Jan. 10, 1956 R. M. ANDERSON 2,729,960

FLASH LAMP

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Fig. 1.

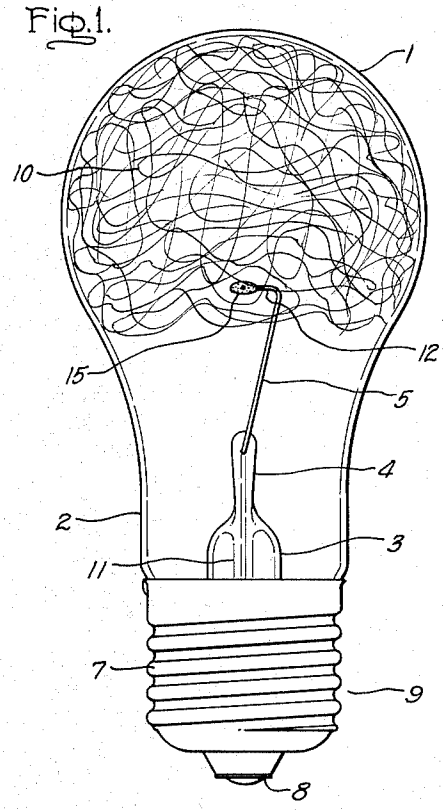
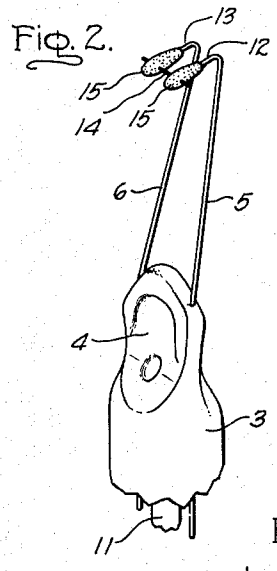


Fig. 2.



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FLASH LAMP

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5 Claims. (Cl. 67—31)

My invention relates in general to flash lamps of the type used for photographic purposes, and more particularly to an ignition means therefor.

Photographic flash lamps of the type most generally in use at present comprise a sealed and interiorly lacquered glass envelope or bulb having a charge of readily combustible material loosely arranged within the bulbous portion of the envelope, a filling of a combustion-supporting gas, and ignition means comprising a pair of lead-in wires extending substantially straight into the envelope from the neck end thereof and bridged at their inner ends by a filament the ends of which are embedded in beads of primer or fulminating material coated on the inner end portions of the lead-in wires. When such a lamp is flashed, the ignited primer material forms an ellipsoidal-shaped flash pattern the major axis of which extends transversely to the plane of the primer-coated inner end portions of the lead-in wires and therefore transversely to the axis of the envelope. As a result, two darkened areas are formed on the bulb on opposite sides thereof directly opposite each side of the filament, the darkened areas resulting from, among other things, the charring of the customary inside lacquer coating on the bulb wall by the intense heat of the primer combustion. Inasmuch as these darkened areas are formed on the bulb immediately prior to the combustion of the combustible material and the resulting light flash produced thereby, the primer flash occurring at approximately three milliseconds following energization of the ignition filament as contrasted to the 20 millisecond peak of the light flash from the combustible material, an appreciable portion of the actinic light generated by the combustible material is therefore masked-off or absorbed, thus preventing full transmission and utilization of all the available light generated by the lamp.

It is an object of my invention, therefore, to provide a flash lamp of the above character having a materially increased total light output and a substantially higher peak light.

It is another object of my invention to provide a flash lamp of the above-mentioned character having an interiorly lacquered bulb and in which the formation of darkened light-absorbing areas on the bulb wall upon flashing of the lamp is substantially eliminated, without affecting in any way the timing characteristics of the light flash produced by the lamp.

Still another object of my invention is to provide a flash lamp in which charring of the customary inside lacquer coating on the bulb wall by the combustion of the ignition primer, and resulting absorption thereby of the light generated by the lamp, is substantially eliminated or in any event greatly minimized.

An important aspect of the invention is the construction and arrangement of the ignition primer in such a manner that the flash pattern thereof extends substantially longitudinally of the bulb.

