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DRAWINGS ATTACHED

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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 a percussion-ignitable flash lamp unit (hereinafter referred to as "of the kind defined") having a primer which, upon being struck, ignites the flash lamp, the means for striking the primer forming a part of the unit or a part of the camera with which it is used. Such flash lamp units may comprise a single lamp or a plurality of lamps each of which is provided with its own primer and, in some cases, with its own striker which may be pre-energized.

In accordance with the present invention there is provided a photographic camera comprising a holder for receiving a percussion-ignitable flash lamp unit of the kind defined and locating a firing element thereof in a firing position and a shutter having a rotatable control shaft for initiating shutter operation, wherein an actuating member for firing a firing element located in the firing position is connected to the rotatable control shaft for movement into the firing position in synchronism with shutter operation. As applied to a single-lens, mirror reflex type camera, means connecting the actuating member to the rotatable control shaft is also coupled to a reflex mirror for imparting pivotal movement thereto.

In the accompanying drawings:—

Fig. 1 shows schematically a camera mechanism constructed in accordance with one form of the present invention for firing a percussion-ignitable flash lamp unit, the

parts being in the position they assume prior to the insertion of a flash lamp unit in a holder;

Fig. 2 is a view similar to Fig. 1, but showing the position the parts assume when a flash lamp is inserted in the holder;

Fig. 3 is a view similar to Fig. 2, but showing the position the parts assume at the moment of shutter release;

Fig. 4 is a plan of Fig. 1;

Fig. 5 is a perspective view of part of a multi-lamp percussion-ignitable flash lamp unit showing a striker in the energized condition; and

Fig. 6 is a view similar to Fig. 5, but showing the striker in the released condition.

As illustrated, the camera mechanism comprises a shutter which may be of any known type having a rotatable control shaft 22a extending therefrom, such as described in British Patent Specification No. 946,160. The control shaft 22a carries a pinion 22 in engagement with a toothed portion 21a of a slidably mounted member 21 having a projection 21b engaged by an arm 16c of a three-armed lever 16. The lever 16 is mounted on a pivot 17 and is urged in a clockwise direction (as viewed in Figs. 1 to 3) by means of a spring 15 to rotate the control shaft in the direction of the arrow A. An arm 16b of the lever 16 is coupled to levers 18 and 19 for imparting pivot movement to a reflex mirror 20 in known manner in synchronism with shutter operation. An arm 16d of the lever 16 terminates in a cam surface 16a for a purpose hereinafter described.

A holder 4a is provided in the top wall of the camera for receiving a multilamp percussion-ignitable flash lamp unit of the kind shown in Figs. 5 and 6.

As shown in Figs. 5 and 6 the flashlamp unit comprises a base plate 9 on which are mounted 4 flash lamps 23 (only 2 being shown in the drawings), each of which com-

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prises a transparent bulb 24 containing a combustible flash material and a combination supporting gas, a primer 25 extending from the bottom of each bulb. Each flash lamp is provided with its own striker which, as illustrated, comprises a spring 26 which is retained in a slot 9a in the base plate 9 and biased so that one of its angular ends 26a is lodged behind the other end 26b and extends over a slot 9b in the base 9. Each of the flashlamps 23 is provided with its own reflector (not shown) and the lamps and reflectors are enclosed in a transparent cover (not shown) in a manner usual in flashcubes.

A rod 4 is slidably mounted in the holder 4a and is normally held in a position in which it is engaged by the base of an inserted flash lamp unit by means of a pivotally mounted latch member 5 which is urged by means of a spring 5a in a clockwise direction as viewed in Figs. 1 and 2. The latch member 5 also is urged by spring 5a into engagement with a projection 6c on a slidably mounted bar 6 to hold the latter in a retracted position, when a flash unit is not inserted in the holder 4a, as shown in Fig. 1. A spring 7, which is weaker than the spring 5a tends to move the bar 6 to an extended position. The bar 6 is also provided with a projection 6a for engagement with the cam surface 16a on the lever 16.

