

PATENT SPECIFICATION

1,034,906

DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Photographic Camera with Exposure Regulating Device.

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 HUBERT NERWIN) 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 still cameras and roll film magazines for use therein.

An object of the present invention is the provision of a camera for receiving a film magazine having a mechanically explorable indication of the type or sensitivity of film in the magazine.

According to the present invention, there is provided a photographic camera with a built in exposure regulation device and setting means for taking account of film sensitivity in connection with the operation of said device, said camera being for use with a film cartridge accommodated in the camera, the film cartridge being identified as regards the sensitivity of the film contained therein by a mechanically explorable feature thereof and the said feature being so arranged in cartridges for films of different sensitivity that, when the cartridge is in the camera, said feature becomes rigidly located and at a distance which differs with the sensitivity, from a fixed point in the camera, said camera having, for exploring the said feature in its said location to transmit corresponding setting movement to said setting means, a movable element which in its position when the camera has been prepared for insertion of a cartridge, is maintained outside the range of movement of any of

said identifying features in the insertion operation, and which is so adapted that, in a camera preparing operation subsequent to the cartridge insertion, it is caused by a camera member which moves in said latter operation, to explore the position of said feature.

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

Figure 1 is a perspective view of a camera according to the present invention showing a magazine located for insertion into the camera:

Figure 2 is a perspective front view of the magazine showing one embodiment of magazine coding means:

Figure 3 is a top view of a magazine showing an alternative embodiment of magazine coding means:

Figure 4 is a top view of a magazine showing a further embodiment of magazine coding means:

Figure 5 is a perspective view of a camera mechanism for adjusting a lens diaphragm of the camera in response to the coding means on a magazine installed in the camera:

Figure 6 is a perspective view of a camera embodying the mechanism shown in Figure 5;

Figure 7 is a perspective view of a camera in accordance with a second embodiment of the present invention, with portions of the camera housing broken away to show a mechanism for adjusting an exposure indicating dial in response to the coding means on a magazine installed in the camera: and

Figure 8 is a front view of the camera shown in Figure 7.

[Price 4s. 6d.]

THE FILM MAGAZINE

General Description:

Referring to Figure 1, and more particularly Figures 1 and 2, a loaded film magazine 51 of a preferred form comprises a moulded plastic magazine body 52, a moulded plastic magazine cover 53, a moulded plastic spool 54 and a film identification and exposure guide 59 attached to the magazine cover 53. In the assembled magazine, film or film and backing paper is initially wound upon itself to form a coreless film supply roll which is housed in a film supply chamber 62 formed by the co-operation of the magazine body and the magazine back with backing paper and/or film extending across a magazine exposure opening 63 and attached to the spool 54 located in a film spool chamber 64. With the magazine components so disposed, the cover member 53 is cemented or otherwise permanently joined to the magazine body 52. The magazine is not intended to be reloaded: an exposed roll of film is removed therefrom for processing by breaking the magazine open.

Magazine Locating Means:

As shown in Figure 1, a camera of the present invention adapted to accommodate the magazine as above described in the present invention, comprises a main housing 86 provided with a central box-like member 87 located between two chambers 88 and 89 adapted respectively freely to accommodate the film supply and spool chamber portions of the magazine. A continuous rearwardly projecting rib 91 is provided along the rearward portion of the member 87, and is adapted to be received by a corresponding continuous channel 92 surrounding the exposure opening of the magazine as illustrated in Figure 2. To load the camera, the hinged cover member 93 is released by means of latch member 94 and is moved to the position illustrated. After a film winding knob 95 is withdrawn, as shown, to retract the spool engaging key, (not shown), from the chamber 89, the magazine is placed in the camera with the rib 91 in mating relation with the channel 92. The cover member may then be closed and the winding knob depressed to engage the key with a suitable clutch member 96 formed in one of the flanges of the film take-up spool. With the cover in its closed position behind the magazine, pressure pads 97 on the magazine are engaged by spring members 98 on the hinged cover member to urge the magazine forward with a bottom surface 99 of the channel 92 in contact with a rear surface 100 of the rib 91, thereby accurately locating the film plane of the magazine with respect to the camera lens

system 101. To prevent distortional influences on the magazine in the camera, the lateral positioning of the magazine is determined by the lateral freedom of the rib 91 in the channel 92 so that other portions of the magazine are held out of contact with the camera housing. As is readily apparent, the co-operating rib and slot structure between the camera and magazine also serves to provide a labyrinthic light barrier between the two units so that, of the camera components, only the box-like member 87 need be light-tight.

