

PATENT SPECIFICATION

(11) 1323941

1323941

DRAWINGS ATTACHED

- (21) Application No. 39284/70 (22) Filed 14 Aug. 1970
(31) Convention Application No. 850008 (32) Filed 14 Aug. 1969
(31) Convention Application No. 850009 (32) Filed 14 Aug. 1969
(31) Convention Application No. 850125 (32) Filed 14 Aug. 1969 in
(33) United States of America (US)
(44) Complete Specification published 18 July 1973
(51) International Classification G03B 15/04
(52) Index at acceptance

G2A 1G 1H 1K2A 1K2Y 1KY

- (72) Inventors EDWARD LOUIS STURM,
WILLIAM HOWARD HORTON and
CHESTER WILLIAM MICHATEK

(54) PHOTOGRAPHIC APPARATUS



(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 a multi-lamp percussion-ignitable flashlamp unit (hereinafter referred to as "of the kind defined") in which each flashlamp has a primer which is deformed and/or displaced upon being struck by a striker to ignite the flashlamp, the striker forming a part of the unit or a part of the flashlight device, the term deformable or displaceable firing element of a flashlamp as used herein refers to the primer where the striker forms a part of the flashlight device and to the primer and/or striker where the striker forms a part of the flashlamp unit.

In accordance with the present invention there is provided a photographic flashlight device or camera comprising a holder for receiving a multi-lamp percussion-ignitable flashlamp unit of the kind defined, the holder being indexable to position an unfired lamp in a firing position, an actuating member which, with a lamp unit inserted in the holder, normally extends into the lamp unit for actuation to cause ignition of an unfired lamp in the firing position, and means responsive to indexing of the holder for retracting the actuating member from the lamp unit to allow indexing thereof.

In the accompanying drawings:—

Fig. 1 is a perspective view of a camera constructed in accordance with one form of the present invention;

Fig. 2 is a partial perspective view illustrating a signal means employed in a further form of the invention shown in Fig. 12;

Fig. 3 is a view to an enlarged scale of the percussion-ignitable flashcube on the camera shown in Fig. 1, and of a socket for receiving the flashcube on the camera;

Fig. 4 is a perspective view of the flashcube shown in Fig. 3, with parts broken away to illustrate the interior of the cube;

Fig. 5 is a perspective view of a sensing and actuating mechanism for use with a flashcube of the kind defined;

Fig. 6 is a perspective view corresponding to a portion of Fig. 5 but showing the socket in a different rotative position and the relative positions of the camera elements for this socket position;

Fig. 7 is a perspective view of a portion of the mechanism shown in Fig. 5, as viewed from a different angle;

Fig. 8 is a top view of the camera shown in Fig. 1, with portions broken away to illustrate a film winding, a cube advancing, and a shutter driving mechanism;

Fig. 9 is a front view of the camera shown in Fig. 1, with the casing removed to illustrate the positions of the elements of the sensing and actuating mechanism when no flashlamp is on the camera;

Fig. 10 is a front view corresponding to Fig. 9, but illustrating the positions of the elements when an operative flashlamp is in the firing position;

Fig. 11 is a front view corresponding to Fig. 10, but illustrating the positions of the elements when the flashlamp in the firing position is inoperative;

Fig. 12 is a perspective view of another form of a sensing and actuating mechanism;

Fig. 13 is a perspective view showing a second embodiment of the socket in which

there is incorporated a damping means for the actuating member;

Fig. 14 is a perspective view showing a third embodiment of the socket which incorporates a further form of damping means;

Fig. 15 is a perspective view similar to Fig. 14, but showing the socket in a different rotative position; and

Figs. 16 and 17 show respectively the positions of the actuating member relative to the flashcube base for the socket rotative positions shown in Figs. 14 and 15.

In Fig. 1, there is shown the camera of the present invention which comprises a casing 10 supporting an objective 12, a shutter release member 14 for effecting operation of a shutter 15 (Fig. 5), a film-winding member 16 and a viewfinder 18. A percussion-ignitable flashcube 20 is removably received on the camera for operation in synchronism with the shutter 15.

The shutter release member 14, illustrated in Figs. 8—11, comprises a surface 22, accessible from the camera exterior, an elongated body portion 24 which includes a blocking surface 26 for maintaining a driver member 129 in an energised position.

