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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 and more particularly to a shutter cocking and film transport device in such a camera.

In accordance with the present invention there is provided a photographic camera comprising a reciprocable slide which actuates shutter-cocking means during a first advance-and-return movement along a pre-determined path and which actuates film transport means during a second advance-and-return movement along said path.

In the accompanying drawings:—

Figure 1 is a perspective view of a photographic camera constructed in accordance with the present invention with the shutter cocking and film transport device in its initial position;

Figure 2 is a similar view to Figure 1 but with the shutter cocking and transport device at the end of the first advance-and-return movement of the actuating slide.

Referring to Fig. 1, an actuating slide 1 is slidably mounted in the camera by means of a slot 2 in the slide 1 which is engageable with pins 3 mounted on the camera body (not shown). Upon manual movement of the slide 1, against the force of a spring 4, in the direction of arrow A through a distance X, to the position shown in broken lines, a lug 5 on the slide 1 engages a lug 6 on a transmission slide 7. The transmission slide 7 is slidably mounted in the camera by means of a slot 8 engaged with a pin 9. Engagement of lugs 5 and 6 therefore causes the transmission slide 7 to move against the force of a spring 10 until it is latched by a claw 11 of a spring urged pivot-

ally mounted pawl 12, in the position shown in Fig. 2. The transmission slide 7 is provided with a lug 13 which, during movement of the slide 7, engages a lug 14 on a shutter member 15 to move the shutter member 15 against the force of a spring 16. During such movement of the shutter member 15 it engages a projection 17 on a second shutter member 18 to move the shutter member 18 against the force of springs 19 and 20. Therefore, the shutter members are held in the position shown in Fig. 2.

A lever 21 is mounted by a pivot 22 on a film transport slide 23, which is slidably mounted, by means of slots 24 and pins 25, in the camera. The lever 21 is urged, in the direction shown by arrow B, by a spring 26. In the position shown in Fig. 1, the lever 21 is prevented from rotating in a clockwise direction (as viewed from above) by a lug 27 secured to the transmission slide 7. Movement of the slide 7 in the direction A causes the lug 27 to move to a position in which it does not obstruct the lever 21.

The slide 1 may now be released and be returned by the spring 4 to its initial position. The lever 21 has now attained the position shown in Fig. 2.

Upon manual movement of the slide 1 for a second time in the direction A, the lug 5 engages the lever 21 to move the slide 23 in the direction A. The slide 23 is provided with a rack 28 which engages a gear 29. The gear 29 engages a gear 30 which is secured to a shaft 31 on which is mounted a film spool 32. Therefore, movement of the slide 23 in a direction A causes rotation of the film spool 32 in a clockwise direction (as viewed from above) to wind a film 33 thereon. The camera is provided with any known stop device (not shown) engageable with perforations of the film 33 to limit the stroke of the slide 1 when the next frame is reached.

The slide 1 is then released and returned to its initial position by the spring 4. The slide 23 also returns to the position shown in Fig. 2 under the influence of a spring (not

shown). The gear 29 is provided with a one-way clutch (not shown) such that during the return of the slide 23 to its initial position no motion is imparted to the film spool 32.

The camera is now ready for making an exposure. A shutter release button 34 is depressed, thus rotating the pawl 12 against the force of its spring 35 in a clockwise direction (as viewed in the drawings). The slide 7 is therefore released by the claw 11 of the pawl 12 and moves under the influence of the spring 10 toward its initial position. The shutter member 15 follows the slide 7 under the influence of the spring 16, thus uncovering an exposure aperture 36 of the camera. The shutter member 18 is controlled by a control means (not shown) and follows the shutter member 15 after a mechanical or electronic delay in order to cover the exposure aperture 36. The device has now returned to the position shown in Fig. 1 except that the film 33 has been advanced by one frame.

As mentioned above, the perforations on the film 33 control the film advance so that the length of film advanced is the same for each advance movement. However, as the film 33 is wound on to the spool 32, the diameter of the roll of film increases. Therefore, the amount of rotation of the spool 32 progressively decreases with each advance movement. Hence, as shown in Fig. 2, the film advance stroke of the slide 1 varies from a distance "y" at the beginning of the film to a distance "z" at the end of the film.

The lever 21 may be substituted by any other known means, such as electrically operated means, for effecting a change-over between the first and second advances of the slide 1. Also, the invention is not restricted to the specific form of shutter described.

The transmission slide 7 may be adapted to advance a flash-cube (not shown) and store energy for a percussion impact by means not shown, during movement of the slide 7 into the position shown in Fig. 2.

#### WHAT WE CLAIM IS:—

1. A photographic camera comprising a reciprocable slide which actuates shutter-cocking means during a first advance-and-return movement along a predetermined path and which actuates film transport means during a second advance-and-return movement along said path.

