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W. A. KNOOP

2,198,513

LAMP

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FIG. 1

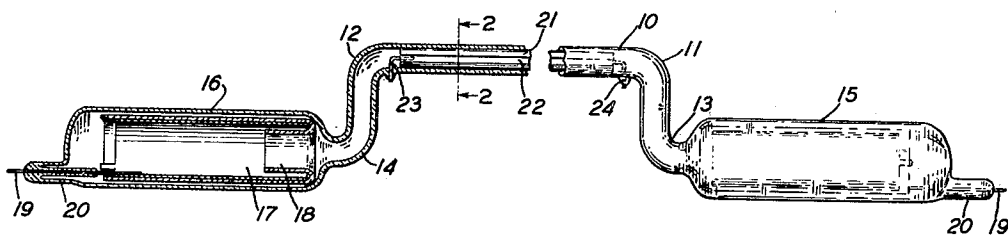


FIG. 2



FIG. 3

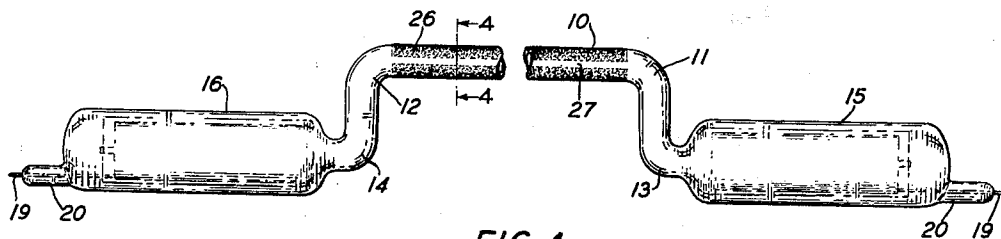
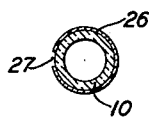


FIG. 4



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LAMP

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7 Claims. (Cl. 176-122)

This invention relates to glow lamps and more specifically to lamps of this character for producing a narrow strip of light.

In some electro-optical systems, as, for example, in a television receiving system employing a mirror helix as the image producing medium, it is necessary to use a glow lamp which gives a long narrow strip of light. The usual filamentary light sources have not been entirely satisfactory when used with such an arrangement as it is difficult to modulate the intensity of the emitted light.

It is an object of this invention to provide a glow lamp to serve as a narrow strip-like source of intense light.

In one embodiment of this invention an opaque rod of refractory material with a rectangular longitudinal groove therein is placed in a glass tube of small diameter. An electrical discharge within the tube is confined to the rectangular groove. The refractory material is preferably white or of a color which reflects much light, some of which would otherwise be wasted.

In another embodiment, a reflecting coating of aluminum is applied to all but a very narrow longitudinal strip of the glass tube thus confining the passage of light from this tube to a very narrow strip. In the preparation of this tube, the surface of the tube on which the aluminum is to be applied is first roughened so that the aluminum will adhere thereto.

The invention will be more readily understood by referring to the following description taken in connection with the accompanying drawing forming a part thereof, in which:

Fig. 1 shows a glow lamp for producing a narrow strip of intense light;

Fig. 2 shows a cross-section of the tube shown in Fig. 1;

Fig. 3 shows another tube for producing an intense strip light source; and

Fig. 4 is a cross-sectional view of the tube shown in Fig. 3.

Referring more particularly to the drawing, Fig. 1 shows a positive column glow lamp for producing a very narrow strip of intense light suitable for use in electro-optical systems requiring such a light source, as in television receiving systems employing a mirror helix as the image receiving medium. This lamp or tube comprises a long thin tube 10 extending through bends 11, 12, 13 and 14 into larger tubes 15 and 16 located at opposite ends of the tube 10. The larger tubes 15 and 16 contain the electrodes between which the discharge takes place. These

electrodes (which are similar) comprise suitable metallic cylinders 17. These cylinders are mounted in glass cylinders 18 the ends of which are doubled back to hold the electrode members 17 firmly in place. Suitable leads 19 which are supported in presses 20 are connected to the metallic electrode members 17.

