PUBLISHED
MAY 4, 1943.
BY A. P. C.

J. A. M. VAN LIEMPT ET AL
FLASH LAMP
Filed Jan. 15, 1941

Serial No. 374,592
2 Sheets-Sheet 1

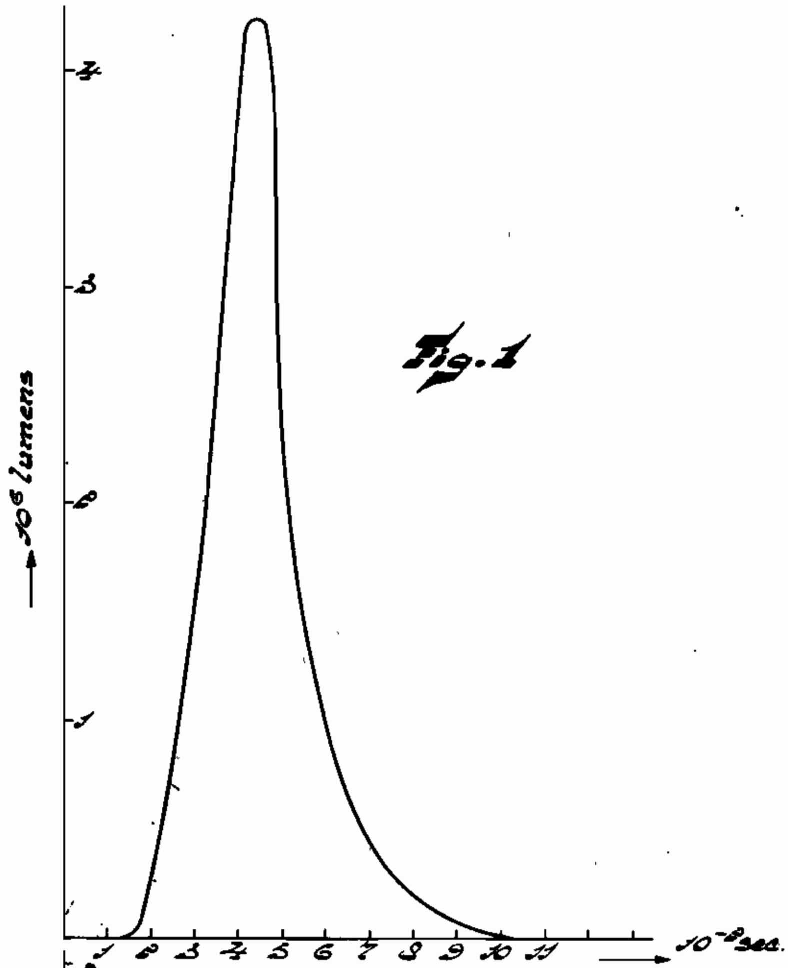

Fig. 1

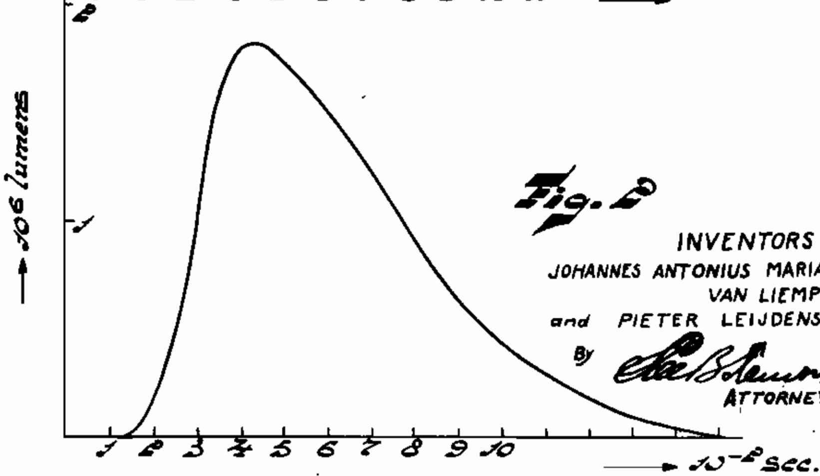

Fig. 2

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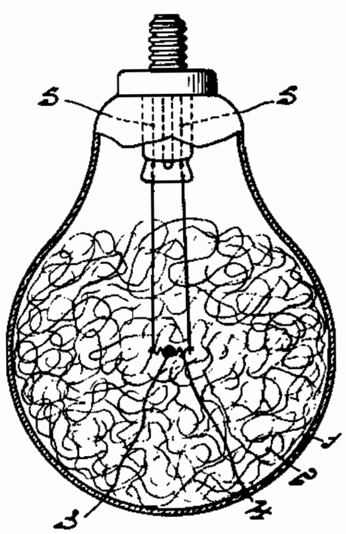

Fig. 3

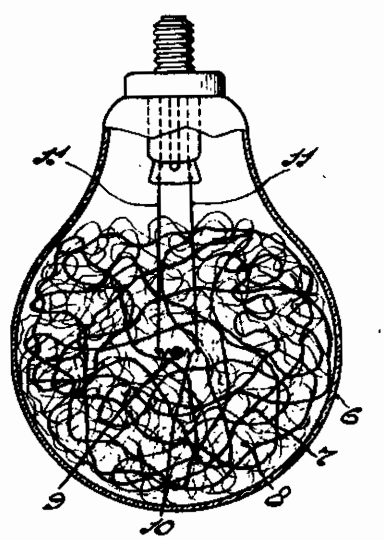

Fig. 4

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ALIEN PROPERTY CUSTODIAN

FLASH-LIGHT LAMP

Johannes Antonius Maria Van Liempt and Pieter Leijdens, Eindhoven, Holland; vested in the Alien Property Custodian

Application filed January 15, 1941

It is known to initiate the ignition of flash-light material consisting of comparatively thick aluminium wire, for instance of more than 35 μ in diameter, or of a comparatively thick aluminium foil having, for instance, a thickness of more than 1 μ by making use of a thin aluminium wire having a thickness of 15 to 22 μ or again of a foil consisting of magnesium, aluminium or an alloy of these metals, which wire or foil has to be provided for this purpose as an intermediary material in the neighbourhood of the so-called ignition paste. In this manner it is possible to obtain a long flash-time while conserving the same time-lag of ignition occurring in a flash-light lamp in which the actinic effect is obtained by means of thin flash-light material. In the present case the term time-lag is to be understood to mean the time elapsing between switching-on the ignition current and the onset of the production of light. A long flash-time while retaining a short time-lag is important when such lamps are used with cameras comprising slit shutters which usually require a long time of travel of the slit.

