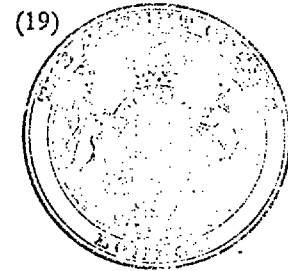


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(54) PHOTOGRAPHIC CAMERA

(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 a photographic camera having a metering mechanism for sensing the presence of a film perforation and for selectively locking and releasing the film transport mechanism.

It is an object of the present invention to provide a photographic camera having a film sensing pawl for detecting the presence of a film perforation with means for removing the pawl from a perforation.

According to the present invention, there is provided a photographic camera including a transport mechanism for advancing perforated film along an exposure plane, a film sensing pawl movable between a retracted position on one side of the exposure plane and an extended position transversing the exposure plane when intercepting a film perforation, a metering mechanism having an active condition disabling the transport means and an inactive condition, means operatively connecting the sensing pawl and the metering mechanism for placing the metering mechanism in its active condition upon movement of the sensing pawl to a predetermined position in its extended position, means operable for replacing the metering mechanism in its inactive condition, means for engaging and moving the sensing pawl from its extended position to its retracted position upon movement of film along the exposure plane by the transport mechanism subsequent to operation of the means for replacing the metering mechanism in its inactive condition.

The invention will be described further,

by way of example, with reference to the accompanying drawing, in which:—

Fig. 1 is a simplified perspective view of a portion of a camera in accordance with the present invention wherein the camera elements are arranged in a state of readiness to make an exposure;

Fig. 2 is an elevational view of the camera of Fig. 1 showing the position of the camera elements after an exposure has been made;

Fig. 3 is an elevational view similar to Fig. 2 showing the position of the camera elements during the initial film transport operation;

Fig. 4 is an elevational view similar to Fig. 1 showing the position of the camera elements during film transport after the high energy lever has been cocked; and

Fig. 5 is an elevational view similar to Fig. 4 showing the position of the camera elements during final film transport operation.

Because 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.

Referring now to Fig. 1, the camera illustrated as the preferred embodiment includes a housing 10 into which a strip 12 of film with perforations 16 and 17 along one edge has been loaded. The film may be contained in a cartridge of the type shown in U.S. Patent No. 3,138,081.

A slide member 22 is reciprocally mounted on housing 10 by a pin-in-slot arrangement. The slide member has a rack with a plurality of teeth 24 in meshing engagement with the teeth of a gear sector 26 coaxially rotatable with a gear 20. Rotation of gear 20 in a counterclockwise direction winds film in the direction of arrow 25. The gear has teeth 28 in meshing

engagement with a ratchet pawl 30 rotatably mounted on gear sector 26. Pawl 30 is biased by a spring 32 into engagement with the teeth of gear 20 so that upon movement of slide member 22 to the left as viewed in Fig. 1, the rotary movement of gear sector 26 is transmitted to gear 20, thereby advancing film along the camera's exposure plane. As slide member 22 is returned to the right by a coil spring 34, gear 20 is prevented from rotating in a clockwise direction by a leaf spring 36 which cooperates with the teeth on a ratchet wheel 100 on a gear 38 in meshing engagement with gear 20.

A shutter release lever 40 is pivotally mounted on a stud 42 and includes an arm 44 which may be manually depressed in the direction of arrow 46 to rotate lever 40 in a clockwise direction against the force of a spring 48. Arm 44 may be either directly moved by pushing down on an end portion 50, or there may be an intermediate member between a body release button, not shown, and the arm. Movement of the shutter release lever 40 in a counterclockwise direction by spring 48 is limited by tab 88 on a high energy lever 84. Shutter release lever 40 has an arcuate portion 66 which is lifted by the clockwise rotation of the shutter release lever.

An anti-short stroke lever 72 is mounted on housing 10 for rotation about a stud 74. Lever 72 carries a ratchet pawl 76 which may engage ratchet teeth 78 on slide member 22. A spring 80 tends to rotate lever 72 in a clockwise direction to engage ratchet pawl 76 and ratchet teeth 78, but the lever is normally held in the disengaged position shown by a tab 82 which engages arm 44 of shutter release lever 40.

