



1,128,918



PATENT SPECIFICATION

1,128,918

DRAWINGS ATTACHED.

Date of Application and filing Complete Specification:
17 Sept., 1965. No. 39674/65.

Application made in United States of America (No. 438,585) on
10 March, 1965.

Complete Specification Published: 2 Oct., 1968.

© Crown Copyright 1968.

Index at Acceptance:—G2 A(1G, 1H, 2C8).

Int. Cl.:—G 03 b 15/04.

COMPLETE SPECIFICATION

Photographic Apparatus.

We, EASTMAN KODAK COMPANY, a Company organised 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 (Assignees of FRANCIS ALPHONSUS WILLIAMS and FRANKLIN DELANO KOTTLER), 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:

This invention relates to a drive means for a disposable, multilamp flash attachment. More particularly, the invention relates to a means for automatically rotating a flash attachment having a series of flash lamp elements or bulbs therein so that an unused flash lamp element is presented, when the film is advanced to an unexposed frame and is simultaneously wound onto a takeup spool.

It is of course necessary in a device of this type that the unused bulbs be properly oriented so that the flash furnishes maximum illumination to the scene selected to be photographed. Where the rotatable flash attachment is cube shaped, for example, with four bulbs to be utilized, a rotation of ninety degrees must be effected upon advancement of the film. In this manner an unused bulb and its associated reflector will always face toward the front of the camera until all four bulbs are exhausted.

It is therefore an object of this invention to provide a drive means for a rotatable multilamp flash attachment whereby the attachment is automatically advanced so that an unused bulb thereof is oriented to provide a scene to be photographed with the full intensity of the flash.

According to the present invention there is provided a drive means for a separable multiflash lamp rotatable flash attachment

for use in a camera of the type having a film advancing means movable from a first position to a second position for advancing film in the camera, the drive means being connected to the film advancing means through a slip connection for rotating the rotatable flash attachment to advance a next bulb into a use position as the film advancing means is being moved from the first position to the second position.

The invention also provides a photographic camera having a film advancing means movable from a first position to a second position for advancing film in the camera and comprising a rotatable socket member having means thereon for receiving a disposable, rotatable flash attachment, and a slip mechanism operatively associated with the film advancing means for rotating the socket a predetermined amount as the film advancing means is moved from its first position to its second position.

The invention will be described further, by way of example, with reference to the accompanying drawings, wherein:

Fig. 1 is an isometric view of a camera having associated therewith a rotatable disposable multilamp flash attachment showing the attachment prior to insertion thereof in a camera socket therefor,

Fig. 2 is a front, partial sectional view to an enlarged scale, of the drive means of the present invention;

Fig. 3 is a partially exploded isometric view of the operating elements of the drive means disclosed in Fig. 2;

Fig. 3A is an enlarged partial, sectional view taken along line 3A—3A of Fig. 2 showing elements of a rotatable flash assembly ejector means;

Figs. 4—7 are schematic drawings showing the relative positions of an escapement disc and escapement lever during various

[Price 4s. 6d.]

SEE ERRATA SLIP ATTACHED



stages of operation of the drive means of Fig. 2.

Referring to Fig. 1, there is shown a camera 1 which has removably attached thereto a rotatable flash attachment 2. Essentially, the flash attachment 2 comprises a disposable cube-shaped element, with each vertical surface thereof having a concave, reflective surface 3 in front of which is disposed a flash bulb means 4. The base portion of the attachment has a plurality of lugs therein for insertion into correspondingly shaped recesses in a receiving socket of the camera. Electrical contacts are provided for properly igniting the desired flash lamp. The camera 1 employs a conventional film winding lever 5 for advancing the film and for simultaneously positioning the rotatable flash attachment 2 in the manner described below. The present invention, however, may be utilized with other forms of film advancement means.

