

PATENT SPECIFICATION

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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 adapted to detachably support and fire percussion-ignitable flashlamp units (hereinafter referred to as "of the kind defined") comprising one or more flashlamps, the or each flashlamp having a primer and a pre-energized striker which, upon being released from its energized condition, strikes the primer to activate the lamp.

In accordance with the present invention, there is provided a photographic camera having a holder for receiving a percussion-ignitable flashlamp unit and for locating a striker of the flashlamp unit in a firing position, wherein an actuating member is mounted for movement towards the firing position to release a striker located therein from its energized position, and the actuating member is moved toward the firing position upon actuation of a shutter release member from an inoperative position and is moved away from the firing position by the return movement of the shutter release member to said inoperative position.

In the accompanying drawings:—

Fig. 1 is a perspective view of a camera constructed in accordance with the present invention and illustrates a pre-energized percussively ignitable flashlamp device received on the camera, and a signal means in the camera viewfinder for indicating the condition of a flashlamp in the firing position;

Fig. 2 is an exploded view of percussion-ignitable flashlamps in a multilamp unit and a socket for receiving such a unit on the camera;

Fig. 3 is a perspective view, to an enlarged

scale, of the socket shown in Fig. 2 with exterior portions of the socket broken away to illustrate the socket interior in its assembled condition;

Fig. 4 is a perspective view of a part of a percussion ignitable flashlamp unit with the cover removed and parts broken away to illustrate the manner in which the flashlamps and the firing elements are supported in the unit;

Fig. 5 is a schematic view to an enlarged scale, of the flashlamp sensing and actuating mechanism employed in the camera shown in Fig. 1;

Fig. 6 is a schematic view of signal means for indicating the condition of a flashlamp and actuated by the mechanism shown in Fig. 5; and

Figs. 7A and 7B are partial schematic views of modified signal means which may be actuated by the mechanism shown in Fig. 5.

The camera of this invention is shown in Fig. 1 and comprises a casing 10 supporting an objective 12, a shutter release member 14, a film advancing member 16 and a viewfinder 18. As will be described more fully hereinafter, the camera is particularly adapted to receive a percussion-ignitable flashcube 20 which is fireable synchronously with operation of the camera shutter by a mechanism 22 illustrated in Fig. 5.

Shutter release member 14 is most clearly illustrated in Fig. 5 and, comprises a depression surface 24 accessible from the camera exterior, and elongated body portion 26 including a lug 28, and a control arm 29. The body portion 26 is slidably mounted on a pair of pins 30 which are received in a pair of slots 31 in the body portion. The shutter release member 14 is movable between an inoperative position for maintaining a driver member 42 in an inoperative position, and an actuated position for releasing the driver member to effect actuation of the shutter and various other camera mechanisms such as a flash firing member. The shutter

release member normally is maintained in the inoperative position by a return spring 32, and includes a pin 34 for returning and resetting the driver member as will be described more fully hereinafter.

Associated with the shutter release member 14, by means of a camming leg 36, is a latch 38, which normally is held in a latched position by means of a spring 40 but which is movable by means of lug 28 to an unlatched position. In its latched position latch 38 maintains the driver member 42 in an inoperative position, from which such member is releasable upon movement of shutter release member 14.

The driver member 42 is pivotally mounted within the camera on a pin 44 for movement between the inoperative position and a released position. Rapid movement from the inoperative to the released position is effected by a spring 46 coupled at one end 48 to the driver member 42 and at the other end 50 to a portion 52 of the shutter release member 14. Return of the driver member to the inoperative position is effected by engagement of pin 34 on the shutter release member 14 with a surface 54 on the driver member 42 to urge the latter, under the action of spring 32, back toward the inoperative position. When the shutter release member 14 is in its inoperative position, and during an initial portion of its downward movement towards its actuated position, the latch 38 maintains the driver member 42 in the inoperative position thereof by latching engagement between a latch surface 55 and a drive member surface 56. On further actuation of the shutter release member, however, the lug 28 thereon engages and pivots the latch 38 to an unlatched position disengaged from the driver member 42, and thereby frees the driver member for the aforementioned rapid movement to the released position thereof. In order to permit easier depression of the shutter release member 14, and easier return or resetting of both the shutter release member and the driver member 42, spring 46 is in a substantially relaxed condition when the shutter release member is in its inoperative position and is tensioned or energized mainly by the initial downward movement of the shutter release member 14.