2. A photographic camera according to claim 1 wherein the reciprocable slide, dur-

ing its first advance movement, engages a transmission slide to cause movement of the transmission slide into latching engagement with latching means, the shutter being engaged and cocked by the transmission slide during its said movement.

3. A photographic camera according to claim 1 or 2 wherein the reciprocable slide, during its second advance movement, causes movement of a film transport slide by engagement with a resiliently urged lever which is pivotally mounted on the film transport slide and at least part of which lies in the path of the reciprocable slide during its second advance movement, the transport slide being geared to a film take-up spool to advance the spool during the said movement of the transport slide.

4. A photographic camera according to claims 2 and 3 wherein, at the start of the first advance movement of the reciprocable slide, a lug secured to the transmission slide prevents movement of the lever into said path of the reciprocable slide, wherein, during the first advance movement of the reciprocable slide, the lug moves into such a position as to allow movement of the lever into said path and a projection on the reciprocable slide moves into such a position as to prevent movement of the lever into said path, and wherein, towards the end of the first advance-and-return movement of the reciprocable slide, the lever is resiliently urged into the said path to establish a connection between the reciprocable slide and the transport slide.

5. A photographic camera according to any one of claims 1—4 wherein the first advance-and-return movement of the reciprocable slide is of a constant length and the second advance-and-return movement progressively decreases in length in response to increase, with each actuation of the film transport means, in the diameter of a roll of film formed by that which has been advanced through the camera.

6. A photographic camera according to any one of claims 1—5 wherein the first advance-and-return movement of the slide causes advancement of a flash cube inserted into the camera and causes the storage of energy for a percussion impact.

7. A photographic camera according to claim 1 constructed substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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shown). The gear 29 is provided with a one-way clutch (not shown) such that during the return of the slide 23 to its initial position no motion is imparted to the film spool 32.

The camera is now ready for making an exposure. A shutter release button 34 is depressed, thus rotating the pawl 12 against the force of its spring 35 in a clockwise direction (as viewed in the drawings). The slide 7 is therefore released by the claw 11 of the pawl 12 and moves under the influence of the spring 10 toward its initial position. The shutter member 15 follows the slide 7 under the influence of the spring 16, thus uncovering an exposure aperture 36 of the camera. The shutter member 18 is controlled by a control means (not shown) and follows the shutter member 15 after a mechanical or electronic delay in order to cover the exposure aperture 36. The device has now returned to the position shown in Fig. 1 except that the film 33 has been advanced by one frame.

As mentioned above, the perforations on the film 33 control the film advance so that the length of film advanced is the same for each advance movement. However, as the film 33 is wound on to the spool 32, the diameter of the roll of film increases. Therefore, the amount of rotation of the spool 32 progressively decreases with each advance movement. Hence, as shown in Fig. 2, the film advance stroke of the slide 1 varies from a distance "y" at the beginning of the film to a distance "z" at the end of the film.

The lever 21 may be substituted by any other known means, such as electrically operated means, for effecting a change-over between the first and second advances of the slide 1. Also, the invention is not restricted to the specific form of shutter described.

The transmission slide 7 may be adapted to advance a flash-cube (not shown) and store energy for a percussion impact by means not shown, during movement of the slide 7 into the position shown in Fig. 2.

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2. A photographic camera according to claim 1 wherein the reciprocable slide, dur-

ing its first advance movement, engages a transmission slide to cause movement of the transmission slide into latching engagement with latching means, the shutter being engaged and cocked by the transmission slide during its said movement.

3. A photographic camera according to claim 1 or 2 wherein the reciprocable slide, during its second advance movement, causes movement of a film transport slide by engagement with a resiliently urged lever which is pivotally mounted on the film transport slide and at least part of which lies in the path of the reciprocable slide during its second advance movement, the transport slide being geared to a film take-up spool to advance the spool during the said movement of the transport slide.

4. A photographic camera according to claims 2 and 3 wherein, at the start of the first advance movement of the reciprocable slide, a lug secured to the transmission slide prevents movement of the lever into said path of the reciprocable slide, wherein, during the first advance movement of the reciprocable slide, the lug moves into such a position as to allow movement of the lever into said path and a projection on the reciprocable slide moves into such a position as to prevent movement of the lever into said path, and wherein, towards the end of the first advance-and-return movement of the reciprocable slide, the lever is resiliently urged into the said path to establish a connection between the reciprocable slide and the transport slide.

5. A photographic camera according to any one of claims 1—4 wherein the first advance-and-return movement of the reciprocable slide is of a constant length and the second advance-and-return movement progressively decreases in length in response to increase, with each actuation of the film transport means, in the diameter of a roll of film formed by that which has been advanced through the camera.

6. A photographic camera according to any one of claims 1—5 wherein the first advance-and-return movement of the slide causes advancement of a flash cube inserted into the camera and causes the storage of energy for a percussion impact.

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