

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) PHOTOGRAPHIC FLASHLIGHT DEVICES

(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 photographic flashlight devices, and to cameras incorporating such devices, 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.

In accordance with the present invention there is provided a photographic flashlight device, or a camera incorporating such a device, having a holder for receiving a percussion-ignitable flash lamp unit of the kind defined and locating the or each succeeding lamp in a firing position, wherein means responsive to scene brightness, controls the percussion firing of a lamp located in the firing position.

In the accompanying drawings:—

Fig. 1 is a perspective view of a photographic still camera constructed in accordance with the present invention, together with a flash lamp unit containing a plurality of percussion-ignitable lamps;

Fig. 2 is a perspective view showing the flash firing mechanism employed in the camera shown in Fig. 1;

Fig. 3 is a front elevation of Fig. 2;

Figs. 4 and 5 are plans of Fig. 2 showing the two stages of operation of the mechanism.

Fig. 6 is a plan of a portion of a camera mechanism constructed in accordance with a further form of the present invention; and

Fig. 7 is a view similar to Fig. 6 but with elements of the mechanism in positions assumed at a different stage of the cyclic operation of the mechanism.

Because photographic cameras are well

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

Referring to Fig. 1, a photographic roll film still camera 20 comprises a body 21 having a picture-taking or lens axis 22 on which are located the usual lens and film plane for holding a frame of a roll of photosensitive film (not shown). The camera shutter mechanism and diaphragm are also positioned to be in operative relationship along the axis 22 to expose a frame of film located at the film plane.

Accessibly located at the top wall of the camera body 21 is a socket 23 designed to receive a multilamp percussion-ignitable flash lamp unit 24 containing a plurality (four) of flashlamps 25. The flash lamp unit 24 and a receiving socket therefor are more fully described in Letters Patent No. 1240784. Briefly, however, the flash lamps 25 are mounted in a vertical position about a vertical axis of rotation on a substantially square base. Depending from the base of each lamp 25 is an exposed primer tube 26 containing a percussively ignitable material that burns when the primer tube 26 is struck by a high energy percussion stiker in the camera. However, the present invention also may use a flash unit having the percussion strikers incorporated in the flash unit, in which case the camera striker is an actuator to release or dislodge the percussion strikers in the unit. Individual light reflectors are positioned behind each lamp 25 and an overall light transmitting protective cover 27 is provided. The package base defines the four lamp sides and includes a depending central connector post 28 that retains the primer tubes 26 and is received in an opening of the socket 23 in any one of four predetermined positions in which one of the lamps 25 is in the operative position.

The camera may employ the camera operating and flashcube indexing mechanism dis-

closed in Letters Patent No. 1154171. As described therein, roll film is wound along the film plane, for positioning successive frames of film on the film plane, by an accessible film winding lever 30. The lever 30 also sets the camera shutter operating mechanism, which is released by an accessible body release member 31 to expose the positioned film frame by admitting light along the axis 22 for a predetermined length of time. The shutter time and/or exposure aperture may be determined automatically by any known exposure control system that senses ambient light through a photoresponsive element 32.

Referring to Fig. 4, the film winding lever 30 rotates a film take-up reel (not shown) in a counterclockwise direction (looking down) through a clutch arrangement by means of a pinion drive gear 33 cooperating with an arcuate rack arm 34 on the winding lever 30. The winding lever 30 also includes a shutter cocking foot 35 see also Figs. 3 and 5 which acts to set the shutter mechanism as the film is being wound.

A shutter mechanism comprises a shutter striking plate or driver 36 which rotates about a pivot pin 37. An upstanding lug 38 on the striking plate 36 is engaged by the cocking foot 35 to move the plate 36 in a clockwise direction (looking down) against the bias of a strong spring 39. The shutter itself comprises a pivotable impact shutter blade 40 (see Fig. 3) having an ear 41 in the path of movement of a finger 42 on the striking plate 36. A lighter spring 43 normally holds the blade 40 in a position covering the exposure aperture, and a latch 45 on the camera body release 31 is normally in the path of movement of the finger 42 to prevent shutter operation until the body release is depressed. Upon release of the cocked striking plate 36 by depressing the body release 31 so that it pivots in a clockwise direction (Fig. 3) against a retaining spring 44, the action of spring 39 causes the finger 42 to move to the right as shown in Fig. 3, striking the ear 41 and moving the shutter blade 40 in a clockwise direction away from the exposure aperture against the bias of the spring 43, which is weaker than the spring 39, until the finger 42 moves across and beyond the ear 41. The shutter blade 40 is returned by the spring 43, after a predetermined length of time, to cover the exposure aperture. The finger 42 is sufficiently resilient to ride up and over the sloping surface of the portion of the shutter blade 40 to which the ear 41 is attached and the sloping upper surface of the latch 45 when the finger 42 is moved to the left during the cocking of the striking plate 36 by the shutter cocking foot 35.