A shutter 57 preferably is of the spring driven type and, as illustrated, includes at least one blade 58 mounted in the camera for pivotal movement about a stud 59. The blade 58 is maintained in a closed position by means of a lug 60 on a latching lever 61, and is released to uncover the aperture by movement of the latching lever 61 and lug 60 thereon to a disengaged position. Thereafter, and in properly timed relation, the aperture is closed by return of the blade 58. To release the shutter in response to depression of the shutter release member, and either independently or of in synchronism with the firing of

a flashlamp, a portion 62 on shutter latching lever 61 is position to be engaged by and upon release of the driver member 42. As the driver member rapidly moves to its released position, as described above, it will strike the portion 62 of the latching lever 61 and will thereby drive the lever 61 to release the blade 58. Of course, the shutter could be of the impact type, and in this case, the member illustrated as blade 58 could be an impacting member for driving a shutter blade to open the shutter.

As shown in Fig. 1, winding mechanism 16 comprises a handle 63 engageable from the camera exterior and adapted to be coupled or connected to a film take-up spool, within a take-up chamber in the camera, for advancing film in the usual manner. Within the camera, the winding mechanism may include means (not shown) for recocking the shutter blade 58 and for indexing the flashcube socket in response to winding of the film. However, as will become more apparent hereinafter, the winding mechanism does not effect the resetting of the driver member 42, nor as described below, does it effect the retracting of an actuating member 207 from the cube.

Viewfinder 18 is of a type well known to those skilled in the art and comprises a front window 64 (Fig. 1), and a back window 65. For purposes to become more apparent hereinafter, sufficient space is provided between the front and back windows for receiving a warning or signal means, such as a lamp 66.

Referring now to Figs. 2 and 4, and to the details of a percussion-ignitable flashlamp unit particularly adapted for use with the present invention, a flashcube 20 is illustrated comprising a base 70 for supporting percussion-ignitable flashlamps 72, a firing element 74 associated with each flashlamp, reflecting means such as polished metal foil behind each flashlamp 76, a cover member of transparent material 78, and supporting means 80. The cube per se is not a part of the present invention; however, a description of certain features of the cube follows for a better understanding of the present invention.

As shown in Fig. 4, each of the flashlamps 72 and its associated firing element 74 is securely supported on one side of the base, normally referred to as the upper face thereof. Formed in base 70 is a circular bore 82 for receiving and supporting a portion of the flashlamp, and slots 84 for receiving and supporting a knee portion 86 of the firing element 74. The upper face of base 70 may be provided with a stop peg for maintaining the firing element 74 in its pre-energized condition. However, in the embodiment illustrated, the function of this stop peg is provided by a bent portion of the firing element itself, as will be described more fully hereinafter.

Each of the four flashlamps 72 comprises a hermetically sealed envelope 88 containing combustible material such as a zirconium foil in a combustion supporting atmosphere such as oxygen. The base or lower portion of envelope 88 is formed around an elongated tube 90, of readily deformable material, having a substantially circular cross section and surrounding or containing in spaced relation therein a back-up member 92. Combustion of the combustible material in the envelope is accomplished by rapidly deforming the tube with a percussive force to effect ignition of a percussion ignitable primer 94, of a material such as a fulminate, coated on member 92 or contained in the space between tube 90 and member 92. Upon such ignition, the resulting heat energy deflagrates and is directed upwardly through the tube 90 and into envelope 88 to initiate combustion of the zirconium foil, or other combustible material in the envelope. A lower portion 96 of tube 90 serves to support the envelope in the cube base and for this purpose is configured to cooperate with the circular bore 82 in the base 70.