The shutter 15 is of the single blade impact type and comprises a blade 28 pivotally mounted in the camera at 30. The shutter is normally maintained in a closed position against a stop 32 by means of a hairpin spring having an end which bears against a pin 36 secured to the camera casing and another end fixed to a catch 38 formed as part of the shutter blade 28. A lug 40 in the shutter blade is adapted to be struck by the driver member 129.

The winding mechanism 16 is shown in Figs. 8—11 and includes a handle 42 fixed to a disk member 44 which is rotatably mounted in the camera. In a manner well known to those skilled in the art, the disk member 44 is connectable to a film take-up spool to advance film through the camera. A projection 46 extending from disk 44 is adapted to rotate a spider member 48 to set various camera operating mechanisms during film advance.

As shown in Fig. 1, the viewfinder 18 comprises a front window 50 and a back window 52 spaced therefrom to permit a translucent warning flag 262 to be moved between the two windows.

Referring now to Figs. 3 and 4, the flashcube illustrated therein comprises a base 56 for supporting a plurality of percussion-ignitable flash devices 58, a reflector 60 for each device, a transparent cover 62, and a support means 64. Each flash device includes a flashlamp 66 and a firing element 68 positioned over openings 69 in the cube base. On an upper face of the base, means are provided for securely supporting each of the flashlamps 66 and firing elements 68; as

shown in Fig. 4, these means comprise a circular bore 70 for receiving a portion of the flashlamp and slots 72 for receiving a knee portion of the firing element.

Each of the four flashlamps 66 comprises a hermetically sealed envelope 74 containing combustible material such as a zirconium foil in a combustion supporting atmosphere such as oxygen. A lower portion of envelope 74 is sealed around an elongated deformable tube 76 having a circular cross section and containing in spaced relation therein an anvil 77. A percussion-ignitable material 80 is placed in the space between the tube 76 and the anvil 77. The percussion-ignitable material 80 is fired when firing element 68 strikes the deformable tube 76. Upon such firing, the heat energy generated by ignition of the percussion-ignitable material 80 deflagrates and is directed upwardly through the tube and into the envelope 74 to initiate combustion of the zirconium foil and thereby to fire the flashlamp.

The firing element 68 is shown in Fig. 4 and comprises a striker member 78, an upwardly extending central portion 80 adapted to be torsionally stressed when the firing element is in the energised position, a knee portion 82 for supporting the firing element on the cube base, and an elongate leg including a bent end portion 84 defining a stop for maintaining the striker member in the energised position over opening 69.

The support means 64 is located on a lower face 86 of base 56 and includes a channel member 88 having an opening 90 of generally square cross section and an external surface 92. At each of the corners of surface 92 there is provided a rib 94 having a tapered lower portion and an upper portion having sides, generally perpendicular to face 86 of the cube base. Also provided on external surface 92 and between the ribs 94 are recessed portions having inclined surfaces 96 which the adapted to cooperate with a socket latching means.

In Figs. 3 and 5, there is shown a socket comprising a cylindrical member 100, a socket base 102, and a wall 104 extending upwardly therefrom to define a socket exterior surface 106 and an interior surface 108. Extending upwardly from socket base 102 are a post member 110 adapted to be received in opening 90 of the cube channel member 88, and a plurality of flexible fingers 112 adapted to cooperate with the surfaces 96 on the external surface 92 of the channel member 88. Also extending in substantially the same direction as post member 110 and fingers 112 are splines 114 adapted to cooperate with the ribs 94 to accurately and securely maintain the cube in the socket.

The external surface 106 of the socket is provided with a camming means 116 having a steeply inclined portion 118, and abutment

means 119 adapted to cooperate with a socket indexing means.

Upon inserting a flashcube into the socket, the post member 110 in the socket is received in the opening 90 of the cube channel member 88, and the tapered lower portions of ribs 94 are received within the socket splines 114 to initially position the cube. As the cube is advanced toward its operative position in the socket, the upper portions of ribs 94 engage and closely cooperate with the internal surfaces of the socket to accurately position the cube. As the cube closely approaches the operative position, the flexible fingers 112 engage the inclined surfaces 96 to securely but releasably hold the cube in the socket.

As shown in Fig. 3, the post member 110 includes a hollowed-out portion 120 which is adapted to slidably receive a T-bar 121 having a body portion 122 and an upper end portion 124 including flanges 126. In an assembled condition, flanges 126 extend into the socket interior where they will be engaged by the cube channel member 88 when the cube is positioned in the socket. The T-bar is resiliently biased to a raised position and is pushed downwardly to a retracted position upon positioning of a cube in the socket to adjust certain camera mechanisms.

