

PATENT SPECIFICATION

(11)

1 296 899

DRAWINGS ATTACHED

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- (21) Application No. 57747/70 (22) Filed 4 Dec. 1970
 (31) Convention Application No. P 19 60 843.6 (32) Filed 4 Dec. 1969 in
 (33) Germany (DT)
 (45) Complete Specification published 22 Nov. 1972
 (51) International Classification G03B 15/04
 (52) Index at acceptance
 G2A 14A1E 1G 1K2A 1K2Y 1KY
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(54) PHOTOGRAPHIC CAMERAS

(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 cameras for use with percussion-ignition flash lamp units (hereinafter referred to as "of the kind defined") comprising a plurality of flashlamps mounted on a base and each having a primer and pre-energized striker which is accessible through an associated access opening in the base for release from its energized condition to strike its primer and activate its lamp.

In accordance with the present invention there is provided a photographic camera comprising receiving means for releasably holding a multilamp percussion-ignition flash unit of the kind defined and mounted for sequentially locating the flashlamps at a firing site, a shutter actuator movable from a first position to a second position to actuate a shutter, an actuator member movable from a retracted cocked position to an extended position for releasing the striker of a lamp located at the firing site and means responsive to movement of the shutter actuator from its first to its second position for moving the actuator member from its retracted cocked position to its extended position and thereafter back to its retracted, cocked position.

In the accompanying drawings:—

Fig. 1 is a perspective view of a camera, with portions removed, constructed in accordance with the present invention; and

Fig. 2 is a view similar to a part of Fig. 1, but illustrates an alternative embodiment of the present invention.

[Price 25p]

Because photographic cameras are well known, the present description will be directed in particular to elements forming part of, or cooperating more directly with, apparatus in accordance with the present invention. It is to be understood that camera elements not specifically shown or described may take various forms well known to those skilled in the art.

As illustrated, a structural support for mechanism elements within the camera body (not shown) is provided by a formed plate or support member 1 comprising a vertical front portion 2 disposed toward the front of the camera body, a horizontal portion 3 extending rearwardly of the front portion, a first spring mount 4 extending upwardly of the right side (as viewed) of the horizontal portion, and a second spring mount 5 extending upwardly of the rear edge of the horizontal portion. Support member 1 is rigidly secured within the camera body with vertical front portion 2 in front of and substantially parallel to the film plane (not shown).

Exposure of the sensitized film is controlled by an impact-type shutter 6. Such shutters are well known in the photographic art; shutter energization being provided by a striking blow to a drive arm 7.

A flash unit 8 is typical of the multilamp percussion-ignition flash units suitable for use with the present invention. Individual lamp strikers 9 are triggerable, upon being mechanically engaged, to fire their corresponding lamps (not shown). For each lamp an opening 10 is provided in flash unit 8 to permit access to the corresponding striker 9.

Capability for releasable mounting of a flash unit is provided by receiving means comprising a socket 11 having a body portion 12 and a pin 13. Pin 13 is slidably mounted in the bottom of body portion 12 for substantially vertical movement and is

disposed to be displaced, on receipt of a flash unit, to a lowered position. The base of the flash unit and the socket portion of the receiver means must cooperate and may be selected from various forms known in the art. The socket 11 is mounted on the top of the camera body for rotation to predetermined stop positions which establish stations for the lamps of a mounted flash unit, one station being designated the firing station wherein a lamp is orientated to illuminate the scene being photographed. Each lamp may be rotated to the firing station and mechanisms for accomplishing sequential rotation are well known in the art.

Actuation of the flash unit is effected by an actuator member or bar 14 comprising a main bar portion 15, a spring arm 16, a hold-down extension 17, and a latch groove 18. Actuator bar 14 is slidably mounted in the camera body for longitudinal movement between a cocked position (illustrated by solid lines) and a projecting position (illustrated by dashed lines). The operative path of actuator bar 14 is selected to permit entry of the access opening 10 at the firing station and the projecting position of actuator bar 14 is selected to permit triggering engagement with a striker 9 at the firing station. Urging of actuator bar 14 toward the projecting position for actuating a flash unit is provided by a spring 19 which is tensioned between the spring arm 16 and a stud 20 rigidly secured to spring mount 4 of the structural support 1.

