

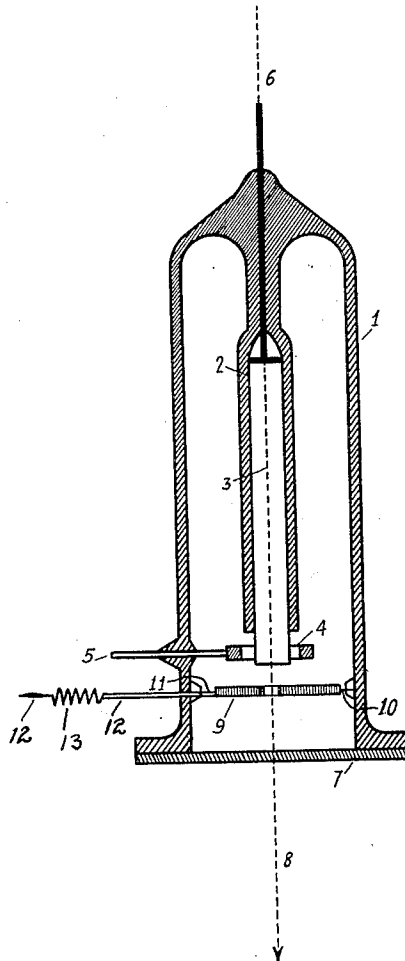
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P. SCHNITZELER

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PROTECTIVE ARRANGEMENT FOR GLOW DISCHARGE LAMPS

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INVENTOR
PETER SCHNITZELER
BY *Thos. J. Adams*
ATTORNEY

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PROTECTIVE ARRANGEMENT FOR GLOW
DISCHARGE LAMPS

Peter Schnitzeler, Berlin, Germany

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The present invention relates to glow-discharge lamps for photographic purposes, especially of the kind employed for recording variations of current in the form of light variations as applicable to picture transmission systems and the like. In lamps of this kind, the light is utilized only in a certain direction which coincides with the axis of the optical system giving an image of the luminous body, the latter in this case, being the gas volume caused to luminesce by virtue of the glow discharge, the gas volume being mostly given large proportions in the working direction so as to insure a high concentration of light.

In lamps of this kind, on account of the concentration of the discharge, considerable disintegration of the electrodes, especially of the cathode, is likely to occur. This disintegration is particularly marked whenever the discharge is very crowded in one direction, for instance, when the glow discharge is produced inside a concave cathode or when the discharge is made to pass through constrictions. By the incidental disintegration, the life of the lamp for the purpose here stated is considerably diminished because the region where the light emerges becomes coated with an opaque layer of metal.

It is, therefore, an object of the present invention to avoid this drawback by reason of the fact that the place of emergence of the light is protected by means of a screen or diaphragm from the impacting of spattered metal particles. Another object of my invention is to provide a screen or diaphragm which may be used at the same time as the optical diaphragm, since it cuts out a certain portion of the radiation of the lamp so that the remaining portion is properly defined as to size and shape.

One embodiment of the basic idea of the invention is shown in the accompanying drawing. Inside the elongated discharge vessel 1, protected by an insulating tube 2, there is mounted the cylindrical hollow cathode 3 having a great dimension in the working direction indicated by the dashed arrow 8 so that the luminous intensity of the cathode glow produced inside 3 is integrated over a correspondingly greater distance. The current is led in through a wire 6 sealed in the glass. The co-acting electrode 4 has the form of a concentric ring and serves as the anode in the case of direct current which is supplied through the lead-in connection 5. The lamp vessel is conveniently closed by a plane-parallel window 7 cemented thereto. The window preferably consists of glass or some other material permeable to the desired sort of radiation and, for instance, it might be made of quartz in a case where ultraviolet light is to be used.

In the case of an arrangement as here illustrated, marked cathode spatter is produced on

account of the concentration of the discharge inside 3, and this would render the window 7 opaque within a short while. The disintegration is particularly pronounced in such cases where the passage of the discharge from the electrode 4 to the cathode 3 takes place through additional constricted portions adapted to intensify the concentration of the light. In all arrangements of this kind, a diaphragm or screen 9 is provided according to this invention, said diaphragm or screen having suitably the shape of a metal plate perforated in the middle and is attached by welding to the discharge vessel by the aid of small radial wires 10, 11, welded onto glass beads. The screen 9 serves suitably not only for the protection of the window 7 against metallic spatter, but at the same time as the diaphragm which precludes all undesirable light from the optical means, and which thus permits cutting out of the radiation a portion of desired size and form.

The arrangement could be also so chosen that the screen and diaphragm 9 forms the co-operating electrode of electrode 3, in which case the electrode 4 may be dispensed with. However, it may occasionally be found a better plan to provide the electrode 4, and to impart a very marked negative potential to the screen 9 compared with electrodes 4 and 3, by providing a supply lead 12 brought in from the outside in which a high resistance 13 is inserted, for it has been shown that it is thus possible to deflect spattered particles traveling in the direction of the screen 9 in such a way that the number thereof reaching window 7 through the central opening of the diaphragm becomes far smaller than in the absence of a charge on the screen 9.

Having now described my invention, what I claim is:—

1. A glow-discharge lamp, comprising, a cathode and an apertured anode adapted to cooperate to emit luminous rays, a window through which the said rays are passed, and a screen having a central light permeable portion interposed between said anode and cathode structure and said window for collecting metallic particles which are separated from said cathode structure due to disintegration of said cathode.