Referring now to Fig. 8, there is shown a driver member 129, the spider member 48 and an indexing slide 131. The driver member 129 comprises a main body portion 132 pivotally mounted within the camera casing, a leg including a latching surface 134 adapted to be engaged by the shutter release member to latch the driver member in an energized position, and a surface 136 adapted to engage the shutter blade to drive the blade to an open position. Indexing slide 131, includes an elongated body member 138 mounted for reciprocal movement, an abutment surface 140 adapted to be engaged by the spider member to reciprocate the body member 138, and a spring member 142 including a bent portion 144 for engaging the abutment means 119 of the socket to index the socket upon reciprocation of the body member 138. A spring 146 is provided for maintaining the socket in its indexed condition and for resiliently urging the socket toward the next position after the socket has been rotated by more than 45°.

The aforementioned camera mechanisms are set by actuation of winding member 42, which rotates the disk 44 attached thereto. As disk 44 rotates, the projection 46 moves into engagement with an arm 148 of the spider member 48 to rotate the spider member in a clockwise direction as viewed in Fig. 8. As the spider member rotates, a second arm 150 of the spider member sets the driver member 129. The clockwise rotation of the spider member also effects engagement between a third arm 152 thereof and the body member 138 of the cube indexing slide to move the

body member to the right, as viewed in Fig. 8, and thereby index the cube to position a new lamp in the firing position. The camera is now set to expose film in the camera by depression of the shutter release member which releases the driver member 129. Upon release, the driver member rapidly moves to the right, as viewed in Fig. 9, and strikes the shutter blade 28. The force of the driver member causes the shutter blade to rotate in a clockwise direction, as viewed in Fig. 9, until its direction of movement is reversed either by means of spring 34 or by means of a stop 252, at which time the blade is returned to its closed position over the camera aperture. Upon movement of the driver member toward the shutter blade, as described above, the third arm 152 of the spider member also moves in a counterclockwise direction (Fig. 8) to permit the body member 1-38 to return to its original position in which spring member 142 is in a position to index the cube by 90° upon further film wind.

Referring now to Figs. 5 and 6, there is shown a flashlamp sensing and firing mechanism which comprises a latching member 203 actuable by T-bar 121, an actuating member 205, a pivotally mounted member 207, a signal means 209, shutter speed changing mechanism 211, and a pivotally mounted lever 213. As will be described more fully hereinafter, this mechanism is inoperative (see Fig. 9) when there is no cube on the camera. However, the mechanism will be described in connection with Figs. 5 and 6 which illustrate the mechanism as it appears when a cube is on the camera and an operative lamp is in firing position.

Latching member 203 is pivotally mounted on a mechanism plate 217 by means of a pin 221 which extends through a central portion 219 of the latching member, latching member 203 is adapted to move between a latching position and a releasing position. One end of the member 203 is provided with a projection 223 adapted to be engaged by a lower end 215 of the T-bar for rotating the latching member to its releasing position when a cube is positioned on the camera. At another end of the latching member 203, a lug 225 on the member is connected to spring 227, and an abutment surface 229 is provided for engagement with member 207. When no cube is positioned on the camera, spring 227 serves to maintain both the latching member 203 in its latching position and the T-bar in its raised position (Fig. 9).

The pivotally mounted member 207 comprises a central portion 230 which is pivotally mounted on a pin 232 which extends from mechanism plate 217. A leg 234 of the member 207 is provided with a surface 236, adapted to engage surface 229 on the latching member 203; and another leg 238 of the member 207 includes a pin 240 adapted to

function as a cam follower in cooperation with camming means 116 of the socket, and an abutment surface 241 adapted to engage actuating member 205 for moving the actuating member in relation to the surfaces of the camming means.

The shutter speed changing mechanism 211 is pivotally mounted within the camera casing at 242 and includes a lever 244 provided with a leg 246 having a slot 248 adapted to receive the lug 225 of the member 203. Another leg 250 of the lever 244 includes an abutment 252 (Fig. 10) adapted, when in the dotted-line position shown in Fig. 10, to be engaged by the shutter blade to provide one speed of shutter operation. A difference shutter speed results when lever 244 is moved to a second position (solid-line position in Fig. 10) in which the stop 252 will not be engaged by the shutter blade. As will become more apparent hereinafter, lever 244 is moved between its respective positions by means of the latching member 203 and in response to the positioning (or removal) of a flashcube in the socket.