To return the winding lever 30 to its initial position after each winding stroke or when released, there is provided a return tension spring 47 which is fixed at one end to the camera body 21, and at its other end to a slid-

able flash socket winding arm 50. The socket winding arm 50, which interconnects the lever 30 and the flash indexing mechanism to be hereinafter described, is pivotally attached to the winding lever 30 by means of a pin-and-socket connection.

Referring to Fig. 3, the socket 23 receives the connector post 28 of a flashlamp unit, with the lamp percussion tubes 26 exposed to cooperate with the camera firing mechanism to be hereinafter described. The socket 23 (and inserted multilamp unit 24) is automatically indexed or repositioned to present a fresh lamp in the operative after a flash exposure. A spring drive mechanism as shown in Letters Patent No. 1154171 is energized as film is wound and the shutter cocked or set, and if the lamp is fired with camera operation, the drive mechanism acts automatically to rotate the socket 23 ninety degrees to place a subsequent lamp 25 in the operative position.

The spring drive mechanism includes a rotatable socket driving ring 70 (Fig. 4) located beneath the socket 23, and having a fixed vertical winding pin 71 which is engageable by a hooked end 72 of the socket winding arm 50.

A helical drive spring (not shown) fixed at one end to the ring 70 and at the other end to the camera body urges the ring in a clockwise direction (Fig. 3). Referring to Figs. 4 and 5, as the winding lever 30 is operated, the hooked end 72 engages the pin 71 and is guided by means of a guide edge 75 on the camera body to rotate the ring 70 from an original position shown in solid lines in Fig. 5 one-quarter turn in a counter-clockwise direction against the bias of the helical drive spring to the position shown in Fig. 4. Upon completion of the 90° rotation, a latch tab 76 on a latch member 60, which is rotatable coaxially with the striking plate 36, engages a wedge shaped latch skirt (not shown) on the periphery of ring 70.

The top surface of the driving ring 70 defines clutch teeth (not shown) engageable with corresponding teeth (not shown) on the bottom surface of socket 23, so as to rotate the socket 23 in a clockwise direction with ring 70 by the drive spring and to allow ring 70 to be rotated in a counterclockwise direction by the winding arm 50 without simultaneous rotation of the socket. When the ring 70 has been rotated in a counterclockwise direction by the arm 50 to its energized position shown in Fig. 4, a stop plate 82 on latch member 60 is engaged by the striking plate 36 to maintain the latch tab 76 stationary and to prevent return rotation of the ring 70 until after camera operation as described.

To ensure proper positioning of the socket assembly 23 after indexing, the body release 31 includes a positioning pawl 84 (see particularly Fig. 2) that is located in the front one of four notches 86 equally spaced on the peri-

phery of the socket 23 to correspond to the flash lamp locations.

As stated, shutter operation is controlled by disengagement of the release latch 45 on the body release member 31 from the striking plate 36, the counterclockwise rotation of which by its spring 39 allows the latch member 60 to rotate in a counterclockwise direction by urging of the socket drive spring and thereby allow socket indexing. The socket indexing is also controlled by the flash striker mechanism to be hereinafter described.

In order to provide for flash pictures, a lamp firing mechanism is built into the camera body. The firing mechanism comprises a striker member 51 (Figs. 2 and 3) pivotable about a pin 52 and having a wedge shaped striker pin 53 which, when released, strikes the percussion tube 26 of a flash lamp 25 disposed in the operative position. Energy to the striker pin 53 is provided by means of a spring 55 connected at one end to the striker member 51 and at the other end to the camera body.

The striker member 51 is cocked during film winding by means of a tab 61 on the latch member 60.

