

1330 271

PATENT SPECIFICATION

(11) 1330 271

DRAWINGS ATTACHED



- (21) Application No. 4959/72 (22) Filed 2 Feb. 1972
 (31) Convention Application No. P21 05 211.9
 (32) Filed 4 Feb. 1971 in
 (33) Germany (DT)
 (44) Complete Specification published 12 Sept. 1973
 (51) International Classification G03B 15/05
 (52) Index at acceptance G2A 1H 1K1 1KY

(54) IMPROVEMENTS IN OR RELATING TO FLASH APPARATUS

(71) We, FRANKE & HEIDECHE G.M.B.H., a German Body Corporate, trading as ROLLEI-WERKE FRANKE & HEIDECHE, of 196 Salzdahlumerstrasse, Braunschweig, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The present invention relates to discharge flash apparatus for photographic use with means responsive to light reflected from a photographic subject for short-circuiting the flash tube through a quenching tube.

15 In apparatus of this kind light reflected from a photographic subject is measured and the duration of the flash discharge is controlled on the basis of this measurement. If the distance of the photographic subject from the flash apparatus exceeds that at which the full light-output of the flash apparatus is required for the illumination of the subject, the quenching tube will not come into operation, and the photograph may then be under-exposed.

20 Discharge flash apparatus has already been proposed which includes a signal device which is moved out of an inoperative position by the flash tube current and is returned thereto by current passing through the quenching tube. It is true this does not prevent under-exposed photographs when the subject is too far away, but the photographer is made aware by the signal that the maximum distance acceptable for satisfactory exposure of a photograph has been exceeded. He can then take the photograph again with a larger diaphragm aperture, or else, when using flash apparatus with adjustable light intensity, he can switch over to a higher light output. In important cases he can also ascertain, by making a test discharge of the flash tube before actually taking the photograph, whether the light-output is sufficient.

40 As the quenching tube, when ignited, takes over the flash current and develops an appropriate quantity of light, it is accommodated in a light-proof manner within the apparatus. The functioning of the quenching tube can be

observed when the light-proof cover is partly removed. A "viewing window" is thus generally provided on the flash apparatus. As the quenching tube flash practically coincides with the flash of the flash tube itself, it can only be seen by direct observation of the window during the flash. The aforementioned known apparatus is free of these drawbacks, as it gives a permanent indication, but automatic restoration can only be achieved with difficulty.

The present invention provides a discharge flash apparatus for photographic use comprising a flash tube; a quenching tube connected in parallel with the flash tube; means for measuring light reflected from a photographic subject whilst the flash tube is discharging during a photographic exposure and for automatically terminating the flash tube discharge by igniting the quenching tube to short circuit the flash tube; and a window whereby operation of the quenching tube can be observed, said window having a phosphorescent coating activated by operation of the quenching tube.

The phosphorescent coating is preferably sensitive to ultra-violet rays and provided on the inside of the window. The window can be provided with an external ultra-violet filter preventing the phosphorescent coating from being activated by light from outside the apparatus. The duration of the afterglow of the phosphorescent layer, whilst not permanent, is in practice sufficient to enable operation of quenching tube to be observed distinctly.

A preferred embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, wherein:—

Figure 1 is a schematic diagram of a discharge flash apparatus according to the present invention; and

Figure 2 a partial view, from the rear, of the apparatus shown in Figure 1.

The discharge flash apparatus shown includes a flash tube 1, with an ignition electrode 2. A quenching tube 3 having a quenching ignition electrode 4 is connected in parallel with the flash tube 1. When the flash appar-

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atus is operated, the flash tube 1 is first ignited by the electrode 2. After a sufficient flash duration, photo-electrically determined, the quenching tube 3 is ignited by the electrode 4, so to short circuit and thus extinguish the flash tube 1. The quenching tube 3 is contained in a light-sealed hermetic cover or is accommodated in a housing containing the remainder of the apparatus. The only part of the cover permeable to light is a small area opposite an observation window 5. This window 5 is preferably situated on the rear of the flash apparatus 6, and within the photographer's field of vision as shown. The inside of the window 5 is coated with a phosphorescent layer 7 which is activated by the ultra-violet radiation of the quenching tube 3 and which persists for a certain period to indicate that the quenching tube 3 has functioned. The outside of the window 5 is provided with an ultra-violet filter coating 8, or the window itself functions as an ultra-violet filter, thus preventing any activation of the phosphorescent coating by external ultra-violet light emanating, for example, from the flash tube 1 itself. To provide for easier observation, the external coating 8 can take the form of a lenticular screen, or else a lenticular screen can be superimposed on the window, whether the window be in itself an ultra-violet filter, or be coated with an ultra-violet filter coating.

WHAT WE CLAIM IS:—

1. Discharge flash apparatus for photographic use comprising a flash tube; a quenching tube connected in parallel with the flash tube; means for measuring light reflected from a photographic subject whilst the flash tube is discharging during a photographic exposure

and for automatically terminating the flash tube discharge by igniting the quenching tube to short circuit the flash tube; and a window whereby operation of the quenching tube can be observed, said window having a phosphorescent coating activated by operation of the quenching tube.

2. Discharge flash apparatus as claimed in claim 1, wherein the phosphorescent coating is sensitive to ultra-violet rays and is provided in the apparatus on the inside of the window.

3. Discharge flash apparatus as claimed in claim 1, or claim 2, wherein the outside of the window is coated with an ultra-violet filter layer to prevent activation of the phosphorescent coating by ultra-violet rays from outside the apparatus.

4. Discharge flash apparatus as claimed in claim 1, or claim 2, wherein the window is an ultra-violet filter for preventing activation of the phosphorescent coating by ultra-violet rays from outside the apparatus.

5. Discharge flash apparatus as claimed in claim 3, wherein the filter layer comprises a lenticular screen.

6. Discharge flash apparatus as claimed in claim 3, or claim 4, including a lenticular screen superimposed upon the window.

7. Discharge flash apparatus substantially as described herein with reference to the accompanying drawings.

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3. Discharge flash apparatus as claimed in claim 1, or claim 2, wherein the outside of the window is coated with an ultra-violet filter layer to prevent activation of the phosphorescent coating by ultra-violet rays from outside the apparatus.

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