As shown in Fig. 5, actuating member 205 includes an elongated body portion 254 and is slidably mounted on the mechanism plate 217 by means of a pair of pins 256 and 257 which extend from the body portion 254 and are received in a pair of slots 258 in the mechanism plate. Pin 257 is adapted to be engaged by pivotally mounted lever 213 to effect the firing of a flashlamp as will be described more fully hereinafter. At an upper portion of the actuating member a leg 261, a leg 263, and an abutment surface 264, are adapted to engage respectively; a bent leg of the signal mechanism 209; a striker member 78 in the flashcube; and the member 207.

Signal means 209 comprises a signal flag 262 and an articulate linkage 265 for coupling the flag to the actuating member 205 and for pivotally mounting the flag on the mechanism plate. At one end, the articulate connection includes a bent leg 266 adapted to engage the leg 261 of the actuating member, and the other end of the connection includes a forked leg 267 for receiving a crank member 269 of flag 262. In operation, the flag is movable between a raised position, to which it is urged by a spring 270 (Fig. 7), and a lowered position in which it is in view in the camera viewfinder. In this lowered position, the flag indicates that an inoperative flashlamp is in the firing position.

As shown in Fig. 5, lever 213 is mounted on the mechanism plate 217 by means of a pivot pin 217 extending through a central portion thereof. One end portion of the lever 213 includes a striking surface 273 adapted to be struck by a hammer member 275 carried on the arm 150 of the spider member and moved with driver 129; a spring 276 urges the lever 213 in a counterclockwise direction, as viewed in Fig. 5. At another

end of the striking lever, a leg 277 is adapted to contact the pin 257 of the actuating member 205 to effect movement thereof toward its extended positions under the action of member 275 and/or spring 267.

Referring now to Fig. 9, the elements are illustrated in the positions they assume when there is no flashlamp on the camera. As illustrated, the latching member 203 is in its latching position and is held therein by means of the relatively strong spring 227. In this position one end of the member 203 maintains T-bar 121 in its raised position within the cube and the other end of the member 203 latches the member 207 in its withdrawn position. In this position, member 207 engages surface 264 on the actuating member 205 to hold the member in its retracted position within the camera casing. With the actuating member in the retracted position the pin 257 thereon secures the lever 213 in an inoperative position in which it will not be engaged by the hammer member 275 upon shutter actuation. Leg 261 of the actuating member 205 will maintain the signal flag 262 in a raised position out of view in the camera viewfinder. Moreover, as long as the latching member 203 is maintained in its latching position, it will hold the shutter speed changing mechanism 211 in a position wherein the abutment 252 thereon will be engaged by the shutter during actuation thereof.

In Fig. 10, there is illustrated the relative positions of the elements of the sensing and actuating mechanism when a flashcube is positioned on the camera and an operative lamp is in the firing position. As shown, the cube has moved the T-bar 121 to a retracted position; in moving to its retracted position, T-bar 121 has rotated latching member 203 in a counterclockwise direction to release the member 207 and actuating member 205. The actuating member 205 has moved toward its extended position and is in position to engage a pre-energized striker member 78 not shown, associated with a lamp in the firing position. With movement of the actuating member to the raised position the linkage 265 will pivot the signal flag toward the lowered position thereof. As shown, however, this pivotal movement is not sufficient to bring the flag into view in the camera viewfinder. Lever 213 is in a position to be struck by the hammer member 275.

Referring now to Fig. 11 the elements of the sensing and actuating mechanism are illustrated in the positions they will assume when an inoperative lamp is in the firing position, as for example, when the striker member has been released to fire the lamp. The actuating member 205 is in its extended position. When the actuating member is in this position, the signal flag 262 is visible in the viewfinder to warn of the inoperative flashlamp. The striking surface 273 of lever 213

is out of the path of movement of hammer 275; thus, the surface 273 will not be struck in the event the shutter is operated when an inoperative lamp is in the firing position.