As the camera shutter is being cocked, the latch member 60 is rotated in a clockwise direction by means of the plate 36, and by engagement of the tab 61 with a striker latch arm 57, the striker member 51 is moved in a counterclockwise direction about its pivot 52 against the bias of the striker spring 55 from the released position shown in dotted lines in Fig. 3 to the cocked position shown in solid lines in Fig. 3 and also as illustrated in Fig. 4. In the cocked position of the striker member 51, an indexing control pawl 58 thereon engages a notch 86 in the socket 23 to prevent socket rotation by means of the ring 70 until after the striker member 51 has moved to its released position where pawl 58 is out of engagement with the notch 86 and the socket 23 can be indexed, the striking pin 53 by virtue of its wedge shape being cammed out of the way by the adjacent tube 26 during rotation of the socket 23.

For flash operation, illumination is synchronized with film exposure by means of a latch end 63 which is carried by the release member 31 and is normally disposed in the path of movement of the striker latch arm 57 when the striker member 40 is cocked. When the body release member 31 is depressed, the latch end 63 releases the latch arm 57 and the movement of striking plate 36 releases the latch member 60 to fire the lamp in timed relation with camera operation.

The striker member 51 further includes a lower extension 85 defining a slot 83. A control lever 87 which is mounted for pivotal movement about an axis 88 includes a lock pin 89 that selectively is positioned in the slot 83 to prevent movement of the striker member 51 from the cocked position.

When the control lever 87 is in the flash position as shown in solid lines in Fig. 3, the pin 89 is disengaged from the slot 83, thereby permitting movement of the striker member 51 to the released position. For camera operation without flash, the lever 87 assumes the dotted line or daylight position in Fig. 3, in which the pin 89 is disposed in the slot 83 to prevent movement of the member 51. In the latter case, the pawl 58 also remains in the notch 83 to prevent socket rotation after camera operation.

Control lever 87 is biased to rotate in a counterclockwise direction (Fig. 3) by means of a spring 90 to assume the daylight or dotted line position. Normally, however, the control lever 87 is held in its solid line or flash position against its spring bias by an arm 91 on the camera release member 31. When the camera is operated by depressing the release member 31, the lever 87 tends to assume its daylight position prior to shutter release.

A camera operation mode selector lever 95 is movable between a solid line position (Figs. 2 and 3) for daylight operation and a dotted line position for flash operation. In the flash operation position, a tab 96 frictionally engages the control lever 87 to prevent movement of the lever 87 to its daylight position, when the body release 31 is depressed, by means of the spring 90.

The selector lever 95 may be manually movable between the daylight and flash positions or it may be moved automatically by means of an element in an exposure control system, as for example a needle sensing clamp as disclosed in Letters Patent No. 1154913 in which the clamp moves a predetermined amount to clamp the needle of a moving coil galvanometer when the needle is located in the daylight range of the exposure control system. However, the clamp moves an additional amount when the needle is located in the low light range of the system. This additional amount of movement is transmitted by means of a linkage to the selector lever 95 to move it to its flash position. The additional motion also may be used to move mechanically, by known means, a "use flash" signal flag into the viewfinder of the camera.

Alternatively, it also may be desirable in a camera having an automatic exposure control system to fire the flash lamp for additional light even though the camera is set for daylight operation. In that case, a manual "fill-in" flash lever 97 may be provided, which lever is moved before camera operation to engage a tab 98 on the lever 87 and retain the lever 87 in its flash operation position regardless of the light level sensed by the exposure control system.

CAMERA OPERATION

To operate the photographic camera according to the preferred embodiment of the invention, the connector post 28 of a multilamp

flash lamp unit 24 is placed in the socket 23 with an unfired percussion flash lamp 25 in the operative position.

5 If an unexposed frame of film is not located in the film plane on the lens axis 22, the film is advanced by turning the film advance lever 30, thereby moving an unexposed film frame into the film plane and setting the shutter by cocking the shutter striking plate 36 through 10 the cocking foot 35 on the film advance lever 30. Simultaneously, the socket driving ring 70, if not energized by a prior operation, is rotated through an angle of 90° in a counterclockwise direction, against the bias of the helical drive 15 spring, from the solid line position shown in Fig. 5 to the position shown in Fig. 4, where the ring 70 is engaged by the latch tab 76. Pawl 84, which is in the forward notch 86 of the socket 23, prevents socket 23 and inserted 20 flash lamp unit 24 from rotating with the ring 70. After completion of the film winding operation, the driving ring 70 tends to rotate in a clockwise direction but is held stationary by means of the latch tab 76 which in turn, 25 is prevented from moving to release the ring 70 because of the engagement by the stop plate 82 with the striking plate 36.

