

PATENT SPECIFICATION

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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 comprising a film transport mechanism and a shutter cocking device, for use with films and in which the film advancing step is determined by single perforation holes spaced at frame intervals, a sensing member being provided which is pivotally and displaceably supported, the member sensing the film and being moved by the film after engaging a perforation and thereby controlling the blocking of the film transport.

It is the object of the present invention to provide an improved film transport and shutter cocking mechanism in a photographic camera.

According to the present invention, there is provided a photographic camera comprising a film transport mechanism and a shutter cocking device, for use with films in which the film advancing step is determined by single perforation holes spaced at frame intervals, a sensing member pivotally and displaceably supported, the member sensing the film and being moved by the film after engaging a perforation therein and thereby controlling the blocking of the film transport, characterized in that the sensing member as it is moved by the film is arranged to slide along a control lever until it is released by the control lever at the end of a predetermined constant film transport path whereupon the sensing member is immediately withdrawn

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from the film perforation under the action of a spring and simultaneously permits the control lever to block further transport of the film.

The invention will be described further, by way of example, with reference to the accompanying drawings in which parts not necessary for understanding the operation of the mechanism have been omitted in the schematic representations and in which:—

Fig. 1 shows a film transport and shutter cocking mechanism according to the invention in an initial position;

Fig. 2 shows the mechanism during film transport;

Fig. 3 shows the mechanism in its film transport blocking position;

Fig. 4 shows the mechanism if no cartridge is inserted.

The mechanism is first described with reference to Fig. 1. On the camera housing 26, a film advance member 1 is supported for sliding movement in the direction of the arrow "C" and is biased by a spring 18 in the opposite direction. A lug 13a of a rack 13 engages a notch 1c of the advance member 1, the rack being supported for sliding movement in the direction of the arrow "C" and being in engagement with a gear 14. The film advancing member 1 includes a cam 1a which is contacted by an ear 2b, under the action of spring 4, of a shutter drive lever 2 supported for pivotal movement about a pin 22. The spring 4 is connected into a hole 2c of the drive lever 2. An arm 2a of the drive lever 2 cooperates in a known manner with a shutter to fire the same (not shown in the drawing).

The film advancing member 1 also includes locking teeth 1b cooperating with an arm 3b of a control lever 3. The control lever 3 is pivotally supported on a pin 24 and is biased by a spring 9 in the direction of the arrow "D", the spring 9 being con-

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connected in a hole 3g of the control lever 3. The control lever 3 has an arm 3a cooperating with the arm 2a of the drive lever 2, and an arm 3d which cooperates with the release member 10. A further arm 3e of the control lever 3 cooperates with a projection 5a of a sensing member 5. The sensing member 5 is slidably supported and pivots about a pin 11 engaged in a slot 5c thereof. A spring 8 which is secured to a pin 23 of the sensing member 5 biases the member 5 towards a stop means 16 and to a position in which the end of the slot 5c is abutted by the pin 11. A nose 5b of the sensing member 5 cooperates with the film 12 for engagement with a perforation 12a. The gear 14 engages a gear 25 which cooperates with a film take-up reel 15.

The above mechanism operates as follows:

The mechanism as illustrated in Fig. 1 is in its initial position in which the arm 2a of the drive lever 2 takes the position "B". The control lever 3 is maintained in this position, against the force of a spring 9 tending to pivot the control lever in the direction of the arrow "D", so that the arm 3b does not engage with the locking teeth 1b of the film advancing member 1. A lever 6 is kept in the ineffective position shown, by means of a cartridge inserted in the cartridge compartment indicated at 17 by a dash-dotted line. The sensing member 5 abuts the stop means 16 and the pin 11 under the action of spring 8.

If the film advancing member 1 is moved in the direction of the arrow "C", the rack 13, the gears 14, 25 and the take-up reel 15 cause the film to be advanced in the direction of the arrow "F". As the film advancing member 1 is moved, the drive lever 2 is pivoted in the direction of the arrow "H" by means of the cam 1a (Fig. 2) towards its cocked position. This releases the control lever 3 and, under the action of its spring 9, moves it in the direction of the arrow "D". The arm 3e of the control lever 3 thus engages the projection 5a of the sensing member 5 and, against the action of spring 8, moves the nose 5b of the sensing member 5 towards the film 12. As soon as the nose 5b of the sensing member 5 contacts the film 12 under the action of spring 9, the movement of the control lever 3 and the sensing member 5 is interrupted (Fig. 2). The film transport, however, is not yet completed in this position. In the course of further advancement, a perforation 12a reaches the area of the nose 5b of the sensing member 5 so that the latter can engage the perforation 12a.

The sensing member 5 and the control lever 3 now take the positions shown in

dashed lines in Fig. 2, the arm 3b of the control lever 3 being moved to a position directly at the beginning of the locking teeth 1b of the film advancing member 1. During further film advancement the engaged nose 5b of the sensing member 5 is driven along in the direction of the arrow "F" by the perforation 12a of the film 12. The projection 5a of the sensing member 5 slides over the arm 3e of the control lever 3 and spring 8 is simultaneously biased.

As soon as the projection 5a of the sensing member 5 has reached the edge 3c of the control lever 3 (Fig. 3), the projection 5a leaves the arm 3e of the control lever 3 whereupon the nose 5b of the sensing member 5 is removed from the perforation 12a under the action of spring 8 and the sensing member 5 completes its movement at the stop means 16 (shown in Fig. 3 in dashed lines). Due to the fact that the projection 5a of the sensing member 5 releases the arm 3e of the control lever 3, the latter can pivot further in the direction of the arrow "D" under the action of its spring 9 until the arm 3b of the control lever 3 engages the locking teeth 1b of the film advancing member 1 so that film transport is blocked. The removal of nose 5b of the sensing member 5 and the blocking of the film transport are effected at high speed and in rapid succession as soon as a predetermined position during the film advancing step is reached whereby a film advance step is obtained which is always constant. When the film advancing member 1 has arrived at the above predetermined position, the drive lever 2 has been moved to its cocked position (shown in Fig. 3) by means of the cam 1a. The drive lever 2 is retained in this position by means (not shown in the drawing) which cooperate with the release member for releasing the drive lever 2 to fire the shutter.

