April 2, 1957 W. E. GLEIM ET AL 2,787,149

PHOTOFLASH LAMP

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Fig. 1.

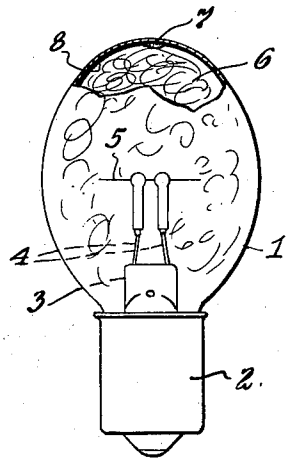


Fig. 2.

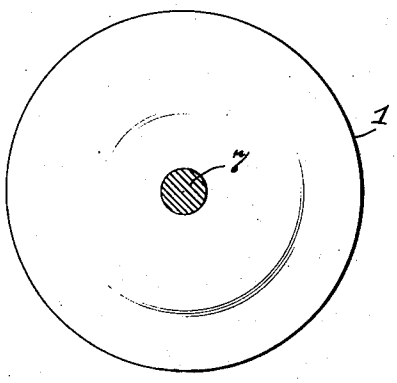
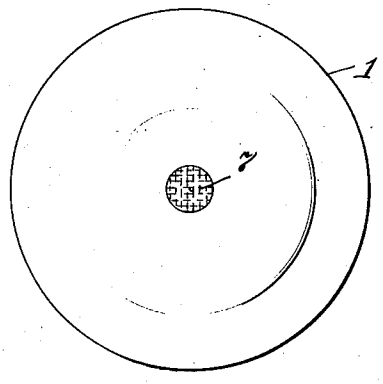


Fig. 3.



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PHOTOFLASH LAMP

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3 Claims. (Cl. 67—31)

This invention relates to photoflash lamps, and more particularly, to indicating means by which the lamp automatically designates whether or not it is in proper useable condition, or whether it has become a leaker.

It is well-known in the trade that photoflash lamps that have leaked and have admitted air, will give faulty performance and are more apt to shatter the glass of which the bulb is made than those lamps in which the predetermined proportion of oxygen is present. Attempts have been made heretofore to include some indication of improper admission of air into such lamps, but those efforts have not been entirely successful.

According to the present invention, an object, broadly stated, is to obtain a distinct and rapid color indication when a lamp admits air from the atmosphere, or, as referred to in the trade, becomes a leaker.

More specifically, the invention proposes utilization of materials which function promptly to effect a distinct change in color, even with small amounts of admitted air and without involving delay of a complete cycle of chemical reaction for effecting a change of color.

A further object is to utilize a combination of materials of which one is inert and has a coloration of warning so predominant that slight change of the active material will render the inert material visible for warning purposes.

A further object of the invention is to utilize colors that have well understood meaning and within the middle range of eye sensitivity.

Other objects and advantages of the invention will become evident to persons skilled in the art to which it appertains as the description proceeds, both by direct recitation thereof and by implication from the context.

Referring to the accompanying drawing, in which like numerals of reference indicate similar parts throughout the several views:

Figure 1 is a sectional elevation of a photoflash lamp embodying the invention;

Figure 2 is an end view of the lamp, showing the spot of color as it appears when the lamp is in proper useable condition; and

Figure 3 is a similar view, showing a spot of color changed to indicate that the lamp is a leaker.

In the specific embodiment of the invention illustrated in said drawing, the reference numeral 1 indicates a glass or other transparent bulb set in a base 2 and having a stem 3 compressed into sealing engagement with electrode supports or lead-in wires 4 for electrodes 5 the discharge of which is capable of flashing the aluminum or other material 6 more or less filling the bulb 1 in conjunction with an appropriate gas filling including a predetermined amount of oxygen. In the manufacture of the flash lamp, the bulb is loaded with a flashing material, evacuated and charged with the gas and then sealed in accordance with usual practice. Concurrently with the afore-mentioned steps of manufacture, a warning spot 7 of composition constituting the present invention is applied within the bulb on the surface thereof and activated for the purpose intended. It may also be appropriate to state

in this connection that the interior of the bulb 1 is usually coated with a transparent lacquer 8, the primary intention of which is to resist shattering of the glass. This lacquer has a further advantage in connection with our invention, in that it constitutes a layer to which the substance of our invention will readily adhere.