The use of such intermediary ignition material in the form of foil having the required thickness, such as aluminium foil having a thickness of about 0,5 μ has the drawback of the material being difficult to handle and when making use of thin aluminium wire having a diameter of about 15 to 22 μ the drawback is experienced that such a thin wire can be obtained only by etching because drawing to such a thinness is technically unfeasible.

The present invention has for its object to obviate the said drawbacks concomitant with the use of the well-known intermediary ignition materials.

According to the invention this is achieved by means of a flash-light lamp whose gas-filled bulb contains a flash-light material in the form of a comparatively thick wire which is to be ignited secondarily, an actinic aluminium alloy adapted to be readily ignited in the form of a drawn wire of less than 45 μ in diameter which constituting the intermediary ignition material, and an explosive primary ignition paste.

In the present invention the secondary flash-light material in the form of a comparatively thick wire may consist either of aluminium or of an actinic aluminium alloy adapted to be readily ignited. In this connection flash-light material in the form of a comparatively thick wire is to be understood to mean wire having a diameter of more than 35 μ when it consists of aluminium, and to mean wire of more than 60 μ in diameter, when it consists of the said aluminium alloy adapted to be readily ignited.

So the invention includes secondary flash-light material in the form of wire which as such is adapted to be ignited without the need for additional means and through a normal explosive ignition paste or not and then yields in itself a long flash time, but a much too long time lag for practical purposes.