The preferred lamp firing element 74 is shown most clearly in Fig. 4, and comprises an elongated striker member 98, and upwardly extending central portion 100 adapted to be torsionally stressed to energize the striker member, knee portion 86 for engaging and locating the firing element on the cube base, and a supporting leg 102 including a bent end portion 104 which serves as a stop for maintaining the striker member in the energized position. During manufacture, the cube striker member 98 is positioned in a pre-energized position in which it is maintained by end portion 104 until the cube is fired. A cut-out portion 110 is provided in the cube base 70 below the energized striker member 98 for receiving a camera actuating member.

The supporting means 80 (Fig. 2) extends downwardly from a lower face 112 of base 70 and may be separately attached or integrally moulded thereto. Supporting means 80 comprises a channel member 114 defining an opening 116 and an external surface 118. At each of the four corners of the external surface, locating means are provided comprising splines 120 each having a tapered lowered portion 122 joined to an upper portion 124 having generally vertical sides. As will be described more fully hereinafter, in connection with a camera socket for receiving the cube, the splines 120 are guided into the socket by the tapered portions and are held or maintained securely in their proper position relative to the socket mainly by the upper portions 124. Also provided on the flat sides of external surface 118 and between the splines 120 are recesses 126 having an inclined lower surface 128 for cooperating with the socket latching means also to be described more fully hereinafter.

In summary, the flashcube described above supports a plurality of flashlamps, each lamp having a pre-energized striker member. In order to fire one of the lamps an actuating member is moved through an opening in the base of the cube to engage and dislodge the striker member from its energized position. The striker member will then rapidly strike the tube of the flashlamp to percussively ignite the primer which, in turn, will deflagrate into the envelope to ignite the combustible material and fire the lamp. In the energized position, the striker member is located over the opening in the cube base. In the released position, on the other hand, the striker wire is in contact with the lamp tube and is spaced from the base opening.

Referring now to Figs. 2 and 3, a preferred embodiment of a camera socket 150 is illustrated for receiving a multilamp unit or flashcube and comprises a base 151, a slidably mounted ring 153, a cover member 155, and a post 157.

Base 151 comprises a plate 159 having an opening 161 therethrough for receiving a portion of post 157, and walls 163 extending upwardly from the outer periphery of the base plate and including means defining cut out portions 165 for supporting rings 153. Also extending upwardly from the base plate and spaced radially inwardly from the walls 163, are resilient latching fingers 167, each of which includes an upper camming surface 169 to spring the fingers outwardly as the cube is inserted into the socket, and a lower camming surface 171 to maintain the cube in the socket.

Ring 153 includes an outer flange 173 including means defining openings or arcuate slots 175, configured to receive the walls 163 of base 151 and a plurality of blades 177 projecting inwardly from the outer flange to define cube contacting surfaces. Between the blades 177 are cut out portions 181 configured, as illustrated most clearly in Fig. 3, to receive the latching fingers 167.

Cover member 155 comprises a body 183 having an opening 185 therein formed of a plurality of straight sides 187, and cube orienting portions 189 at the corners of the opening.

Post 157 includes a threaded lower portion 191 for securing the post to a camera, an upper portion 193 adapted to be received within the cube supporting means 80 to prevent tilting of the cube in the socket, and a central flange 197 having an outer radius greater than the radius of base opening 161 for securing the socket to the camera.

