

PATENT SPECIFICATION

(11) 1 286 641

DRAWINGS ATTACHED

- (21) Application No. 50431/69 (22) Filed 14 Oct. 1969
(31) Convention Application No. 767 100 (32) Filed 14 Oct. 1968 in
(33) United States of America (US)
(45) Complete Specification published 23 Aug. 1972
(51) International Classification G03B 15/04
(52) Index at acceptance G2A 1G 1K2A 1K2Y 1KY
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(54) PHOTOGRAPHIC CAMERA

(71) We, EASTMAN KODAK COMPANY, a Company organized under the Laws of the State of New Jersey, United States of America of 343 State Street, Rochester, New York 14650, United States of America, 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 a photographic camera for use with percussion-ignitable flash lamp units (hereinafter referred to as "of the kind defined") comprising one or more flash lamps, the or each flash lamp having a primer which, upon being struck activates the lamp. The striker for activating the lamp may be a part of the camera mechanism or may be incorporated in the flash lamp unit.

In accordance with the present invention there is provided a photographic camera having a socket for receiving a percussion-ignitable flash lamp unit of the kind defined, said camera comprising a shutter-driving member operable upon actuation of a shutter release member to open a shutter and actuating means movable by the shutter-driving member for effecting ignition of a percussion-ignitable lamp of a received unit in synchronisation with opening of the shutter.

The single figure of the accompanying drawing is a perspective view, partly broken away, of a photographic camera constructed in accordance with one form of the present invention.

Because certain parts of photographic and related apparatus are well known, the following description is directed in particular to those elements forming, or cooperating directly with the mechanism of the present invention, elements that are not specifically shown or described herein being understood to be selectable from those known in the art.

The drawing illustrates a photographic camera 10 having a housing 11 that includes a front wall 12 and a top wall 13, the front and top walls 12 and 13 being shown partially broken away for clarity of illustration. Included

in the camera 10 are a shutter 14 pivotally mounted at 15 for movement between a closed position shown in solid lines and an open position shown in broken lines, a spring 16 mounted at one end on a pin 17 fixed to camera housing 11 and at the other end on the shutter 14 for returning the shutter 14 from its open position to its closed position, a shutter-driving member or driver 18 slidably mounted for movement by means of a spring 19 into driving engagement with the shutter 14, and a shutter-release member 20 slidably mounted for downward releasing movement by the camera operator and upward return movement by means of a spring 21 respectively to release the shutter driver 18 from, and retain the shutter driver 18 in, its cocked position shown in solid lines.

Also included in the camera 10, but not shown, is a film-winding and shutter-cocking mechanism through which the camera operator can effect the return of the shutter driver 18 from its released position shown in broken lines to its cocked position shown in solid lines. Upon completion of such cocking movement, the shutter-release member 20, having been returned by the spring 21 to its original position, shown in solid lines, retains the shutter driver 18 in its cocked position by the engagement of a lug 22 with a lug 23 as shown.

The shutter driver 18 includes a shutter-driving portion 24, extending toward front wall 12 and engageable with a portion 25 of the shutter 14, and another portion 26 extending toward top wall 13 as shown. Spaced slightly to the right of the portion 26 is a ramp portion 27 of an irregularly shaped actuating member 28, which is pivotally mounted at 29 to permit substantially vertical movement of an upwardly extending finger 30 at the right-hand end of the member 28.

Shown beneath the broken-away portion of the top wall 13 is a socket 31 for removably receiving a multilamp flash unit 32 having a plurality of percussion-ignitable flash lamps 33 therein, such a flash unit being shown in a position above the camera 10 from which it may conveniently be inserted into the socket

31. Each of the percussion-ignitable lamps 33 in the flash unit 32 has a primer tube 34 depending therefrom as shown. Disposed within the unit 32, in a position adjacent to, but spaced from, the ignition tube 34 of each lamp 33, is a resilient striking member 35 biased for movement into percussive contact with the primer tube 34, but shown retained or cocked against such movement by means of a lug 36 protruding upwardly from the base 37 of unit 32. In the base 37, beneath each cocked striking member 35, is a hole 38 through which the finger 30 can move to push the striking member 35 upwardly out of engagement with the lug 36 and thereby release the striking member 35 for rapid movement, under its own biasing influence, into percussive contact with the primer tube 34.

Depending from the centre of the flash lamp unit base 37 is a square-shaped mounting stem 39 having a square-shaped axial opening therein (not shown). In each side wall 40 of the mounting stem 39 is a recess 41 through which a shaped retaining finger of the socket 31 can extend. The socket 31 includes a square-shaped centre post 42, which is snugly receivable in the square-shaped axial opening in the mounting stem 39, and a plurality of fingers 43 that are resiliently movable into engagement with the recesses 41 in the mounting stem 39 when the centre post 42 is received in the axial opening of the stem 39 upon insertion of the unit 32 into the socket 31. The snug fit of the square-shaped centre post 42 in the square-shaped axial opening in the mounting stem 39 serves both to orientate the unit 32 in an operative angular position and retain the unit 32 against unintended rotation in the socket during use, while fingers 43, when engaged with the recesses 41, serve particularly to retain the unit 32 against possible upward movement during percussive ignition of a lamp 33 in the unit.

