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GASEOUS ELECTRIC DISCHARGE LAMP DEVICE

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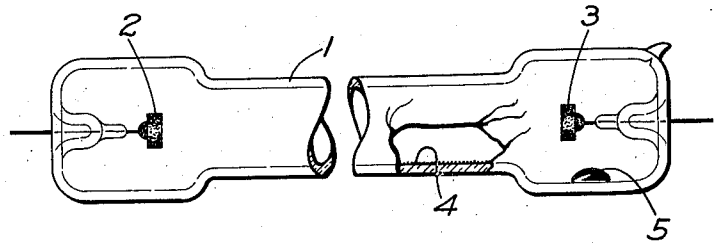

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GASEOUS ELECTRIC DISCHARGE LAMP DEVICE

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3 Claims. (Cl. 176—122)

The present invention relates to gaseous electric discharge lamp devices generally and more particularly the invention relates to such devices having a luminescent material associated therewith which material emits light during the operation of the lamp to complement and supplement the visible light emitted by the luminous gaseous electric discharge in the lamp.

Zinc-silicate is a good luminescent material for use in connection with mercury vapor discharge lamps as the yellow green color tone of the lamp is attractive for indoor and outdoor decoration. The usual method of preparing zinc-silicate for such use is by precipitating this material from a solution as a finely grained powder after which it is heated to a glowing temperature several times before the finished product is attained. During these heating periods the zinc-silicate becomes rather coarse grained, the size of the grains being 10 to 200 μ and larger in the finished product. The zinc-silicate used heretofore in conjunction with gaseous electric discharge lamps has had such grain sizes for it was believed that zinc-silicate, in common with other fluorescent materials, would be deleteriously affected by reducing the grain size by milling and would lose its fluorescent quality during the milling process.

The object of the invention is to provide a mercury vapor discharge lamp having zinc-silicate of small grain size associated therewith. Still further objects of the invention will be apparent from the following detailed description thereof and from the appended claims.

We have discovered that milling to reduce the grain size has no deleterious effect on zinc-silicate and that, in fact, the fluorescent quality of the zinc-silicate is improved, that is, this material emits light which is a closer approximation to daylight, when the grain size thereof is reduced to from 1 to 5 μ by milling after the manufacture of the zinc-silicate has been otherwise completed. The time required for the milling depends on the nature of the milling and the grain size of the zinc-silicate prior to the milling process. In one milling process carried out by us 100 grams of zinc-silicate having a grain size of from 10 to 50 μ was placed in a porcelain mill having an inside diameter of 10 cms. and a length of 12 cms. Twelve agate balls of 15 mm. diameter and 10 cm.^{3} of alcohol were placed in the mill and the mill was revolved for 50 hours at a speed of 50 revolutions per minute. When the milling operation has been completed the zinc-silicate had a grain size of approximately 1 to 5 μ and the fluorescent light emitted thereby was a much closer approximation to daylight than zinc-silicate of larger grain size. The change in the color of the light emitted by the zinc-silicate was observed under the analysis-lamp at intervals during the milling process.

The zinc-silicate having a small grain size is applied to the inner or outer surface of the container of a mercury vapor discharge lamp, or on a reflector, or light transmitting screen separate from but in operative relation to the lamp by methods now known in the art, as by using a volatile binding medium, such as glycerin, boric acid, or water glass, applied to the surface to be coated and then dusting the finely divided zinc-silicate on said binding medium after which the binding medium is volatilized leaving a coating of zinc-silicate on the surface.

In the drawing accompanying and forming part of this specification a mercury vapor discharge lamp having the internal surface of the container thereof coated with zinc-silicate having small grain size in accordance with the present invention is shown in a side elevational, partly sectional view.

Referring to the drawing the new and novel mercury vapor discharge lamp comprises a tubular, glass container 1 having electrodes 2 and 3 sealed therein at each end thereof and a body 5 of mercury therein. Said electrodes 2 and 3 consist of graphite though it will be understood that we contemplate the use of other types of electrodes, such as sheet metal electrodes, or thermionic electrodes in the lamp. When desired, said container 1 has a starting gas, such as argon, therein. Said container 1 has a coating 4 of fine grained zinc-silicate on the inner surface thereof which coating is applied thereto by the method disclosed above, or, when desired, any other method of applying such material to said surface is used.

During the operation of the lamp the zinc-silicate transforms the ultra violet light emitted by the mercury vapor discharge into visible light and preferably the coating 4 is of such thickness that the visible light emitted by the mercury vapor discharge between said electrodes 2 and 3 is transmitted by said coating 4 so that the lamp emits a mixed light from said discharge and said fluorescent coating 4. An approximation of the various shades of daylight is achieved by a lamp having the above structure.

While we have shown and described and have pointed out in the annexed claims certain novel features of the invention, it will be understood

that various omissions, substitutions and changes in the forms and details of the device illustrated and in its use and operation may be made by those skilled in the art without departing from the broad spirit and scope of the invention.

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

1. A gaseous electric discharge lamp comprising a container, electrodes sealed therein, a gaseous atmosphere therein capable of emitting visible and ultra-violet light when excited by an electric discharge therethrough and zinc-silicate mounted in light receiving relation to the discharge in said lamp, said zinc-silicate having a grain size of approximately 1 to 5 μ.

2. A gaseous electric discharge lamp comprising a container, electrodes sealed therein, a gaseous atmosphere therein capable of emitting visible and ultra-violet light when excited by an electric discharge therethrough and a coating of zinc-silicate on the inner surface of said container, said zinc-silicate having a grain size of approximately 1 to 5 μ.

3. A gaseous electric discharge lamp comprising a container, electrodes sealed therein, a gaseous atmosphere therein capable of emitting visible and ultra-violet light when excited by an electric discharge therethrough and a coating of zinc-silicate on the inner surface of said container, said zinc-silicate having a grain size of approximately 1 to 5 μ, said coating being pervious to the visible light emitted by said gaseous atmosphere.

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