Referring now to the assembly of the socket, shown in Fig. 2, it can be seen that the ring 153 is configured and adapted to be slidably received over upwardly extending walls 163 of the socket 150. Moreover, as will be described hereinafter, the ring 153 is normally maintained in a raised position on the socket

but is adapted to be pushed to a lowered position by engagement with the lower portions of cube supporting means 80 when a cube is positioned in the socket. After the ring 153 is properly located, cover member 155 is placed over the end portions of upwardly extending walls 163 and is permanently fastened thereon by glue, heat, ultrasonic sealing, or other appropriate means. Once securely fastened to the base 151, the cover member serves to orientate a cube received in the socket by mating with the cube splines 120 to position the cube accurately with respect to the socket. The post 157 is now inserted through opening 161 in the base 151 and is turned to thread the post into a screw threaded bore in the camera until the flange 197 thereof engages the upper surface of plate 159 to securely and rotatably hold the entire socket on the camera.

Referring now to Figs. 5 and 6, a mechanism for firing a percussion-ignitable flashcube is illustrated, the mechanism comprising a pivotally mounted member 199, a pivotally mounted element 201, a slidably mounted member 203, a pivotally mounted lever 205, and the actuating member 207.

Pivotally mounted member 199 comprises a central body portion having means 210 thereon for pivotally mounting the member 199 on the camera or mechanism plate, and end portions 211 and 213 respectively lying on opposite sides of the pivot means 210. End portion 211 includes a pin 214 engagable with ring 153 for moving the member 199, in response to movement of the ring, either to an inactive position or to a sensing position, depending on whether or not a flash unit is received within the socket 150. The inactive position of the member 199 is illustrated in dotted lines in Fig. 5 and corresponds to the position of the member prior to the positioning of a cube on the camera, whereas the sensing position is illustrated in solid line and corresponds to the member's position with a cube on the camera. Also extending outwardly from end portion 211 is an abutment 217 adapted to engage a portion of element 201 to unlatch the cube firing mechanism when a cube is received within the socket and the ring 153 and member 199 are in their sensing positions. End portion 213 of member 199 includes a notch 219 in which a spring 221 is coupled for normally urging the member 199 and ring 153 toward their inactive positions. It should be understood, however, that spring 221 is relatively weak and will not eject a properly positioned cube from the socket. While not illustrated in the preferred embodiment, member 199 could include means accessible from the camera exterior for ejecting the lamp unit.

Element 201 is pivotally mounted on the mechanism plate, by means of a pin 223, and is pivoted for movement between a latch-

ing position, illustrated in dotted lines on Fig. 5, and a release position, illustrated in solid lines on Fig. 5. A leg 225 of element 201 includes an abutment surface 227 adapted to be engaged by abutment 217 of member 199; and an end portion 229 of element 201 includes an extension 231 for engaging a portion of member 203 to maintain the member in a raised position when the element 201 is in its latching position.

In the preferred embodiment illustrated, member 203 includes a slot 233 adapted to receive a pin 235, to mount member 203 for longitudinal sliding movement between a raised position illustrated in Fig. 5 and a lowered position to be described more fully hereinafter in connection with firing of a flash-lamp. Member 203 includes a lug 237, adapted to be engaged by extension 231 on element 201, to latch the member in its raised position when a cube has not been positioned on the camera; another lug 239 on member 203 is adapted to engage lever 205 to control the position of the lever as will be described more fully hereinafter. The lower portion of member 203 includes a bent portion 241 adapted to engage the control arm 29 of shutter release member 14 to control movement of the member 203 between its raised and lowered positions. Member 203 is resiliently urged toward its lower position by means of a spring 243 attached at one end 245 to the mechanism plate of the camera and at its other end 247 to a portion of member 203.

Lever 205 is mounted on the mechanism plate at 249 by means of a pin which permits pivotal movement of the lever between a position "a" illustrated in solid lines in Fig. 5, an intermediate position "b" illustrated in dotted lines in Fig. 5 and a signalling position "c", also illustrated in dotted lines in Fig. 5. The lever 205 is urged in a counterclockwise direction (as viewed in Fig. 5) by means of a spring 250, but movement of the lever in this counterclockwise direction is controlled by means of lug 239 on the member 203. One end portion of the lever 205 is provided with a striking surface 251 adapted, when the lever is in its intermediate position, to be struck by the driver member 42 to effect firing of a flash lamp in the firing position. The other end of lever 205 includes a bevelled surface 253 adapted to engage the actuating member 207 at 254 to transmit the striking force from the driver member 42 to the actuating member 207 for firing the flash lamp. Lever 205 effects movement of the actuating member to its fully raised position, to be described more fully hereinafter.