The tube may be filled with any suitable inert gas at a lower pressure such as for example, carbon dioxide, neon, argon, etc., or any suitable mixture of these or other inert gases. When a difference of potential is applied between the two connections 19, 19 and a discharge started in the tube 10, a strip light source is produced. This strip light source, however, is not suitable in some cases where a very narrow source of intense light is used. To produce such a narrow strip of intense light, a refractory member 21 having a narrow rectangular groove 22 therein is placed within the tube 10 and held in position by means of metallic wires 23 and 24 which are sealed into the tube 10. Refractory member 21 may be of any suitable material, as for example the cream-colored refractory material known as Isolantite.

As the discharge is confined to the narrow rectangular groove 22 (see Fig. 2) and the cream-colored walls of this groove reflect the light of the gas discharge within the groove, the light emitted from this strip-like source is very intense. Such a source is well adapted for use in a television receiver system employing a mirror helix as the image producing medium. As an example of such a television system, reference may be made to Patent 2,037,166 of J. R. Hefele, issued April 14, 1936, which discloses such a system.

In Fig. 3 there is shown a tube which is similar to that described above with reference to Figs. 1 and 2 with the exception that a different means for confining the emission of light from the glow lamp to a relatively narrow slit is employed. In the modification shown in Fig. 3 (it is also shown in cross-section in Fig. 4) a thin reflecting coating 26 of aluminum is placed or coated on the outside wall of the tube 10 with the exception of a very narrow strip 27. The narrow slit 27 is only a very small fraction of the total circumference of the tube 10 and the entire coating 26 takes part in the reflection of the light generated. Much multiply-reflected light finally passes through the slit as well as light which reaches the slit directly or after a single reflection. Thus a very intense but narrow source of light is produced.

In the preparation of a tube such as is shown in Fig. 5, glass tubing of about 3 millimeters bore was cut to the proper length for the purpose and a narrow strip of adhesive tape about 0.8 millimeter wide was fixed longitudinally on the glass over the portion represented by the strip 27. A small space near the end was totally covered with adhesive tape or other suitable material to protect it from subsequent operation. The first operation consisted of sandblasting the glass to roughen it. The adhesive tape protected the narrow strip. After the roughening operation, aluminum metal was applied with a Schoop gun in a fairly thick deposit. After the adhesive tape was removed these tubes were made up into capillary lamps which proved more satisfactory than anything known up to this time. In spite of the fact that the glass becomes sufficiently hot to conduct current and is chilled quite rapidly, the aluminum metal deposited in this way shows no signs of peeling.

This invention is obviously not limited in use to television systems but may be used generally as a strip light source. For example, the invention is applicable to neon or other inert gas lamps of the type used for electrical signs, the tubes in this case being in general of relatively large bore.

Various modifications may be made in the invention as above disclosed, the scope of this invention being defined by the appended claims.

What is claimed is:

1. A lamp comprising a glass tubing, a refractory member having a longitudinal groove therein located within said tubing, and means for initiating an electric discharge through said groove.

2. A lamp comprising a glass tubing, means including a refractory member having a longitu-

dinal groove therein for confining the emission of light from said lamp to a relatively narrow slit and also serving as a means to reflect the discharge through said tube.

3. A lamp comprising a glass tubing, a refractory member having a longitudinal groove therein located within said tubing, said groove being narrow relative to the inside diameter of the tubing, and means for initiating an electric discharge through said groove.

4. A lamp comprising a tubing at least a portion of which is light transmitting, a refractory rod member having a longitudinal groove therein located within and closely engaging the inside surface of said tubing, said groove being adjacent a portion of the tubing that is light transmitting, and means for initiating an electric discharge through said groove.

5. A lamp comprising a tubing at least a portion of which is light transmitting, a refractory rod member having a longitudinal groove therein, said groove being of rectangular cross-section, and means for initiating an electric discharge through said groove.

6. A lamp comprising a tubing at least a portion of which is light transmitting, a refractory rod member having a longitudinal groove therein located within and closely engaging said tubing, said rod being a good reflector of light, and means for initiating an electric discharge through said groove.

7. A lamp comprising a tubing at least a portion of which is light transmitting, a refractory rod member having a longitudinal groove therein located within and closely engaging said tubing, means for holding said rod in place within said tubing, and means for initiating an electric discharge through said groove.

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