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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 for use with a film having one perforation per frame.

According to the present invention there is provided a photographic camera for use with a film having one perforation per frame, the camera including a pivotally mounted multiarm element comprising a sensing arm for sensing film perforations, a locking arm for locking a film transport means, a driving arm for driving the camera shutter, and a further arm cooperating with a shutter release member which exerts spring bias on the multiarm element to pivot the latter in a direction to urge the sensing arm against the film for engagement with a film perforation, and wherein upon engagement of the sensing arm with a film perforation and continued film transport, the multiarm element is pivoted so that a shutter driving spring is tensioned, and said further arm slides along the shutter release member until the multiarm element, under spring bias, assumes a position in which the shutter releases member serves as a movable stop for the element and in which the sensing arm is withdrawn from the film perforation and the locking arm locks the film transport means, the multiarm element remaining in this position until released by the shutter release member whereby the camera shutter is operated by the driving arm of the multiarm element moving under the spring bias provided by the tensioned shutter driving spring.

The present invention will now be described by way of example with reference to the accompanying drawings in which:—

Fig. 1 shows a camera according to the present invention with a multiarm element in an initial position;

Fig. 2 shows the position of the multiarm element during film transport;

Fig. 3 shows the multiarm element in a film transport locking position with the shutter drive cocked.

Referring to Figure 1, the multiarm element 1 is rotatably and slidably mounted in an elongated hole 1e about a pin 9 and comprises three arms 1a, 1c, 1d. The sensing arm 1a cooperates with a perforation 8a of a film 8, the locking arm 1c with a film transport wheel 4, and the driving arm 1d with a shutter blade 3. The multiarm element 1 is spring biased in a direction opposite to that of the arrow A by a leg spring 6 mounted on the release member 2 and in a clockwise direction, by means of a tension spring 7.

A shutter release member 2 is pivotably mounted about a pin 10, and is biased in a clockwise direction by means of a tension spring 5. One end 2a of the release member 2 cooperates with a lug 1b of a further arm of the multiarm element 1. The end 2a comprises two front surfaces which run at an acute angle with respect to each other, one of the front surfaces running approximately parallel to and the other transverse to the direction of film transport.

The film transport wheel 4 engages with a gearwheel 11 driving the winding core of a cartridge (not illustrated) via an intermediate gearwheel 4a.

The apparatus operates in the following manner.

After an exposure has taken place, the parts of the camera are in the position shown in Fig. 1 with the multiarm element 1 resting with its sensing arm 1a in contact with the film 8. The multiarm element 1 is spring-biased by the release member 2 in the direction of the arrow A by the engagement of the release member 2 with the lug 1b of the multiarm element 1.

When the film transport wheel 4 is rotated

in the direction of the arrow B, the film 8 is moved in the direction of the arrow C. When a film perforation 8a reaches a position immediately below the sensing arm 1a, the arm 1a engages the perforation 8a in the direction of the arrow A. The sensing arm 1a is then conveyed by the film 8, during the remainder of the film transport operation.

During this operation, multiarm element 1 rotates about the pin 9 in the direction of the arrow D until the lug 1b, sliding in engagement with the release member 2 reaches the point of the end 2a. The multiarm element 1 then moves in the direction of the arrow E under the force of the leg spring 6 (see Fig. 2). During this movement, the sensing arm 1a disengages from the perforation 8a, and the locking arm 1c of the multiarm element 1 engages the locking teeth 4b of the film transport wheel 4 so that further film transport is prevented (see Fig. 3). The release member 2 is then free to pivot about pin 10 under the action of spring 5 and come to rest against a stop 12.

The film 8 has now reached its exposure position, any further movement being prevented by the engagement of the locking arm 1c with the locking teeth 4b.

During film transport and the movement of the multiarm element 1, the tension spring 7, which engages with the driving arm 1d of the multiarm element 1 is tensioned so that the multiarm element 1 is now held with a stored driving energy via its lug 1b engaging with the end 2a of the release member 2, as shown in Figure 3. In this position, the release member 2 acts as a movable stop for the multiarm member 1.

When the release member 2 is moved by the camera user in the direction of the arrow F by applying a force to an end 2b thereof, the end 2a releases the lug 1b which allows the multiarm element 1 to run-down in the direction of the arrow G under the action of the tension spring 7.

During this run-down, the driving arm 1d of the multiarm element 1 drives the shutter blade 3. During this movement of the multiarm element 1, the lug 1b reaches a position below the end 2a of the release member 2, as shown in Fig. 3 in dashed lines, and the locking arm 1c disengages from the locking teeth 4b of the film transport wheel 4.

When the camera user releases the release member 2, the multiarm element 1 is moved by the release member 2 under the action of the spring 5 in the direction of the arrow A, Figure 1, until it rests with the sensing arm 1a in contact with the film 8 and thus assumes its position described with respect to Fig. 1, ready for another exposure cycle.

WHAT WE CLAIM IS:—

1. A photographic camera for use with

a film having one perforation per frame, the camera including a pivotally mounted multiarm element comprising a sensing arm for sensing film perforations, a locking arm for locking a film transport means, a driving arm for driving the camera shutter, and a further arm cooperating with a shutter release member which exerts spring bias on the multiarm element to pivot the latter in a direction to urge the sensing arm against the film for engagement with a film perforation, and wherein upon engagement of the sensing arm with a film perforation and continued film transport, the multiarm element is pivoted so that a shutter driving spring is tensioned, and said further arm slides along the shutter release member until the multiarm element, under spring bias, assumes a position in which the shutter releases member serves as a movable stop for the element and in which the sensing arm is withdrawn from the film perforation and the locking arm locks the film transport means, the multiarm element remaining in this position until released by the shutter release member whereby the camera shutter is operated by the driving arm of the multiarm element moving under the spring bias provided by the tensioned shutter driving spring.

