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ELECTRIC LAMP DEVICE

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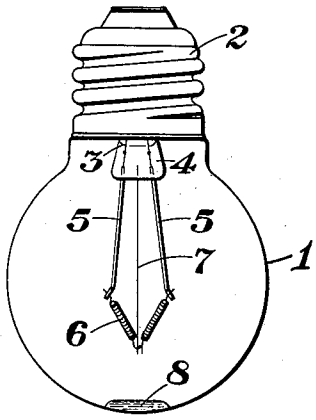

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ELECTRIC LAMP DEVICE

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3 Claims. (Cl. 176—1)

The present invention relates to electric lamp devices generally and more particularly the invention relates to such devices having an incandescent filament and a luminescent gaseous filling useful as a light source, and as an ultra violet generator.

In previous devices of this type the light emitted by the incandescent filament has drowned out the light emitted by the luminescent gaseous atmosphere so that the spectrum of the light emitted by such device was strong in the colors of the light emitted by the incandescent filament and weak in the colors of the light emitted by the luminescent gaseous filling. The object of the present invention is to provide a lamp device of the above type in which the spectrum of the light emitted by such device is as rich in the color of the light emitted by the luminescent gas as in the color of the light emitted by the incandescent filament. A further object of the invention is to provide such a device in which the filament consumes less current than in prior devices of the same type. A still further object of the invention is to provide such a device having a long operating life. Still further objects attaching to the device and to its use and operation will be apparent to those skilled in the art from the following particular description and from the claims.

In accordance with these objects the device comprises a metal filament having electron emitting material in operative relation therewith, either impregnated therein or coated thereon. The electron emitting material makes possible the ionization of the gaseous atmosphere in the container of the device at a lower temperature of the filament than in such devices having a filament consisting solely of high melting point metal alone. Since the filament operates at a low temperature it has a long operating life and the color and intensity of its emitted light does not drown out the light emitted by the luminescent gaseous atmosphere.

In the drawing accompanying and forming part of this specification an embodiment of the invention is shown in side elevation.

Referring to the drawing the lamp device comprises a glass container 1 having therein a stem 3. Screw base 2 is attached to said container 1. Two current leads 5 are sealed into pinch part 4 of said stem 3, said current leads 5 serving as a support for a coil shaped incandescent filament 6. Said filament 6 is supported by wire 7 attached to the mid-part thereof and sealed into the pinch part 4. Said wire 7 is not connected into the circuit. The container 1 is filled with the usual discharge conducting gases well known in the art such as, for example, argon, helium, neon, nitrogen or carbon dioxide. An especially good filling is a mixture of argon and helium at a pressure of 3 mm. A small quantity such as 1 gram or several grams, of a vaporizable material such as mercury is introduced into the tube and forms, as shown, a small drop or body 8. The vaporizable metal may also be in the form of a coating on the interior of the lamp chamber according to the material used. Sodium, potassium, cadmium, or magnesium may be used as the vaporizable metal if desired. The incandescent filament 6 consists of a high melting point metal, such as tungsten, coated with electron emitting material. The electron material may also be mixed in pulverized form with the metal of the incandescent filament during the making of said filament if desired. Instead of the electron emitting material being impregnated in the filament, it can also be a rod surrounded by the filament or a tube surrounding or surrounded by the filament. Such materials as the oxides of alkali or earth alkali metals are suitable for use as the electron emitting material.

When current is applied to the device the vaporizable material, pool 8, is vaporized by the heat radiations from the filament 6, and at the same time the filament 6 emits a heavy stream of electrons which ionizes the gas, argon and helium, in the container 1. Due to the potential difference of leads 5 an electric discharge parallel to the filament 6 is formed, supported by the ionized principal rare gas filling. This gaseous discharge excites the metal vapor, as is well known in the art, and brings said vapor to an intensive luminescence, so that the light output of the principal gas filling is drowned out.

In previous lamps of this type it was necessary to heat the filament to a temperature of 2,000° C. to obtain a discharge current of 100 milliamperes and to a temperature of 2400° C. up to 2500° C. to obtain a discharge current of ½ ampere; in the present invention, due to the electron emitting material of the filament, it is sufficient if the filament is heated only to 800 to 900° C. to obtain a discharge current of 100 milliamperes and only to 1100 to 1200° C. to obtain a discharge current of ½ ampere. Therefore less current is consumed by the filament in the present device and more by the gaseous atmosprere in said device. The filament need not be brought to a white heat,

a red heat or a yellow heat being sufficient to ionize the gaseous filling so that the intensity and color of the light emitted by the metal vapor filling is as strong or stronger than the light emitted by said filament. The lower operating temperature of the filament results in a longer life for the device.

It will be understood that the container is of quartz, uviol glass, Pyrex or lead or lime glass, and capable of transmitting all or a portion only of the lines of the spectrum of the light, visible or invisible generated by the device, as is now well understood in the art, such as a uviol glass, having a cut-off around 2750–3000A when it is desired to use the device as an ultra violet generator for health purposes.

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

1. An energy emitter comprising a container, a support therein, a conductor mounted on the support, said conductor being formed of straight sections positioned at an acute angle relative to each other, a coating of electron emitting material having an emissivity greater than that of thorium oxide on each of said sections, and an ionizable gas within the container, the breakdown potential per unit length of the gas along the sections of said conductor when heated being less than the potential necessary to bring the unit filament length up to dense electron emitting temperature.

2. An electric lamp device comprising a container, a gaseous filling therein, a substantially V-shaped filament sealed therein, said filament comprising a high melting point metal and one or more oxides of alkali earth metals for emitting sufficient electrons to excite said gaseous filling in a discharge between the legs of said V-shaped filament, said filament constituting the sole terminal source of the discharge.

3. An electric lamp device comprising a container, a gaseous filling therein, a substantially V-shaped filament sealed therein, said filament comprising a high melting point metal and one or more oxides of alkaline earth metals for emitting sufficient electrons to excite said gaseous filling in a discharge between the legs of said V-shaped filament, said filament constituting the sole terminal source of the discharge, said gaseous filling comprising a mixture of inert gas and a metal vapor.

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