Referring now to Figs. 2 and 3, a film drive spool 6, constituting a portion of the usual film-advancing mechanism, is mounted for rotational movement in the camera housing. It is of course understood that as the drive spool rotates in the direction of arrow A as seen in Fig. 3, exposed film is wound onto the spool and an unexposed frame is advanced to the exposure position in the usual manner. Rigidly secured to the topmost portion of drive spool 6 is an elongated member 7 having a pair of opposed slots 8 and 9 therein. In abutting relation with the upper face of the elongated member 7 and having a pair of spaced apart arms 8a and 9a adapted to seat securely in the slots 8 and 9 is a first shaft 10. The shaft 10 has, rigidly attached thereto, an enlarged clutch plate 11 and a clutch disc 12. The clutch disc 12 is affixed to the clutch face 11 by glue, heat sealing, or like means and is constructed of material such as neoprene or other plastics substance.

An escapement disc 13 having a series of notches 19 in the outer periphery thereof is disposed above the clutch disc 12 and is rigidly connected to a second shaft 14 which is mounted for rotational movement in a mounting plate 15 which extends from the camera housing. A compression spring 16 is disposed between the mounting plate 15 and the escapement disc 13 to urge the disc into frictional engagement with the clutch disc 12. It may be seen that the clutch plate 11, the clutch disc 12 and the escapement disc 13 taken together constitute a slip clutch mechanism.

Disposed adjacent to the escapement disc 13 is a pivoted escapement lever 17. As may most clearly be seen with reference to Fig. 3, the escapement lever 17 is comprised essentially of a power arm 18 and a control arm 20. The escapement lever 17 is disposed below

an escapement mounting plate 21 which is fixed to the camera housing. Screw means 22 extends through the escapement mounting plate 21 and the escapement lever 17 into a housing plate 23 which is attached to the camera housing. The escapement lever 17 is free to rotate about the screw means 22 with respect to the escapement plate 21.

Referring once again to Fig. 3, the control arm 20 has an upturned portion 24 on the outermost end thereof. Affixed to the underside of the arm 20, for example, by spot welding, is an escapement spring 25. The escapement spring 25, at its outermost extent, is free of engagement with the control arm but substantially follows the configuration thereof, being separated slightly from the upturned portion 24 when in its normal unstressed position for a purpose to be more clearly brought out below. A two-armed coil spring 26 is fixed to the camera housing by means (not shown) so that the coil portion thereof is fixedly positioned and the arms thereof have freedom of movement. One arm of the coil spring 26 is received in an escapement plate notch 21a of the escapement plate 21 and the other arm thereof is received in a power arm notch 18a of the power arm 18. In this manner, the escapement lever 17 is continuously biased in a clock-wise direction, as viewed in Fig. 3.

Rigidly fixed to the top of the second shaft 14 is a pinion 27 which drives a gear 28, the gear 28 being rotatably mounted in the mounting plate 15 by means (not shown). As may be most clearly seen in Fig. 3, the gear 28 has a square-shaped socket in the uppermost portion thereof which is adapted to receive a correspondingly shaped male member 29 integrally formed on the lower end of a spindle 30. An enlarged head 31 is attached to the opposite end of the spindle 30 to receive a portion of the rotatable flash element. A cylindrical recess 32 in the enlarged head 31 accommodates a two-armed, spring retention clip 33 and an outer button 34 having an aperture 35a therein. The rotatable flash element 2 has an element associated therewith which extends through the aperture 35a and is engaged by the retention clip 33 releasably to maintain the rotatable flash attachment in a correctly oriented position.

Mounted for free sliding movement on the spindle 30 is a rider ring 35 which has a pair of upstanding ejector arms 36 and 37 integrally attached thereto. As may most clearly be seen in Fig. 3A, the arms 36 and 37 extend into slots 38 and 39, respectively, which are located in the enlarged head 31. A two-armed ejector actuator lever 40 is mounted for pivotal movement about a pin 41 which extends from the camera housing wall. One arm of the ejector actuator lever 40 is forked at its outer extremity and has two

bearing members 42 and 43 affixed thereto in opposed relation on either side of the spindle 30. The other arm of the ejector actuator lever 40 has a button member 44 attached thereto which extends through a hole in a wall 45 of the camera housing (Figs. 1 and 2).