2. A photographic camera according to Claim 1 wherein the multiarm element includes an elongated hole which runs transverse to the direction of film transport, and by which the multiarm element is slidably and pivotably mounted on a pin.

3. Photographic camera according to Claim 1 or Claim 2 wherein the further arm of the multiarm element includes a lug which cooperates with the shutter release member.

4. Photographic camera according to Claim 3 wherein one end of the shutter release member includes two front surfaces which run at an acute angle with respect to each other, one of the front surfaces running approximately parallel to and the other transverse to the direction of film transport, which runs approximately parallel to the and wherein the lug on the further arm of the multiarm element cooperates with the front surface of the shutter release member in a position where the sensing arm is in contact with the film or engaged with a film perforation, the lug cooperating with the front surface of the shutter release member which runs transverse to the direction of film transport when the multiarm element is in a position where the shutter driving spring is tensioned and the locking arm locks the film transport means.

5. Photographic camera according to any one of the preceding Claims wherein the multiarm element is spring biased towards engagement with the film transport means

in the direction of the arrow B, the film 8 is moved in the direction of the arrow C. When a film perforation 8a reaches a position immediately below the sensing arm 1a, the arm 1a engages the perforation 8a in the direction of the arrow A. The sensing arm 1a is then conveyed by the film 8, during the remainder of the film transport operation.

During this operation, multiarm element 1 rotates about the pin 9 in the direction of the arrow D until the lug 1b, sliding in engagement with the release member 2 reaches the point of the end 2a. The multiarm element 1 then moves in the direction of the arrow E under the force of the leg spring 6 (see Fig. 2). During this movement, the sensing arm 1a disengages from the perforation 8a, and the locking arm 1c of the multiarm element 1 engages the locking teeth 4b of the film transport wheel 4 so that further film transport is prevented (see Fig. 3). The release member 2 is then free to pivot about pin 10 under the action of spring 5 and come to rest against a stop 12.

The film 8 has now reached its exposure position, any further movement being prevented by the engagement of the locking arm 1c with the locking teeth 4b.

During film transport and the movement of the multiarm element 1, the tension spring 7, which engages with the driving arm 1d of the multiarm element 1 is tensioned so that the multiarm element 1 is now held with a stored driving energy via its lug 1b engaging with the end 2a of the release member 2, as shown in Figure 3. In this position, the release member 2 acts as a movable stop for the multiarm member 1.

When the release member 2 is moved by the camera user in the direction of the arrow F by applying a force to an end 2b thereof, the end 2a releases the lug 1b which allows the multiarm element 1 to run-down in the direction of the arrow G under the action of the tension spring 7.

During this run-down, the driving arm 1d of the multiarm element 1 drives the shutter blade 3. During this movement of the multiarm element 1, the lug 1b reaches a position below the end 2a of the release member 2, as shown in Fig. 3 in dashed lines, and the locking arm 1c disengages from the locking teeth 4b of the film transport wheel 4.

When the camera user releases the release member 2, the multiarm element 1 is moved by the release member 2 under the action of the spring 5 in the direction of the arrow A, Figure 1, until it rests with the sensing arm 1a in contact with the film 8 and thus assumes its position described with respect to Fig. 1, ready for another exposure cycle.

WHAT WE CLAIM IS:—

1. A photographic camera for use with

a film having one perforation per frame, the camera including a pivotally mounted multiarm element comprising a sensing arm for sensing film perforations, a locking arm for locking a film transport means, a driving arm for driving the camera shutter, and a further arm cooperating with a shutter release member which exerts spring bias on the multiarm element to pivot the latter in a direction to urge the sensing arm against the film for engagement with a film perforation, and wherein upon engagement of the sensing arm with a film perforation and continued film transport, the multiarm element is pivoted so that a shutter driving spring is tensioned, and said further arm slides along the shutter release member until the multiarm element, under spring bias, assumes a position in which the shutter release member serves as a movable stop for the element and in which the sensing arm is withdrawn from the film perforation and the locking arm locks the film transport means, the multiarm element remaining in this position until released by the shutter release member whereby the camera shutter is operated by the driving arm of the multiarm element moving under the spring bias provided by the tensioned shutter driving spring.

2. A photographic camera according to Claim 1 wherein the multiarm element includes an elongated hole which runs transverse to the direction of film transport, and by which the multiarm element is slidably and pivotably mounted on a pin.

3. Photographic camera according to Claim 1 or Claim 2 wherein the further arm of the multiarm element includes a lug which cooperates with the shutter release member.

4. Photographic camera according to Claim 3 wherein one end of the shutter release member includes two front surfaces which run at an acute angle with respect to each other, one of the front surfaces running approximately parallel to and the other transverse to the direction of film transport, which runs approximately parallel to the and wherein the lug on the further arm of the multiarm element cooperates with the front surface of the shutter release member in a position where the sensing arm is in contact with the film or engaged with a film perforation, the lug cooperating with the front surface of the shutter release member which runs transverse to the direction of film transport when the multiarm element is in a position where the shutter driving spring is tensioned and the locking arm locks the film transport means.

5. Photographic camera according to any one of the preceding Claims wherein the multiarm element is spring-biased towards engagement with the film transport means



by a leg spring mounted on the shutter release member engaging with the multiarm element.

- 5 6. Photographic camera according to any one of the preceding Claims wherein the locking arm of the multiarm element co-operates with locking teeth of a film trans-

port wheel which forms part of the film transport means.

7. Photographic camera substantially as hereinbefore described with reference to, and as shown in the accompanying drawings. 10

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