

PATENT SPECIFICATION

(11) 1 220 562

DRAWINGS ATTACHED



1 220 562

- (21) Application No. 4886/69 (22) Filed 29 Jan. 1969
 (31) Convention Application No. P 16 22 324.8
 (32) Filed 7 Feb. 1968 in
 (33) Germany (DT)
 (45) Complete Specification published 27 Jan. 1971
 (51) International Classification G 01 j 1/44
 (52) Index at acceptance
 G1A 247 248 269 300 302 325 357 358 359 369 378 380
 393 502 504 506 511 514 615
 G2A 1H 1K1 1KY

(54) DISCHARGE FLASHLIGHT

(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:—

The present invention relates to discharge flashlights with photo-electric light control and serves to eliminate undesirable influences of extraneous light sources of comparable power and similar type of light.

With flashlights of this kind the light reflected from the subject is received by an integrating photo-electric luminous-density meter during the discharge. When a certain adjustable threshold value is reached an impulse is generated which interrupts the discharge of the flash tube. In the case of a combination of a number of flash tubes which are ignited in succession by an ignition pulse generator, in accordance with a pulse programme, the threshold value pulse serves to interrupt the programme, so that the discharge of the remaining flash tubes, which have not yet been ignited, will not take place.

As the flash discharge causes fluctuating light of high frequency to occur, it is possible to eliminate the influence of constant-light sources, such as daylight or the light of incandescent lamps, in the photo-electric measuring process. Other flash apparatus, however, can disturb the control operation.

In the arrangement first mentioned, the flash tube is short-circuited by a control element actuated by the photo-electric measuring device when a threshold value is reached. The actuation of the control element may be the ignition of a quenching tube to extinguish the flash tube. Cases may also occur, however, in which the quenching tube is ignited by an extraneous flash apparatus,

so that the storage condenser of the flash-light is discharged before the flash tube itself is even ignited.

By way of a remedy, a photo-sensitive switch operative when exposed to a flash has been proposed, blocking the generation of impulses for the quenching tube if the flash fails to occur. The quenching tube can thus only come into operation if the flash tube has first been ignited. Care has to be taken, however, to ensure that this photo-sensitive switch is carefully screened against extraneous light entering either directly or indirectly via the reflector of the flash apparatus.

According to the present invention there is provided a discharge flashlamp including a flash tube, a high tension circuit including a storage condenser and an ignition circuit for the ignition of the flash tube, a quenching tube connected in parallel with the flash tube and a photoelectric device arranged to generate an ignition pulse to ignite the quenching tube only when a pulse is generated in the high tension circuit for igniting the flash tube.

In a preferred embodiment of the invention there may be provided switch means associated with both the high tension circuit and the quenching tube whereby the switch means is operable to prevent ignition of the quenching tube until the pulse is generated for igniting the flash tube. A control signal for the switch means may be taken from the ignition circuit of the flash tube and be coupled inductively, capacitatively or ohmically to the switch element. In a further version the impulse can be taken direct from the storage condenser.

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

Fig. 1 shows a flash apparatus in which the control signal is taken from the ignition circuit of the flash tube;

[Price 5s. 0d. (25p)]

Fig. 2 shows a similar system, with a simplified construction; and

Fig. 3 shows a further version, in which the control signal is taken from the storage condenser, with a construction simplified still further.

A high-tension storage condenser 1 is charged up by a direct-voltage converter 2, via a diode 3; for the low-voltage part a battery 4 is provided. An ignition voltage is tapped off a voltage-divider formed by resistors 5, 6, 7. The resistor 6, a capacitor 8, and primary winding 9 of an ignition transformer are connected in series, so that the capacitor 8 is charged up. On the closing of a switch 10 the capacitor 8 is discharged via the primary winding 9 of the transformer. The high-tension surge thus occurring in the secondary winding 11 ignites flash tube 13 via electrode 12.

At the same time the ignition impulse is conveyed, via capacitor 14 to a monostable flip-flop 15, 16 which is connected with the base of transistor 17. The transistor 17 is normally conductive, so that it short-circuits ignition circuit 20 of quenching tube 21. The ignition impulse actuates the flip-flop 15, 16 and renders the transistor 17 non-conductive, at least for the duration of the discharge of the storage condenser, i.e. for the duration of the flash.

