

23276

10

PATENT SPECIFICATION

DRAWINGS ATTACHED

1.183.080

1.183.080



Date of Application and filing Complete Specification: 28 June, 1967.

No. 29790/67.

Application made in United States of America (No. 562561) on 5 July, 1966.

Complete Specification Published: 4 March, 1970.

Index at acceptance: —G2 A(1G, 2C8)

International Classification: —G 03 b 15/04

COMPLETE SPECIFICATION

Improvements in or relating to Cameras with Flashcube Mechanisms

We, IMPERIAL CAMERA CORP., a corporation organised under the laws of the State of Delaware, United States of America, of 421 North Western Avenue, Chicago, Illinois, 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:—

This invention relates to a camera construction designed for use in combination with a flashcube. Flash structures of this type comprise a plurality of separate flash bulbs in a single mounting. The bulbs are adapted to be energized in sequence whereby the operator of a camera can take a plurality of pictures before changing the flash structure.

This invention will be described with particular reference to camera constructions adapted for use in combination with film magazines. United States Patent Specification No. 3,138,081, issued on June 23, 1964, illustrates a construction comprising a roll film magazine wherein a length of film is located within a magazine body. One end of the film is attached to a spool at one side of the magazine while a supply roll of film is located at the other side of the magazine. An opening is defined by the back of the magazine whereby movement of the film will provide for exposure through this opening. When the film is associated with a camera adapted to rotate the spool, the pictures can be taken.

A camera adapted to be used in conjunction with the magazine is disclosed in United States Patent Specification No. 3,138,084. This camera is provided with a sensing finger which is adapted to engage the surface of the film in the cartridge. The film has perforations spaced at intervals which correspond to a frame of the film. The sensing finger is adapted to successively engage these perforations as the film is moved in the camera. Engage-

ment of a perforation by the sensing means will impede further movement of the film whereby the user of the camera can automatically determine when the film is in a position for taking the next picture. In the construction shown in United States Patent Specification No. 3,138,084, a separate button is provided on the camera for disengaging the sensing finger to permit further movement of the film.

Camera constructions are known which are suitable for use in conjunction with such film magazines. Such constructions include a sensing member adapted to engage perforations in roll film whereby the film can be accurately indexed and whereby other camera operations can be precisely controlled. The constructions specifically combine means for controlling indexing movement of the film in a camera while at the same time providing a latching arrangement for the camera shutter whereby the camera cannot be operated unless the film is in proper position.

The introduction of flashcube constructions provides added advantages for individuals taking pictures. In prior arrangements using flash bulbs, it was necessary to insert a separate bulb after each picture was taken. With such an arrangement, a relatively extended time delay takes place between successive picture taking operations. The flashcube arrangement permits successive pictures by merely shifting the position of the cube after a picture is taken.

It is a general object of this invention to provide a camera construction which is suitable for operation with flash constructions of the flashcube type.

It is a more specific object of this invention to provide a camera of the type described which includes mechanisms permitting the use of film magazines and flashcube arrangements in combination whereby the camera can be operated with maximum convenience.

[Price 5s. 0d.]

These and other objects of this invention will appear hereinafter and for purposes of illustration, but not of limitation, specific embodiments of this invention are shown in the accompanying drawings in which:—

Figure 1 is a plan view of a camera construction in accordance with the invention;

Figure 2 is a front elevation view of the camera construction;

Figure 3 is a side elevational view of the camera construction;

Figure 4 is a detail illustration taken about the line 4—4 of Figure 2;

Figure 5 is an exploded view illustrating the drive components employed within the camera housing;

Figure 6 is an exploded view illustrating the flashcube mounting means and other components mounted on the exterior of the camera housing;

Figure 7 is a horizontal cross-sectional view taken about the line 7—7 of Figure 2;

Figure 8 is a horizontal cross-sectional view taken about the line 8—8 of Figure 2; and,

Figure 9 is an enlarged fragmentary cross-sectional view taken about the line 9—9 of Figure 1.