In accordance with a preferred embodiment of the invention, the inner end portions of the lamp lead-in wires, which carry the primer material and are bridged by the ignition filament, are bent laterally so as to be disposed in a plane transverse to the bulb axis, with the ignition filament more or less centered with respect to the bulb axis and located in the lower region of the charge or clew of combustible material within the bulb. In this manner, the ellipsoidal-shaped flash pattern of the ignition primer is definitely oriented with respect to the bulb so that its major axis is more or less aligned with the bulb axis. As a result, one of the ends of the ellipsoidal primer flash pattern is directed down into the neck portion of the bulb where the light from the combustible material is absorbed anyway, while the other end of the primer flash pattern is sufficiently removed from the top of the bulb (by reason of the lowered position of the ignition means in the mass of combustible material) so as to substantially avoid any light-absorptive charring at such region of the inside lacquer coating on the bulb wall. Thus, the formation of darkened light-absorbing areas on the bulb is effectively circumvented and a substantially greater proportion of the generated light is transmitted through the bulb wall.

Further objects and advantages of my invention will appear from the following description of a species thereof and from the accompanying drawing.

In the drawing, Fig. 1 is an elevation of a flash lamp comprising my invention, and Fig. 2 is a fragmentary perspective view of the mount of the lamp shown in Fig. 1.

Referring to the drawing, the flash lamp there illustrated comprises a sealed light-transmitting envelope or bulb **1** of glass or other suitable light-transmitting material and having a neck portion **2** provided with a reentrant stem **3** terminating at its inner end in a press portion **4** through which are sealed a pair of lead-in wires **5, 6**. The lead-in wires **5, 6** may be of the conventional three-section type and comprising, for example, nickel-plated iron inner lead portions and copper outer lead portions joined by intermediate seal lead portions of Dumet wire for sealing into the stem press **4**. At their outer ends the lead-in wires **5, 6** are connected to the terminals **7** and **8** of a conventional type lamp base **9** cemented or otherwise suitably secured to the neck **2** of the bulb **1**. A quantity or clew of readily combustible material **10** is loosely arranged in the bulbous or "active" portion of the bulb **1**. The combustible material **10** may be in the form of shredded foil, leaf foil or fine wire of any suitable metal, such as aluminum, magnesium, or alloys thereof. The bulb **1** is filled with oxygen or other suitable combustion-supporting gas at a suitable pressure, for example, of 400 to 600 millimeters or so of mercury. The bulb **1** is evacuated and the gas filling introduced thereinto through an exhaust tube **11** which communicates with the interior of the bulb through the stem tube **3** and which is subsequently tipped-off in the conventional manner to hermetically seal the bulb. The bulb **1** is coated on its inner surface, and preferably on its outer surface as well, with a protective coating of a suitable light-transmitting lacquer or varnish to thereby minimize cracking of the glass bulb on charge flashing and render the bulb substantially shatterproof.

In accordance with the invention the lead-in wires **5, 6** are formed, interiorly of the bulb, with laterally bent inner end portions **12, 13** which extend parallel to each other in closely spaced side-by-side relation in a plane transverse to the axis of the bulb and are disposed more or less symmetrically on opposite sides of the bulb axis. To position the bent inner ends **12, 13** of the lead-in wires in such manner, the portions of the lead-in wires which extend inwardly from the stem press **4** may be angularly bent to one side of the plane of the flattened stem press, as shown. Connected across the bent inner ends **12, 13** of the lead-in wires, and extending transversely to and preferably passing through or closely adjacent the

bulb axis, is an ignition filament **14** such as a straight length of tungsten wire, for instance. The portions of the bent inner ends **12, 13** of the lead-in wires, at and adjacent their connection to the filament **14**, are provided with small beads or coatings **15** of a suitable fulminating substance in which the ends of the filament are also embedded to thereby form a primer or lamp ignition means of the so-called divided primer type. The fulminating material **15** for the lamp may be any of the well-known compositions employed for such purpose and comprising, for example, a mixture of one or more readily combustible metal powders and one or more powdered oxidizing agents bonded together by a suitable binder. Preferably, however, the fulminating material **15** is of the type disclosed and claimed in U. S. Patent 2,280,598, G. H. Meridith, dated April 21, 1942, and assigned to the assignee of the present application.

