its use and operation may be made by those skilled in the art without departure from the broad spirit and scope of the invention, for example, the shape of the container, the electrodes and the green fluorescent body may be varied; a normal cathode glow lamp having a container of a glass which transmits ultra-violet radiations may be enclosed in a metal hood having a window of fluorescent glass and said window may have a green coating if desired.

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

A photographic dark room lamp emitting a light harmless to photographic developing emulsions comprising a container, negative glow discharge electrodes sealed therein, a gaseous atmosphere therein, the light emitted by said device being rich in green radiations and in light radiations of shorter wave lengths, a green fluorescent body in operative relation to said device to transmit the green light rays and transform the visible and invisible light rays of other wave lengths into visible green light and a filter in operative relation to said device adapted to screen out the light, other than the green light, emitted by said device and by said fluorescent body.

FRANZ ABSHAGEN.