In accordance with the invention there is provided a camera construction including a housing for holding a length of film, means for advancing the film, a flash lamp socket associated with said housing, said socket being designed for holding a rotatable lamp of the type comprising a plurality of flash bulbs, said bulbs being adapted to be successively energized when rotated to picture taking position, means for rotating said lamp including a drive element, means operatively connecting said drive element to said film advancing means, a drive coupling between said drive element and said socket adapted to rotate said socket in response to the action of said drive element, said drive coupling being adapted to rotate with said drive element and comprising spring means adapted to press into engagement with said socket to rotate said socket, and locking means adapted to engage said socket at an intermediate point in the movement of said film advancing means, said locking means holding said socket in position during continued movement of the film advancing means, and said continued movement overcoming the pressure applied by said spring means.

The construction of this invention is particularly adaptable for use in combination with film magazines of the type referred to. As will be explained in detail, the driving action is adapted to be co-ordinated with the film magazine whereby engagement and disengagement of the drive coupling can be accurately controlled. It will be understood, however, that the basic concepts of the present invention are applicable to cameras other than

those employing films of the type specifically referred to herein.

The accompanying drawings illustrate a camera construction 10 according to the invention. The construction comprises a casing 12 having a removable back 14. A film cartridge of the type described in the aforementioned patent is adapted to be inserted into the camera after which the removable back 14 is locked into place whereby pictures can be taken.

The particular camera construction shown embodies mechanical elements of the type illustrated in our U.S. Patent No. 3,406,621. As noted in said patent, a slot is defined by the film cartridge. This slot exposes perforations defined by the film carried in the cartridge, and a sensing finger 18 (see Figure 8) is adapted to be received in these perforations as the film advances. The combination of the perforations and the sensing finger serves to align the frame of the film in a proper position for taking each picture. Operation of the camera shutter mechanism releases the sensing finger from the perforations whereby the film can be advanced to the next frame at which time the next perforation operates in combination with the sensing finger to lock the film for purposes of taking the next picture.

A portion of the structure described in our U.S. Patent No. 3,406,621 is disclosed herein since the novel features of the present invention are adapted to be employed in combination with this prior structure. The finger 18 is adapted to be received in a perforation at which time the finger pivots about its mounting on the arm 20. The spring 22 normally urges the finger in opposition to this pivoting movement. When the finger 18 is moved in a counterclockwise direction by a film perforation, the pawl 24 is brought into engagement with ratchet teeth 26. This prevents further movement of the film advancing knob 28.

The structure also provides for locking of the shutter actuating member 30 during film advancing. Thus, the finger 18 rides against the back of the film during film advance, and in this condition, the arm 20 is pivoted in a counterclockwise direction about pivot point 32. This brings the extension 34 formed at the end of the arm 20 into an opening defined by the shutter actuating member 30. Accordingly, the member 30 cannot be pushed downwardly until the finger 18 is received in the next film perforation at which time the film frame will be in the desired position.

The present invention specifically contemplates a means for automatically positioning the flashcube 36 (Figures 1 to 3) during film advance. This is accomplished by mounting the flashcube in a socket 38 which is coupled to the film advance knob 28.

As best shown in Figures 5 to 9, a film

cartridge 40 is inserted within the camera, and a drive sprocket element 42 is adapted to fit into the film cartridge. The shaft 44 of the sprocket element 42 is secured to a sleeve element 46, and ratchet wheel 48 carrying ratchet teeth 26 is attached to the sleeve. The film advance knob 28 is also connected to these members whereby the sprocket 42 will move in direct response to rotation of the film advance knob 28.

The top side of the knob 28 defines a recess 50 and a drive coupling element 52 is received in this recess. The coupling element 52 carries fingers 54 which are adapted to interfit with grooves 56 defined by the bottom side of an element 58. The element 58 combines with an element 60 to form the socket 38.

The element 58 defines recesses 62 around its periphery. In accordance with the embodiment illustrated, four such recesses are provided, each offset 90° with respect to adjacent recesses. This corresponds with the arrangement of the bulbs in the flashcube construction. As will be apparent when considering the following description of the operation of the disclosed structure, the number and position of recesses 62 will vary depending upon the bulb positions employed in the flashcube.

