

PATENT SPECIFICATION

(11) 1 286 642

DRAWINGS ATTACHED

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- (21) Application No. 50434/69 (22) Filed 14 Oct. 1969
 (31) Convention Application No. 767 142 (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 14A1C 14A1D 1G 1H 1K2A 1K2Y 1KY
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(54) PHOTOGRAPHIC FLASHLIGHT DEVICE

(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 flashlight device, and to a camera incorporating such a device, 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 lamp having a primer which, upon being struck, ignites its associated lamp.

In accordance with the present invention there is provided a photographic flash light device comprising a holder for receiving a percussion-ignitable flash lamp unit of the kind defined, a striker for striking a primer of a flash lamp unit received in the holder and drive means for automatically cocking the striker as a result of striking a primer of a received flash lamp unit.

According to the present invention there is also provided a photographic camera comprising a shutter release member, a holder for receiving a percussion-ignitable flash lamp unit of the kind defined, a striker for striking, upon actuation of the shutter release member, a primer of a flash lamp unit received in the holder and drive means for automatically cocking the striker as a result of striking a primer of a received flash lamp unit.

In the accompanying drawing:

Fig. 1 is a perspective view of part of a photographic camera constructed in accordance with the present invention and showing the firing mechanism in a normal energized position; and

Fig. 2 is a plan of a portion of the camera shown in Fig. 1 showing the path followed by the striker during its movement between its energized and de-energized conditions.

Since cameras of the type hereinafter de-

scribed are generally well known, the present description will be directed in particular to elements forming a part of or cooperating more directly with the mechanism of the present invention, elements not specifically shown or described herein being understood to be selectable from those known in the art.

Referring to Fig. 1, a camera 4 has a frame 6 within which a rotatable socket 8, shown in part, is mounted for receiving a percussion-ignitable, multilamp, photoflash unit 10. A socket and photoflash unit of the type usable in this invention is described in detail in our Letters Patent No. 1240784. Various camera mechanisms are known for providing indexing rotation of a socket in synchronism with other cyclic operations of the camera such as shutter cocking and film advancing. Such indexing of socket 8 and flash unit 10 in 90° increments to position the primers 12 of flash lamps 14 at a firing position is achieved in camera 4 by means of a drive gear 16, an energizer gear 18 and an idler gear 20 forming a gear train interconnecting any known drive means such as a drive motor 22 to a socket gear 24 on which the socket 8 is mounted. The gear ratios are properly selected to advance the socket gear 90° for each picture-taking cycle. The drive motor 22 is also employed in known manner to cock the shutter and advance the film.

A firing mechanism 26 for firing percussion-ignitable flash lamps 14 comprises a bow-shaped, leaf spring 28 having one end 30 (see Fig. 2) connected to a post 32 on the energizer gear 18, its opposite end 34 free, and the portion thereof intermediate its ends interposed between a fulcrum post 38 and a guide rib 36, both secured to the camera body 6. A control cam 40 for the camera drive system is secured to the gear 18 which is designed by proper selection of gear ratios to make one complete revolution for each quarter of a revolution made by the socket gear 24. The control cam 40 has a shoulder 42 that is engageable by a pivotally mounted lever 44 biased by means of a spring 46 into engagement with the periphery of control cam 40 for holding

the cam and firing mechanism in a normal rest or energized position. In this rest or energized position, the end 34 of spring 28 is in engagement with a lug 48 on a latch lever 50 pivotally mounted at 52 on the frame 6, and the spring 28 is bowed into a fully energized position by virtue of the position of the latch lug 48, post 38 and pin 32. When the latch lever 50 is moved in the direction of the arrow in Fig. 1, the spring end 34 is released and the energy stored therein whips the spring end 34 into percussion impact with a primer 12 located at the firing position for igniting the primer and its associated flash lamp 14. A leaf spring 28 mounted as described was found to urge a striking surface into engagement with a primer 12 with an impact velocity of approximately 1400 inches per second whereas a comparable cantilever spring was found to urge a striking surface into engagement with a primer at a velocity of approximately 900 inches per second.