30 At this point, the winding lever 30 is permitted to return to its initial position by means of the return spring 47, as shown in Fig. 5, and the camera is ready for operation with augmenting flash if ambient light conditions warrant the use thereof.

35 This is accomplished by aiming the camera in the desired direction and depressing the body release member 31 to its fully depressed position as shown by dotted lines in Fig. 3. This motion initially removes the arm 91 from the path of movement of the control lever 87 40 and then releases the finger 42 of the cocked striking plate 36, which rapidly strikes the shutter ear 41 to cause the shutter blade 40 to uncap the diaphragm aperture according to the predetermined exposure time. Simultaneously, the latch 63 releases the striker arm 57 45 and the pawl 84 is removed from the forward notch 86.

50 If the camera is set for daylight operation by positioning mode selector lever 95 in the solid line position as shown in Fig. 3, and if no fill-in flash is desired, lever 87 rotates as the release member 31 is depressed until the pin 89 enters the slot 83. It will be appreciated that this occurs before the latch 63 otherwise 55 releases the striker arm 57. In that case, the striker pin is prevented from striking the lamp tube 26 and the ring 70 and socket 23 are prevented from rotating after camera operation. If, however, the selector 95 is moved 60 manually or has moved automatically to the flash position, or the "fill-in" flash lever 97 is operated, the pin 89 remains clear of the slot 83 and the striker pin 53 is moved by means of the spring 55 at high energy to strike 65 the lamp primer tube 26 and fire the lamp

25 upon impact. After firing, the pawl 58 is moved out of the notch 86, thereby permitting the driving ring 70 and the socket 23 to be rotated in the clockwise direction as shown in Figs. 4 and 5 to move the next succeeding 70 lamps into the flash operation position. After all four lamps in the inserted unit have been used, the unit is removed or ejected in any known manner.

75 Referring now to the form of the invention shown in Figs. 6 and 7, a lower section of a percussion-ignitable flash lamp unit 101 is shown mounted for indexing rotation in a socket 102 and having primer tubes 103 which 80 extend upwardly from the plane of the drawing as viewed in Figs. 6 and 7 to individual flash lamps which are not shown. The tubes 103 are rigidly supported at their bottom end by a base 104 in a manner such that when 85 a unit is inserted in the socket 102 and indexed to a firing position 105, a tube 103 is disposed in position for percussion striking. After firing a lamp, the socket 102 is rotated in synchronism with other cyclic camera functions and another primer tube 103 is indexed to the firing 90 position 105, this indexing being effected by apparatus generally known in the art.

95 Also shown in Figs. 6 and 7 is a typical camera shutter release lever 110 having an actuating tab 111 which is usually located outside the housing of the camera. The lever 110 is pivotally mounted at one end on a pin 112 and is urged in a clockwise direction, as viewed in Figs. 6 and 7, by means of a spring 118. 100 The shutter release lever 110 has formed thereon between the tab 111 and the pin 112, a striker release lug 113 and includes, near its movable end, a retaining arm 114. A shutter actuating slide 115 is connected to the lever 110 by means of a pin 116 and extends to a location adjacent to a shutter actuating 105 mechanism, not shown, a stop 117 limiting the movement of the lever 110 in a clockwise direction.

110 A striker release, bellcrank lever 120 is pivotally mounted on the camera frame by means of a pin 121 in a location such that a release arm 122 thereof is contractable by the release lug 113 of the shutter release lever 110 during 115 downward movement of the shutter release lever. The striker release lever 120 is urged in a counterclockwise direction against stop 123 by means of a spring 124. The striker release lever 120 also includes a retaining arm 120 125 which has a cam surface 126 and retaining ledge 127.

130 Located in cooperative relation with respect to the socket 102 and the striker release lever 120 is a percussion striker 130 which is pivotally mounted at one end on a pin 131 and is biased in a counterclockwise direction by means of a drive spring 132. The striker 130 has a cocking lug 134 extending therefrom and has its moving end 136 shaped to cooperate 130

with the cam surface 126 on the striker release lever 120.

Slidably mounted on the camera frame in operative relation with the cocking lug 134 of the striker 130 is a cocking slide 140. The movement of the cocking slide 140 is directed by pins 141 which extend through elongated slots 142 in the body of the slide and the slide 140 is urged away from the cocking lug 134 by means of a spring 144. On the end of the slide 140 adjacent to the cocking lug 134 is formed a shoe 145 adapted to contact a mating surface on the lug 134. At the opposite end of the lever 140, is formed a follower 146 which is biased into following contact with a cocking cam 148 by means of the spring 144. The cam 148 is rotatably mounted on a shaft 149 and is rotated in a counterclockwise direction by the cyclic movement of one of the camera elements (not shown), such as the film advancing movement of a film winding lever or the movement of a shutter cocking lever.

