

PATENT SPECIFICATION

(11)

1286 663

DRAWINGS ATTACHED

- (21) Application No. 49609/69 (22) Filed 9 Oct. 1969
 (31) Convention Application No. 766759 (32) Filed 11 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 comprising at least one flash lamp having a primer which, upon being struck, effects ignition of the lamp. Such flash lamp units are described in our Letters Patent No. 1240784.

It is an object of the present invention to provide a photographic camera with means for synchronising the operation of the camera shutter and the striking of a primer of an inserted percussion-ignitable flash lamp unit.

In accordance with the present invention there is provided a photographic camera having a holder for receiving a percussion-ignitable flash lamp unit and locating a primer thereof at a firing position, the camera also having a shutter actuating and primer striking means comprising two relatively movable parts and means for coupling the two parts together for movement as a unit, upon actuation of a shutter release member, towards their respective operating position until one part reaches its operating position whereupon the coupling means allows the other part to continue its movement to its operating position.

In the accompanying drawings.

Fig. 1 is a plan of a part of a photographic camera constructed in accordance with one form of the present invention and showing the mechanism in the cocked or energized position;

Fig. 2 is similar to Fig. 1 but showing the mechanism in the firing position;

Figs. 3, 4, 5 and 6 show schematically different forms of shutter actuating mechanism for use in the camera shown in Figs. 1 and 2.

Referring to Fig. 1, a base 1 and upwardly

extending ignition tubes 2 of a percussion-ignitable multilamp photoflash unit are mounted in a supporting socket 3. The socket 3 is mounted on a camera frame C for indexing rotation during cyclic camera operations by known means (not shown).

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

Also mounted on the frame C is an operating lever 10 having an operating tab 11 which normally extends outside the camera housing (not shown). The operating lever 10 is pivotally mounted on a pin 12 and is biased in a clockwise direction, as viewed in Fig. 1, against a stop 13 by means of a spring 14. The lever 10 also includes an extension 15 that is located for cooperating with a release lever 20 which includes a release arm 21 and a retaining arm 22. The release lever 20 is mounted for rotation on a pin 23 and is urged in a counterclockwise direction against a stop 24 by means of a spring 25. The free end of retaining arm 22 is formed in a manner providing a retaining surface 26 and a cam surface 27.

A striker and shutter operating unit 30 is mounted for pivotal movement and a shaft 31 and includes separately movable drive member 32 and striking member 33 which are coupled by means of a weak spring 34. The separately movable members 32 and 33 include respectively spacing extensions 36 and 37 which are normally urged into contact by means of the spring 34. The drive member 32 includes a tail 38 connected to a heavy drive spring 39 which urges the drive member 32 in a counterclockwise direction towards an ignition tube 2 of a received flash unit 1.

The drive member 32 also has formed thereon a cocking arm 40 which is located for contact by a cocking slider 41. The slider 41 is mounted on pins 42 for movement directed by slots 43 thereof and has an output end 44

with a shoe adapted to contact the cocking arm 40. A cocking cam 45 is rotatably mounted on a shaft 46 and is connected to the film advance mechanism of the camera (not shown) for rotation in a counterclockwise direction in response to camera film advance. The slider 41 is biased by means of a spring 48 against surface 47 of cam 45 which has a configuration such that rotation of the cam 45 in a counterclockwise direction effects cocking movement of drive member 32.

A brief description of the operation of the elements described thus far will now be provided in order to simplify description of elements not yet mentioned.

With the striker and shutter operating unit 30 in the cocked position shown in Fig. 1, the operating lever 10 can be moved towards the release lever 20 to actuate a picture-taking operation. During this movement, the extension 15 of lever 10 rotates the release lever 20 in a clockwise direction to release the unit 30 for movement of the drive spring 39 towards the indexed ignition tube 2. It can be seen that although striking member 33 is not directly connected to spring 39, the contact of spacing extensions 36 and 37 causes the striker member 33 to follow movement of the drive member 32 towards the flash unit 1. It can also be seen, particularly in Fig. 2, that the movement of drive member 32 towards the flash unit 1 is stopped prior to contact with an ignition tube 2 of unit 1. It is to be particularly noted that during the movement of the drive member 32 into contact with the stop surface designated 50, the end 32a of the drive member 32 passes into a shutter actuating zone designated in Figs. 1 and 2 schematically as A. This movement of the end 32a effects operation of the camera shutter designated schematically as S in Figs. 1 and 2 by one of the various mechanisms shown in Figs. 3-6 which will be described subsequently.

It can be seen in Figs. 1 and 2 that although the movement of the drive member 32 is stopped by the surface 50, the striking member 33 is not stopped and its inertia causes its continued movement against the force of the light spring 34 and carries portion 33a thereof into percussion contact with the indexed ignition tube 2. The percussion activates the primer charge in the tube 2 and causes ignition of the flash lamp associated therewith.

After percussion contact, the light spring 34 retracts the striking member 33 to its following relation with the drive member 32 so as to be clear of the flash unit 1 and socket 3 as shown in broken lines.

During film advance, the cam 45 is rotated in a counterclockwise direction forcing the slider 41 to the right, as viewed in Figs. 1 and 2. The end 44 of the slider 41 then moves into contact with the cocking arm 40 on the

drive member 32 and rotates the unit 30 in a clockwise direction against the action of the drive spring 39. The end 32a of the drive member 32 then contacts the cam surface 27 of the release member 20 and rotates it slightly in a clockwise direction allowing the portion 32a to move into the retained position above the retaining surface 26 of the release lever as shown in Fig. 1. After completion of the film advance and indexing of socket 3 to place a new lamp in alignment for firing, the camera is ready for the next picture-taking operation.