5 After the firing of a flashlamp, the camera is prepared for the next picture taking operation as set forth hereinabove with regard to Figs. 1 and 8. Upon the winding of the film by means of the handle 42, the flashcube socket is rotated to position the next flashlamp in the firing position. In order to permit such rotation, it is necessary to withdraw the actuating member from the cube and this is accomplished as illustrated in Fig. 6 by the action of the camming means 116 on pin 240 of member 207. As member 207 is pivoted downwardly by the action of surface 118 on pin 240, the actuating member is moved to a retracted position below the cube base. The actuating member will remain in this retracted position as the cube and socket are rotated until the next flashlamp is positioned in the firing position, at which time the surface portion of the camming means opposite portion 118 permits the member 207 to move upward and the actuating member arm to move upwardly into engagement with the next pre-energized striker member.

Referring now to Fig. 12 a further form of the present invention has been illustrated which is similar in many respects to the first described embodiment. Elements of this form of the invention which are common to the previously described form have been labelled with the same reference numerals, but with a prime superscript.

As shown in Fig. 12, a lever 213', instead of being struck or impacted by a hammer member, is released by movement of a hammer member 150' and moves under the action of a relatively strong spring 401 to effect the firing of the flashlamp. Cocking of the driver member 129' rotates the lever 213' by means of a wire 403 to a set position where it is latched by a retaining member 405. Then when the hammer member 150' is released, a portion 407 thereof will strike the retaining member 405 to release the lever 213', whereupon the lever will be rapidly rotated in a counter-clockwise direction, as viewed in Fig. 12, by spring 401. As the lever rotates, its leg 277' will engage and move the actuating member 205' upwardly to dislodge striker member 78' and thereby fire the flashlamp. Whereas various other aspects of this embodiment also may differ somewhat from the previously described embodiment, the operation thereof should be apparent from the previous description and this will not be further described here.

The mechanism of the present invention permits the use of an actuating member which normally extends into the flashlamp unit by providing means on the socket for effecting the withdrawal of the actuator during the indexing

of the flashlamp unit. The disclosed mechanism is particularly suitable for use in compact cameras, since the cam means for effecting the actuator withdrawal is carried on the socket. Other and further advantages will be apparent to those skilled in the art and from the foregoing description and attached illustrations.

Referring now to Fig. 13, a second embodiment of the invention is disclosed which comprises a damping means 300 for preventing the accidental firing of a flash lamp upon the indexing thereof to the firing position. In this embodiment the socket comprises a cylindrical member 100'' having a wall 104'' with an exterior surface 106'' thereon, and a camming means 116'' formed in the wall 104''. The damping means 300 is incorporated into the camming means 116'' and is adapted to substantially reduce the rate of return movement of actuating member 205'' when it approaches the actuating member. The damping means 300 includes stepped sections in the camming means 116'', each stepped section being formed by portions 304 and 306 extending generally in the direction of movement of actuator 205'', and an intermediate connecting portion 308 extending generally perpendicular to the direction of movement of actuator 205''.

An example is set forth below with reference to points designated A, B, C, and D in Fig. 13 respectively representing approximately 22°, 22°, 85°, and 90° of socket rotation, as measured from the firing position.

A base surface portion 312 of the camming means 116'' is located relative to the camera to withdraw an uppermost portion 314 of the actuating member 205'' to a position spaced approximately .010 inch from the bottom face of the cube base, indicated in dot dash lines in Fig. 13. The camming means portion 304 extends upwardly from the surface portion 312 at an angle of substantially 90 degrees and extends into the connecting portion 308. The connecting portion 308 extends substantially horizontally over 63° of rotation to the rounded corner at the point C. At the point C, the connecting portion 308 is located to space the uppermost portion 314 of actuator 205'' approximately .010 inch from the flash lamp striker. The point C is reached immediately after the opening in the cube base rotates into alignment over the actuating member. The camming means portion 306 extends upwardly from point C at substantially 5° from the vertical until it curves into the uppermost point D. When the pin 240'' is at point D, the uppermost portion 314 of the actuating member is spaced above the striker wire by approximately .130 inch, unless such fully extended upward movement has been blocked by an energized striker member. The dimensions given have been

established for use with a striker member requiring the equivalent of approximately 4 ounces static load for dislodging, and have been found operative with rotation rates of 90° in one tenth (.1) of a second, although it also is believed to be operative at even faster rates of rotation.

Regardless of the particular shape of the camming means, however, it is desirable that the actuating member first engage the striker with less than the equivalent of 3 ounces static load even when the cube is rotated at a reasonably rapid rate.