The operation of the invention will now be described. Assuming that flash is desired to supplement scene light whilst taking a picture, a rotatable flash attachment is mounted on the camera in the manner described above. The cube is properly oriented with respect to the front of the camera in the following manner. The drive spool 6 is rotated in the direction of arrow A to advance a frame of unexposed film to a correct location in the customary manner. The escapement disc 13 is also rotated in the direction of arrow A due to its frictional engagement with the clutch disc 12 under the influence of the compression spring 16. The pivoted escapement lever 17, as previously described, is biased by the coil spring 26 so that the control arm 20 and the associated escapement spring 25 abut against the periphery of escapement disc 13. As may most clearly be seen with reference to Figs. 4-7, the arm 20 and the spring 25 are positioned with their axes at a slight angle to the tangent at the point of contact on the escapement disc 13.

As the escapement disc 13 rotates, one of the notches 19 is carried around to the general vicinity of the spring 25 and the upturned portion 24 as seen in Fig. 4. Continued rotation of the disc causes the trailing edge of the notch 19 to catch the spring 25, causing it to flatten against the upturned portion 24, as seen in Fig. 5, thus allowing the two elements to enter the slot 19 under the influence of the coil spring 26 (Fig. 6). The rotational movement of the escapement disc 13 is thus halted. The drive spool 6 continues to rotate until the film is correctly positioned since the clutch face 11 and the clutch disc 12 are capable of moving relative to the escapement disc 13. Cessation of the movement of the disc 13 results in the stoppage of the rotational mechanism of the rotatable flash attachment. When an operator has taken a picture, it is once again necessary for the film to be advanced and the rotatable flash attachment to be rotated the proper amount. To accomplish this, it is necessary that the escapement lever 17 be cleared from the notch 19 so that the escapement disc 13 may once again rotate until the next subsequent notch 19 is engaged. Any suitable mechanism may be employed to engage and rotate the lever 17 in a counterclockwise direction (as seen in Fig. 3) against the bias of the spring 26. For example, a cam or lever means may be operatively associated with the shutter operating mechanism (not

shown) whereby the escapement lever 17 is rotated to withdraw the upturned portion 24 and the spring 25 from the notch 19 as the picture is taken. Once free of the confines of the notch 19, the spring 25 resumes its normal unstressed position as shown in Fig. 7, thus preventing the elements 24 and 25 from re-entering the notch just occupied by them. The escapement disc is now free to rotate and the cycle is again repeated so that the rotatable flash attachment is properly indexed.

It should be noted that the escapement disc 13 as shown has three indexing notches 19 therein. The disc therefore rotates 120° for each cycle of operation. To index correctly the rotatable flash attachment at 90° increments it is thus necessary to provide a 4 : 3 gear ratio between the gear 28 and the pinion 27. After all four bulbs of the rotatable flash attachment have been exhausted, the attachment may be ejected by depressing the button 44 thereby causing the ejector arms 36 and 37 to enter the recess 32 of the enlarged head 31. The ejector arms 36 and 37 will then contact a portion of the rotatable flash attachment 2 to release the attachment from the grasp of the retention clip 33. Upon removal of the exhausted attachment, a new one may be inserted.

The invention has been described in detail with particular reference to a preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the scope of the invention as described hereinabove and as defined in the appended claims. For example, it is possible for an electric or spring motor means to be substituted for the manual means disclosed hereinabove. Alternatively, a rotatable flash attachment of any desired configuration may be substituted for the cube-shaped attachment, with corresponding revision of the drive means. For example, the gear ratio of the transmission elements or the number of indexing notches in the escapement disc might be varied to increase or decrease the degree of rotation.

WHAT WE CLAIM IS:—

1. A drive means, for a separable multi-flash lamp rotatable flash attachment for use in a camera of the type having a film advancing means movable from a first position to a second position for advancing film in the camera, the drive means being connected to the film advancing means through a slip connection for rotating the rotatable flash attachment to advance a next bulb into a use position as the film advancing means is being moved from the first position to the second position.

2. A drive means as claimed in claim 1, wherein the slip connection is provided by a slip clutch mechanism.

bearing members 42 and 43 affixed thereto in opposed relation on either side of the spindle 30. The other arm of the ejector actuator lever 40 has a button member 44 attached thereto which extends through a hole in a wall 45 of the camera housing (Figs. 1 and 2).