A stop member 64 is pivotally attached to the camera housing by means of the pin 66. The stop member includes a projection 68 which is adapted to be received by the recesses 62. A spring 70 has one end attached to the stop member 64 while the other end is attached to the camera housing. With this arrangement, the projection 68 normally presses against the side wall of the element 58.

The stop member 64 includes an element 72 located on its underside. A return portion 74 of the element 72 is adapted to be engaged by projection 76 formed on the arm 20. When the shutter actuating element 30 is moved downwardly, an extension 73 is engaged by a cam member 75 associated with the element 30. This pulls the arm 20 forwardly whereby the projection 76 will pull the projection 68 out of the recess 62.

It will be noted that a slot 78 is defined in the end of the stop member 64 so that the stop member 64 is slidable relative to the pin 66. When the projection 68 is pulled out of a recess 62, the spring 70 shifts the stop member 64 whereby the projection 68 will bear on the side wall of the member 58 and the projection 68 will not return to a recess 62 when the shutter actuating member 30 is released.

It will be noted that the element 60 of the socket 38 defines ratchet teeth 80. A plurality of pawl members 82 are inserted in slots 84 which are defined by the wall 86. As shown in Figure 6, this wall defines the

opening within which the element 60 is inserted. The pawls 82 include spring projections 88 which engage the ratchet teeth 80. The pawl members prevent the element 60 from shifting in reverse after the flashcube has been rotated to a desired position. They thus serve as stops which prevent reverse shifting movement which might occur as a result of the spring actions which characterize the disclosed structure.

In order to provide the necessary electrical characteristics, contact strips 90 are positioned in association with the socket 38. The contact strips include end portions 92 which are adapted to be bent-over in the manner shown in Figure 4 whereby contact elements defined by the flashcube 36 can engage the portions 92.

The construction also includes a flashcube ejection element 94. This element comprises a pivotal member having an actuation button 96 at one end and an ejection element 98 at the opposite end. This arrangement can be readily mounted adjacent the flashcube socket in the manner shown in Figure 4. A flashcube in the socket will be lifted up when the button 96 is pressed down. The insertion of a new flashcube will reset the ejection mechanism.

In the operation of the illustrated construction, a film cartridge is inserted, and the knob 28 is then rotated until the finger 18 senses the first perforation in the film. The finger 18 drops into the perforation, and slight continued advancement of the film causes the pawl 24 to engage a tooth 26 whereby the advancing knob 28 will be locked. A flashcube can be inserted in the proper position, and since the extension 34 is held out of engagement with the member 30, a picture can be taken.

When the shutter actuating member is moved downwardly, the cam element 75 forces the arm 20 clockwise whereby the finger 18 is withdrawn from the perforation and the projection 76 causes the projection 68 to be pulled out of a recess 62 in the socket element 58. When this occurs, the spring 22 pulls the finger 18 away from the perforation rod, and the action of the spring 70 on the stop arm 64 causes the slot 78 to move relative to the pivot 66 so that the stop arm 64 shifts. The result of this is that when the shutter actuating member 30 is released the finger 18 does not enter the perforation but bears against the film and the extension 68 does not fall back into a recess 62.

To prepare for taking the next picture, the knob 28 is rotated. The drive coupling 52 causes the flashcube socket and the flashcube to rotate with the knob 28. After rotation of the socket through 90°, the projection 68 will fall into the next recess 62. Slight additional advancement will cause the stop arm 64 to move to the cocked position in opposition to the spring 70. At this time, the socket

and flashcube will remain stationary even when advancement of the knob 28 is continued. The pawl members 88 will prevent any backward shifting of the socket and flashcube.

- 5 Advancement of the knob 28 can be continued since drive coupling 52 incorporates a slip clutch action. Thus the fingers 54 are in the form of spring members which normally engage the element 58 and which are so
10 arranged that, when the socket element 58 is held stationary, continued movement of the knob 28 overcomes the pressure applied by the fingers 54 to the element 58 whereby the coupling element 52 can continue to rotate
15 with the knob 28, the fingers 54 riding over the element 58.

