

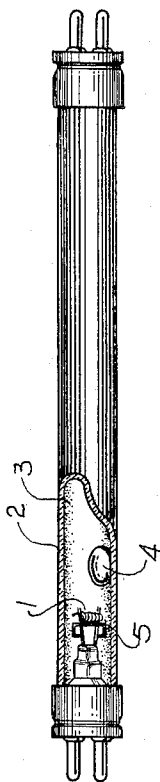
Aug. 8, 1944.

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2,355,258

ULTRAVIOLET FLUORESCENT LAMP

Filed May 13, 1941



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UNITED STATES PATENT OFFICE

2,355,258

ULTRAVIOLET FLUORESCENT LAMP

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Application May 13, 1941, Serial No. 393,178

2 Claims. (Cl. 176—122)

This invention relates to electric gaseous discharge lamps and more particularly to those capable of transmitting ultra-violet light.

An object of this invention is to obtain a gaseous discharge lamp which will transmit very little visible light.

Another object is to obtain such a lamp which will also transmit a substantial amount of ultra-violet light.

A further object is to obtain such a lamp which may be readily adapted for use in connection with signs, maps, etc.

Further objects, advantages and features will be apparent from the following specification taken in conjunction with the accompanying drawing in which:

The figure is a side elevational view shown partly in section of the lamp.

Many times it is desirable to illuminate an object and at the same time have a minimum amount of visible light given off. This is especially true with respect to the illumination of dials, clocks and other instruments on the dash boards of automobiles, airplanes and the like. This may be done by causing a film or layer of luminescent material to be spread over the surface of the area desired to be illuminated and by causing ultra-violet rays to be focused on the luminescent material. The ultra-violet rays will excite the luminescent material to a state of fluorescence.

Very often, however, efforts along this line have resulted in too much visible light being given off, thus detracting from the efficiency and the effect of the luminescent material on the face of the object being lighted. We have, therefore, devised an electric gaseous discharge lamp which not only possesses a high ultra-violet light output but which also gives off very little visible light.

By using a tubular glass envelope having a high ultra-violet and low visible light output in combination with a coating of a calcium or magnesium tungstate on the inner walls of the electric gaseous discharge lamp into which the tubular glass envelope is formed, the desired effect may be readily obtained.

As shown in the accompanying figure, the tubular glass envelope 2 is coated with a layer of luminescent material 3. The oxide-coated filamentary electrodes 1 are sealed in at each end of the envelope. A small quantity of mercury 4 is introduced into the sealed envelope. The lamp is then exhausted to a fine degree of vacuum, filled with an inert gas and sealed. The tubular glass envelope should be of the type which trans-

mits very little visible light and a substantial amount of ultra-violet rays. The luminescent material used should be one which gives a blue light when excited by ultra-violet rays. The inert gas may be argon at about 2 mm. pressure. Auxiliary electrodes 5 may be used to facilitate the starting of the discharge across the lamp.

We have found that when a coating of luminescent material on the inner walls of the lamp is not used, the ultra-violet rays transmitted by the glass are not of the wave length to properly excite the luminescent film on the face of the object to be illuminated. By applying the luminescent coating to the inner walls of the lamp, ultra-violet light of the desired wave length is emitted by the coating. We have found that blue-luminescent material adds considerably to the ultra-violet output of the proper wave length, because such a material if a tungstate, will emit considerable ultra-violet radiations of the invisible wave lengths just below the blue.

Thus our lamp combines two different elements to give an electric gaseous discharge lamp which will very efficiently and very effectively excite the luminescent film spread over the object desired to be illuminated. The glass which forms the envelope of the lamp is one possessing high ultra-violet and low visible light output and this glass envelope is coated with a layer of blue-luminescent material.

By using a type of glass generally known in the trade, as Corex red purple glass and a calcium tungstate luminescent material preferably lead-activated, a highly efficient lamp of this type may be obtained. Thus in the lamp of this invention, the electrical discharge in the mercury and argon mixture will, at the proper pressures, produce a large quantity of the mercury resonance radiation of 2537 Angstrom units in wavelength. This wavelength is extremely harmful to the eyes, so it is undesirable in such a lamp. However, when it falls on the calcium tungstate coating, the latter absorbs it, and reemits it at higher ultra-violet and blue wavelengths by fluorescence. The ultra-violet glass then absorbs most of the visible light produced, such as the blue, leaving only the ultra-violet between 3000 and 3800 Angstrom units, because the glass is preferably one which absorbs wavelengths below 3000 Angstrom units in order to prevent, for example, any 2537 radiations not absorbed by the tungsten coating, from leaving the lamp.

We thus have a source of light mainly limited to the 3000 to 3800 Angstrom unit wavelength. This type of ultra-violet is present in sunlight and is

hence not ordinarily harmful. It will, nevertheless, cause strong fluorescence of many well-known substances, such as zinc sulphide, for example. Numerals and the like on airplane and other control equipment can thus be painted with such a substance and will become readily visible when illuminated by such a "black" lamp. Such a lamp is accordingly of great value in warfare, particularly during "black-outs," so called, when strong light must be kept at a minimum. It also may be used advantageously to illuminate signs, maps, and navigation instruments.

What we claim is:

1. A low-voltage electric gaseous discharge lamp emissive of ultra-violet rays in a limited range of wavelength and effectively non-emissive of visible light rays, said lamp comprising: a single walled elongated tubular glass envelope for enclosing the discharge of said lamp, with the outer face of said envelope comprising the outer face of said lamp; a filamentary electrode mounted within said envelope adjacent each end thereof and electrically connected to lead-in wires extending through the ends of said envelope; a source of ultra-violet rays predominantly of 2537 Angstrom unit wavelength within said envelope and comprising a mixture of argon and a small quantity of mercury; means for receiving and translating said 2537 wavelength ultra-violet rays into a combination comprising ultra-violet rays in the range of 3000 to 3800 Angstrom unit wavelength and blue visible rays, said means comprising a layer of fluorescent material on the inner face of said envelope, directly exposed to the emission of said 2537 wavelength source and substantially completely covering said inner face;

and means embodied in the composition of said glass envelope for limiting the output of said lamp to ultra-violet rays in the range of 3000 to 3800 Angstrom unit wavelength to the exclusion of 2537 wavelength rays and visible rays from either the 2537 wavelength source or the layer of fluorescent material.

2. A low-voltage electric gaseous discharge lamp emissive of ultra-violet rays in a limited range of wavelength and effectively non-emissive of visible light rays, said lamp comprising: a single-walled elongated tubular envelope of red-purple Corex glass transmitting ultraviolet rays of 3000 to 3800 Angstrom unit wavelength and absorbing visible rays and ultraviolet rays of 2537 Angstrom unit wavelength, for enclosing the discharge of said lamp; with the outer face of said envelope comprising the outer face of said lamp; a filamentary electrode mounted within said envelope adjacent each end thereof and electrically connected to lead-in wires extending through the ends of said envelope; a source of ultra-violet rays predominantly of 2537 Angstrom unit wavelength within said envelope and comprising a mixture of argon and a small quantity of mercury; and means for receiving and translating said 2537 wavelength ultra-violet rays into a combination comprising ultra-violet rays in the range of 3000 to 3800 Angstrom unit wavelength and blue visible rays, said means comprising a layer of fluorescent material on the inner face of said envelope, directly exposed to the emission of said 2537 wavelength source and substantially completely covering said inner face.

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