Withdrawal of actuator bar 14 to a protected position is provided by an L-shaped retracting member 21 comprising a latch arm 22, drive-down arm 23 and a spring tab 24. Retracting member 21 is pivotally mounted on the camera body by means of a stud 25 and is disposed to allow coupling engagement between drive-down arm 23 and hold-down extension 17 of actuator bar 14. A spring stud 26 is rigidly secured to spring mount 5. A strong hairspring 27 is mounted upon stud 25 and is tensioned between spring stud 26 and spring tab 24 to urge retracting member 21 in a clockwise direction (as viewed in Fig. 1). Retracting member 21 has a latched position (shown by solid lines in Fig. 1) in which it serves to limit movement of actuator bar 14 beyond the projecting position, and a retracted position (shown by dashed lines in Fig. 1) in which it serves to restrain the actuator bar from operative movement beyond the cocked position.

Shutter actuation is accomplished by means of a shutter driver 33 comprising a body portion 34, a striking finger 35, a retract finger 36, a spring tab 37 and a cocking extension 38 extending upwardly of the body portion. Shutter driver 33 is

pivotally mounted on structural support 1 by means of a stud 39. A spring stud 40 is rigidly secured to the support member 1 and hairspring 41 is mounted upon stud 39 and is tensioned between spring tab 37 and spring stud 40 to urge operative counterclockwise rotation (as viewed in Fig. 1) of shutter driver 33 from the cocked position (shown by solid lines in Fig. 1).

Striking finger 35 extends beyond body portion 34 to allow striking engagement with drive arm 7 in the course of an operative movement.

Release means such as a release member 42 restrains the shutter driver 33 from movement beyond the cocked position and releases it upon sufficient depression of the member 42 by the camera user.

Latching of actuator bar 14 in the cocked position is provided by a first latch 43 comprising latch end 44, a driven end 45 and a spring tab 46. First latch 43 is pivotally mounted on support plate 1 by means of a stud 47 and is disposed to allow latch end 44 to extend into latch groove 18 when the actuator bar 14 is in the cocked position. A stop tab 48 and a spring stud 49 are rigidly secured to support plate 1. A hair spring 50 is mounted upon stud 47 and is tensioned between spring stud 49 and spring tab 46 to urge latch 43 in a clockwise direction (as viewed) away from stop tab 48. Drive end 45 bends sharply to extend into the gap between striking finger 35 and retract finger 36 and thus couples movement of shutter driver 33 to latch 43. With shutter driver 33 in a cocked position, latch 43 is restrained to the latch position illustrated in Fig. 1 (solid lines).

Latching of retracting member 21 in the latched position is accomplished by a second latch 51 comprising a driven arm 52, a stop catch 53 and a spring tab 54. Latch 51 is pivotally mounted on support plate 1 by means of a stud 55 and is disposed to permit catch 53 to engage latch arm 22 to restrain retracting member 21 in the latched position. A spring stud 56 is rigidly secured to support plate 1 and a hairspring 57 is tensioned between spring tab 54 and stud 56 to urge the second latch in a clockwise direction (as viewed) toward latching engagement with retracting member 21.

Means for cocking the shutter driver 33 and retracting member 21 is provided by a cocking member 58 comprising a body portion 59, a drive edge 60 and a bent end 61. Cocking member 58 is mounted for longitudinal sliding motion within the camera body and is disposed to permit coupling engagement between drive edge 60 and cocking extension 38 of shutter driver 33.

Bent end 61 extends to allow coupling engagement with latch arm 22 of retracting 125

member 21. Movement of cocking member 58 in the direction of arrow A to the set position (illustrated by dashed lines in Fig. 1) moves retracting member 21 to the latched position, this being accomplished by displacing the sloped edge of stop catch 53. Shutter driver 33 is moved to the cocked position by engagement with drive edge 60, this being accomplished by forcing striking finger 45 past a sloped edge 42a of release member 42. Movement of shutter driver 33 to the cocked position is imparted to first latch 43 by retract finger 36 forcing the first latch 43 to the latch position.

Disabling of actuator member 14 during normal operation is accomplished by a disabling latch 62 comprising a latch arm 63 a driven arm 64 and a spring tab 65. Disabling latch 62 is pivotally mounted on the camera body by means of a stud 66 and is disposed to allow coupling engagement between driven arm 64 and pin 13. With the pin 13 in the lowered position, disabling lever 62 is correspondingly displaced to a release position wherein latch arm 63 is withdrawn from actuator bar 14. A spring stud 67 is rigidly secured to the camera body. A hairspring 68 is mounted on stud 66 and is tensioned between spring tab 65 and spring stud 67 to urge disabling latch 62 to a latch position wherein latch arm 63 engages hold-down extension 17 preventing movement of actuator bar 14 from the cocked position.