A photo-electric converter 22 provides an output current pulse in response to the flash produced in the flash tube 12, which current pulse is integrated by integrator 23 and fed into the base of transistor 24. Upon overcoming a predetermined threshold level transistor 24 generates an output pulse to the ignition circuit 20 to ignite the quenching tube 21 via electrode 25 so that the flash tube 13 is caused, by short-circuiting, to become extinguished.

In place of the capacitive coupling 14 of the flip-flop 15, 16 to the ignition circuit an inductive or ohmic coupling could be used.

Fig. 2 shows a simplified circuit system similar to that of Figure 1. Transistors of the same kind can be provided; the flip-flop 15, 16 is constructed so as to draw no current from the battery until the switching process itself takes place, so that the battery of the apparatus is not loaded thereby.

In the further circuit construction shown in Fig. 3, the control pulse is taken direct from a storage condenser 101 and conveyed via the condenser 114 to the base of the transistor 126.

Via a voltage-divider formed by resistors 127, 128, 129 the transistor 126 receives a positive bias voltage, so that the line 119 to the ignition circuit is thereby kept short-circuited. When the flash tube 113 is ignited, a negative voltage impulse, almost down to zero potential, occurs in the storage condenser 101. The impulse reaches the base

of the transistor 126 and blocks it. The time constant of the base circuit elements is selected to ensure that transistor 126 is blocked for the entire duration of the discharge of the storage condenser 101, so that it is only during this period that the measuring impulse of the luminous density measuring device 122 can pass through to ignition circuit 120 to ignite quenching tube 121. Diode 130 serves as a protection for the transistor 126. Here again, the transistor 126 can be preceded by a pulse shaper (such as a flip-flop), as in the versions mentioned previously.

If this flip-flop 15, 16 is set to sufficient sensitivity, it is possible to ensure, with very moderate switching action or circuit apparatus, that no special biasing current source is required by the extraneous flash blocking circuit.

It is thus possible, with very moderate switching action or circuit apparatus, to ensure that the apparatus is reliably protected from interference influences emanating from extraneous flash apparatus.

WHAT WE CLAIM IS:—

1. A discharge flashlamp including a flash tube, a high tension circuit including a storage condenser and an ignition circuit for igniting the flash tube, a quenching tube connected in parallel with the flash tube and a photo-electric device arranged to generate an ignition pulse to ignite the quenching tube only when a pulse is generated in the high tension circuit for igniting the flash tube.

2. A flashlamp as claimed in claim 1 including switch means associated with both the high tension circuit and the quenching tube whereby the switch means is operable to prevent ignition of the quenching tube until the pulse is generated for igniting the flash tube.

3. A flashlamp as claimed in claim 2, wherein the switch means comprises a transistor switchable between a normally conductive condition and a non-conductive condition by means of a transistor flop-flop pulse shaper circuit in response to a flash-tube ignition pulse generated in the flash tube ignition circuit.

4. A flashlamp as claimed in claim 2, wherein the switch means comprises a transistor switchable between a normally conductive condition and a non-conductive condition in response to the discharge of a high tension circuit storage condenser connected with the base of the transistor.

5. A flashlamp as claimed in claim 3 or 4 wherein the collector electrode of the transistor is connected with the ignition electrode of the quenching tube.

6. A flashlamp as claimed in claim 5, including a capacitor interconnected be-



Fig. 2 shows a similar system, with a simplified construction; and

Fig. 3 shows a further version, in which the control signal is taken from the storage condenser, with a construction simplified still further.

A high-tension storage condenser 1 is charged up by a direct-voltage converter 2, via a diode 3; for the low-voltage part a battery 4 is provided. An ignition voltage is tapped off a voltage-divider formed by resistors 5, 6, 7. The resistor 6, a capacitor 8, and primary winding 9 of an ignition transformer are connected in series, so that the capacitor 8 is charged up. On the closing of a switch 10 the capacitor 8 is discharged via the primary winding 9 of the transformer. The high-tension surge thus occurring in the secondary winding 11 ignites flash tube 13 via electrode 12.

