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FLASH-LIGHT LAMP

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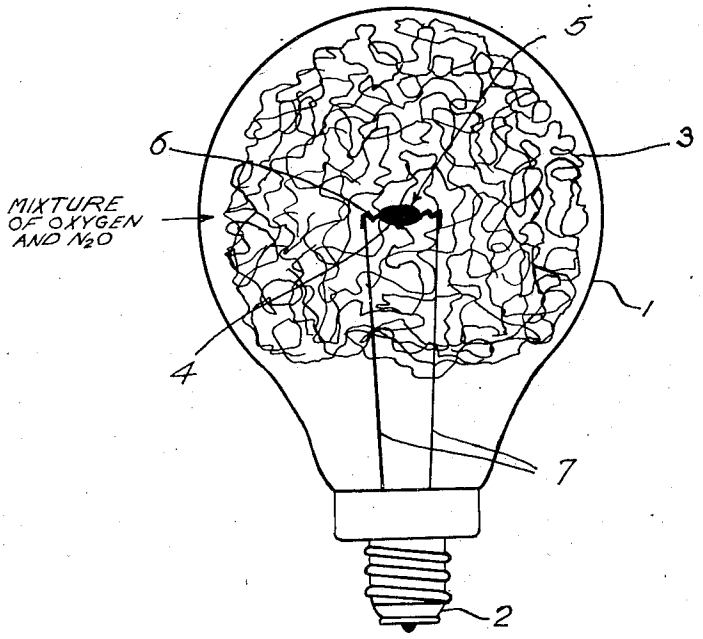

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FLASHLIGHT LAMP

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2 Claims. (Cl. 67—31)

It was found a long time ago that a flash-light lamp should have a flash-time which is not excessively short. Such for two reasons:

When making instantaneous exposures there is greater probability that the synchronizer operating the shutter of the camera will cause the shutter to open during that part of the exposure-time characteristic curve of the flash-light lamp in which the light emission is a maximum; this is of particular importance in connection with iris shutters.

Moreover, because the transit time of many slot-shutters is so long it is necessary to have correspondingly long flash-times to ensure that the negative be entirely exposed. Efforts have therefore been made to make flash-light lamps with longer flash-time by using comparatively thick combustible material. It is true that this leads to a lamp having a wider exposure-time characteristic curve but the defect of this lamp is that the time lag i. e. the time which elapses between establishment of the ignition current and the commencement of light development is far too long.

This defect may be avoided by manufacturing lamps which are not provided with a simple filling but with combustible material constituted by mixtures of thin and thick aluminium foil, thin and thick aluminium wire or thin and thick wire of an aluminium alloy of for example aluminium with 7% of magnesium, in which cases a normal time lag is obtained.

Efforts have also been made to prolong the flash-time by eccentric arrangement of the ignition filament or again by the arrangement of a screen in the bulb with the result that the combustion path is artificially lengthened, by the use of tubular bulbs and so forth.

All these constructions, however, have the disadvantage of being complicated.

According to the present invention, the object aimed at is reached by quite different means viz by a suitable choice of the nature of the gas-filling.

According to the invention, the gas filling is constituted by oxygen having added to it from 10 to 60% by volume of N_2O gas. The proportion used depends on the desired flash-time whereby the greater the quantity added the longer is the flash-time.

The N_2O addition, however, also has the effect of increasing the above-described time lag in proportion to the quantity of N_2O added. The N_2O addition also has the effect of lowering the light-output in proportion to the quantity added. These two injurious effects practically start to occur beyond 30% of N_2O.

The two injurious effects of the N_2O addition which is favourable by itself may, however, be easily balanced by the use of a quicker acting ignition-paste or again by a low increase of the pressure of the gas or the volume of the bulb.

Satisfactory mixtures are those containing from 10 to 60% by volume of N_2O gas, more particularly those containing from 20 to 50% by volume of N_2O gas.

For constituting the combustible material use may be made of solid combustible materials in the form of foil, band, wire or powder of suitable materials such for example as magnesium, aluminium, zirconium and alloys of these substances.

To explain the invention we may mention that the additions of other gases such as N_2 and CO_2 also result in lengthening of the flash-time but these additions have such a cooling effect during combustion that the light-output (lumens sec. per mgr. of combustible material) is reduced to such an extent and the ignition may in addition occur so late and so irregularly that these disadvantages cannot be simply balanced.

In order that the invention may be clearly understood and readily carried into effect I shall describe the same in more detail with reference to the accompanying drawing in which the single figure is a side view of a flash lamp according to the invention.

The flash lamp shown in the drawing comprises a bulb 1 of transparent material having a base 2, combustible material 3 in the form of thin wire and an igniter 5 which serves to ignite the material 3. The igniter 5 comprises a filament 6 supported by two wires 7 and carrying an ignition mixture 4 consisting, for example, of a pulverized metal, for instance aluminum, an oxidizing agent, for instance lead dioxide, and a binder, for instance nitrocellulose or siliceous varnish. In accordance with the invention the bulb is filled with a mixture 8 of oxygen and N_2O, the quantity of N_2O being from 10% to 60%, preferably 20% to 50%, by volume of the mixture.

The advantages of the invention will be shown by the following comparison between a lamp having a filling of oxygen and a lamp which is the same as the first lamp except that, in accordance with the invention, it contains a mixture of oxygen and N_2O.

An incandescent lamp bulb having a diameter

of 55 mms., is filled with 27 mgr. of alloy wire having a thickness of 35μ (Al with 7% of Mg) and with pure oxygen at a pressure of 23 cms. This lamp will yield the characteristic values indicated in column I of the table.

	I	II	III
Time lag.....second..	0.020	0.030	0.020
50% flash-time.....	0.017	0.034	0.046
25% flash-time.....	0.025	0.049	0.069
Max. lumens.....	1.5×10^6	0.5×10^6	0.6×10^6
Lumens sec.....	28.000	20.000	28.000

(The expression 50% (25%) flash-time is used to define the time which elapses between the moments when the emission of light is 50% (25%) of the maximum value in the ascending and descending branches of the characteristic curve.)

If, other things being equal, the bulb is then filled with a mixture of 60% by volume of O_2 and 40% by volume of N_2O at a pressure of 23 cms. the characteristic values given in column II are found. If, however, the gas pressure is increased to 35 cms. and if a slightly quicker acting ignition paste is used the characteristic values of column III are obtained. This shows that the desired effect is completely reached by the use of the invention.

The invention has the particular advantage that for obtaining a long flash-time the use of a simple filling of combustible material may suffice and in addition that even other of the above-mentioned complications need not occur.

It is, however, obvious that if desired the present invention may be combined with similar means which themselves already bring about a longer flash-time so that the flash-time can be further lengthened.

The invention has the additional advantage that N_2O gas is directly obtainable commercially in a sufficiently pure state. In addition, the N_2O gas has no corrosive action on the usual combustible materials such as aluminium, magnesium and their alloys.

What I claim is:

1. A flash lamp comprising a transparent bulb, solid combustible material within the bulb and adapted to react actinically with oxygen, a mixture of oxygen and N_2O within the bulb and containing from about 10% to 60% by volume of N_2O, and means to ignite said combustible material.

2. A flash lamp comprising a transparent bulb, solid combustible material within the bulb and adapted to react actinically with oxygen, a mixture of oxygen and N_2O within the bulb and containing from about 20% to 50% by volume of N_2O, and means to ignite said combustible material.

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