Exposure Guide Label:

As illustrated in Figure 1, an exposure guide label 59 appropriate to the particular type of film in a magazine may be attached to the cover thereof in the area surrounding an aperture 102 through which exposure indicating numerals 103, Figure 1, are visible. With the magazine installed in the camera, the exposure guide label and the exposure indicating numeral aligned with the aperture are visible through a window 104 in the hinged cover member 93. Since the magazine is not intended to be reused, the appropriate label may be permanently attached to the loaded magazine or, if desired, an appropriate guide might be moulded into the magazine back prior to assembling the magazine, in which case, of course, the advantage of being able to load all kinds of film into the same magazine components would be lost.

Magazine Coding Means:

In order to enable an element of a camera to be adjusted automatically according to the sensitivity of the film in a magazine, a mechanically explorable coding means may be provided on the magazine as shown in a preferred embodiment in Figures 2 to 4. In Figure 2, this coding means comprises a coding notch 105, the position of which along the forwardly projecting rib 106 is empirically determined as a function of the sensitivity or speed of the particular film loaded in the magazine. For example, as viewed in Figure 2, the higher the film speed, the further notch 105 would be from the left end of the rib 106. Figures 3 and 4 show alternative coding means in which the position of an abutment shoulder 105¹ or a projection 105² along the rib is determined by the speed of the film in a magazine. It should be noted that all of these coding means comprise the removal of material from the rib rather than the addition of material, thereby affording a simple means of coding a standard magazine after it has been loaded with film. The removal of material from the rib is preferably accomplished by punching out a solid section or by locally melting the rib rather than by a

sawing or grinding technique, in order to prevent contaminating the magazine with dust or shavings.

A second coding notch or similar means may also be provided on the magazine along a rib 107 as shown at 108 in Figure 2. The position of this coding means along the rib is empirically determined as a function of the type of film in the magazine in order that exposed magazines may be automatically sorted prior to being processed. If a greater range of values were to be coded along either of the ribs than would be practical by means of a single abutment surface, two or more such surfaces might be employed along the rib, for example, in a binary coding system.

Code Responsive Camera Adjustment Means:

Figures 5 and 6 show a mechanism and external construction of a simple camera 109 in which a lens diaphragm opening is automatically set in accordance with the speed of the film in the magazine installed in the camera. This camera corresponds substantially in appearance and basic construction to that shown in Figure 1 and is loaded in the same manner previously described.

A cover latching device employed in the camera comprises a latching member 111 slidably mounted beneath a top wall 112 of the camera housing by a rivet 113 on the wall 112 engaging a slot 114 in the member 111, and by a latch operating element 115 extending through a slot 116 in the wall 112. The camera cover member 117 is hinged at 118 and is held in a closed position by the engagement of a locking pin 119 thereon with a locking arm 120 on the member 111, which, in turn, is urged towards the illustrated locking position by a spring 121 attached to a depending ear 122 of the member 111 and to a mechanism plate 123 supported behind a front wall 124 of the camera housing. A control plate 125 is slidably attached to the mechanism plate 123 by means of rivets 126 and is urged in the same direction as the latching member by a spring 127. A diaphragm operating pin 128 is carried by an arm 129 of the control plate and engages slots 131 and 132 in overlapping diaphragm blades 133 and 134 respectively, which are pivotally supported on the mechanism plate by a stud 135. Due to the angular relation of the slots 131 and 132, the size of a lens aperture 136, determined by the overlapping relation of the blades, is increased as the control plate is moved towards the left as illustrated in the drawing, and is decreased as the plate is moved towards the right.