A high energy lever 84 is mounted on housing 10 and is biased by spring 34 for rotation in a counterclockwise direction about a stud 86. Lever 84 is held against such rotation by a tab 88 which latches over a surface 90 on arcuate portion 66 of the shutter release lever until the shutter release lever is rotated in a clockwise direction. A bent tab portion 92 on high energy lever 84 is aligned with a push member 94 on slide member 22 to cock the high energy lever when the slide lever is moved to the left, as will be explained hereinafter.

Metering lever 96 is rotatably carried on housing 10 by a stud 56 and carries a metering pawl 98 urged toward an active position in engagement with the teeth of ratchet 100 by a spring 101 to prevent rotation of gear 38. A tab 102 is carried by metering lever 96 in alignment with high energy lever 84, and a second tab 103 is in alignment with arcuate portion 66 of shutter release lever 40.

A film sensing pawl 104 on a sensing finger 105 is mounted for rotational and

longitudinal movement on a stud 106 on camera housing 10. Sensing finger 105 has a tab 114. A retainer 118 is also rotatably carried by stud 106 and is urged in a counterclockwise direction by a spring 120 into abutment with a tab 122 on metering lever 96 or tab 114 on sensing finger 105.

Fig. 1 shows the elements of the camera in their respective positions after an unexposed frame of film has been wound into the exposure area. The camera is now ready to be operated to take a picture. Metering pawl 98 of lever 96 is in its active position in engagement with ratchet 100 so that slide member 22 cannot be moved to the left to transport more film. Film sensing pawl 104 is extended into perforation 16 in the film, and high energy lever 84 has been moved into a cocked position by push member 94 of the slide member and is held there against the force of the spring 34 by tab 88 engaging surface 90 on arcuate portion 66 of the shutter release lever. Anti-short stroke lever 72 is held against spring 80 by tab 82 engaging arm 44 to keep pawl 76 out of ratchet teeth 78.

To expose a picture, end portion 50 is depressed to rotate shutter release lever 40 in a clockwise direction against spring 48. Referring to Fig. 2, this raises arcuate portion 66 so that metering lever 96 is raised to its phantom line position by tab 103 and so that tab 88 slips over surface 90 to permit high energy lever 84 to rotate about pivot 86 toward its released position. During its rotation, the high energy lever contacts a portion of the camera's shutter, not shown, to actuate the shutter. As the high energy lever comes into contact with tab 102 of metering lever 96, it transfers kinetic energy to the metering lever to move the lever to its full line position shown in Fig. 2. Upon clockwise rotation of arm 44, pawl 76 of anti-short stroke lever 72 is raised to engage ratchet teeth 78. When end portion 50 of the shutter release lever is released, it can only rotate in a counterclockwise direction until the lower surface of arcuate portion 66 abuts tab 88 on the high energy lever. This keeps arm 44 out of engagement with tab 82 so that anti-short stroke lever 72 remains in its operative position shown in Fig. 2.

Because metering pawl 98 has been disengaged from ratchet 100, advance slide 22 can now be moved to the left. Such movement rotates gear sector 26 in a counterclockwise direction, causing similar rotation of gear 20 and clockwise rotation of gear 38 and ratchet 100. Rotation of gear 20 causes film to be advanced to the left as viewed in Fig. 3 to begin rotating film sensing finger 105 in a clockwise direction. This brings a cam surface 130 on the sensing finger into engagement with an abutment 132 on the camera housing so that sensing

pawl 104 is urged upwardly from perforation 16. After the sensing pawl clears the perforation, spring 120 rotates retainer 118 and sensing finger 105 in a counterclockwise direction to its full line position shown in Fig. 4, tab 122 on metering lever 96 having been lifted out of the notch in the top of the retainer. Tab 122 of the metering lever is now positioned above an abutment surface 128 on the retainer to prevent the metering lever from returning to its original position. Sensing pawl 104 now rests on the film surface and is urged against that surface by a spring 134.