During movement of the latch lever 50 to release the spring end 34, the lever 44 is momentarily withdrawn from the shoulder 42 of the control cam 40 by means of an arm 54 having one end pivotally secured to the lever 50, and its other end secured to the lever 44 by a lost motion pin 56 and slot 58 connection. Release of the control cam 40 allows the camera drive motor 22 to rotate the energizer gear 18 and control cam 40 through a single revolution, further rotation being prevented by virtue of the shoulder 42 re-engaging the lever 44, and to move the socket gear 24 through an increment of 90° to advance a new flash lamp 14 with its primer 12 located at the firing position. The control cam 40 is released in time relation to the release of the spring end 34 to assure striking of primer 12 before the release of the cam 40. This relationship is achieved by the lost motion pin 56 and slot 58 connection, but may be achieved by other suitable means. During the single revolution of the control cam 40, the spring end 34 is moved in a curved path as denoted by arrows 60 in Fig. 2 to a position in front of the latch lug 48. During approximately the last 135° of rotation of the energizer gear 18 and the control cam 40 from the dotted position of pin 32 as seen in Fig. 2 to its final rest position, the spring 28 is energized.

A release means for firing the mechanism 26 comprises a shutter release lever 62 having a button 64 which is located on the exterior of the camera housing. The shutter release lever 62 is pivotally mounted on a pin 66 and is biased by means of a spring 68 into engagement with a stop pin 70. A shutter blade 72 is pivotally mounted at 74 and is biased by means of a spring 76 into engagement with a stop pin 78. Depression of the button 64 and shutter lever 62 in the direction of the arrow, as seen in Fig. 1, into engagement with a stop 80 causes a lug 82 on the lever 62

to release a tensioned, shutter blade driving arm 84 which strikes a tab 86 on the shutter blade 72 and drives it through aperture open and closed positions to make an exposure. The shutter lever 62 has an upwardly extending end 88 having a ramp 90 engageable by the latch lever 50. Downward movement of the shutter lever 62 causes the ramp 90 to move the latch lever 50 in a clockwise direction, as seen in Fig. 1, to release the spring end 34. Pivotal movement of the latch lever 50 is transmitted to the lever 44 by means of the arm 54, and the lost motion therebetween permits release of the spring end 34 for firing the primer 12 before the lever 44 releases the control cam 40.

In describing the operation of the mechanism it will be assumed that the camera parts are in their rest position as shown in Figs. 1 and 2. Upon depressing the camera release button 64, the shutter lever 62 is moved to its dotted position as seen in Fig. 1 thereby releasing the driving arm 84 for driving the shutter blade 72 to make an exposure in a known way. Movement of the shutter lever 62 also releases the latch lever 50 for releasing the spring end 34 to allow it to strike the primer 12 and ignite a flash lamp 14. Immediately after the flash lamp 14 has been ignited, the lever 44 is withdrawn, by means of the arm 54, and pin 56 and slot 58 connection, to release the control cam 40 thereby allowing the drive motor 22 to drive the energizer gear 18 through a single revolution. Such movement of the energizer gear 18, in cooperation with lever lug 48 re-energizes the firing spring 28, and indexes the socket gear 24 through an angle of 90° to present the succeeding flash lamp 14 and primer 12 at the firing locus. Following this cycle of operation, the camera parts return to their normal rest position as seen in Fig. 1 in preparation for another exposure.

WHAT WE CLAIM IS:—

1. A photographic flash light device comprising a holder for receiving a percussion-ignitable flash lamp unit of the kind defined, a striker for striking a primer of a flash lamp unit received in the holder and drive means for automatically cocking the striker as a result of striking a primer of a received flash lamp unit.

2. A photographic flash light device according to Claim 1 for use with a multilamp, percussion ignitable flash lamp unit of the kind defined, wherein the drive means automatically indexes the holder, upon cocking the striker, to bring the succeeding flash lamp of a received unit into the firing position.

