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FLUORESCENT LAMP AND METHOD OF MAKING

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Fig. 1

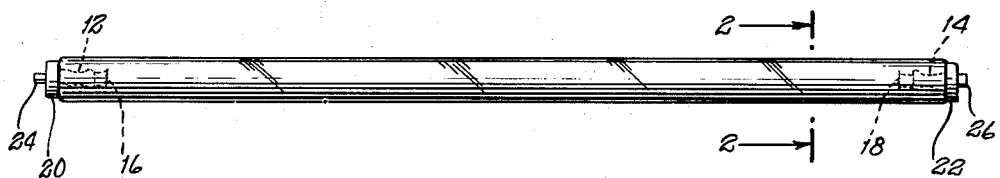
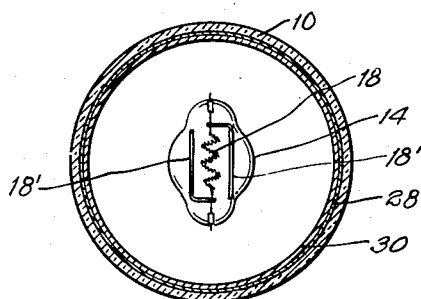


Fig. 2



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FLUORESCENT LAMP AND METHOD OF MAKING

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4 Claims. (Cl. 313—109)

This invention is composed of a discovery by means of which a certain type of fluorescent lamp which heretofore could not be made in the quick start form can now be so made.

There is in the fluorescent lighting art a so called insect repellent lamp, which strictly is not a correct description of its function. The fact is that an insect repellent lamp is a lamp having a color which is less likely to attract insects because of its particular light spectrum. These lamps have a spectrum in which yellow and red predominate which is not so readily seen by insects as are the usual fluorescent lamps having a more normal or white light spectrum. Because of this characteristic these so called insect repellent lamps are finding more and more use. Heretofore they have been made of the hot cathode type which are relatively slower in starting and require the starter usually used for the ordinary fluorescent lamp.

The purpose of this invention is to provide an improvement in insect repellent lamps which adapt them to quick start operation.

Insect repellent lamps are caused to have a yellow, red spectrum predominance by the use of a filter in the form of a coating of cadmium sulphide which underlies the usual phosphor coating. The cadmium sulphide coating filters the blues and greens of the transmitted light of the glowing phosphor, resulting in a predominance of yellows and reds in its useful spectrum. Particularly enough, fluorescent lamps having a cadmium sulphide light reflecting layer would not operate as quick starting lamps.

In accordance with this invention it has been discovered that if finely divided silicon dioxide is blended with the coating from which the cadmium sulphide layer is made, the lamp becomes capable of quick start operation.

From the above the objects of this invention will be quite clear.

In the accompanying drawings,

Figure 1 is a diagrammatic plan view of quick start insect repellent lamp of the type employing this invention; and

Figure 2 is a cross-sectional view thereof taken on the line 2—2 of Figure 1.

Physically the lamp of this invention is substantially the same as prior slow start insect repellent fluorescent lamps with the one exception indicated above and pointed out in more detail hereinafter. It consists of a tubular glass envelope 10 slit at the ends and having the usual re-entrant stems 12 and 14 terminating in presses. Supported in these presses are the usual cathodes 16 and 18 which when the lamp is used as a quick start lamp will be of the usual electron emissive cold cathode construction. As shown in Figure 2, there may be associated with each cathode a pair of horns 18' commonly used in such lamps.

Likewise in accordance with prior practice, the tubular envelope 10 is provided at the ends with the usual caps

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20 and 22 which in this case are provided with the usual quick start contact structure 24 and 26, by means of which the lamp is mounted in the proper fixtures and electrically connected in circuit.

Also in accordance with usual practice, the inner wall of the envelope 10 is provided with a thin layer of cadmium sulphide which is overlaid with the usual layer of phosphor or phosphor mixtures 30. Likewise the lamp during its manufacture is highly evacuated and is provided with an atmosphere of argon and mercury vapor supplied by a small quantity of mercury introduced into the envelope during its manufacture. Such a lamp as described will not operate as a quick start lamp. However, by incorporating in the cadmium sulphide coating finely divided silicon dioxide, the lamp becomes an instant start lamp.