To open the camera, the latch operating element 115 is moved to the left, thereby sliding the locking arm 120 out of engage-

ment with the locking pin 119. As the plate 111 is thus moved to its extreme left position, a depending lug 137 thereon engages a horizontal arm 138 on the control plate and likewise moves the control plate to its extreme left position, thereby moving the diaphragm blades to the position of maximum lens aperture. With the latch operating element held in the open position, a coded magazine 51 is installed in the camera as previously described and assumes the position shown in Figure 5 relative to the camera mechanism. In this position, a pawl 139, pivotally mounted on an arm 138 by a stud 141, is engaged by the left end of the magazine rib 106 and is moved out of contact with a lug 142 on the arm 138 against the tension of a light spring member 143. The hinged cover member is then closed and retains the magazine in position as previously described. After the cover has been moved to its closed position, the latch operating element 115 is released, and is returned to its extreme right position by the spring 121, to lock the cover. As the member 111 moves to the locking position, the control plate 125 also moves to the right under the influence of the spring 127 until the pawl 139 engages a coding notch 105 or some other form of coding discontinuity along the rib 106 as shown in Figures 2, 3 and 4, thereby adjusting the lens aperture in accordance with the position of the coding means along the rib. Although the foregoing operation has been described with the latch operating element held in the left-most position as the magazine is installed, the latch element may be released prior to the installation of the magazine if desired, in which case the pawl 139 engages the right end of the rib 106. When the latching member is thereafter moved to the left to allow the pin 119 to move past the end of the arm 120 as the cover is completely closed, the pawl 139 rides past the coding means by virtue of its angular disposition as it is moved along the rib to the left end thereof. When the latch element is then released, the pawl is blocked by the coding means during its return stroke as previously described. In either event, however, the magazine is engaged by the spring members on the cover member, as shown at 98 in Figure 1, before the pawl moves towards the right along the rib, to ensure that the magazine is held in engagement with the pawl during this operation.

Figures 7 and 8 show an alternative camera construction whereby the code sensing means is actuated by opening the camera cover and adjusts an exposure guide scale in accordance with the speed of the film in the coded magazine. In this construction, those elements designated by primed numerals are similar to the previously described

correspondingly designated elements of Figure 5. A control plate 125¹ and a hinged cover member 117¹ are connected by a linkage member 144 pivotally attached to the cover member 117¹ by a pin 145 with a slot 146 in the linkage member in engagement with a stud 147 on an arm 148 of the control plate. Thus, when the cover member is released by means of a latch 94¹ corresponding to that shown in Figure 1, and is moved to its fully opened position parallel to the camera housing, the right end of the slot 146 engages the stud 147 and slides the control plate 125¹ to its extreme left position, where it is held by a detent member 149 mounted on a top wall 112¹ of the housing by a pin 151 and urged into engagement with a notch 152 in the control plate by a spring 153. In order to allow the cover member 117¹ to be fully opened, the linkage member 144 is curved as shown at 152 to clear a cover hinge 118¹. With the cover in its open position, a coded film magazine can be installed in the camera as previously described with the left end of the rib 106 in engagement with a pawl 139¹. As the cover is then returned to its closed position, the slot 146 allows the linkage member 144 to move relative to the pin 147 without disturbing the position of the control plate. During the final stage of the cover closing operation, after the magazine has been engaged by the spring members 98 on the cover as shown in Figure 1, a detent release pin 155 on the cover engages the detent member 149 and moves it out of engagement with the notch 152 to allow the control plate to be moved to the right by the spring 127¹ until the pawl encounters the coding means along the rib 106.

In this embodiment of the invention, the control plate is provided with a pin 156 in engagement with a radial slot 157 in a disc 158, which is rotatably mounted on the mechanism plate 123¹ by a sleeve member 159 co-axial with the camera lens system. Thus the angular position of the disc 158 is determined by the magazine coding means. A second disc 161, is attached to the disc 158 for movement therewith and is provided with exposure and flash indicating symbols 162 and 163, which are visible through accurate apertures 164 and 165 respectively of the camera housing. Figure 8 illustrates, for example, the position assumed by the symbols for a hypothetical film speed represented by a coding notch in the intermediate portion of the rib 106. The shutter control ring 166, which regulates the diaphragm opening and/or the shutter speed, as is well known in the prior art, is provided with a daylight exposure index mark 167, which, when aligned with the symbol corresponding to the existing light conditions effects a proper setting of the shutter.

Thus, the symbols visible in Figure 8 indicate that a proper exposure may be made under all light conditions ranging from 'Open Shade' to 'Sand or Snow', by aligning the index mark with the appropriate symbol. If the magazine were loaded with slower film, the coding notch would be further to the left so that, for example, only those symbols designating light conditions of 'Hazy Sun', 'Bright Sun', and 'Sand or Snow' would be visible, thereby indicating that proper exposures would be possible only under such lighting conditions. Conversely, a magazine coded for film of high sensitivity would cause the disc to be rotated clockwise so that, for example, the symbols for 'Rainy Day' and 'Cloudy Day' would also be visible, thereby indicating that proper exposures could be made under these conditions.