Shown in the top wall 13, at a location adjacent to the socket opening, is a hole 44 to permit movement of the finger 30 into and out of contact with a received flash lamp unit 32, the finger 30, in its upward travel, protruding through the hole 44 and through the hole 38 thereabove to push the striking member 35 upwardly out of engagement with the lug 36 as previously described.

The actuating member 28 is caused to rotate in a counterclockwise direction, as viewed in the drawing, when struck at the ramp portion 27 by the portion 26 of the shutter driver 18 during movement of the driver 18 under the action of the spring 19 in the direction of the arrow A, such rotation of the actuating member 28 in a counterclockwise direction resulting in upward movement of the finger 30 into contact with a received flash lamp unit 32. It has been found that suitable synchronization of flash lamp ignition with shutter opening is obtained when the shutter driver

18 strikes the actuating member 28 before the shutter driver 18 strikes the shutter 14, thereby permitting peak flash lamp illumination to be attained by the time the shutter 14 is fully opened. Although, in the preferred embodiment as illustrated, the shutter driver 18 travels in the direction of the arrow A a certain distance before striking the first ramp portion 27 of the actuating member 28 and then portion 25 of the shutter 14, it should be understood that the entire stroke of movement by the shutter driver 18 in the direction of the arrow A, both before and after the shutter driver 18 engages the actuating member 28 and shutter 14, is considered and referred to herein as shutter-opening movement of the shutter driver 18. As shown and described herein, the finger 30 of the actuating member 28 thus provides a percussion-ignition actuating means that is movable into contact with a received flash lamp unit 32 to effect percussion ignition of a lamp 33 in the received unit, such actuating means being coupled to, or integral with, a movable member such as the actuating member 28 that is driven directly by the shutter driver 18 during the shutter-opening movement of the driver 18.

In operation, the mechanism of the present invention, as incorporated in the preferred embodiment shown and described herein, works as follows. Upon the camera operator's downward movement of the shutter-release member 20 from its position shown in solid lines to its position shown in broken lines, the shutter-driving member 18 is released for rapid movement by the spring 19 in the direction of the arrow A. Such movement of the shutter driver 18 first causes the portion 26 thereof to strike ramp portion 27 of the actuating member 28, causing the member 28 to rotate in a counterclockwise direction and thereby move the finger 30 upwardly through the hole 44 and through the hole 38 to release the striking member 35 for movement into percussive contact with the primer tube 34 of the lamp 33. Continued movement of the shutter driver 18 in the direction of the arrow A then causes the portion 24 thereof to strike the portion 25 of the shutter 14, causing the shutter 14 to rotate in a clockwise direction from its closed position to its open position. After a photographic exposure has thus been made, the aforementioned film-winding and shutter-cocking mechanism (not shown) in the camera is operated by the camera operator to effect the return of the shutter driver 18 and the actuating member 28 to their original positions shown in the drawing, the shutter-release member 20 having already been returned to its original position by the return spring 21.

WHAT WE CLAIM IS:—

1. A photographic camera having a socket for receiving a percussion-ignitable flash lamp unit of the kind defined, said camera comprising a shutter-driving member operable upon

31. Each of the percussion-ignitable lamps 33 in the flash unit 32 has a primer tube 34 depending therefrom as shown. Disposed within the unit 32, in a position adjacent to, but spaced from, the ignition tube 34 of each lamp 33, is a resilient striking member 35 biased for movement into percussive contact with the primer tube 34, but shown retained or cocked against such movement by means of a lug 36 protruding upwardly from the base 37 of unit 32. In the base 37, beneath each cocked striking member 35, is a hole 38 through which the finger 30 can move to push the striking member 35 upwardly out of engagement with the lug 36 and thereby release the striking member 35 for rapid movement, under its own biasing influence, into percussive contact with the primer tube 34.

Depending from the centre of the flash lamp unit base 37 is a square-shaped mounting stem 39 having a square-shaped axial opening therein (not shown). In each side wall 40 of the mounting stem 39 is a recess 41 through which a shaped retaining finger of the socket 31 can extend. The socket 31 includes a square-shaped centre post 42, which is snugly receivable in the square-shaped axial opening in the mounting stem 39, and a plurality of fingers 43 that are resiliently movable into engagement with the recesses 41 in the mounting stem 39 when the centre post 42 is received in the axial opening of the stem 39 upon insertion of the unit 32 into the socket 31. The snug fit of the square-shaped centre post 42 in the square-shaped axial opening in the mounting stem 39 serves both to orientate the unit 32 in an operative angular position and retain the unit 32 against unintended rotation in the socket during use, while fingers 43, when engaged with the recesses 41, serve particularly to retain the unit 32 against possible upward movement during percussive ignition of a lamp 33 in the unit.