Referring again to Figs. 6 and 7, a blocking member 150 includes a blocking arm 151 and an actuating arm 152 and is mounted in the camera at a location adjacent to the socket 102 on a central pivot 153. The blocking member 150 is urged in a clockwise direction about the pivot 153 by means of a spring 154 and is limited by a stop 155 so that in its rest position the blocking arm 151 has a portion 156 located in the path of movement of the striker 130 between the striker's energized and firing positions. The blocking arm 152 can be moved out of the path of movement of the striker 130 by movement about the pivot 153 in a counterclockwise direction.

A mechanism for controlling the positioning of the blocking member 150 includes a typical scene-light measuring instrument, schematically indicated at 160, having a pivoted coil that is energized by or under control of a photocell, not shown. An output member 166 of the instrument 160 is positioned by the coil of the measuring instrument 160 as a function of scene brightness and moves in a clockwise direction as viewed in Figs. 6 and 7 in response to higher brightness levels.

The control mechanism for the blocking member 150 also includes a retracting slide 170 which is mounted in the camera for sliding movement on pins 171 and cooperates with the shutter release lever 110, output member 166 and blocking member 150. The retracting slide 170 includes a follower post 172 which is urged downwardly into following contact with the retaining arm 114 of the shutter release lever 110 by means of a spring 174 which is weaker than the spring 118 of the shutter release mechanism. At the end of the slide 170 remote from the follower post 172, there is formed a control surface 175 which is adapted to contact the output member 166, when that member is in the zone denoted "no flash" in the drawings, and limit the downward move-

ment of the slide 170. At the same end as the control surface 175, the slide 170 has an extension forming a retracting arm 176 which when the output member 166 is not in position to limit downward movement of the slide 170 (Fig. 7), i.e., in the zone denoted "flash" in the drawings, the retracting arm 176 is moved into contact with the actuating arm 152 of the blocking mechanism 150 and pivots the blocking mechanism in a counterclockwise direction against the action of the spring 153.

Having now described in detail the various elements shown in Figs 6 and 7, the operation of these elements will be further described.

In Fig. 6 the camera elements are in a stage of cyclic operation ready for picture taking, the striker 130 having been cocked and retained in the cocked position by the striker release lever 120. Moreover, the output member 166 has moved to the zone where no flash is needed in response to a corresponding sensing of scene brightness by the light meter 160. When the shutter release 110 is actuated by downward pressure on the tab 111, the retaining arm 114 moves downwardly to the position indicated by dotted lines in Fig. 6 and the retracting slide 170 is free to move downwardly in response to the action of the spring 174. Since the output member 166 is in the zone where flash is not required, the member 166 contacts the surface 175 of the slide 170 and prevents downward retracting movement of the slide 170. The blocking lever 150 is, therefore, not retracted from its blocking position and the portion 156 thereof remains in the path of movement of the striker 130. After further downward movement of the shutter release lever 110, the release lug 113 moves the release lever 120 to the position indicated by dotted lines in Fig. 6 and the striker 130 is released and moves to the position likewise indicated in dotted lines. It can be seen from Fig. 6 that in this position the striker 130 does not contact the primer tube 103 and no flash occurs.

Referring now to Fig. 7, the cocking cam 148 is shown during its rotation which causes the cocking slide 140 to move the striker 130 back to a cocked position such as shown in Fig. 6. During this movement, the end portion 136 of the striker 130 rides over the cam surface 126 on the striker release lever 120 to allow re-engagement of the striker 130 by the ledge 127. In this instance, the output member 166 has been moved by the light meter in response to scene brightness, to the zone where flash is required. Therefore, when the shutter release 110 is actuated to the position indicated by dotted lines in Fig. 7, the retracting slide 170 is free to move under the force of the spring 174 into contact with the arm 152 of the blocking member 150. Thus, the blocking member 150 is pivoted to the position indicated in dotted lines and the portion 156 is moved out of the path of movement of the

striker 130 so that upon subsequent release the striker 130 is free to move into percussion contact with the tube 103 as also indicated in dotted lines.