Experiments demonstrate that the amount of silicon dioxide employed is not critical. It has been found that insect repellent lamps will quickly start in many cases if as little as one percent by weight of silicon dioxide is incorporated in the cadmium sulphide coating. At the other end of the range it can be said that theoretically as much as 100% by weight can be included, but from the viewpoint of insect repellent lamps it has been found that the higher the percentage of silicon dioxide in the cadmium sulphide coating, the more and more is that coating's filtering function destroyed. Experiments indicate that for commercial purposes about 50% by weight of silicon dioxide can be incorporated in the cadmium sulphide layer. This much silicon dioxide does change the light filter characteristics of the cadmium sulphide spectrum to some degree, but this change can be counter-balanced by changing the phosphor or mixtures thereof of which the fluorescent coating 30 is composed.

The following procedure is employed to produce the above described lamp. A coating consisting of the following ingredients is prepared as a suspension:

Cadmium sulphide.....	grams.....	132
Nitro-cellulose	cc.....	320
Butyl acetate.....	cc.....	1281
Dibutyl phthalate.....	cc.....	50

This mixture is ground in a ball mill for about sixteen hours, producing a suspension suitable for the purpose. The nitro-cellulose and butyl acetate act as organic carriers for the cadmium sulphide which can later be evaporated and baked out of the coating. The dibutyl phthalate is used as a plasticizer and is but one example of a large number of plasticizers which would be suitable for a coating of this kind, as those skilled in the art will understand.

The silicon dioxide is also incorporated into a suspension composed of the following ingredients:

Silicon dioxide.....	grams.....	260
Nitro-cellulose	cc.....	480
Butyl acetate.....	cc.....	3385
Dibutyl phthalate.....	cc.....	50

This mixture is also further ground in a ball mill for approximately sixteen hours.

A suitable form of silicon dioxide for the purposes of this invention is commercially available under the name "Hi-Sil," manufactured and sold by Columbia Southern Chemical Company. It is suitable because it has been found that the more finely divided the silicon dioxide, the more effective it is for the purposes of this invention. "Hi-Sil" happens to provide a finely divided form of a silicon dioxide which is still more finely divided by the ball mill referred to. Here again, as before, the carriers and plasticizers function as mentioned above and are provided for similar purposes.

The two suspensions prepared as above are then mixed

in equal quantities by volume, providing a final suspension which is coated on the envelope 10 to provide the layer 28 of Figure 2. This coating is then baked to evaporate and remove the liquid carriers.

The coated envelope is then coated with the phosphor or mixtures thereof selected for use, and of course, again baked to remove its volatile carriers.

After the envelope is highly evacuated in accordance with usual practice, it is filled in the usual manner, for example with about 2½ millimeters of argon gas and 50 milligrams of mercury. Of course, all the other processing steps commonly used in making such lamps will be employed.

There is another advantage of the coating 28 which has been observed, namely that there is a tendency for the lamps to have less darkened ends as its useful life develops. The phenomenon of darkened ends in fluorescent lamps is well known, and it is only noted here that the presence of silicon dioxide seems to tend to reduce the tendency of darkened ends to occur as the lamp grows older in use.

From the above description it will be apparent to those skilled in the art that the substance of this invention is capable of some variation in detail, and it is preferred, therefore, that the material herein contained be taken in an exemplary sense.

What is claimed is:

1. A quick starting fluorescent lamp having a transparent envelope coated on its inner face with a coating containing cadmium sulphide and silicon dioxide overlaid with a phosphor coating.

2. In the combination of claim 1, said silicon dioxide being present in the proportions of two to seventy-five percent by weight.

3. In the combination of claim 1, said cadmium sulphide and silicon dioxide being present in substantially equal proportions.

4. In the method of manufacturing a quick starting fluorescent lamp the steps of milling a mixture of cadmium sulphide, a volatile organic carrier and a plasticizer, milling a mixture of finely divided silicon dioxide, a volatile organic carrier and a plasticizer, mixing said milled mixtures, coating a fluorescent tube envelope with said final mixture and baking said coating.

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