Advancement of the knob 28 continues until the finger 18 is received in the next perforation in the film. At this point, the above described sequence of operations is repeated.

- 20 It will be noted that the construction of the present invention provides for positioning of the flashcube irrespective of the amount of rotation necessary to provide for advancement of the film from one frame to the next. Thus, a flashcube with four positions requires a rotation of the advancing knob through 90°. Additional advancement
25 of the knob is necessary in order to provide the necessary film advancement and, accordingly, direct coupling of the flashcube socket with the film advancing knob would not be feasible. The construction of the instant invention provides an ideal coupling arrangement in that
30 the flashcube can be accurately positioned without the necessity for a separate operation. Different types of film cartridges could be employed since proper operation of the flashcube positioning means does not depend
35 on the degree of rotation necessary for film advancement. Finally, the disclosed construction provides for simultaneous release of the flashcube advancing and film advancing mechanisms upon actuation of the shutter. It will
40 be noted that the instant invention provides extreme advantages from an efficiency standpoint in that applicant's prior film advancing mechanism need only be modified to a slight degree in order to incorporate the flashcube
45 positioning mechanism.
50

WHAT WE CLAIM IS:—

1. A camera construction including a housing for holding a length of film, means for advancing the film, a flash lamp socket associated with said housing, said socket being
55 designed for holding a rotatable lamp of the type comprising a plurality of flash bulbs, said bulbs being adapted to be successively energized when rotated to picture taking position, means for rotating said lamp including a drive element, means operatively
60 connecting said drive element to said film advancing means, a drive coupling between said

drive element and said socket adapted to rotate said socket in response to the action of said drive element, said drive coupling being adapted to rotate with said drive element and comprising means adapted to press into engagement with said socket to rotate said socket, and locking means adapted to engage
65 said socket at an intermediate point in the movement of said film advancing means, said locking means holding said socket in position during continued movement of the film advancing means, and said continued movement overcoming the pressure applied by said
70 spring means.
75

2. A construction in accordance with claim 1 wherein said locking means comprises a projection adapted to engage recesses defined by said socket, said projection being resiliently mounted whereby continued movement of said socket operates to shift said projection from a position of initial engagement to a locking position at which time said
80 socket is held stationary by said projection, and wherein operation of the shutter mechanism of said camera results in movement of said projection out of a socket recess and shifting of the projection back to said initial
85 position whereby the projection will bear against the socket until the socket is moved to a point where the projection presses into the next recess defined by the socket.
90

3. A construction in accordance with claim 1 wherein said socket defines a plurality of recesses, said recesses corresponding in number to the number of bulbs in said lamp, the locking means for said socket comprising means adapted to extend into recesses defined
95 by said socket for retaining the socket against continued rotation, and including means interconnected with the shutter mechanism of the camera for moving said extending means out of said recesses.
100

4. A construction in accordance with claim 3 wherein said extending means are mounted on a slideable arm, and including means for shifting the position of said arm after said
105 extending means moves out of a recess whereby said extending means will not return to a recess when said shutter mechanism is released.
110

5. A construction in accordance with any preceding claim wherein said film is of the type included within a cartridge, said film defining spaced-apart perforations for locating the successive frame in said film, said construction including sensing means adapted to detect said perforations, and means
115 interconnecting said drive element and said sensing means whereby said drive element is locked against continued advancement when the successive film frames are moved to picture taking position.
120

6. A construction in accordance with claim 5 wherein actuation of the shutter mechanism of the camera simultaneously releases
125

and flashcube will remain stationary even when advancement of the knob 28 is continued. The pawl members 88 will prevent any backward shifting of the socket and flashcube.

- 5 Advancement of the knob 28 can be continued since drive coupling 52 incorporates a slip clutch action. Thus the fingers 54 are in the form of spring members which normally engage the element 58 and which are so arranged that, when the socket element 58 is held stationary, continued movement of the knob 28 overcomes the pressure applied by the fingers 54 to the element 58 whereby the coupling element 52 can continue to rotate with the knob 28, the fingers 54 riding over the element 58.