Intended operation of the preferred embodiment is initiated upon depression of release member 42 by the camera user. Sufficient depression releases shutter driver 33 which moves operatively to engage and actuate shutter assembly 6. Operative motion of shutter driver 33 permits clockwise rotation (as viewed in Fig. 1) of first latch 43 thereby unlatching actuator bar 14.

If no flash unit is mounted (normal operation), disabling latch 62 restrains actuator bar 14 to remain protected within the camera in the cocked position. Shutter driver 33 continues moving to engage second latch 51 to release retracting member 21 which, upon release, moves to the retract position under the urging of spring 27.

With a flash unit mounted, pin 13 is displaced to the lowered position forcing disabling latch 62 to withdraw from actuator bar 14 and move to the release position. Operation is initiated by depression of release member 42 to release shutter driver 33 for operative motion. Shutter driver 33 strikes and energizes shutter assembly 6 for an exposure oscillation. Operative movement of shutter driver 33 permits coupled first latch 43 to move from the latch position releasing actuator bar 14. Actuator bar 14 then moves under urging of spring 19 to the projecting position there-

by triggering the flash unit. The travel time for shutter driver 33 to move to engage and release second latch 51 provides a delay allowing firing of the flash unit. Release of second latch 51 permits retracting member 21 to move to the retract position under the urging of strong hair spring 27. Strong hairspring 27 overpowers spring 19 and actuator bar 14 is driven to the cocked position wherein the actuator bar is removed from the opening 10 and protected by the camera body. Cocking of the shutter driver 33 and retracting member 21 is accomplished by pushing cocking member 58 in direction A, as described hereinabove.

An alternative embodiment of the present invention is illustrated in Figure 2. The only significant change is to the first latch 43. In this embodiment the first latch is assembled in two pieces and comprises a first portion 100 disposed to enter latch groove 18 and a second portion 101 extending into the operative path of shutter driver 33. Portions 100 and 101 are assembled to cooperate as a spring hinge to permit first portion 100 to be forced from latch groove 18 when second portion 101 is operatively engaged by shutter driver 33. The hinge action permits return of shutter driver 33 to the cocked position during a cooking operation. The overall operation of the remaining portions of the alternate mechanism is substantially the same as for the presently preferred embodiment.

WHAT WE CLAIM IS:—

1. A photographic camera comprising receiving means for releasably holding a multilamp, percussion-ignition flash unit of the kind defined and mounted for sequentially locating the flashlamps at a firing site, a shutter actuator movable from a first position to a second position to actuate a shutter, an actuator member movable from a retracted, cocked position to an extended position for releasing the striker of a lamp located at the firing site and means responsive to movement of the shutter actuator from its first to its second position for moving the actuator member from its retracted, cocked position to its extended position and thereafter back to its retracted, cocked position.

2. A photographic camera according to Claim 1, wherein the means responsive to the movement of the shutter actuator from its first to its second position comprises a first latch which is spring urged to a position for latching the actuator member in its retracted cocked position and is movable to an unlatching position by said movement of the shutter actuator, and a second latch which is spring urged to a position in which it latches a spring-actuated retracting member in a cocked position and is movable

member 21. Movement of cocking member 58 in the direction of arrow A to the set position (illustrated by dashed lines in Fig. 1) moves retracting member 21 to the latched position, this being accomplished by displacing the sloped edge of stop catch 53.

Shutter driver 33 is moved to the cocked position by engagement with drive edge 60, this being accomplished by forcing striking finger 45 past a sloped edge 42a of release member 42. Movement of shutter driver 33 to the cocked position is imparted to first latch 43 by retract finger 36 forcing the first latch 43 to the latch position.

Disabling of actuator member 14 during normal operation is accomplished by a disabling latch 62 comprising a latch arm 63 a driven arm 64 and a spring tab 65. Disabling latch 62 is pivotally mounted on the camera body by means of a stud 66 and is disposed to allow coupling engagement between driven arm 64 and pin 13. With the pin 13 in the lowered position, disabling lever 62 is correspondingly displaced to a release position wherein latch arm 63 is withdrawn from actuator bar 14. A spring stud 67 is rigidly secured to the camera body. A hairspring 68 is mounted on stud 66 and is tensioned between spring tab 65 and spring stud 67 to urge disabling latch 62 to a latch position wherein latch arm 63 engages hold-down extension 17 preventing movement of actuator bar 14 from the cocked position.