Actuating member 207 is mounted for longitudinal movement relative to the camera casing by means of a pin 255 received in an opening 257 of a portion 258 of the camera body. This actuating member is movable between a retracted position a' illustrated in solid lines

in Fig. 5, a fully raised position *c'* illustrated in dotted lines in Fig. 5, and an intermediate position *b'*, also illustrated in dotted lines, wherein it is adapted to rest against the striker member 98 for sensing the condition of the member and effecting actuation of the wire.

Referring now to the operation of the flash firing mechanism and again to Fig. 5 a flash lamp or multilamp unit, when positioned in the socket, will engage and urge the ring 153 to a lowered position to pivot member 199 and element 201 in a direction (as viewed in Fig. 5) to unlatch the member 203. Even after being unlatched, member 203 is maintained in its raised position (solid lines in Fig. 5) by the control arm 29 of shutter release member 14. However, it is urged toward its lower position by means of the spring 243 and will move downwardly with the shutter release member 14 and control arm 29 during the picture taking operation. Thus, as the shutter release member is depressed to effect shutter actuation, it will be followed by downward movement of member 203 which, in turn, will effect counterclockwise pivoting of lever 205, and raising of actuating member 207 to either of the two dotted line positions shown in Fig. 5. As will become more apparent hereinafter, lever 205 and actuating member 207 will assume a selected one of the two dotted line positions depending upon whether the flash lamp in the firing position is operative or inoperative: positions (*b* and *b'*) representing an operative flash lamp and positions (*c* and *c'*) representing an inoperative flash lamp.

Assuming now that the flash lamp in the firing position is operative, the actuating member 207 will be moved upwardly out of the camera casing, and into the cube to engage its energized striker member 98. Spring 250, attached to lever 205, is selected to have sufficient force to rotate the lever but insufficient force to dislodge the striker member 98 from its energized position. If the forwardly facing flash lamp is fired, the lever 205 and actuating member 207 would move to their positions *c* and *c'* (dotted lines in Fig. 5) and, as will be described more fully hereinafter in connection with Fig. 6, a signal could be energized to indicate in the camera viewfinder that the forwardly facing lamp has been fired.

Upon further depression of shutter release member 14, and again assuming an unfired flash lamp, latch 38 will release the driver member to effect an opening of the shutter as described hereinabove. Moreover, since the striking surface 251 of lever 205 will be in its second position *b*, it will be struck by the driver member and will be rapidly driven thereby in a counterclockwise direction (as viewed in Fig. 5). This rapid movement will, in turn, be transmitted through surface 253 to the actuating member 207, and will rapidly

force the striker member 98 upwardly over portion 104 to release the energy in the firing element and effect the firing of the flash lamp. Synchronization of shutter actuation with flash lamp firing is built into the mechanism by effecting both shutter actuation and cube firing by means of a single driver member 42.

After full depression of shutter release member 14, and after the flashlamp in the firing position has been fired and the film exposed, the shutter release member is returned to its initial raised position by means of the spring 32. Simultaneously with such return: latch 38 is returned to its latched position by means of spring 40; the driver member is returned to its inoperative position by means of pin 34 and under the action of spring 32; member 203 is returned to its raised position by means of arm 29 and under the action of spring 32 (the same being stronger than both spring 243 and spring 250); the lever 205 is returned to its position *a* by the action of member 203 and under the action of spring 32; and the actuating member 207 is positively withdrawn from the cube, and returned to its retracted position by means of lever 205 under the action of spring 32. Since all of these mechanism are returned and reset or cocked by or upon return of the shutter release member to its inoperative position, it is not necessary to accomplish these functions through the film winding or cube indexing mechanisms, and thus, these latter mechanisms can be simplified as well as more easily operated.