3. A photographic camera comprising a shutter release member, a holder for receiving a percussion-ignitable flash lamp unit of the kind defined, a striker for striking, upon actuation of the shutter release member, a primer of a flash lamp unit received in the holder



the cam and firing mechanism in a normal rest or energized position. In this rest or energized position, the end 34 of spring 28 is in engagement with a lug 48 on a latch lever 50 pivotally mounted at 52 on the frame 6, and the spring 28 is bowed into a fully energized position by virtue of the position of the latch lug 48, post 38 and pin 32. When the latch lever 50 is moved in the direction of the arrow in Fig. 1, the spring end 34 is released and the energy stored therein whips the spring end 34 into percussion impact with a primer 12 located at the firing position for igniting the primer and its associated flash lamp 14. A leaf spring 28 mounted as described was found to urge a striking surface into engagement with a primer 12 with an impact velocity of approximately 1400 inches per second whereas a comparable cantilever spring was found to urge a striking surface into engagement with a primer at a velocity of approximately 900 inches per second.

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1. A photographic flash light device comprising a holder for receiving a percussion-ignitable flash lamp unit of the kind defined, a striker for striking a primer of a flash lamp unit received in the holder and drive means for automatically cocking the striker as a result of striking a primer of a received flash lamp unit.

2. A photographic flash light device according to Claim 1 for use with a multilamp, percussion ignitable flash lamp unit of the kind defined, wherein the drive means automatically indexes the holder, upon cocking the striker, to bring the succeeding flash lamp of a received unit into the firing position.

3. A photographic camera comprising a shutter release member, a holder for receiving a percussion-ignitable flash lamp unit of the kind defined, a striker for striking, upon actuation of the shutter release member, a primer of a flash lamp unit received in the holder



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- 3 and drive means for automatically cocking the striker as a result of striking a primer of a received flash lamp unit.
- 5 4. A photographic camera according to Claim 3, wherein the striker comprises a leaf spring which is supported intermediate its ends and is movable by means of the drive means to a cocked position for storing potential energy urging the striker towards a firing position.
- 10 5. A photographic camera according to Claim 4, wherein the leaf spring is slidably supported intermediate its ends between a rib and a post which also comprises a fulcrum for the leaf spring.
- 15 6. A photographic camera according to Claim 5, wherein one end of the leaf spring comprises a primer-striking surface and is retained in the cocked position by means of a releasable latch which, upon actuation of the shutter release member, is moved to an inoperative position.
- 20 7. A photographic camera according to Claim 6, wherein the other end of the leaf spring is pivotally mounted on a rotatable member which is driven by the drive means to cock the striker.
- 25 8. A photographic camera according to Claim 7, wherein the rotatable member is held against rotation by means of a second latch which is released upon actuation of the shutter release member.
- 30 9. A photographic camera according to Claim 8, wherein the first-mentioned latch comprises a pivotally mounted member having a lug for engagement in front of the leaf spring, in the direction of movement of the spring to its firing position, the pivotally mounted member being spring urged towards its operative position and moved to its inoperative position by the engagement of a cam surface on the shutter release member.
- 40 10. A photographic camera according to Claim 9, wherein the second latch comprises a pivotally mounted lever which is spring urged into engagement with a stop carried by the rotatable member and is coupled to the pivotally mounted member by means of an arm extending therebetween so that actuation of the shutter release member causes actuation of the camera shutter and ignition of a flash lamp of an inserted unit, to effect a synchronized flash-picture-taking operation, and releases the rotatable member which, during its rotation slides the leaf spring away from its latch, then slides it towards and in front of its latch and finally bows the leaf spring to its cocked position whereat the rotatable member is again engaged by its latch.
- 55 11. A photographic camera according to any one of the preceding claims 3 to 10, wherein the holder comprises a rotatable socket which is adapted to receive a multi-lamp, percussion-ignitable flash lamp unit of the kind defined and wherein a peripheral portion of the socket is formed with gear teeth in engagement with the teeth of an idler gear wheel engaging teeth carried by the periphery of the rotatable member.
- 60 12. A photographic camera according to any one of the preceding claims 3 to 11, wherein the drive means also actuates a film advancing mechanism.
- 65 13. A photographic camera according to Claim 12, wherein the drive means also actuates a shutter cocking mechanism.
- 70 14. A photographic camera according to Claim 3, constructed substantially as hereinbefore described with reference to, and as shown in, the accompanying drawing.
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