Intended operation of the preferred embodiment is initiated upon depression of release member 42 by the camera user. Sufficient depression releases shutter driver 33 which moves operatively to engage and actuate shutter assembly 6. Operative motion of shutter driver 33 permits clockwise rotation (as viewed in Fig. 1) of first latch 43 thereby unlatching actuator bar 14.

If no flash unit is mounted (normal operation), disabling latch 62 restrains actuator bar 14 to remain protected within the camera in the cocked position. Shutter driver 33 continues moving to engage second latch 51 to release retracting member 21 which, upon release, moves to the retract position under the urging of spring 27.

With a flash unit mounted, pin 13 is displaced to the lowered position forcing disabling latch 62 to withdraw from actuator bar 14 and move to the release position. Operation is initiated by depression of release member 42 to release shutter driver 33 for operative motion. Shutter driver 33 strikes and energizes shutter assembly 6 for an exposure oscillation. Operative movement of shutter driver 33 permits coupled first latch 43 to move from the latch position releasing actuator bar 14. Actuator bar 14 then moves under urging of spring 19 to the projecting position there-

by triggering the flash unit. The travel time for shutter driver 33 to move to engage and release second latch 51 provides a delay allowing firing of the flash unit. Release of second latch 51 permits retracting member 21 to move to the retract position under the urging of strong hair spring 27. Strong hairspring 27 overpowers spring 19 and actuator bar 14 is driven to the cocked position wherein the actuator bar is removed from the opening 10 and protected by the camera body. Cocking of the shutter driver 33 and retracting member 21 is accomplished by pushing cocking member 58 in direction A, as described hereinabove.

An alternative embodiment of the present invention is illustrated in Figure 2. The only significant change is to the first latch 43. In this embodiment the first latch is assembled in two pieces and comprises a first portion 100 disposed to enter latch groove 18 and a second portion 101 extending into the operative path of shutter driver 33. Portions 100 and 101 are assembled to cooperate as a spring hinge to permit first portion 100 to be forced from latch groove 18 when second portion 101 is operatively engaged by shutter driver 33. The hinge action permits return of shutter driver 33 to the cocked position during a cocking operation. The overall operation of the remaining portions of the alternate mechanism is substantially the same as for the presently preferred embodiment.

WHAT WE CLAIM IS:—

1. A photographic camera comprising receiving means for releasably holding a multilamp, percussion-ignition flash unit of the kind defined and mounted for sequentially locating the flashlamps at a firing site, a shutter actuator movable from a first position to a second position to actuate a shutter, an actuator member movable from a retracted, cocked position to an extended position for releasing the striker of a lamp located at the firing site and means responsive to movement of the shutter actuator from its first to its second position for moving the actuator member from its retracted, cocked position to its extended position and thereafter back to its retracted, cocked position.

2. A photographic camera according to Claim 1, wherein the means responsive to the movement of the shutter actuator from its first to its second position comprises a first latch which is spring urged to a position for latching the actuator member in its retracted cocked position and is movable to an unlatching position by said movement of the shutter actuator, and a second latch which is spring urged to a position in which it latches a spring-actuated retracting member in a cocked position and is movable



to an unlatching position, during said movement of the shutter actuator, to move the actuator member to its retracted, cocked position.

- 5 3. A photographic camera according to Claim 2, wherein the shutter actuator is moved to its first position and the retracting member is simultaneously moved to its cocked position by means of a cocking
10 member.

4. A photographic camera according to Claim 1, 2 or 3, wherein a spring-actuated latch retains the actuator member in its

retracted, cocked position in the absence of a flash unit in the receiver means and is 15 moved to an inoperative position by means of a pin which is displaced into engagement with the latch upon insertion of a flash unit into the receiver means.

5. A photographic camera according to Claim 1, constructed substantially as herein- 20 before described with reference to, and as shown in Fig. 1, or Fig. 1 as modified by Fig. 2 of the accompanying drawings.

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Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1972.
Published at the Patent Office, 25 Southampton Buildings, London WC2A 1AY from which copies
may be obtained



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