At the same time the ignition impulse is conveyed, via capacitor 14 to a monostable flip-flop 15, 16 which is connected with the base of transistor 17. The transistor 17 is normally conductive, so that it short-circuits ignition circuit 20 of quenching tube 21. The ignition impulse actuates the flip-flop 15, 16 and renders the transistor 17 non-conductive, at least for the duration of the discharge of the storage condenser, i.e. for the duration of the flash.

A photo-electric converter 22 provides an output current pulse in response to the flash produced in the flash tube 12, which current pulse is integrated by integrator 23 and fed into the base of transistor 24. Upon overcoming a predetermined threshold level transistor 24 generates an output pulse to the ignition circuit 20 to ignite the quenching tube 21 via electrode 25 so that the flash tube 13 is caused, by short-circuiting, to become extinguished.

In place of the capacitive coupling 14 of the flip-flop 15, 16 to the ignition circuit an inductive or ohmic coupling could be used.

Fig. 2 shows a simplified circuit system similar to that of Figure 1. Transistors of the same kind can be provided; the flip-flop 15, 16 is constructed so as to draw no current from the battery until the switching process itself takes place, so that the battery of the apparatus is not loaded thereby.

In the further circuit construction in Fig. 3, the control pulse is taken direct from a storage condenser 101 and conveyed via the condenser 114 to the base of the transistor 126.

Via a voltage-divider formed by resistors 127, 128, 129 the transistor 126 receives a positive bias voltage, so that the line 119 to the ignition circuit is thereby kept short-circuited. When the flash tube 113 is ignited, a negative voltage impulse, almost down to zero potential, occurs in the storage condenser 101. The impulse reaches the base

of the transistor 126 and blocks it. The time constant of the base circuit elements is selected to ensure that transistor 126 is blocked for the entire duration of the discharge of the storage condenser 101, so that it is only during this period that the measuring impulse of the luminous density measuring device 122 can pass through to ignition circuit 120 to ignite quenching tube 121. Diode 130 serves as a protection for the transistor 126. Here again, the transistor 126 can be preceded by a pulse shaper (such as a flip-flop), as in the versions mentioned previously.

If this flip-flop 15, 16 is set to sufficient sensitivity, it is possible to ensure, with very moderate switching action or circuit apparatus, that no special biasing current source is required by the extraneous flash blocking circuit.

It is thus possible, with very moderate switching action or circuit apparatus, to ensure that the apparatus is reliably protected from interference influences emanating from extraneous flash apparatus.

WHAT WE CLAIM IS:—

1. A discharge flashlamp including a flash tube, a high tension circuit including a storage condenser and an ignition circuit for igniting the flash tube, a quenching tube connected in parallel with the flash tube and a photo-electric device arranged to generate an ignition pulse to ignite the quenching tube only when a pulse is generated in the high tension circuit for igniting the flash tube.

2. A flashlamp as claimed in claim 1 including switch means associated with both the high tension circuit and the quenching tube whereby the switch means is operable to prevent ignition of the quenching tube until the pulse is generated for igniting the flash tube.

3. A flashlamp as claimed in claim 2, wherein the switch means comprises a transistor switchable between a normally conductive condition and a non-conductive condition by means of a transistor flop-flop pulse shaper circuit in response to a flash-tube ignition pulse generated in the flash tube ignition circuit.

4. A flashlamp as claimed in claim 2, wherein the switch means comprises a transistor switchable between a normally conductive condition and a non-conductive condition in response to the discharge of a high tension circuit storage condenser connected with the base of the transistor.

5. A flashlamp as claimed in claim 3 or 4 wherein the collector electrode of the transistor is connected with the ignition electrode of the quenching tube.

6. A flashlamp as claimed in claim 5, including a capacitor interconnected be-

3
tween the collector of the transistor and the ignition electrode of the quenching tube.

7. A discharge flashlamp substantially as
ereinbefore described with reference to,
5 and as illustrated in, Figures 1, 2 or 3 of the accompanying drawings.

For the Applicants,
MATTHEWS, HADDAN & CO.,
Chartered Patent Agents,
Haddan House,
33 Elmfield Road,
Bromley, Kent, BR1 1SU.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1971.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY
from which copies may be obtained.