Still further, the spring 46 is tensioned only while the shutter release member is being depressed, and is substantially relaxed after release of the driver and upon and after return of the shutter release member. This reduces the force necessary both to depress the shutter release member during the initial stage thereof and the force necessary to return the shutter release member to its inoperative position.

Thus, with a cube on the camera, the various springs 32, 46, 243, and 250 balance each other, to some extent, and thereby reduce the force, or at least permit operation with substantially the same force that otherwise would be necessary to depress the shutter release member. For example, the springs 243 and 250 cooperate to aid in urging the shutter release member toward its actuated position and against the return force of spring 32.

Also, after firing of the flashlamp at the firing location, the flashlamp can be indexed to locate the next or another respective one of the flashlamps at the firing position. This indexing can be effected in known manner by rotating the socket and/or cube either manually, or automatically in response to film winding.

Referring now to Fig. 6, a mechanism 301 is illustrated for generating a signal in the

viewfinder indicative of the condition of the flash lamp in the firing position. In this mechanism the lever 205 includes an electrical contact 303 forming part of a warning lamp circuit comprising, for example, a source of electrical energy 305, the warning lamp 66, and a second electrical contact 309 cooperating with the first contact 303 to define a switch 313. Contact 309 is positioned on the camera body, for example at 311, and is positioned such that it will be engaged by contact 303 only when the actuating member 207 is moved to the position c' assumed when the flash lamp in the firing position has been fired. Thus, if the flash lamp already has been fired, its striker member will not be positioned over opening 110, and initial actuation of the shutter release member will move the actuating member 207 to position c' , thereby energizing the warning circuit and lamp 66. On the other hand, when the lamp is unfired the actuating member will engage and be stopped by the striker member in the cube before the contacts of switch 313 are closed, and the warning signal will not be energized. Of course, it will be apparent to those skilled in the art that warning lamp 66 can be positioned within the viewfinder or it could be positioned elsewhere in the camera. Moreover, other means such as a light pipe or reflecting means could be used to transmit a light signal in a manner making it visible in the viewfinder, or other appropriate place, to warn the camera operator of the cube condition.

Although not a part of the preferred embodiment, other signal circuits are illustrated in Figs. 7A and 7B, also for indicating the condition of the flash lamp in the firing position. In these circuits a signal is generated when the flash lamp is in an unfired condition, as distinguished from the signal effected by the circuit of Fig. 6 for a fired condition. In Fig. 7A the actuating member 207 is electrically non-conductive and includes electrical contacts 314 and 315 arranged to provide a normally open switch 316 in a circuit including a source of electrical energy 317 and a signal lamp 319. The resiliency of contact 314 will maintain the switch 316 in an opened condition unless and until contact 314 engages an operative striker member in the flash cube. Upon such engagement the upward force of the actuating member 207 will urge the resilient contact 314 downwardly into engagement with the contact 315 to energize the signal circuit and illuminate lamp 319. If the flash lamp in the firing position is fired, however, the striker member will not be in a position to be engaged by contact 314 and switch 316 will remain open. Thus, the signal lamp 319 will not be energized and no signal will be generated. As in the embodiment illustrated in Fig. 6, it is intended that the signal lamp 319 positioned in a manner to be visible

in the viewfinder, or some other appropriate place, to indicate to the camera operator that the flash lamp in the firing position is operative. Of course, the warning signals of Fig. 6 and Fig. 7A could be used together: the signal of the embodiment shown in Fig. 6 indicating when the lamp is fired, and the signal of the modification shown in Fig. 7A energizing a "flash ready" signal. As illustrated in Fig. 7B, the switch could be defined by a pair of spaced contacts 321 and 323 carried on actuating member 207 and adapted to be closed by the conductivity of the striker member 98 itself, rather than by direct contact between the contacts.