When an electric current is passed through the ignition filament **14** of a flash lamp constructed as described above, the beads or coatings **15** of primer material are ignited and produce an ellipsoidal-shaped flash pattern which ignites the combustible material **10** and the major axis or length of which is directed approximately axially or lengthwise of the bulb. As a result, one of the ends of the ellipsoidal flash pattern, instead of being directed against the side wall of the bulb as before and thus producing a light-absorbing discoloration thereon, is directed down into the neck of the bulb where it does not have any adverse effect on the subsequent light flash from the lamp, the light directed into the neck end of the bulb being for the most part wasted anyway because of the presence of the stem **3** therein and the customary base **9** thereon. At the same time, due to the lowered positioning of the primer material **15** in the lower region of the clew **10** of combustible material, charring of the inside lacquer coating on the bulb by the other end of the elongated flash pattern of the primer material **15** is substantially avoided or, in any event, appreciably minimized.

The complete elimination of one of the darkened light-absorbing spots heretofore customarily formed on the active portion of the bulb wall of a flash lamp, together with the substantial elimination of the other, therefore effects an appreciable reduction in the amount of absorbed or masked light and consequently a substantial increase in the total light output and peak intensity of the lamp. Thus, I have found that by the use of my improved primer construction the total light output of the lamp is increased from around 10 to 15 percent, while the peak intensity is increased from around 15 to 20 percent. Also, of most important consideration is the fact that the light-time characteristics of the lamp are not altered in any way whatsoever, the light flash from the lamp still peaking at the customary peak time interval of 20 milliseconds, following initial energization of the lamp ignition filament.

Although a preferred embodiment of my invention has been disclosed, it will be understood that the invention is not to be limited to the specific construction and arrangement of parts shown, but that they may be widely modified within the spirit and scope of my invention as defined by the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A flash lamp comprising a sealed radiation-transmitting envelope having a neck portion, a combustion-supporting gaseous filling in said envelope, a charge of readily combustible material loosely arranged within the bulbous portion of said envelope, and ignition means in said envelope comprising a pair of substantially parallel wire supports extending adjacent and in a plane transverse to the axis of the envelope neck portion and located within the said charge of combustible material, a filament connected across the said wire supports and located adjacent the axis of the envelope neck portion, and coatings of fulminating material on the said wire supports located adjacent the axis of the envelope neck portion and embedding the ends of the said filament.

2. A flash lamp as set forth in claim 1 wherein the said wire supports and the coatings of fulminating material thereon are located within the lower region of the said charge of combustible material.

3. A flash lamp comprising a sealed radiation-transmitting envelope having a neck portion, a combustion-supporting gaseous filling in said envelope, a charge of readily combustible material loosely arranged within the bulbous portion of said envelope, and ignition means in said envelope comprising a pair of lead-in wires sealed through the wall of the envelope and extending thereinto from the neck portion thereof and having laterally bent inner ends extending adjacent and in a plane transverse to the axis of the envelope neck portion and located within the said charge of combustible material, a filament connected across the said bent ends of the lead-in wires and located adjacent the axis of the envelope, and coatings of fulminating material on the said bent ends of the lead-in wires located adjacent the axis of the envelope neck portion and embedding the ends of the said filament.

4. A flash lamp as set forth in claim 3 wherein the said bent inner ends of the lead-in wires extend substantially parallel to one another and are located within the lower region of the said charge of combustible material.

5. A flash lamp comprising a sealed radiation-transmitting envelope having a neck portion provided with a reentrant stem extending into said neck portion approximately centrally thereof, a combustion-supporting gaseous filling in said envelope, a charge of readily combustible material loosely arranged within the bulbous portion of said envelope, and ignition means in said envelope comprising a pair of lead-in wires sealed through said stem and extending therefrom into the interior of said envelope at a slight angle to the axis of the envelope neck portion and having laterally bent inner ends extending back toward and adjacent said axis and substantially parallel to each other in a plane transverse to the said axis of the envelope neck portion, said bent inner ends being located directly above the stem and within the said charge of combustible material, a filament connected across the said bent ends of the lead-in wires and extending transversely of and approximately intersecting the axis of the envelope neck portion, and extended coatings of fulminating material on the said bent ends of the lead-in wires located adjacent the axis of the envelope neck portion and embedding the ends of said filament.

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