2. A glow-discharge lamp including a cylindrical cathode member, an anode member cooperatively associated therewith, means for applying electric potentials between said cathode and anode structures for producing luminous rays, a window positioned opposite said anode and cathode structure for passing the luminous rays emitted by the cooperative action of said anode and cathode, and an apertured diaphragm positioned between said anode and cathode structures and said window for passing light through its aperture and collecting on its outer portion

disintegrated particles emitted from said cathode by the application of said electric potentials.

3. The glow-discharge lamp claimed in claim 2 including, in addition, means for applying electric potentials to said diaphragm member relative to said cathode for accentuating the action thereof in collecting said disintegrated particles from said cathode.

4. A glow-discharge lamp comprising an anode and a cathode structure for producing luminous rays upon an application of an electric potential between said anode and cathode, an apertured diaphragm cooperatively associated with said anode and cathode member for passing light through its aperture and collecting on its outer portion disintegrated particles emitted from said cathode by a disintegration thereof produced by the applications of said potentials and said diaphragm also serving as a screen for screening detrimental luminous rays emitted from passing beyond said diaphragm, and a window positioned opposite said anode and cathode structures and said diaphragm for passing the said luminous rays emitted.

5. In a glow lamp structure, a cathode electrode and an anode electrode cooperatively associated and adapted to produce luminous rays upon applications of electric potentials between said electrodes, a window positioned opposite said anode and cathode structures for passing the luminous rays emitted from said anode and cathode, an apertured screen interposed between said anode and cathode structures and said window for passing light through its aperture and collecting disintegrated particles emitted from said cathode by said application of potentials and screening the said window from detrimental light rays emitted from the cooperative action of the said cathode and anode, and means for applying electric potentials between said screen member and said cathode for accentuating the action thereof and causing the same to function as one of the electrodes of the lamp.

6. A glow discharge variable intensity light source comprising a bulb, a cathode and an anode within the bulb, and a shield between the cathode and the wall of the bulb having an aperture in front of the cathode.

7. In a device of the class described, a bulb including a substantially flat optical window, a pair of spaced electrodes within the bulb, and a member interposed between one of said electrodes and said window and formed with an aperture of predetermined size and shape through which light may pass.

8. A source of light for producing a photographic record of light wave variations corresponding to sound wave variations comprising a bulb having a substantially flat optical window, a cathode within the bulb, an anode within the bulb, an ionizable gas within the bulb, and a member interposed between the cathode and said window and formed with an aperture of suitable size and shape for permitting the passage of light rays.

9. A source of light for producing a photographic record of light wave variations corresponding to impressed signalling variations comprising a bulb having a substantially flat optical window, a cathode within the bulb, an anode within the bulb, an ionizable gas within the bulb, and a member interposed between the cathode and said window and formed with an aperture of suitable size and shape aligned with the cathode.

10. A source of light for producing a photo-

graphic record of light wave variations corresponding to signalling variations comprising a bulb, a cathode within the bulb, an anode within the bulb, a metallic disk between the cathode and the wall of the bulb and said disk formed with an aperture of suitable size and shape positioned in front of the cathode.

11. A source of light for producing a photographic record of light wave variations corresponding to signalling variations comprising a bulb including a substantially flat optical window, an anode within the bulb, a cathode within the bulb, an ionizable gas within the bulb at such a pressure that at operating voltage a concentrated glow is produced, an opaque member positioned between the cathode and said window and formed with an opening permitting the passage of light rays.

12. A source of light for producing a photographic record of light wave variations corresponding to signalling variations comprising a bulb including an optical window, an anode within the bulb, a cathode within the bulb, an ionizable gas within the bulb at such a pressure that at operating voltage a concentrated glow is produced, and an opaque member positioned between the cathode and said window and formed with an aperture of suitable size and shape for permitting the passage of light rays.

13. A source of light for producing a photographic record of light wave variations corresponding to signalling variations comprising a bulb including an optical window, an anode within the bulb, a cathode within the bulb, an ionizable gas within the bulb, and an opaque member positioned between the cathode and said window and formed with an aperture of suitable size and shape arranged in substantial alignment with the cathode for permitting the passage of light rays.

14. In a device of the class described, a bulb including a pair of spaced electrodes between which a glow discharge is produced, an optical window through which said glow discharge may be observed, and a member interposed between one of said electrodes and said window and formed with an aperture of suitable size and shape for defining the glow discharge area observable.

15. A source of light for producing a photographic record of light wave variations comprising a bulb including a substantially flat optical window, an anode within the bulb, a cathode within the bulb, an ionizable gas within the bulb at such a pressure that at operating voltage a concentrated glow is produced about the cathode, an opaque member positioned between the cathode and said window and formed with an opening permitting the passage of light rays.

16. A glow discharge lamp comprising means including an apertured anode for producing luminous rays, an envelope therefor having a window portion through which the produced luminous rays are passed and screening means aligned between said ray producing means and said window.

17. The glow discharge lamp claimed in claim 16 wherein said screen is an apertured member.

18. The glow discharge lamp claimed in claim 16 wherein said screen is an apertured member, said aperture being aligned with the means to produce the luminous rays and adapted to permit the emitted luminous rays to pass through the apertured portion to the window and to collect on the solid portion the sputtered particles.