WHAT WE CLAIM IS:—

1. A photographic camera having a holder for receiving a percussion-ignitable flashlamp unit of the kind defined and for locating a striker or one of the strikers in a firing position, and an actuating member mounted for movement towards the firing position to release a striker located therein from its energised position, said actuating member being moved toward said firing position upon actuation of a shutter release member from one inoperative position and being moved away from the firing position by the return movement of the shutter release member to said inoperative position.
2. A photographic camera according to Claim 1, wherein upon initial actuation of the shutter release member the actuating member is spring urged from a retracted position and into contact with a striker located in the firing position and upon further actuation of the shutter release the actuating member is moved to release the striker.
3. A photographic camera according to Claim 2, wherein the actuating member is retained in the retracted position by latch means which is released by the initial movement of the shutter release member for movement of the actuating member under the action of the spring into contact with a striker located in the firing position.
4. A photographic camera according to Claim 3, wherein the actuating member is moved to release the striker by means of a pivotally mounted driver which is normally held in an inoperative position against the action of a driver spring by means of a latch which is released upon said further actuation of the shutter release member.
5. A photographic camera according to Claim 4, wherein the driver is connected to the shutter release member by means of the driver spring which is tensioned by the initial actuation of the shutter release member and, upon release of its latch, strikes one end of a pivotally mounted lever, the other end of which is in engagement with the actuating member.
6. A photographic camera according to Claim 5, wherein the movement of the actuat-

viewfinder indicative of the condition of the flash lamp in the firing position. In this mechanism the lever 205 includes an electrical contact 303 forming part of a warning lamp circuit comprising, for example, a source of electrical energy 305, the warning lamp 66, and a second electrical contact 309 cooperating with the first contact 303 to define a switch 313. Contact 309 is positioned on the camera body, for example at 311, and is positioned such that it will be engaged by contact 303 only when the actuating member 207 is moved to the position c' assumed when the flash lamp in the firing position has been fired. Thus, if the flash lamp already has been fired, its striker member will not be positioned over opening 110, and initial actuation of the shutter release member will move the actuating member 207 to position c' , thereby energizing the warning circuit and lamp 66. On the other hand, when the lamp is unfired the actuating member will engage and be stopped by the striker member in the cube before the contacts of switch 313 are closed, and the warning signal will not be energized. Of course, it will be apparent to those skilled in the art that warning lamp 66 can be positioned within the viewfinder or it could be positioned elsewhere in the camera. Moreover, other means such as a light pipe or reflecting means could be used to transmit a light signal in a manner making it visible in the viewfinder, or other appropriate place, to warn the camera operator of the cube condition.

Although not a part of the preferred embodiment, other signal circuits are illustrated in Figs. 7A and 7B, also for indicating the condition of the flash lamp in the firing position. In these circuits a signal is generated when the flash lamp is in an unfired condition, as distinguished from the signal effected by the circuit of Fig. 6 for a fired condition. In Fig. 7A the actuating member 207 is electrically non-conductive and includes electrical contacts 314 and 315 arranged to provide a normally open switch 316 in a circuit including a source of electrical energy 317 and a signal lamp 319. The resiliency of contact 314 will maintain the switch 316 in an opened condition unless and until contact 314 engages an operative striker member in the flash cube. Upon such engagement the upward force of the actuating member 207 will urge the resilient contact 314 downwardly into engagement with the contact 315 to energize the signal circuit and illuminate lamp 319. If the flash lamp in the firing position is fired, however, the striker member will not be in a position to be engaged by contact 314 and switch 316 will remain open. Thus, the signal lamp 319 will not be energized and no signal will be generated. As in the embodiment illustrated in Fig. 6, it is intended that the signal lamp 319 positioned in a manner to be visible

in the viewfinder, or some other appropriate place, to indicate to the camera operator that the flash lamp in the firing position is operative. Of course, the warning signals of Fig. 6 and Fig. 7A could be used together: the signal of the embodiment shown in Fig. 6 indicating when the lamp is fired, and the signal of the modification shown in Fig. 7A energizing a "flash ready" signal. As illustrated in Fig. 7B, the switch could be defined by a pair of spaced contacts 321 and 323 carried on actuating member 207 and adapted to be closed by the conductivity of the striker member 98 itself, rather than by direct contact between the contacts.