In operation, and as the rotation of the socket is started after a lamp firing, the actuating member 205'' will be withdrawn from the flashcube as the camming means surface portion 118'' passes against pin 240''. When surface portion 312 is on pin 240'', the uppermost portion 314 of actuating arm 205'' will be spaced by .01 inch from the cube base. Thereafter, the pin 240'' will move off the portion 312 and onto the connecting portion 308 which permits actuating member 205'' to move upwardly until the uppermost portion 314 thereof engages and rides on cube base 56''. At this moment the actuating member 205'' will be spaced from member 207'' at the normal point of engagement 278, and the position of the actuating member will be determined by its engagement with the cube base. Upon further socket rotation the follower 240'' reaches point C; at this point, the actuating member will have moved into opening 69'' in the cube base and the actuating member 205'' will also again move into engagement with the member 207'' at point 278. Such engagement will substantially arrest further upward movement of the actuating member with the uppermost portion 314 thereof adjacent but spaced from the wire by approximately .010 inch. With still further socket rotation, the pin 240'' will move to the position D and the member 207'' will move out of contact with the actuating arm 205'' to permit the latter to move into engagement with the striker member 78''. Thereafter, and as described above, lever 213'' can be struck at 273'' to dislodge the striker member and fire the flash lamp.

With reference to Fig. 13, there is shown a dashpot 325 which is coupled at one end to the member 207'', and at the other end to a fixed member within the camera. The dashpot could be used either in lieu of, or in addition to, the damping means described above. In operation, rapid upward movement of the member 207'', is prevented by means of the dashpot when the socket is indexed, thereby preventing the accidental firing of a flash lamp. However, since the member 207'' will move to an uppermost position spaced from actuating member 205'' when pin 240'' reaches point D, the dashpot 325 will

not affect the movement of the arm during the firing of the flash lamp.

Referring to Figs. 14—17, there is shown a third embodiment of the invention. The socket of this embodiment is also adapted to damp the movements of the activating member 205''' and comprises a cylindrical member 100''', a portion of which is shown in Figs. 14 and 15, a camming means 116''' formed in member 100''', and a damping means 300'''. The flashcube 20''', partially shown in Figs. 14—17, is identical to the flashcube described previously, except for the addition of a ramp 302 at an end of the opening 69'''. The ramp 302 is spaced upwardly from the lamp unit base 56''', and together with base 56''' defines a step for the actuating member.

The damping means 300''' comprises a stepped surface on camming means 116''' formed by a base surface portion 312''', portions 304''', 306''' and 316 extending generally in the direction of travel of the actuating member, and connecting portions 308''' and 317, all of the portions being joined to form a continuous surface for controlling the return movement of actuating member 205'''.

Upon indexing of the socket to move a new lamp into firing position, the actuating member 205''' first will be withdrawn from the multilamp unit, by the engagement of the camming means surface portion 118''' with the pin 240'''. When pin 240''' reaches surface portion 312''' the actuating member will be fully withdrawn from the unit. Upon further rotation of the socket, follower 240''' will move along portion 304''' under the action of a spring, not shown, and will engage portion 308''', as illustrated in Fig. 14. In this position of follower 240''', the member 207''' will not engage the actuating member at point 278''', and the actuating member will move upwardly into engagement with the lowermost surface of the cube base 56''' (See Fig. 16). Thus, the position of the actuating member will be determined by the position of the cube base and independently of the member 207'''. Still further socket rotation will align portion 317 over the pin 240''', and the pin will move along portion 316 to engage the portion 317 (Fig. 15). Simultaneously with the last described movement, the actuating member will approach the edge of ramp 302 and will drop off the lowermost surface of base 56''' and onto the ramp (Fig. 17). Whereas portion 316 will approach the pin 240''' at approximately the same time that the edge of ramp 302 approaches the actuating member 205''', the pin 240''' preferably engages camming means portion 317 before the actuating member 205''' engages the cube ramp 302. This is due, in part, to the selected spring pressures acting on the pivotally mounted member

