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PROCESS OF MAKING A LAYER CONTAINING A FLUORESCENT MATERIAL

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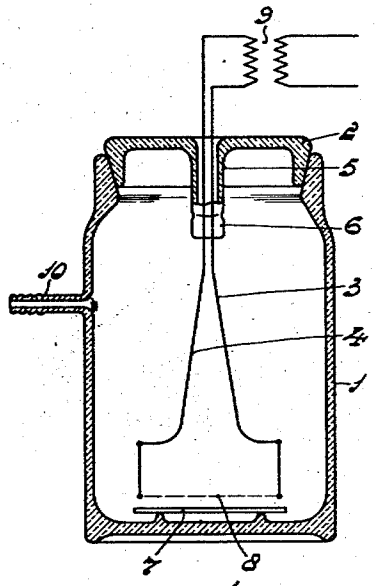

Fig. 1.

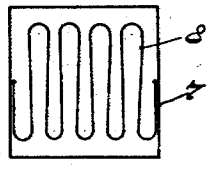

Fig. 2.

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PROCESS OF MAKING A LAYER CONTAINING A FLUORESCENT MATERIAL

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4 Claims. (Cl. 250—34)

This invention relates to a method of making a layer containing a fluorescent material. Such fluorescing layers are used for various purposes, for example, as X-ray intensifying screens.

When making such a layer according to the invention the fluorescent material is volatilized and precipitated in a vacuum.

It has been found that a fluorescing layer formed in this manner has a very uniform structure. In fact, all of the molecules precipitated appear to have the same orientation. By this uniform structure the fluorescence of the layer is increased.

In some cases it is desired to obtain fluorescing layers having such a thickness that they are transparent to light. For this purpose the method according to the invention is particularly suitable. In fact, a fluorescing layer formed by means of this method may be given a greater thickness than a fluorescing layer which does not have such a uniform structure without the transparency being unfavourably affected thereby.

An additional advantage of the method according to the invention consists in that the nature of the grain of the fluorescent material precipitated may be varied by modifying the rate of volatilization. As a rule the size of the grains will be small at a quick volatilization which is of great importance, for example, in the manufacture of X-ray intensifying screens. It is found that the image taken on such a screen will be sharper as the size of the grains of the fluorescent material is reduced.

For a better understanding of the present invention, reference should be had to the accompanying drawing, wherein

Figure 1 is a sectional view of apparatus that may be used to carry out the improved process according to the invention; and

Fig. 2 is a plan view of the base or sheet on which the fluorescent layer is to be formed showing the filament from which the sensitive material is volatilized.

The apparatus comprises a glass vessel or bulb 1 closed by a stopper 2. Leading-in wires 3 and 4 pass through the re-entrant portion 5 of the stopper 2 and are hermetically sealed at the press 6. A sheet 7, for example of glass, on which the fluorescent layer is to be formed is laid on the bottom of the bulb 1 before the stopper is inserted therein. A filamentary wire 8 is mounted on the ends of the leading-in wires 3 and 4 so as to be adjacent the upper surface of the sheet 7 when the stopper is inserted in the bulb. The wire 8 is supplied with heating current from a suitable source, such as a transformer 9, so as to be heated to incandescence after the bulb 1 has been evacuated through the connection 10. The wire 8 is coated with fluorescent material, such as zinc sulphide or calcium tungstate, which is volatilized by the heating of said wire and precipitates in the form of a layer on the upper surface of the sheet 7. A fluorescent layer having a fine, uniform structure and improved sensitivity is thereby produced. The sheet 7 may, if desired, be first coated with a layer, consisting of a material by which the fluorescent material is perfectly adsorbed, before it is subjected to the described coating process.

The fluorescent layer on the sheet 7 may comprise a mixture of fluorescent substances which may be volatilized simultaneously. This layer may also contain other substances in addition to the fluorescent material. These substances may be incorporated into the layer, for example, by volatilizing them simultaneously with the fluorescent material in the bulb 1.

The fluorescent layer formed in this manner is found to have novel and unexpected properties. In comparison with the layers formed by the processes hitherto employed, the layer has a more uniform structure, is much more transparent and possesses enhanced sensitivity. The fluorescence obtained is greatly increased while the light absorption is decreased.

What we claim is:

1. A method of making an X-ray intensifying screen, in which a suitable base together with a quantity of fluorescent material is introduced into a closed space which is exhausted, whereupon the fluorescent material is volatilized and precipitated on the base.

2. The process of making an X-ray intensifying screen consisting of a base covered with a layer of fluorescent material, which comprises introducing said base and a quantity of fluorescent material in a closed envelope, evacuating said envelope, and volatilizing and precipitating said material on the base.

3. A method of making a ray-sensitive screen comprising volatilizing and precipitating zinc sulphide on a sheet or base in a vacuum.

4. A method of making a ray-sensitive screen comprising volatilizing and precipitating calcium tungstate on a sheet or base in a vacuum.

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