WHAT WE CLAIM IS:—

1. A photographic camera having a holder for receiving a percussion-ignitable flashlamp unit of the kind defined and for locating a striker or one of the strikers in a firing position, and an actuating member mounted for movement towards the firing position to release a striker located therein from its energized position, said actuating member being moved toward said firing position upon actuation of a shutter release member from one inoperative position and being moved away from the firing position by the return movement of the shutter release member to said inoperative position.
2. A photographic camera according to Claim 1, wherein upon initial actuation of the shutter release member the actuating member is spring urged from a retracted position and into contact with a striker located in the firing position and upon further actuation of the shutter release the actuating member is moved to release the striker.
3. A photographic camera according to Claim 2, wherein the actuating member is retained in the retracted position by latch means which is released by the initial movement of the shutter release member for movement of the actuating member under the action of the spring into contact with a striker located in the firing position.
4. A photographic camera according to Claim 3, wherein the actuating member is moved to release the striker by means of a pivotally mounted driver which is normally held in an inoperative position against the action of a driver spring by means of a latch which is released upon said further actuation of the shutter release member.
5. A photographic camera according to Claim 4, wherein the driver is connected to the shutter release member by means of the driver spring which is tensioned by the initial actuation of the shutter release member and, upon release of its latch, strikes one end of a pivotally mounted lever, the other end of which is in engagement with the actuating member.
6. A photographic camera according to Claim 5, wherein the movement of the actuat-



ag member away from the firing position is effected by means of a slidably mounted member which upon movement of the shutter release member to its inoperative position is engaged and moved thereby to turn the pivotally mounted lever about its pivot so as to move the actuating member in the appropriate direction.

7. A photographic camera according to Claim 6, wherein a latch for holding the slidably mounted member against movement is released by the insertion of a unit in the holder.

8. A photographic camera according to Claim 7, wherein the latch for holding the slidably mounted member against movement comprises a pivotally mounted element, one end of which engages the slidably mounted member and the other end of which is engaged by a pivotally mounted member which is engagable by a slidably mounted ring disposed in the path of movement of a unit being inserted in the holder.

9. A photographic camera according to any one of the preceding claims, wherein the moving of the actuating member to a firing position gives rise to an indication of the fired or unfired condition of a lamp in the firing position.

10. A photographic camera according to Claim 9 as appendant to any one of Claims 2 to 8, wherein means for indicating the fired condition of a lamp in the firing position comprises an electric warning lamp which is energized during the movement of the actuat-

ing member under the action of the spring acting thereon.

11. A photographic camera according to Claim 10 as appendant to any one of Claims 5 to 8, wherein the circuit of the electric warning lamp includes a switch which is actuated by the pivotally mounted lever, during the movement thereof under the action of a spring, when a fired lamp is in the firing position.

12. A photographic camera according to Claim 9 as appendant to any one of Claims 2 to 8, wherein means for indicating the unfired condition of a lamp in the firing position comprises an electric warning lamp which is energized during the movement of the actuating member under the action of the spring acting thereon.

13. A photographic camera according to Claim 12, wherein the actuating member carries a pair of contacts which are connected in the circuit of electric warning lamp and are electrically connected together upon movement of the actuating member into contact with a striker.

14. A photographic camera according to Claim 1, constructed substantially as hereinbefore described with reference to, and as shown in, Figs. 1 and 3 to 6, or Figs. 1 and 3 to 6 as modified by Fig. 7A or Fig. 7B.

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