In the absence of a flash lamp unit in the holder 4a, the parts are in the position shown in Fig. 1. That is, the latch member 5 is urged by the spring 5a into a position in which it engages the projection 6c and holds the bar 6 in the retracted position. In this position, the projection 6a is disposed beneath the path of movement of the cam surface 16a so that the pivotal movement of the lever 16 in a clockwise direction (as viewed in Fig. 1) under the action of the spring 15 will actuate the shutter 2 and reflex mirror 20 in proper timed relation, but will not displace the bar 6.

Upon inserting a flash lamp until in the holder 4a, the rod 4 is moved downwardly and turns the latch member 5 in a counter-clockwise direction (as viewed in Fig. 1) to the position shown in Fig. 2 in which it is disengaged from the projection 6c, thereby permitting the spring 7 to move the upper end of the bar 6 into engagement with the striker 26a of a flash lamp 23 located in a firing position (see Fig. 5). The force exerted by the spring 7 is insufficient to dislodge the striker 26a from the stop 26b. In this position of the bar 6, the projection 6a is disposed in the path of movement of the cam surface 16a when the lever 16 is turned in a clockwise direction to the position shown in Fig. 3 so that the bar 6 is moved in the direction of the arrow C to dislodge the striker 26a from the stop 26b and thereby fire a flash lamp in synchronism with shutter

operation.

In order that the presence of a used flash lamp in the holder 4a may be detected, there is provided a signal comprising a lever 10 pivotally mounted at 10a and having one end disposed in the path of movement of the projection 6b on the bar 6 and the other end carrying a flag 10c. Normally, the flag 10c is held in an inoperative position as shown in Figs. 1 and 2 by means of a light spring (not shown). However, when the bar 6 moves to the fully extended position in firing a flash lamp, the projection 6b engages the end 10b of the lever 10 and turns it in a clockwise direction to the position shown in Fig. 3 in which the flag 10c is located between a window 11 and a pentaprism 12 and may be observed by looking through a viewfinder eyepiece 13.

WHAT WE CLAIM IS:—

1. A photographic camera comprising a holder for receiving a percussion-ignitable flashlamp unit of the kind defined and locating a firing element thereof in a firing position and a shutter having a rotatable control shaft for initiating shutter operation, wherein an actuating member for firing a firing element located in the firing position is connected to the rotatable control shaft for movement into the firing position in synchronism with shutter operation.
2. A photographic camera according to Claim 1 and of the single-lens, mirror reflex type, wherein means connecting the actuating member to the rotatable control shaft is also coupled to a reflex mirror for imparting pivotal movement thereto.
3. A photographic camera according to Claim 1 or 2, wherein the actuating member comprises a slidably mounted bar having one end movable into the firing position.
4. A photographic camera according to Claims 2 and 3, wherein the means connecting the actuating member to the rotatable control shaft comprises a slidably mounted member having a toothed portion in engagement with a pinion carried by the rotatable control shaft and a pivotally mounted lever having one arm engageable with a projection on the slidably mounted member and a cam surface on the free end of its other arm engageable with a projection on the slidably mounted bar.
5. A photographic camera according to Claim 4, wherein the pivotally mounted lever includes a third arm which is coupled to means for imparting pivotal movement to the reflex mirror.
6. A photographic camera according to claim 4 or 5, wherein a latch member is spring urged in a direction to retain the slidably mounted bar in a position in which its projection is disposed out of the path of movement of the cam surface on the pivot-

prises a transparent bulb 24 containing a combustible flash material and a combination supporting gas, a primer 25 extending from the bottom of each bulb. Each flash lamp is provided with its own striker which, as illustrated, comprises a spring 26 which is retained in a slot 9a in the base plate 9 and biased so that one of its angular ends 26a is lodged behind the other end 26b and extends over a slot 9b in the base 9. Each of the flashlamps 23 is provided with its own reflector (not shown) and the lamps and reflectors are enclosed in a transparent cover (not shown) in a manner usual in flashcubes.