As the film advancing member 1 is released, it returns to its initial position under the action of spring 18. Simultaneously, the rack 13 and the gears 14 and 25 return to their initial positions whereas a clutch (not shown) provided between gear 25 and the take-up reel 15 remains ineffective so that the film 12 does not move.

The arm 3d of the control lever 3 cooperates with the release member 10 and prevents an inadvertent double exposure by projecting into the range of operation of said release member 10 during film advance and shutter cocking (Figs. 1 and 2). When, however, the cocked position according to Fig. 3 is reached, the arm 3 lies outside the range of operation of the release member 10 and, thus, permits its being actuated.

If the release member 10 is moved in the direction of the arrow "E", the drive lever 2 is released in a known manner (not shown) and, under the action of spring 4, moves at high speed from position shown in Fig. 3 to position "B" (Fig. 1) with the arm 2a of the drive lever 2 actuating the shutter (not shown) in a known manner and, by means of the arm 3a, discontinuing the blocking between the film advancing member 1 and the arm 3b of the control lever 3. This causes the shutter release blocking 3d, 10 to become effective and the arm 3e again snaps under the projection 5a of the sensing member 5.

Now the mechanism again takes its initial position (Fig. 1) and is ready for further actuation.

A lever 6 which is positioned in the cartridge compartment and which is supported for pivotal movement about pin 21 permits the camera to be actuated even if no cartridge is inserted. In this latter case, a pin 20 of the lever 6 which extends into the cartridge compartment 17 as no cartridge is present, exerts pressure upon surface 3f (see Fig. 4) under the action of a spring 7 which is connected to a hole 6a so that the control lever 3 is pivoted in a direction "G" opposite to the direction of the arrow "D". This moves the arm 3d of the control lever 3 out of the range of operation of the release member 10 and the spring 9 of the control lever 3 is overcome by the stronger spring 7. As a result, the film advancing member and the release member can be actuated without interruption e.g. for demonstrating the camera.

Upon reaching the end of the advancing step, the nose 5b of the sensing member 5 is immediately withdrawn from the perforation 12a by means of the above-described mechanism so that the film 12 again takes a planar position for the next exposure. Moreover, the shutter release does not have to fulfil an additional function since the removal of the sensing member 5 is controlled by the film 12 and the control lever 3. Thus, a soft shutter release is possible.

WHAT WE CLAIM IS:—

1. A photographic camera comprising a film transport mechanism and a shutter cocking device, for use with films in which the film advancing step is determined by single perforation holes spaced at frame intervals, a sensing member pivotally and displaceably supported, the member sensing the film and being moved by the film after engaging a perforation therein and

thereby controlling the blocking of the film transport, characterized in that the sensing member as it is moved by the film is arranged to slide along a control lever until it is released by the control lever at the end of a predetermined constant film transport path whereupon the sensing member is immediately withdrawn from the film perforation under the action of a spring and simultaneously permits the control lever to block further transport of the film.

2. A camera according to Claim 1, characterized in that the sensing member comprises a nose and a projection, the nose being biased by a spring in a direction opposite to its direction of engagement and opposite to the film transport direction, and the projection of the sensing member cooperating with an arm of the control lever.

3. A photographic camera according to Claim 1 or 2, characterized in that the control lever is pivotally supported and has a plurality of arms and is biased by a spring towards a position blocking the film transport.

4. A photographic camera according to Claim 3, characterized in that one arm of the control lever cooperates with locking teeth of a film advancing member in order to block the film transport.

5. A photographic camera according to Claim 3 or 4 characterized in that a second arm of the control lever cooperates with a shutter drive lever, the operation of the drive lever terminating the blocking of the film transport by means of the second arm of the control lever.

6. A photographic camera according to Claim 3, 4 or 5, characterized in that a third arm of the control lever cooperates with the shutter release member to prevent double exposures.

7. A photographic camera according to any preceding claim characterized in that there is provided a pivotally supported lever having a pin, the lever being biased by a spring which moves the pin into a cartridge compartment, the pin being arranged to have no influence on the control lever if a cartridge is inserted but serving to retain the control lever in a non-blocking position if no cartridge is inserted.

8. A photographic camera having a film transport and shutter cocking mechanism substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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If the release member 10 is moved in the direction of the arrow "E", the drive lever 2 is released in a known manner (not shown) and, under the action of spring 4, moves at high speed from position shown in Fig. 3 to position "B" (Fig. 1) with the arm 2a of the drive lever 2 actuating the shutter (not shown) in a known manner and, by means of the arm 3a, discontinuing the blocking between the film advancing member 1 and the arm 3b of the control lever 3. This causes the shutter release blocking 3d, 10 to become effective and the arm 3e again snaps under the projection 5a of the sensing member 5.

Now the mechanism again takes its initial position (Fig. 1) and is ready for further actuation.

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thereby controlling the blocking of the film transport, characterized in that the sensing member as it is moved by the film is arranged to slide along a control lever until it is released by the control lever at the end of a predetermined constant film transport path whereupon the sensing member is immediately withdrawn from the film perforation under the action of a spring and simultaneously permits the control lever to block further transport of the film.

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