As slide member 22 is moved to the left, pushing member 94 rotates high energy lever 84 in a clockwise direction until its tab 88 latches over surface 90 on shutter release lever 40. This latches the high energy lever in its cocked position shown in Fig. 4, and allows further counterclockwise movement of the shutter release lever to withdraw ratchet pawl 76 from teeth 78 so that the slide may be returned to the right. In the preferred embodiment, more than one actuation of slide member 22 is required to advance film by one frame. Therefore, after one such actuation, the camera elements are positioned as shown in Fig. 4 with sensing pawl 104 somewhere between film perforations 16 and 17. Since metering lever 96 is retained in its Fig. 2 position by surface 128 of retainer 118, slide member 22 is free to be moved again to the left.

When the next succeeding film perforation 17 reaches the position of sensing pawl 104, the pawl drops into the perforation as shown in Fig. 5. As the operator continues to move slide member 22 to the left, the trailing edge of perforation 17 causes clockwise rotation of sensing finger 105 and retainer 118 to remove surface 128 from below tab 122 of metering lever 96, thereby allowing the metering lever to be moved by spring 101 to its position shown in Fig. 1 preventing further movement of slide member 22 to the left. Since anti-short stroke member 72 has been held in its Fig. 1 position throughout the entire second operation of slide member 22, it cannot prevent return movement of the slide member after the film advance mechanism has been locked up.

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 defined in the appended claims.

WHAT WE CLAIM IS:—

1. A photographic camera including a transport mechanism for advancing perforated film along an exposure plane, a film sensing pawl movable between a retracted position on one side of the exposure plane

and an extended position transversing the exposure plane when intercepting a film perforation, a metering mechanism having an active condition disabling the transport means and an inactive condition, means operatively connecting the sensing pawl and the metering mechanism for placing the metering mechanism in its active condition upon movement of the sensing pawl to a predetermined position in its extended position, means operable for replacing the metering mechanism in its inactive condition, means for engaging and moving the sensing pawl from its extended position to its retracted position upon movement of film along the exposure plane by the transport mechanism subsequent to operation of the means for replacing the metering mechanism in its inactive condition.

2. A camera as claimed in Claim 1, wherein the film sensing pawl is movable in a first direction generally perpendicular to the exposure plane between its retracted and extended positions and in a second direction in its extended position generally parallel to the exposure plane, the pawl being arranged to be moved in its second direction by the trailing edge of a film perforation as the film is advanced along the exposure plane.

3. A camera as claimed in Claim 1 or 2 including a shutter release lever movable from a first position to a second position for effecting exposure of film at the exposure plane, and wherein the means operable for replacing the metering mechanism in its inactive condition are actuatable when the shutter release lever is moved to its second position.

4. A camera as claimed in Claim 2 or 2 and 3 wherein the means for placing the metering mechanism in its active condition upon movement of the sensing pawl in the second direction is arranged to be operable after the sensing pawl has moved a first predetermined distance, and the means for moving the sensing pawl to its retracted position is operable upon a movement of said sensing pawl in the second direction beyond the first predetermined distance.

5. A camera as claimed in any preceding Claim wherein the means for moving the sensing pawl to its retracted position comprises cam means.

6. A camera as claimed in Claim 5 wherein the cam means comprises a cam surface on the sensing pawl or the housing and an abutment on the housing or the sensing pawl respectively and located in the path of the cam surface during movement of the sensing pawl in the second direction.

7. A camera as claimed in any preceding Claim wherein the metering mechanism has means urging it into its active condition.

8. A camera as claimed in any preceding Claim further including spring means for

pawl 104 is urged upwardly from perforation 16. After the sensing pawl clears the perforation, spring 120 rotates retainer 118 and sensing finger 105 in a counterclockwise direction to its full line position shown in Fig. 4, tab 122 on metering lever 96 having been lifted out of the notch in the top of the retainer. Tab 122 of the metering lever is now positioned above an abutment surface 128 on the retainer to prevent the metering lever from returning to its original position. Sensing pawl 104 now rests on the film surface and is urged against that surface by a spring 134.

As slide member 22 is moved to the left, pushing member 94 rotates high energy lever 84 in a clockwise direction until its tab 88 latches over surface 90 on shutter release lever 40. This latches the high energy lever in its cocked position shown in Fig. 4, and allows further counterclockwise movement of the shutter release lever to withdraw ratchet pawl 76 from teeth 78 so that the slide may be returned to the right. In the preferred embodiment, more than one actuation of slide member 22 is required to advance film by one frame. Therefore, after one such actuation, the camera elements are positioned as shown in Fig. 4 with sensing pawl 104 somewhere between film perforations 16 and 17. Since metering lever 96 is retained in its Fig. 2 position by surface 128 of retainer 118, slide member 22 is free to be moved again to the left.