Having now described the general operation of the percussion striking and shutter operation unit 30, the various embodiments which can be utilized in cooperation with unit 30 to provide synchronization of the picture-taking operation with percussion flash will be further described with reference to Figs. 3-6. In Figs. 3-6, the drive member 32 is indicated schematically, the detailed structure described above which is not pertinent to the description of the manner in which portion 32a thereof actuates shutter operation being omitted.

In Fig. 3, the member 32 is used in conjunction with an impact shutter 60 of known construction. Upon movement of the portion 32a towards the stop 50, the portion 32a strikes an actuator arm 61 of the shutter 60 rotating the shutter in a clockwise direction to admit light through the camera aperture. In its rest position on the stop 50, the portion 32a is clear of the actuator arm 61 so that a shutter spring 63 can return the shutter 60 to its closed position against a stop 64 before recocking of the drive member 32. The member 32 is cammed past the arm 61 during recocking.

In Fig. 4, the portion 32a of the drive member 32 releases a shutter driver 70 of known construction by contacting and depressing a lug 71 of a lever 72. A drive spring 73 then moves the shutter driver 70 to operate a camera shutter in a known manner. Recocking of the shutter driver 70 is accomplished in a known manner after cocking of the drive member 32 so that the lever 72 is positioned by means of a spring 74 for again retaining the shutter driver 70 in its cocked position.

In Fig. 5, the drive member 32 is used to actuate an electronic shutter 80 of known type. The portion 32a in moving towards the stop 50, moves a spring contact 81 to a closed position with respect to a contact 82 allowing current flow from a source 83 to operate a shutter 80 in a known manner.

The Fig. 6 arrangement is similar to that shown in Fig. 5 except that in this instance the drive member 32 itself forms part of the circuit to an electronic shutter 90 and, upon engagement of portion 32a with a contact 91 on stop 50, the circuit from a source 92 is

completed to operate the shutter 90 in a known manner.

WHAT WE CLAIM IS:—

- 5 1. A photographic camera having a holder for receiving a percussion-ignitable flash lamp unit and locating a primer thereof at a firing position, the camera also having a shutter actuating and primer striking means comprising two relatively movable parts and
- 10 means for coupling the two parts together for movement as a unit, upon actuation of a shutter release member, towards their respective operating positions until one part reaches its operating position whereupon the coupling means allows the other part to continue its movement to its operating position.
- 15 2. A photographic camera according to claim 1, wherein the two parts comprise a pair of levers mounted for pivotal movement about a common axis and the coupling means comprises a spring urging the two levers towards one another.
- 20 3. A photographic camera according to claim 2, wherein the two levers are urged towards their operating loci by means of a spring acting on the trailing lever, in the direction of movement of the levers towards their operating positions, the levers being retained in the cocked or energized position
- 25 by means of a latch which is moved to an inoperative position upon actuation of the shutter releasing member.
- 30 4. A photographic camera according to

claim 3, wherein the levers are pivoted to the cocked or energized position by means of a slide member which is actuated by means of a rotatable cam connected to a film advancing member.

5. A photographic camera according to claim 2, 3 or 4, wherein the camera shutter comprises a pivotally mounted blade which is pivoted to effect a picture-taking exposure upon impact by one of said levers.

6. A photographic camera according to claim 2, 3 or 4, wherein the camera shutter includes a shutter driver mechanism which is retained in a cocked condition by means of a latch which is releasable upon impact by one of said levers.

7. A photographic camera according to claim 2, 3 or 4, wherein the camera shutter is electrically operated under the control of one of said levers.

8. A photographic camera according to claim 7, wherein said lever in its operating position closes a switch in a shutter-operating circuit.

9. A photographic camera according to claim 7, wherein said lever in its operating position completes a shutter-operating circuit.

10. Photographic cameras according to claim 1, constructed substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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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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10 means for coupling the two parts together for movement as a unit, upon actuation of a shutter release member, towards their respective operating positions until one part reaches its operating position whereupon the
15 coupling means allows the other part to continue its movement to its operating position.
2. A photographic camera according to claim 1, wherein the two parts comprise a pair of levers mounted for pivotal movement
20 about a common axis and the coupling means comprises a spring urging the two levers towards one another.
3. A photographic camera according to claim 2, wherein the two levers are urged
25 towards their operating loci by means of a spring acting on the trailing lever, in the direction of movement of the levers towards their operating positions, the levers being retained in the cocked or energized position
30 by means of a latch which is moved to an inoperative position upon actuation of the shutter releasing member.
4. A photographic camera according to

claim 3, wherein the levers are pivoted to the cocked or energised position by means of a slide member which is actuated by means of a rotatable cam connected to a film advancing member.

5. A photographic camera according to claim 2, 3 or 4, wherein the camera shutter comprises a pivotally mounted blade which is pivoted to effect a picture-taking exposure upon impact by one of said levers.

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7. A photographic camera according to claim 2, 3 or 4, wherein the camera shutter is electrically operated under the control of one of said levers.

8. A photographic camera according to claim 7, wherein said lever in its operating position closes a switch in a shutter-operating circuit.

9. A photographic camera according to claim 7, wherein said lever in its operating position completes a shutter-operating circuit.

10. Photographic cameras according to claim 1, constructed substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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