Sept. 21, 1948. J. L. COX 2,449,880

LIGHT SOURCE

Filed May 16, 1945

Fig. 1.

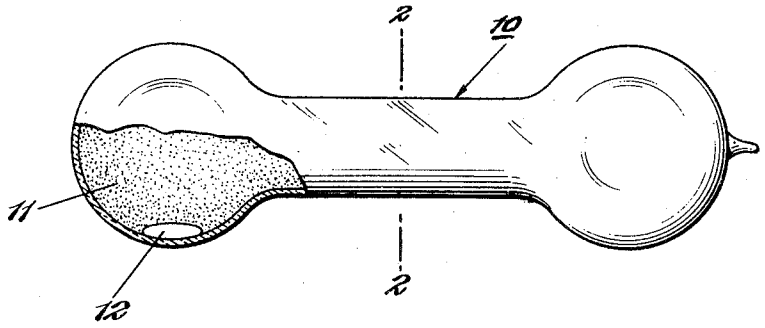


Fig. 2

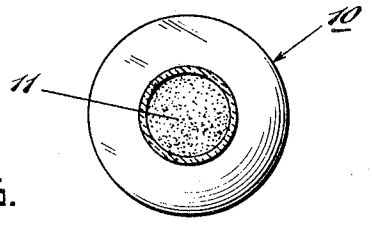
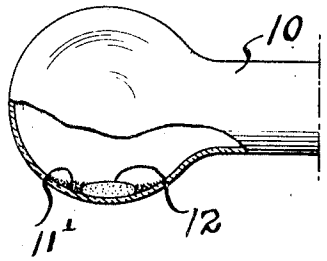


Fig. 3.



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LIGHT SOURCE

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1 Claim. (Cl. 176—122)

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This invention relates to a novel form of light source.

One object of this invention is to provide a new form of light source which becomes luminescent upon agitation.

Another object of the invention is to provide a light source which may be energized without the use of any form of usual power supply.

A still further object of the invention is to provide a light source in the form of a transparent evacuated vessel having enclosed therein a small quantity of a rare gas or a mixture of several rare gases, mercury and a phosphor, preferably in finely divided or powdered form.

Other and more detailed objects of the invention will be apparent from the following disclosure of one embodiment thereof such as that illustrated in the attached drawings.

This invention resides substantially in the combination, construction, arrangement and relative location of parts, all as will be described in detail below.

In the accompanying drawings—

Figure 1 is a side elevational view of a light source in accordance with this invention with a portion broken away to show the interior thereof;

Figure 2 is a cross-sectional view taken on the line 2—2 of Figure 1; and

Figure 3 is a fragmentary view similar to that of Figure 1 showing a modified structure.

All the well known forms of practical light source of the electrical type are energized to the point of luminescence by the application of electrical potentials thereto so as to pass current either through the wire or a gaseous atmosphere. There are some other forms of light sources not yet at a practical stage which are capable of producing light after exposure to other light sources such as the sun or artificial light. There are still other known but impractical forms of light sources by means of which light is produced mechanically. The light source of this invention differs in major respects from all these known sources of light.

In accordance with this invention a vessel 10 of any suitable configuration and made of transparent material such as glass, and preferably Pyrex glass is evacuated to the degree commonly employed in producing incandescent and fluorescent lamps and sealed off. The interior wall of the vessel is coated with a suitable fluorescent material or mixtures thereof, as for example zinc silicate and before sealing off a small quantity of rare gas such as neon, argon and the like is introduced therein as well as a small globule of

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mercury. The luminescent coating has been diagrammatically illustrated by the reference numeral 11 and the mercury globule by the reference numeral 12.

This self-contained unit becomes a light source upon agitation as by shaking. Such agitation causes the fluorescent coating to become luminescent.

The modified construction of Figure 3 is a preferred embodiment of the device. In this form the difference, as illustrated over that of the previously described form, is that the fluorescent powder instead of being applied to the interior wall of the vessel 10 is placed therein in the form of a small body of loose powder as illustrated at 11'. As before, of course, the vessel 10 is evacuated to the appropriate degree and a rare gas content is included. Thus to crystallize the difference between the structures of Figures 1 and 2 and Figure 3, the fluorescent material is in the form of a coating in the former and a loose quantity of powder in the latter. In the modified arrangement when the vessel is agitated the droplet of mercury 12 and the fluorescent powder 11' engage in violent frictional contact with each other, the gas content of the vessel and the interior wall thereof, resulting in the generation of visible light.

It is not clearly understood why this device so operates, but it is believed that the agitation causes the development of a static charge which ionizes the gaseous content of the vessel. Thereupon the fluorescent coating becomes visibly luminous either by ionic bombardment or by the impingement thereon of ultra-violet rays produced by such agitation. It is possible that there is some other more correct explanation of the electronic or other forces which cause luminescence, and therefore the above possible explanation of the operation is given purely as speculation.

As those skilled in the art will appreciate, there is a wide range of suitable coating materials for the interior of the vessel having other known characteristic efficiency of fluorescence and color. Likewise, it is known that mixtures of these various materials may be used for the same purpose. Other suitable coating materials which can be specifically named are zinc beryllium silicate, calcium tungstate and the like. It is likewise well known that various rare gases may be used and that they in combination with the different coating materials will affect the color characteristics of the source. It is also well understood that the amount and pressure of the gas within the vessel

can be varied with well known changes in the characteristics of these devices. It is understood that advantage may be taken of all of this knowledge in adapting the light source of this invention to various purposes and uses. It will also be understood that the quantity of mercury used is not critical and that the device will produce light without the use of the fluorescent coating.

Since undoubtedly the basic cause of luminescence is a result of the frictional effect of the mercury on the gas and/or coating the shape of the glass vessel may be modified to increase this frictional effect. Thus in the form of structure illustrated in the attached drawing the vessel is provided with an elongated restricted central portion terminating in bulbous ends for the purpose of increasing such frictional effects. It therefore follows that various other physical forms of the vessel which would contribute to this frictional effect are within the scope of this invention. For example other forms of constructions as well as baffles could be used to intensify the frictional effect.

Upon consideration it will be seen that a light source of this kind may have many uses of which the following are merely suggestive. It could be used as a signaling device especially in emergency conditions; it could be used as an indicator lamp, for example an automobile tail lamp. These latter uses are indicative of the fact that it could be used in any place where it would be subject to constant agitation and therefore remain constantly luminous. It could be used for novel effects such as for example in stage productions and other similar spectacles. Finally, a very practical use would be to employ it as a fish lure, where by proper agitation of the lure it would

contribute greatly to the fabled realm of fish psychology. The above are indicative of the possibilities of use of a device of this kind.

In view of the fact that the subject matter of the invention is capable of considerable variation within the skill and knowledge of the art to which it is related, I do not desire to be strictly limited to the disclosure as given for purposes of illustration, but rather to the scope of the appended claim.

What is claimed is:

A method of generating visible light comprising mechanically agitating liquid mercury in contact with loose phosphor particles in an atmosphere of rare gas at low pressure.

JAMES L. COX.

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