When the next succeeding film perforation 17 reaches the position of sensing pawl 104, the pawl drops into the perforation as shown in Fig. 5. As the operator continues to move slide member 22 to the left, the trailing edge of perforation 17 causes clockwise rotation of sensing finger 105 and retainer 118 to remove surface 128 from below tab 122 of metering lever 96, thereby allowing the metering lever to be moved by spring 101 to its position shown in Fig. 1 preventing further movement of slide member 22 to the left. Since anti-short stroke member 72 has been held in its Fig. 1 position throughout the entire second operation of slide member 22, it cannot prevent return movement of the slide member after the film advance mechanism has been locked up.

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 defined in the appended claims.

WHAT WE CLAIM IS:—

1. A photographic camera including a transport mechanism for advancing perforated film along an exposure plane, a film sensing pawl movable between a retracted position on one side of the exposure plane

and an extended position transversing the exposure plane when intercepting a film perforation, a metering mechanism having an active condition disabling the transport means and an inactive condition, means operatively connecting the sensing pawl and the metering mechanism for placing the metering mechanism in its active condition upon movement of the sensing pawl to a predetermined position in its extended position, means operable for replacing the metering mechanism in its inactive condition, means for engaging and moving the sensing pawl from its extended position to its retracted position upon movement of film along the exposure plane by the transport mechanism subsequent to operation of the means for replacing the metering mechanism in its inactive condition.

2. A camera as claimed in Claim 1, wherein the film sensing pawl is movable in a first direction generally perpendicular to the exposure plane between its retracted and extended positions and in a second direction in its extended position generally parallel to the exposure plane, the pawl being arranged to be moved in its second direction by the trailing edge of a film perforation as the film is advanced along the exposure plane.

3. A camera as claimed in Claim 1 or 2 including a shutter release lever movable from a first position to a second position for effecting exposure of film at the exposure plane, and wherein the means operable for replacing the metering mechanism in its inactive condition are actuatable when the shutter release lever is moved to its second position.

4. A camera as claimed in Claim 2 or 2 and 3 wherein the means for placing the metering mechanism in its active condition upon movement of the sensing pawl in the second direction is arranged to be operable after the sensing pawl has moved a first predetermined distance, and the means for moving the sensing pawl to its retracted position is operable upon a movement of said sensing pawl in the second direction beyond the first predetermined distance.

5. A camera as claimed in any preceding Claim wherein the means for moving the sensing pawl to its retracted position comprises cam means.

6. A camera as claimed in Claim 5 wherein the cam means comprises a cam surface on the sensing pawl or the housing and an abutment on the housing or the sensing pawl respectively and located in the path of the cam surface during movement of the sensing pawl in the second direction.

7. A camera as claimed in any preceding Claim wherein the metering mechanism has means urging it into its active condition.

8. A camera as claimed in any preceding Claim further including spring means for



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urging the sensing pawl toward its extended position.

9. A camera as claimed in any preceding Claim wherein the means operable for

5 placing the metering mechanism in its inactive condition comprises a high energy lever movable from a cocked position to a released position for effecting exposure of film at the exposure plane, means resiliently
10 urging the high energy lever towards its released position and means for releasably latching the high energy lever in its cocked position.

10. A camera as claimed in Claim 9
15 further comprises spring means biasing the metering mechanism toward its active condition, and wherein the high energy lever contacts the metering mechanism by abutment means on the metering
20 mechanism and the high energy lever for transmitting the kinetic energy of the high energy lever during its movement toward its

released position to the metering mechanism to move the metering mechanism against the force of said spring means. 25

11. A camera as claimed in Claim 10 further comprising means for releasably holding the metering mechanism in its inactive condition, and operable whilst the high energy lever is in its released position. 30

12. A camera as claimed in Claim 3, or any of Claims 4—10 when appendant thereto, and Claim 11 further comprising means on the high energy lever for holding the shutter release lever in its second position when the high energy lever is in other than its cocked position. 35

13. A photographic camera for perforated roll film substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings. 40

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