Describing the invention more in detail, we utilize a mixture of an active ingredient and an inert ingredient and apply the same as a mixture made into a paste by utilization of an appropriate vehicle. The vehicle is ultimately evaporated and is not present in the sealed-off bulb. The active ingredient employed is cobalto-cobalti cyanide, which for brevity will be referred to as the "cyanide compound." This compound alone has the characteristic of presenting a blue color when dry or dehydrated or pink color, when wet or hydrated. As there is always moisture in the air, a bulb which leaks and admits air will carry with it moisture that will change the color of this active cyanide compound. The inert ingredient is a yellow pigment. When this yellow pigment is mixed within the range of proper proportions with the dry cyanide compound, the color of the mixture will be green, and it is this mixture and color which normally appears at the end of the bulb as spot 7, as shown in Fig. 2.

The proportions preferably used for these ingredients ranges between 20 and 35% for the inert ingredient and 80 to 65% of the active ingredient. The fact that there are two ingredients distributes the active ingredient with intervening particles of the inert ingredient and since there is no chemical combination, but merely a close association of the particles which affect the eye to produce the green color, it will be appreciated that change of these particles which are blue to a different color will promptly result in the other pigment becoming predominant and giving a quick yellow color impression to the eye. We also emphasize in this connection that the colors thus employed, namely green and yellow, are within the middle range of eye sensitivity. Furthermore, the color of green has become universally a symbol of safety, and consequently, the utilization of green as the color for spot 7 when the lamp is in safe condition, is highly advantageous. The change from green to yellow is furthermore one which is readily recognized by contrast, and consequently the change of color in a bulb from green to yellow will serve as readily recognized and unmistakable warning to the user of the flash lamp.

In manufacture, an acceptable procedure comprises mixing the inert ingredient with the active ingredient, as powder. A paste is then made of the mixture by adding an appropriate amount of a liquid vehicle, such as methyl-alcohol or a mixture of methyl-alcohol, butyl-alcohol, or a mixture of methyl-alcohol and naptha, or the mixture of amyl acetate and naptha, or in some instances, naptha alone. The butyl-alcohol and the amyl-acetate are desirable ingredients for purposes of softening the lacquer in the bulb and thus attain a partial sinking of the composition into the lacquer and assuring retention thereof after the carrier is dried out or driven off. The methyl-alcohol and naptha are more volatile than the other ingredients and will evaporate more readily. Consequently, the compromise desired by the manufacturer of rate of drying and degree of softening of the lacquer may be made in choosing any desired proportions of the vehicle. After the paste is made, the spot thereof is applied at the desired position on the inside of the bulb in contact with the lacquer thereon, after which the bulb is loaded with the flashing material, baked to drive off all moisture, evacuated, and charged with the usual gas filling and then sealed up. Under the arid conditions thus obtained within the bulb, the composition forming the spot is green and stands out sharply in the vision of the observer or user. In event that the bulb is a leaker, and admits moisture

from the atmosphere, the cyanide compound fades from its blue color, and as it begins to fade, the yellow pigment constituting the inert ingredient promptly predominates in color and long before the active compound has been fully changed to the pale pink which occurs when it has absorbed all the moisture that it will take, the predominating yellow is clearly visible and is in such large proportion that it remains yellow, notwithstanding the presence of the pale pink of the active ingredient. It will consequently now be evident that it is not necessary to await the long cycle of chemical and color change in the active ingredient to its final status of color under maximum hydration to obtain a definite color indication by the yellow of the inert ingredient that the tube is a leaker.

We claim:

1. A spot of material for inclusion in a lamp having a transparent bulb, and subject to change by the gaseous condition in said bulb, said spot of material being a mechanical mixture composed of cobalto-cobalti cyanide as an active material, the color whereof changes under varying conditions which may prevail within said bulb, and a yellow pigment as an inert material the color whereof remains constant, said inert material being included within the proportionate range of 20 to 35% and active material correspondingly within the range of 80 to 65%.

2. A spot of material for inclusion in a lamp having a transparent bulb, and subject to change by the gaseous condition in said bulb, said spot of material being a mechanical mixture composed of cobalto-cobalti cyanide as an active material, the color whereof changes under varying conditions which may prevail within said bulb, and a yellow pigment as an inert material the color whereof remains constant, said inert material being substantially 30% and the active ingredient substantially 70%.

3. In a lamp having a transparent bulb, color indicating means for detecting the presence of air therein comprising a dispersed mixture of cobalto-cobalti cyanide as an active material and a yellow pigment as an inert material in the ratio of approximately 7 to 3, the color of said active material being responsive to the gaseous atmosphere within the bulb and controlling the color of the mixture so that relatively small variations in the color of the active material substantially alter the color of the mixture to effect a positive and expeditious determination of the gaseous condition within the lamp.

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