The operation of the invention will now be described. Assuming that flash is desired to supplement scene light whilst taking a picture, a rotatable flash attachment is mounted on the camera in the manner described above. The cube is properly oriented with respect to the front of the camera in the following manner. The drive spool 6 is rotated in the direction of arrow A to advance a frame of unexposed film to a correct location in the customary manner. The escapement disc 13 is also rotated in the direction of arrow A due to its frictional engagement with the clutch disc 12 under the influence of the compression spring 16. The pivoted escapement lever 17, as previously described, is biased by the coil spring 26 so that the control arm 20 and the associated escapement spring 25 abut against the periphery of escapement disc 13. As may most clearly be seen with reference to Figs. 4-7, the arm 20 and the spring 25 are positioned with their axes at a slight angle to the tangent at the point of contact on the escapement disc 13.

As the escapement disc 13 rotates, one of the notches 19 is carried around to the general vicinity of the spring 25 and the upturned portion 24 as seen in Fig. 4. Continued rotation of the disc causes the trailing edge of the notch 19 to catch the spring 25, causing it to flatten against the upturned portion 24, as seen in Fig. 5, thus allowing the two elements to enter the slot 19 under the influence of the coil spring 26 (Fig. 6). The rotational movement of the escapement disc 13 is thus halted. The drive spool 6 continues to rotate until the film is correctly positioned since the clutch face 11 and the clutch disc 12 are capable of moving relative to the escapement disc 13. Cessation of the movement of the disc 13 results in the stoppage of the rotational mechanism of the rotatable flash attachment. When an operator has taken a picture, it is once again necessary for the film to be advanced and the rotatable flash attachment to be rotated the proper amount. To accomplish this, it is necessary that the escapement lever 17 be cleared from the notch 19 so that the escapement disc 13 may once again rotate until the next subsequent notch 19 is engaged. Any suitable mechanism may be employed to engage and rotate the lever 17 in a counterclockwise direction (as seen in Fig. 3) against the bias of the spring 26. For example, a cam or lever means may be operatively associated with the shutter operating mechanism (not

shown) whereby the escapement lever 17 is rotated to withdraw the upturned portion 24 and the spring 25 from the notch 19 as the picture is taken. Once free of the confines of the notch 19, the spring 25 resumes its normal unstressed position as shown in Fig. 7, thus preventing the elements 24 and 25 from re-entering the notch just occupied by them. The escapement disc is now free to rotate and the cycle is again repeated so that the rotatable flash attachment is properly indexed.

It should be noted that the escapement disc 13 as shown has three indexing notches 19 therein. The disc therefore rotates 120° for each cycle of operation. To index correctly the rotatable flash attachment at 90° increments it is thus necessary to provide a 4:3 gear ratio between the gear 28 and the pinion 27. After all four bulbs of the rotatable flash attachment have been exhausted, the attachment may be ejected by depressing the button 44 thereby causing the ejector arms 36 and 37 to enter the recess 32 of the enlarged head 31. The ejector arms 36 and 37 will then contact a portion of the rotatable flash attachment 2 to release the attachment from the grasp of the retention clip 33. Upon removal of the exhausted attachment, a new one may be inserted.

The invention has been described in detail with particular reference to a preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the scope of the invention as described hereinabove and as defined in the appended claims. For example, it is possible for an electric or spring motor means to be substituted for the manual means disclosed hereinabove. Alternatively, a rotatable flash attachment of any desired configuration may be substituted for the cube-shaped attachment, with corresponding revision of the drive means. For example, the gear ratio of the transmission elements or the number of indexing notches in the escapement disc might be varied to increase or decrease the degree of rotation.

WHAT WE CLAIM IS:—

1. A drive means, for a separable multi-flash lamp rotatable flash attachment for use in a camera of the type having a film advancing means movable from a first position to a second position for advancing film in the camera, the drive means being connected to the film advancing means through a slip connection for rotating the rotatable flash attachment to advance a next bulb into a use position as the film advancing means is being moved from the first position to the second position.