Shown in the top wall 13, at a location adjacent to the socket opening, is a hole 44 to permit movement of the finger 30 into and out of contact with a received flash lamp unit 32, the finger 30, in its upward travel, protruding through the hole 44 and through the hole 38 thereabove to push the striking member 35 upwardly out of engagement with the lug 36 as previously described.

The actuating member 28 is caused to rotate in a counterclockwise direction, as viewed in the drawing, when struck at the ramp portion 27 by the portion 26 of the shutter driver 18 during movement of the driver 18 under the action of the spring 19 in the direction of the arrow A, such rotation of the actuating member 28 in a counterclockwise direction resulting in upward movement of the finger 30 into contact with a received flash lamp unit 32. It has been found that suitable synchronization of flash lamp ignition with shutter opening is obtained when the shutter driver

18 strikes the actuating member 28 before the shutter driver 18 strikes the shutter 14, thereby permitting peak flash lamp illumination to be attained by the time the shutter 14 is fully opened. Although, in the preferred embodiment as illustrated, the shutter driver 18 travels in the direction of the arrow A a certain distance before striking the first ramp portion 27 of the actuating member 28 and then portion 25 of the shutter 14, it should be understood that the entire stroke of movement by the shutter driver 18 in the direction of the arrow A, both before and after the shutter driver 18 engages the actuating member 28 and shutter 14, is considered and referred to herein as shutter-opening movement of the shutter driver 18. As shown and described herein, the finger 30 of the actuating member 28 thus provides a percussion-ignition actuating means that is movable into contact with a received flash lamp unit 32 to effect percussion ignition of a lamp 33 in the received unit, such actuating means being coupled to, or integral with, a movable member such as the actuating member 28 that is driven directly by the shutter driver 18 during the shutter-opening movement of the driver 18.

In operation, the mechanism of the present invention, as incorporated in the preferred embodiment shown and described herein, works as follows. Upon the camera operator's downward movement of the shutter-release member 20 from its position shown in solid lines to its position shown in broken lines, the shutter-driving member 18 is released for rapid movement by the spring 19 in the direction of the arrow A. Such movement of the shutter driver 18 first causes the portion 26 thereof to strike ramp portion 27 of the actuating member 28, causing the member 28 to rotate in a counterclockwise direction and thereby move the finger 30 upwardly through the hole 44 and through the hole 38 to release the striking member 35 for movement into percussive contact with the primer tube 34 of the lamp 33. Continued movement of the shutter driver 18 in the direction of the arrow A then causes the portion 24 thereof to strike the portion 25 of the shutter 14, causing the shutter 14 to rotate in a clockwise direction from its closed position to its open position. After a photographic exposure has thus been made, the aforementioned film-winding and shutter-cocking mechanism (not shown) in the camera is operated by the camera operator to effect the return of the shutter driver 18 and the actuating member 28 to their original positions shown in the drawing, the shutter-release member 20 having already been returned to its original position by the return spring 21.

WHAT WE CLAIM IS:—

1. A photographic camera having a socket for receiving a percussion-ignitable flash lamp unit of the kind defined, said camera comprising a shutter-driving member operable upon



actuation of a shutter release member to open a shutter and actuating means movable by the shutter-driving member for effecting ignition of a percussion-ignitable lamp of a received unit in synchronisation with opening of the shutter.

2. A photographic camera according to Claim 1, wherein the socket means is adapted to receive a flash lamp unit of the kind defined and having a built-in striker for the or each flash lamp and the actuating means is movable into contact with such a unit received in the socket to effect movement of a striker into percussive contact with its lamp.

3. A photographic camera according to Claim 1 or 2, wherein the actuating means has a movable member coupled thereto and drivable by the shutter-driving member to move the actuating means into contact with a received flash lamp unit as the shutter-driving member moves to drive the shutter from the closed position to the open position.

4. A photographic camera according to Claim 3, wherein the shutter-driving member is movable into engagement with the movable member to drive said movable member and thereby move the actuating means into contact with a received flash lamp unit before the shutter-driving member engages the shutter to drive the shutter from the closed position to the open position.

5. A photographic camera according to Claim 3 or 4, wherein the shutter-driving member is retained in a cocked position by means of a latch element carried by the shutter release member and the actuating means is formed integrally with the movable member.

6. A photographic camera according to Claim 1, constructed substantially as hereinbefore described with reference to, and as shown in, the accompanying drawing.

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Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1972.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.



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