To facilitate the use of the camera with flash lamps, the indicia visible through window 165 indicates the distance range within which an exposure may be made with film of the type in the magazine with a particular type of lamp, and provide a simple means for adjusting the shutter and/or diaphragm for optimum results at any distance within the permissible range. For example, the position of the flash guide indicia 163 in window 165 of the camera shown in Figure 8 indicates that the shutter and/or diaphragm can be adjusted for a properly exposed flash illuminated photograph of an object within a range of four to fifteen feet from the camera by aligning a flash distance index mark 168 on the ring 166 with the numeral representing the distance to the subject.

The subject matter of the present application is closely related to that of our application No. 198/63 (Serial 1,034,901) of which the present application is a divisional.

WHAT WE CLAIM IS:—

1. A photographic camera with a built-in exposure regulation device and setting means for taking account of film sensitivity in connection with the operation of said device, said camera being for use with a film cartridge accommodated in the camera, the film cartridge being identified as regards the sensitivity of the film contained therein by a mechanically explorable feature thereof and the said feature being so arranged in cartridges for films of different sensitivity that, when the cartridge is in the camera, said feature becomes rigidly located and at a distance which differs with the sensitivity, from a fixed point in the camera, said camera having, for exploring the said feature in its said location to transmit corresponding setting movement to said setting means, a movable element which in its position when the camera has been prepared for in-

correspondingly designated elements of Figure 5. A control plate 125¹ and a hinged cover member 117¹ are connected by a linkage member 144 pivotally attached to the cover member 117¹ by a pin 145 with a slot 146 in the linkage member in engagement with a stud 147 on an arm 148 of the control plate. Thus, when the cover member is released by means of a latch 94¹ corresponding to that shown in Figure 1, and is moved to its fully opened position parallel to the camera housing, the right end of the slot 146 engages the stud 147 and slides the control plate 125¹ to its extreme left position, where it is held by a detent member 149 mounted on a top wall 112¹ of the housing by a pin 151 and urged into engagement with a notch 152 in the control plate by a spring 153. In order to allow the cover member 117¹ to be fully opened, the linkage member 144 is curved as shown at 152 to clear a cover hinge 118¹. With the cover in its open position, a coded film magazine can be installed in the camera as previously described with the left end of the rib 106 in engagement with a pawl 139¹. As the cover is then returned to its closed position, the slot 146 allows the linkage member 144 to move relative to the pin 147 without disturbing the position of the control plate. During the final stage of the cover closing operation, after the magazine has been engaged by the spring members 98 on the cover as shown in Figure 1, a detent release pin 155 on the cover engages the detent member 149 and moves it out of engagement with the notch 152 to allow the control plate to be moved to the right by the spring 127¹ until the pawl encounters the coding means along the rib 106.

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5 sersion of a cartridge, is maintained outside the range of movement of any of said identifying features in the insertion operation, and which is so adapted that, in a camera preparing operation subsequent to the cartridge insertion, it is caused by a camera member which moves in said latter operation, to explore the position of said feature.

10 2. A camera as claimed in claim 1 in which the camera member referred to is a back cover of the camera.

15 3. A camera as claimed in claim 1 or 2 in which the arrangement is such that the exploratory movement of said element is in a direction transversely of the general direction of insertion of the cartridge into the camera.

20 4. A camera as claimed in any of claims 1 to 3 wherein the exploratory element is spring loaded into the exploring position by means of a setting spring.

5. A photographic camera as claimed in claim 1, and substantially as hereinbefore

described with reference to and as illustrated in Figures 5 and 6 or Figures 7 and 8 of the accompanying drawings. 25

6. A photographic camera with a built-in exposure regulating device adjustable in accordance with the sensitivity of a film contained in a cartridge intended for use in the camera, the film cartridge having a mechanically explorable feature indicative of the sensitivity of the film, wherein the camera has means coupled to the exposure regulating device and capable of exploring the feature of the film cartridge and wherein the said means is positionable by the camera back, on opening of the latter, to a position outside the range of the mechanically explorable feature and is released, by the camera back, for its exploratory movement, under spring tension, on closing of the camera back. 30 35 40

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