A rod 4 is slidably mounted in the holder 4a and is normally held in a position in which it is engaged by the base of an inserted flash lamp unit by means of a pivotally mounted latch member 5 which is urged by means of a spring 5a in a clockwise direction as viewed in Figs. 1 and 2. The latch member 5 also is urged by spring 5a into engagement with a projection 6c on a slidably mounted bar 6 to hold the latter in a retracted position, when a flash unit is not inserted in the holder 4a, as shown in Fig. 1. A spring 7, which is weaker than the spring 5a tends to move the bar 6 to an extended position. The bar 6 is also provided with a projection 6a for engagement with the cam surface 16a on the lever 16.

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Upon inserting a flash lamp until in the holder 4a, the rod 4 is moved downwardly and turns the latch member 5 in a counter-clockwise direction (as viewed in Fig. 1) to the position shown in Fig. 2 in which it is disengaged from the projection 6c, thereby permitting the spring 7 to move the upper end of the bar 6 into engagement with the striker 26a of a flash lamp 23 located in a firing position (see Fig. 5). The force exerted by the spring 7 is insufficient to dislodge the striker 26a from the stop 26b. In this position of the bar 6, the projection 6a is disposed in the path of movement of the cam surface 16a when the lever 16 is turned in a clockwise direction to the position shown in Fig. 3 so that the bar 6 is moved in the direction of the arrow C to dislodge the striker 26a from the stop 26b and thereby fire a flash lamp in synchronism with shutter

operation.

In order that the presence of a used flash lamp in the holder 4a may be detected, there is provided a signal comprising a lever 10 pivotally mounted at 10a and having one end disposed in the path of movement of the projection 6b on the bar 6 and the other end carrying a flag 10c. Normally, the flag 10c is held in an inoperative position as shown in Figs. 1 and 2 by means of a light spring (not shown). However, when the bar 6 moves to the fully extended position in firing a flash lamp, the projection 6b engages the end 10b of the lever 10 and turns it in a clockwise direction to the position shown in Fig. 3 in which the flag 10c is located between a window 11 and a pentaprism 12 and may be observed by looking through a viewfinder eyepiece 13.

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2. A photographic camera according to Claim 1 and of the single-lens, mirror reflex type, wherein means connecting the actuating member to the rotatable control shaft is also coupled to a reflex mirror for imparting pivotal movement thereto.
3. A photographic camera according to Claim 1 or 2, wherein the actuating member comprises a slidably mounted bar having one end movable into the firing position.
4. A photographic camera according to Claims 2 and 3, wherein the means connecting the actuating member to the rotatable control shaft comprises a slidably mounted member having a toothed portion in engagement with a pinion carried by the rotatable control shaft and a pivotally mounted lever having one arm engageable with a projection on the slidably mounted member and a cam surface on the free end of its other arm engageable with a projection on the slidably mounted bar.
5. A photographic camera according to Claim 4, wherein the pivotally mounted lever includes a third arm which is coupled to means for imparting pivotal movement to the reflex mirror.
6. A photographic camera according to claim 4 or 5, wherein a latch member is spring urged in a direction to retain the slidably mounted bar in a position in which its projection is disposed out of the path of movement of the cam surface on the pivot-



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ally mounted lever, a slidably mounted rod being displaceable by the insertion of a flash lamp unit in the holder to move the latch member against the action of its spring to a position in which it releases the slidably mounted bar for movement under the action of a spring, which is weaker than the spring acting on the latch member, into non-firing engagement with a firing element located in the firing position.

10 7. A photographic camera according to

claim 6, wherein the slidably mounted bar actuates a signal which is visible in the camera viewfinder.

8. A photographic camera according to 15 claim 1, constructed substantially as hereinbefore described with reference to, and as shown in, Figs. 1 to 4 of the accompanying drawings.

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