- 5 The embodiment of the present invention disclosed with reference to Figs. 6 and 7 can be modified so that the blocking member is normally biased out of the firing path of the striker and moved into the path by movement
10 of a mechanism similar to the retractor 170 but designed to move the blocking element into the path. In such a modification the light output would disable the mechanism which moved the blocking element into the firing path when
15 in a position indicating flash was needed.

It will be also be appreciated that the blocking member 156 can be used to couple a camera aperture setting means, to the distance setting means and provide automatic exposure control for flash in a manner similar to that
20 disclosed in Letters Patent No. 1,062,577.

The control mechanisms of the present invention can be used in conjunction with other types of firing systems for percussion-ignitable
25 flash lamps.

For example, in our copending Application No. 49434/69 (Serial No. 1287293) a flash lamp unit is disclosed in which preloaded firing springs are provided within the flash unit.
30 flash units of this type utilize an actuating element in a camera or other photographic apparatus, which element in is moved along an actuating path and into the flash lamp unit to release the firing spring in the flash lamp unit. The firing spring in turn, fires the percussive primer of a flash lamp in the unit. The blocking element of the control mechanisms of the present invention can be located
35 to move into the path of the camera actuating element of such a system thereby controlling flash in the same manner as described herein.

Thus, in accordance with the present invention, a flash is selectively produced in response to ordinary movements of the photographic
45 apparatus and the output from a scene-light sensor, and a partial movement of the flash actuating mechanism provided during each picture-taking cycle.

WHAT WE CLAIM IS:—

- 50 1. A photographic flashlight device having a holder for receiving a percussion-ignitable flash lamp unit of the kind defined and locating the or each succeeding lamp in a firing position, wherein means responsive to scene
55 brightness, controls the percussion firing of a lamp located in the firing position.

2. A photographic flashlight device according to Claim 1, wherein the control means responsive to scene brightness controls the movement of a blocking member which, when the scene brightness is above a predetermined level, blocks the movement of an actuating member of a flash lamp firing means.

3. A photographic camera incorporating a

photographic flashlight device according to Claim 1 or 2.

4. A photographic camera incorporating a photographic flashlight device according to Claim 2, wherein the firing means comprises a pivotally mounted member which is spring urged from a cocked position towards a firing position and the blocking member comprises a pivotally mounted control lever which, upon actuation of a shutter release member, is spring urged towards engagement with the pivotally mounted member to prevent movement thereof, the blocking movement of the control lever being prevented by the control means when the scene brightness is below a predetermined level.

5. A photographic camera according to claim 3 or 4, wherein the holder comprises a socket for receiving a multilamp flash lamp unit of the kind defined and rotatably mounted for locating successive lamps of an inserted unit in the firing position.

6. A photographic camera according to claims 4 and 5, wherein the socket is held against rotation, to index an unfired lamp of an inserted unit, by means of a latch member which is released upon movement of the pivotally mounted member from its cocked position.

7. A photographic camera according to claim 6, wherein the latch member has one arm for latching engagement with the socket, a second arm for engagement with the pivotally mounted member to prevent movement thereof from a cocked position and a third arm engageable with a shutter driver member in its cocked position so that upon release of the shutter driver the latch member is actuated to release the socket and pivotally mounted member.

8. A photographic camera according to any one of the preceding claims 3 to 7, including manually operable means for overriding the control means.

9. A photographic camera according to claim 8 as appendant to claim 4, 6 or 7, wherein the manually operable means comprises a latching member for blocking movement of the control lever into engagement with the pivotally mounted member.

10. A photographic camera incorporating a photographic flash light device according to claim 2, wherein the actuating member is spring urged to a firing position, upon release of a latch member by actuation of a shutter release member, and the blocking member is spring urged into the path of movement of the actuating member from its cocked to its firing position.

11. A photographic camera according to claim 10, wherein the control means is movable, when the scene brightness is above a predetermined level, to a position in which it blocks movement of a slide member which is connected by means of a lost-motion connec-



striker 130 so that upon subsequent release the striker 130 is free to move into percussion contact with the tube 103 as also indicated in dotted lines.

- 5 The embodiment of the present invention disclosed with reference to Figs. 6 and 7 can be modified so that the blocking member is normally biased out of the firing path of the striker and moved into the path by movement
10 of a mechanism similar to the retractor 170 but designed to move the blocking element into the path. In such a modification the light output would disable the mechanism which moved the blocking element into the firing path when
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It will be also be appreciated that the blocking member 156 can be used to couple a camera aperture setting means, to the distance setting means and provide automatic exposure control for flash in a manner similar to that
20 disclosed in Letters Patent No. 1,062,577.