Advancement of the knob 28 continues until the finger 18 is received in the next perforation in the film. At this point, the above described sequence of operations is repeated.

- 20 It will be noted that the construction of the present invention provides for positioning of the flashcube irrespective of the amount of rotation necessary to provide for advancement of the film from one frame to the next. Thus, a flashcube with four positions requires a rotation of the advancing knob through 90°. Additional advancement of the knob is necessary in order to provide the necessary film advancement and, accordingly, direct coupling of the flashcube socket with the film advancing knob would not be feasible. The construction of the instant invention provides an ideal coupling arrangement in that the flashcube can be accurately positioned without the necessity for a separate operation. Different types of film cartridges could be employed since proper operation of the flashcube positioning means does not depend on the degree of rotation necessary for film advancement. Finally, the disclosed construction provides for simultaneous release of the flashcube advancing and film advancing mechanisms upon actuation of the shutter. It will be noted that the instant invention provides extreme advantages from an efficiency standpoint in that applicant's prior film advancing mechanism need only be modified to a slight degree in order to incorporate the flashcube positioning mechanism.

WHAT WE CLAIM IS:—

1. A camera construction including a housing for holding a length of film, means for advancing the film, a flash lamp socket associated with said housing, said socket being designed for holding a rotatable lamp of the type comprising a plurality of flash bulbs, said bulbs being adapted to be successively energized when rotated to picture taking position, means for rotating said lamp including a drive element, means operatively connecting said drive element to said film advancing means, a drive coupling between said

drive element and said socket adapted to rotate said socket in response to the action of said drive element, said drive coupling being adapted to rotate with said drive element and comprising means adapted to press into engagement with said socket to rotate said socket, and locking means adapted to engage said socket at an intermediate point in the movement of said film advancing means, said locking means holding said socket in position during continued movement of the film advancing means, and said continued movement overcoming the pressure applied by said spring means.

2. A construction in accordance with claim 1 wherein said locking means comprises a projection adapted to engage recesses defined by said socket, said projection being resiliently mounted whereby continued movement of said socket operates to shift said projection from a position of initial engagement to a locking position at which time said socket is held stationary by said projection, and wherein operation of the shutter mechanism of said camera results in movement of said projection out of a socket recess and shifting of the projection back to said initial position whereby the projection will bear against the socket until the socket is moved to a point where the projection presses into the next recess defined by the socket.

3. A construction in accordance with claim 1 wherein said socket defines a plurality of recesses, said recesses corresponding in number to the number of bulbs in said lamp, the locking means for said socket comprising means adapted to extend into recesses defined by said socket for retaining the socket against continued rotation, and including means interconnected with the shutter mechanism of the camera for moving said extending means out of said recesses.

4. A construction in accordance with claim 3 wherein said extending means are mounted on a slideable arm, and including means for shifting the position of said arm after said extending means moves out of a recess whereby said extending means will not return to a recess when said shutter mechanism is released.

5. A construction in accordance with any preceding claim wherein said film is of the type included within a cartridge, said film defining spaced-apart perforations for locating the successive frame in said film, said construction including sensing means adapted to detect said perforations, and means interconnecting said drive element and said sensing means whereby said drive element is locked against continued advancement when the successive film frames are moved to picture taking position.

6. A construction in accordance with claim 5 wherein actuation of the shutter mechanism of the camera simultaneously releases



the locking means for film advancement and the locking means engaging said socket.

5 7. A construction in accordance with any preceding claim wherein said spring means includes a plurality of spring fingers normally engaging said socket, said spring fingers being adapted to ride over said socket after the locking means engage said socket whereby said drive element can continue to rotate.

10 8. A camera construction, substantially as hereinbefore described with reference to the accompanying drawings.

For the Applicants:
RAWORTH, MOSS & COOK,
Chartered Patent Agents,
38 Sydenham Road,
Croydon,
Surrey,
and
75 Victoria Street,
Westminster,
London, S.W.1.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1970.
Published by the Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