207''' and on the actuating member 205''', but even more importantly, is due to the fact that the portion 316 is shorter than the distance between the lowermost surface on base 56''' and ramp 302. Pin 240''', therefore has less distance to travel than the actuating member 205''' and ordinarily will engage the portion 317 before the actuating member engages the ramp 302. In any event, the various structures are arranged such that in the position of rotation shown in Fig. 15, the member 207''' and actuating member are again engaged at point 278'''. At the final indexing stages, the follower 240''' and actuating member respectively slip off portion 317 and ramp 302, and simultaneously move respectively toward recess 319 and into opening 69'''. During these final stages the socket camming means, and particularly portion 306''' thereof, substantially controls the upward movement of the actuating member slowly until the member engages the flashlamp striker member 78'''. The member 207''' again separates from the actuating member at point 278''' as the follower 240''' continues toward the upper limits of recess 319 after the actuating member has been blocked by the striker member. Thus, in the fully indexed position of the socket, the member 207''' will be spaced from the actuating member and will not interfere with movement of the member in the firing of the flashlamp.

Portion 316, of the camming means, serves to prevent backwinding or reverse indexing of the socket in a direction reverse to the direction indicated by arrow 320. This may be desirable where the damping cam does not have a sufficiently steep slope to properly withdraw the finger from the cube base when it is attempted to rotate the socket in a reverse direction. Thus, the force of any attempted reverse rotation will be absorbed by the relatively sturdy camming mechanism rather than the actuating member.

In the illustrated embodiments, the cam control means and damping means have been shown as an integral part of the socket itself, but it should be understood that such means could be otherwise attached to the socket or even separated therefrom with an articulate or other coupling similarly controlling the actuating arm in response to socket rotation.

WHAT WE CLAIM IS:—

1. A photographic flashlight device or camera comprising a holder for receiving a multi-lamp percussion-ignitable flashlamp unit of the kind defined, the holder being indexable to position an unfired lamp in a firing position, an actuating member which, with a lamp unit inserted in the holder; normally extends into the lamp unit for actuation to cause ignition of an unfired lamp in the firing position, and means responsive to indexing of

the holder for retracting the actuating member from the lamp unit to allow indexing thereof.

2. A photographic flashlight device or camera according to Claim 1, wherein the means for retracting the actuating member from a lamp unit received by the holder comprises cam means movable with the holder, and a cam follower means engageable with said actuating member.

3. A photographic flashlight device or camera according to Claim 2, wherein the holder is rotatively mounted for successively aligning the actuating member with the firing elements of a multi-lamp flashlamp unit received by the holder and having lamps equi-spaced about an axis of rotation and wherein the cam means is carried on a cylindrical portion of the holder and the cam follower means includes a pivotally mounted member having a pin extending from one end which rides against a surface of the cam means as the holder is rotated and having an abutment thereon which engages said actuating member.

4. A photographic flashlight device or camera according to Claim 3, wherein the actuating member is spring urged into engagement with the deformable or displaceable firing element (as herein defined) when an unfired lamp is in the firing position, and the actuating member is spring urged to an extended position when a fired lamp is in the firing position.

5. A photographic flashlight device or camera according to Claim 4, wherein signal means responsive to movement of the actuating member registers a signal when the actuating member moves to its extended position.

6. A photographic camera according to Claim 4 or 5, wherein a pivotally mounted lever is held against spring action in a position spaced from the actuating member by means of a latch which is released by means of a hammer member upon actuation of a shutter release member so that the lever is driven by means of the spring against the actuating member to fire a lamp in the firing position.

7. A photographic camera according to Claim 4 or 5, wherein a pivotally mounted lever is actuated by means of a hammer member to cause the actuating member to fire a lamp in the firing position, upon release of a driver member controlled by a shutter release member.

8. A photographic flashlight device or camera according to any one of the preceding claims wherein the actuating member is moved into contact with the lamp firing element when a lamp in said unit is moved into the firing position, and a damping means limits the force with which said actuating member initially contacts the firing element

207''' and on the actuating member 205''', but even more importantly, is due to the fact that the portion 316 is shorter than the distance between the lowermost surface on base 56''' and ramp 302. Pin 240''', therefore has less distance to travel than the actuating member 205''' and ordinarily will engage the portion 317 before the actuating member engages the ramp 302. In any event, the various structures are arranged such that in the position of rotation shown in Fig. 15, the member 207''' and actuating member are again engaged at point 278'''. At the final indexing stages, the follower 240''' and actuating member respectively slip off portion 317 and ramp 302, and simultaneously move respectively toward recess 319 and into opening 69'''. During these final stages the socket camming means, and particularly portion 306''' thereof, substantially controls the upward movement of the actuating member slowly until the member engages the flashlamp striker member 78'''. The member 207''' again separates from the actuating member at point 278''' as the follower 240''' continues toward the upper limits of recess 319 after the actuating member has been blocked by the striker member. Thus, in the fully indexed position of the socket, the member 207''' will be spaced from the actuating member and will not interfere with movement of the member in the firing of the flashlamp.