According to one form of carrying the invention into effect the intermediary filamentary ignition material is advantageously mixed as it were with the secondary filamentary flash-light material, so that the intermediary ignition material need not be located in the neighbourhood of the primary ignition paste, which is contradistinction thereto is necessary when making use of foil or of very thin extremely weak aluminium wires. In fact filling of the bulb with the said actinic wire mixture can be readily effected and, moreover, in one operation by resorting to the method disclosed in American Patent Specification 2,115,423, as a result of which the fuzz of flash-light wire is distributed evenly or substantially evenly throughout the bulb contents which highly promotes the uniformity of the manufacture in regard to the light-time characteristic curve.

The invention may be used with particular advantage when the secondary flash-light material in the form of wire has such a thickness that in itself it can no longer be ignited by a primary ignition paste, but only when making use at the same time of the intermediary ignition material according to the invention.

As actinic aluminium alloys adapted to be readily ignited entering into account for using the invention we may mention, for instance, aluminium-magnesium alloys having a magnesium content of less than 13% or higher than 85%, aluminium-zinc-alloys having a zinc content of 20% at the most or aluminium-cadmium-alloys having a cadmium content of 80% at the most or mixtures of aluminium, cadmium and zinc having a zinc content of 20% at the most.

The term wire used in the present specification is to be understood to include also flattened wire or band whose width amounts to less than five times its thickness.

Fig. 1 shows the light-time characteristic curve of a flash-light lamp whose bulb of 75 mms in diameter is filled with 100 mgs of wire of 50 metres in length and 32 μ in diameter which consists of an alloy of 93% Al and 7% Mg.

Fig. 2 represents the light-time characteristic curve of a flash-light lamp whose bulb, which has also a diameter of 75 mms, is filled with a mixture of 65 mgs of wire having a length of 5,2 metres and a diameter of 90 μ, and 35 mgs of wire having a length of 17 metres and a diameter of 32 μ, both wires consisting of an alloy of 93% Al and 7% Mg.

Fig. 3 represents the flash-light lamp (I) pertaining to Fig. 1 and Fig. 4 represents the lamp (II) pertaining to Fig. 2.

In Fig. 3 the reference number 1 designates the bulb which is furnished with a wire-filling 2 and with a filling of oxygen gas. The reference number 3 indicates diagrammatically the explosive ignition paste provided on the filament 4 which is fed with electric current through the supply conductors 4.

Fig. 4 represents the bulb 6 which is provided with the said wire fillings 7 and 8 and with a filling of oxygen. The reference number 9 indicates diagrammatically the explosive ignition paste provided on the filament 10 which is fed with electric current through the supply conductors 11.

The properties of the two flash-light lamps which, as has already been stated above, have equal bulb and are in either case filled with 100 mgs. of flash-light material in the form of wire and with oxygen having a filling pressure of 40 cms., are summarised in the table below.

Flash-light lamp

Bulb diameter	75 mm.	75 mm.
alloy 93% Al, 7% Mg.	(100 mg.) 32 μ=50 m.	(65 mg.) 90 μ=±4 m. (35 mg.) 32 μ=±17 m.
Time lag	1.6×10^{-2} sec.	1.5×10^{-1} sec.
Peak time	4.3×10^{-1} sec.	4.3×10^{-2} sec.
Lumens sec	100 000	100 000
Max. lumens	4.3×10^{6} lum.	1.8×10^{-4} lum.
50% flash-time	1.8×10^{-2} sec.	5.2×10^{-1} sec.
25% flash-time	3.1×10^{-1} sec.	7.6×10^{-4} sec.

For making the table better understood it is to be noted that the terms:

(1) Time-lag=the time elapsing between switching on the ignition current and the onset of the production of light.

(2) Peak time=the time elapsing between switching on the ignition current and the moment at which the production of light is a maximum.

(3) A% flash-time=the time elapsing between the moments at which the production of light amounts to a% of the maximum production of light.

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