

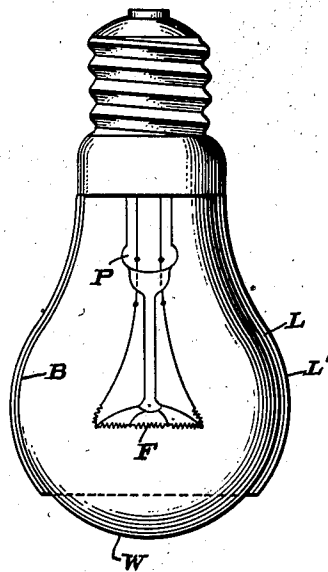
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INCANDESCENT LAMP

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## UNITED STATES PATENT OFFICE

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## INCANDESCENT LAMP

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## 1 Claim. (Cl. 176—34)

This invention relates to electric incandescent lamps adapted for emergency illumination especially as a protection against visibility by aircraft during emergency alarms and attacks from the air.

An object of the invention is the provision of an electric lamp for emergency illumination which is substantially invisible when viewed from above a predetermined minimum height and which can be manufactured at cheap cost.

It has been found, when the necessity arises of reducing practically to darkness the illumination of streets, squares, houses, etc., during attacks from the air, that the light emitted by the lamps should be visible at the most from a height of about 300 meters, and that the flux of light emitted from the lamps should not amount to more than about 5 lumen. Furthermore, since the visibility depends in the first place on the surface brightness per unit of area of a radiating body, the incandescent filament itself should not be visible either from above or from lateral directions.

Attempts have been made to obtain the above object by covering an ordinary incandescent lamp in a suitable manner, but apart from the fact that there always exists the possibility of gaps or openings in the fitting elements of the lamp, this expedient results in an excessive heating of the lamp whereby the operating safety and the safety against mechanical vibrations may be substantially impaired when they have to be mostly depended upon, such as during imminent or actual air attacks.

In order to obviate these disadvantages a coating could be applied in direct contact with the glass bulb of the lamp in place of a casing or envelope and a low voltage filament could be employed in order to reduce the output of the lamp to such an extent to prevent excess heating. Such low voltage lamps, however, have to be connected to a lighting circuit through a transformer. Moreover, apart from the fact that the employment of such lamps is restricted to alternating current networks whereby owing to the various voltages used, the dealers would be compelled to keep an undesirable number of types and sizes of lamps on store, such lamps are too expensive to warrant their general introduction.

The improved lamp forming the subject matter of the present invention is distinguished from the lamps heretofore proposed for the purpose in view by its great simplicity, its extreme freedom from the effects of mechanical shocks and its almost unlimited life. The improved lamp has a

metallic filament, the resistance of which is such that its temperature remains below 1600° C. when the lamp is connected to a supply source of normal operating voltage. Moreover, the lamp is surrounded by a covering or coating consisting of a material impervious to light and almost completely enclosing the lamp bulb except for a small portion constituting a window for passing the rays of light emitted by the filament.

There is obtained in this way an exceptionally cheap lamp which can be screwed into any existing lamp socket without requiring any auxiliary implements and which complies fully with the conditions and requirements during emergency alarms. Contrary to the known constructions employing a shield or casing for the object stated, the coating of the present improved lamp is firmly connected to the lamp bulb whereby no trace of light can penetrate to the outside.

It is of course known that the amount of light emitted by the filament of an incandescent lamp may be reduced by reducing the temperature of the filament and that furthermore for a given line voltage a filament of greater length has a lower temperature than a shorter filament of equal diameter and consisting of the same material. These properties have, in fact, already been utilized for the manufacture of multi-filament lamps, the filaments of which have different illuminating strengths and can be connected selectively.

It is furthermore old to use the bulb of an incandescent lamp partly as a reflector. However, all these attempts differ from the inventive idea to provide a lamp designed for normal line voltage operation with means for reducing the temperature of the filament, thereby enabling it to provide directly upon the bulb of the lamp a layer of lacquer impervious to light rays and insuring high stability and operating safety as well as freedom from the effects of mechanical shocks.

In order to reduce the heating of the coating of light pervious material, the coating may be comprised of two layers, of which the inner one is a reflecting layer for instance a dull white reflector while the outer one is black and of light absorbing character. The bulb acts then, as it were, similar to the spherical reflecting surface as used in so-called Ulbricht-photometer, the wall of which is not perceptibly heated by rays and from the window of which emanates a very uniform flux of light.

The invention is illustrated diagrammatically and by way of example on the accompanying drawing showing a section through a lamp ac-

10 cording to the invention. In the drawing, item B denotes the lamp bulb having the major portion of its outer surface coated with a layer L of a white lacquer upon which coating L' there is another coating consisting of a black lacquer, both layers together forming a covering which is substantially impervious to light. Only the spherical cup W opposite the lamp base is left uncoated, thereby providing a window through which the light can escape. If desired, a colored filter may be arranged in front of the uncovered portion or window.

15 The filament F supported by a re-entrant portion or press P of the bulb B, as regards its sectional area, may be of the type known for the usual 10-watt lamps, with a diameter of about  $\frac{1}{100}$  of 1 millimeter, and a length about twice the length of the filament of a normal 10-watt lamp, that is consuming only 5-watt from the same lighting source, and having a temperature amounting only to about 1600° C. The computed life of such a lamp which can be manufactured

for about the same price as a normal 10-watt lamp is several millions of hours so that the lamp must be considered as unusually safe in service. In addition to its advantage of being substantially shock-proof, the lamp itself and the area sufficiently illuminated by it for carrying on normal manipulations are no longer visible to a normal eye from distances beyond about 200 meters.

I claim:

10 An incandescent lamp comprising an evacuated bulb of normally clear glass, an incandescent filament mounted therein, a coating of white lacquer applied to the exterior surface of said bulb, a further coating of black lacquer impervious to light overlying said first coating, said coatings covering substantially the major portion of said bulb except for a small window, said filament adapted to maintain an operating temperature below 1600° C. when fed from a lighting circuit of standard voltage.

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