Portion 316, of the camming means, serves to prevent backwinding or reverse indexing of the socket in a direction reverse to the direction indicated by arrow 320. This may be desirable where the damping cam does not have a sufficiently steep slope to properly withdraw the finger from the cube base when it is attempted to rotate the socket in a reverse direction. Thus, the force of any attempted reverse rotation will be absorbed by the relatively sturdy camming mechanism rather than the actuating member.

In the illustrated embodiments, the cam control means and damping means have been shown as an integral part of the socket itself, but it should be understood that such means could be otherwise attached to the socket or even separated therefrom with an articulate or other coupling similarly controlling the actuating arm in response to socket rotation.

WHAT WE CLAIM IS:—

1. A photographic flashlight device or camera comprising a holder for receiving a multi-lamp percussion-ignitable flashlamp unit of the kind defined, the holder being indexable to position an unfired lamp in a firing position, an actuating member which, with a lamp unit inserted in the holder, normally extends into the lamp unit for actuation to cause ignition of an unfired lamp in the firing position, and means responsive to indexing of

the holder for retracting the actuating member from the lamp unit to allow indexing thereof.

2. A photographic flashlight device or camera according to Claim 1, wherein the means for retracting the actuating member from a lamp unit received by the holder comprises cam means movable with the holder, and a cam follower means engageable with said actuating member.

3. A photographic flashlight device or camera according to Claim 2, wherein the holder is rotatively mounted for successively aligning the actuating member with the firing elements of a multi-lamp flashlamp unit received by the holder and having lamps equi-spaced about an axis of rotation and wherein the cam means is carried on a cylindrical portion of the holder and the cam follower means includes a pivotally mounted member having a pin extending from one end which rides against a surface of the cam means as the holder is rotated and having an abutment thereon which engages said actuating member.

4. A photographic flashlight device or camera according to Claim 3, wherein the actuating member is spring urged into engagement with the deformable or displaceable firing element (as herein defined) when an unfired lamp is in the firing position, and the actuating member is spring urged to an extended position when a fired lamp is in the firing position.

5. A photographic flashlight device or camera according to Claim 4, wherein signal means responsive to movement of the actuating member registers a signal when the actuating member moves to its extended position.

6. A photographic camera according to Claim 4 or 5, wherein a pivotally mounted lever is held against spring action in a position spaced from the actuating member by means of a latch which is released by means of a hammer member upon actuation of a shutter release member so that the lever is driven by means of the spring against the actuating member to fire a lamp in the firing position.

7. A photographic camera according to Claim 4 or 5, wherein a pivotally mounted lever is actuated by means of a hammer member to cause the actuating member to fire a lamp in the firing position, upon release of a driver member controlled by a shutter release member.

8. A photographic flashlight device or camera according to any one of the preceding claims wherein the actuating member is moved into contact with the lamp firing element when a lamp in said unit is moved into the firing position, and a damping means limits the force with which said actuating member initially contacts the firing element



to prevent the firing thereof during the position of the lamp.

- 5 9. A photographic flashlight device or camera according to Claim 8 as appended to any one of Claims 3 to 7, wherein said damping means comprises a dashpot connected to said pivotally mounted member.

- 10 10. A photographic flashlight device or camera according to Claim 8 as appended to any one of Claims 3 to 6, wherein the damping means comprises a surface on the cam means which controls the rate of movement of the actuating member toward the firing element.

- 15 11. A photographic flashlight device or camera according to Claim 10, wherein said surface is of a stepped configuration to provide intermittent movement of the actuating member toward the firing element.

- 20 12. A photographic flashlight device or camera according to Claim 11, wherein the actuating member contacts a surface on a unit received by the holder during the indexing thereof to further damp the movement of the actuating member. 25

- 30 13. Photographic cameras having an indexable holder for receiving a multi-lamp percussion-ignitable flashlamp unit of the kind defined and means carried by the holder, and actuatable upon indexing thereof, for moving an actuating member away from a received lamp unit, substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

L. A. TRANGMAR BSc, CPA,
Agent for the Applicants.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1973.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