The control mechanisms of the present invention can be used in conjunction with other types of firing systems for percussion-ignitable
25 flash lamps.

For example, in our copending Application No. 49434/69 (Serial No. 1287293) a flash lamp unit is disclosed in which preloaded firing springs are provided within the flash unit.
30 flash units of this type utilize an actuating element in a camera or other photographic apparatus, which element in is moved along an actuating path and into the flash lamp unit to release the firing spring in the flash lamp
35 unit. The firing spring in turn, fires the percussive primer of a flash lamp in the unit. The blocking element of the control mechanisms of the present invention can be located to move into the path of the camera actuating
40 element of such a system thereby controlling flash in the same manner as described herein.

Thus, in accordance with the present invention, a flash is selectively produced in response to ordinary movements of the photographic
45 apparatus and the output from a scene-light sensor, and a partial movement of the flash actuating mechanism provided during each picture-taking cycle.

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- 50 1. A photographic flashlight device having a holder for receiving a percussion-ignitable flash lamp unit of the kind defined and locating the or each succeeding lamp in a firing position, wherein means responsive to scene
55 brightness, controls the percussion firing of a lamp located in the firing position.

2. A photographic flashlight device according to Claim 1, wherein the control means responsive to scene brightness controls the movement of a blocking member which, when the scene brightness is above a predetermined level, blocks the movement of an actuating
60 member of a flash lamp firing means.

3. A photographic camera incorporating a

photographic flashlight device according to Claim 1 or 2.

4. A photographic camera incorporating a photographic flashlight device according to Claim 2, wherein the firing means comprises a pivotally mounted member which is spring
70 urged from a cocked position towards a firing position and the blocking member comprises a pivotally mounted control lever which, upon actuation of a shutter release member, is spring
75 urged towards engagement with the pivotally mounted member to prevent movement thereof, the blocking movement of the control lever being prevented by the control means when the scene brightness is below a predetermined level.
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5. A photographic camera according to claim 3 or 4, wherein the holder comprises a socket for receiving a multilamp flash lamp unit of the kind defined and rotatably mounted for locating successive lamps of an inserted
85 unit in the firing position.

6. A photographic camera according to claims 4 and 5, wherein the socket is held against rotation, to index an unfired lamp of an inserted unit, by means of a latch member which is released upon movement of the pivotally mounted member from its cocked position.
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7. A photographic camera according to claim 6, wherein the latch member has one arm for latching engagement with the socket, a second arm for engagement with the pivotally mounted member to prevent movement thereof from a cocked position and a third arm engageable with a shutter driver member in its cocked position so that upon release of the shutter driver the latch member is actuated to release the socket and pivotally mounted member.
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8. A photographic camera according to any one of the preceding claims 3 to 7, including manually operable means for overriding the control means.
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9. A photographic camera according to claim 8 as appendant to claim 4, 6 or 7, wherein the manually operable means comprises a latching member for blocking movement of the control lever into engagement with the pivotally mounted member.
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10. A photographic camera incorporating a photographic flash light device according to claim 2, wherein the actuating member is spring urged to a firing position, upon release of a latch member by actuation of a shutter release member, and the blocking member is spring urged into the path of movement of the actuating member from its cocked to its firing position.
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11. A photographic camera according to claim 10, wherein the control means is movable, when the scene brightness is above a predetermined level, to a position in which it blocks movement of a slide member which is connected by means of a lost-motion connec-
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tion to the shutter release member for movement therewith to move the blocking member from the path of movement of the actuating member.

- 5 12. A photographic camera according to claim 10 or 11, wherein the holder comprises a socket for receiving a multi-lamp flash lamp unit and mounted for rotation to index succeeding lamps in the firing position.

- 10 13. A photographic camera having a mechanism for receiving and firing a percussion-ignitable flash lamp unit of the kind defined, con-

structed substantially as hereinbefore described with reference to, and as shown in Figs. 1 to 5 of the accompanying drawings.

14. A photographic camera having a mechanism for receiving and firing a percussion-ignitable flash lamp unit of the kind defined, constructed substantially as hereinbefore described with reference to, and as shown in Figs. 6 and 7 of the accompanying drawings. 15 20

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Agent for the Applicants.

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