2. A drive means as claimed in claim 1, wherein the slip connection is provided by a slip clutch mechanism.





3. A drive as claimed in claim 1 or 2, wherein control means are operatively associated with the drive means to limit the movement thereof thereby limiting the degree of rotation of the rotatable flash attachment.

4. A drive means as claimed in claim 3, wherein the control means comprises an escapement disc having a plurality of notches in the outer periphery thereof and a pivotal member adapted selectively to engage the notches in sequential fashion.

5. A photographic camera having a film advancing means movable from a first position to a second position for advancing film in the camera, and adapted to receive a rotatable flash attachment having a plurality of flash bulbs advanceable successively from a non-use to a use position, a slip mechanism operatively associated with the film advancing means for rotating the rotatable flash attachment selectively to advance a bulb toward a use position as the film advancing means is moved from the first position to the second position, a control means operatively associated with the slip mechanism to limit the movement thereof thereby limiting the degree of rotation of the rotatable flash attachment, the control means comprising an escapement disc having notches on the outer periphery thereof and a pivotal member for selectively engaging the notches in sequential fashion.

6. A camera according to claim 5, wherein the pivotal member comprises an arm having a turned up portion at one extremity thereof, biasing means being operatively associated with the arm to bias the turned up portion toward the escapement disc.

7. A camera according to claim 6, wherein a spring element is attached to the said one extremity and closely follows the configuration of the turned up portion but, in its normal unbiased state is separated slightly therefrom, the spring element and turned up portion having an operational width greater than the width of any of the notches when the spring element is in its normal unbiased state, thereby rendering the spring element and substantially vertical portion incapable of entering into any of the notches when the spring is in its normal unbiased state.

8. A camera according to claim 7, wherein each of the notches serves to engage the spring element to bias the element against the turned up portion thereby decreasing the operational width of the spring element and the turned up portion and allowing the spring element and turned up portion selectively to enter each of the notches under the influence of the biasing means.

9. A camera according to any of claims 5 to 8, wherein the rotatable flash attachment is cube-shaped with four concave, reflective surfaces therein, each of the surfaces having a flash bulb mounted therein for

selective advancement toward the front of the camera.

10. A camera according to any of claims 5 to 9, wherein the slip mechanism additionally comprises a pinion driven in accordance with the degree of movement of the film advancing means, a gear means driven by the pinion, and a spindle operatively associated with the gear means for movement therewith and having a recessed portion in the upper end thereof for receiving the rotatable flash attachment.

11. A camera according to claim 10 wherein ejector means is operatively associated with the spindle to eject the rotatable flash attachment from the recessed portion.

12. A camera according to claim 11 wherein the ejector means comprises a rider ring mounted for free sliding movement on the spindle, the rider ring having a pair of upwardly extending arms thereon movable from a first position to a second position, the arms, when in their first position, being clear of the recess and, when in their second position, entering into the recess, and a two-armed ejector actuator lever pivotally mounted adjacent the spindle, one arm of the ejector actuator lever being forked at its outer extremity and having bearing means affixed thereto on opposed sides of the spindle, the other arm of the ejector actuator lever having a manually depressible element thereon which, when depressed, causes the ejector actuator lever to pivot, thereby causing the bearing means to force the rider ring in an upward direction and the arms to move from their first position to their second position.

13. A photographic camera having a film advancing means movable from a first position to a second position for advancing film in the camera and comprising: a rotatable socket member having means thereon for receiving a disposable, rotatable flash attachment, and a slip mechanism operatively associated with the film advancing means for rotating the socket a predetermined amount as the film advancing means is moved from its first position to its second position.

14. A camera according to claim 13, wherein a control means comprising a pivoted lever is operatively associated with the slip mechanism to limit the degree of rotation of the socket.

15. A drive means substantially as hereinbefore described with reference to Figs. 2 to 7 of the accompanying drawings.

16. A photographic camera substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

L. A. TRANGMAR,
Patent Agent.

Reference has been directed in pursuance of Section 9, subsection (1) of the Patents Act, 1949, to patent No. 1,034,909.