

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) CAMERA SHUTTER MECHANISM

(71) We, ERNST LEITZ G.m.b.H., of 6330 Wetzlar, Germany, a joint stock company organised under the laws of the Federal Republic of Germany, 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 shutter mechanism for a camera.

In single lens mirror reflex cameras it is known to take steps to ensure that the shutter cannot be released until the reflex mirror deflecting the rays to the viewfinder has been completely removed from the taking light path. In particular, the shutter release button may not actually release the shutter directly, but may release the mirror, which then swings and during the last part of its movement strikes a lever to cause operation of the shutter.

According to the present invention, there is provided a shutter mechanism for a camera, comprising a release rod actuable to operate a shutter and coupled to a taking light path barrier component, the arrangement being such that upon actuation the release rod moves to render the barrier component movable by urging means out of an operative position in the taking light path and that the barrier component during said movement thereof causes the release rod to execute further movement and thereby to release the shutter upon the barrier component having moved out of the taking light path.

In one embodiment, the mechanism comprises a catch lever so coupling the release rod to the barrier component that upon actuation the release rod pivots the catch lever in one sense out of a position in which the catch lever prevents movement of the barrier component out of the operative position, and that during said movement of the barrier component the latter pivots the catch lever further in said one sense.

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The mechanism may comprise a shutter release lever which is actuated by the release rod during the further movement of the release rod.

Suitably, the barrier component comprises a reflex mirror or a photoresistor of a light intensity measurement device.

The release rod may be actuable by a manually operable shutter release button.

By the arrangement of the components according to the invention the improvement may be achieved that a single release rod can be used to initiate movement of the barrier component out of the taking light path and then to release the shutter, so that in a general way a simplified construction of the mechanism is achieved.

An embodiment of the invention in a camera with through-the-lens exposure measurement and with a retractable photoresistor will now be more particularly described with reference to the accompanying drawings, in which:

Figure 1a is a diagrammatic front elevation view of the camera with a photoresistor in its operative positive in the taking light path and with the shutter mechanism in the cocked condition;

Figure 1b shows a part of the embodiment of Figure 1a in which the shutter mechanism is in the released condition;

Figure 2a is a diagrammatic front elevation view of the shutter mechanism in the cocked condition; and

Figure 2b is a side elevation view of the shutter mechanism shown in Figure 2a, in the released condition.

In Figure 1, 1 designates the body casing of a camera in which the photoresistor 3 has been swung into the taking light path of the lens in front of a camera aperture 2. The photoresistor 3 is held by a carrier arm 3a which is swivellable about a pin 4 and which is acted on by urging means in the form of a tension spring 5 which urges the carrier arm 3a to turn in the counter-clockwise direction out of the taking light path.

The carrier arm is prevented from turning out of the taking light path by a locking lever 6, which is rockable about a pin 7 and which at its end nearer the photoresistor is formed into a curve 6a. A pin 3b fastened on the carrier arm 3a lies against this curve, and the locking lever 6 is in turn prevented from rocking by a catch lever 9, one end of which engages behind a projection 6b on the locking lever 6. The catch lever 9 is in the form of a two-armed lever (Figure 2a) and is rockable about a pin 10.

The shutter of the camera is a roller-blind shutter moving from top to bottom, only the spindle 11 of the first shutter blind being shown in Figures 2a and 2b.

In Figures 1a and 1b the shutter elements (blinds and rollers) lie in front of the upper parts of the carrier arm and locking lever, and if shown, would have masked these elements.

As may be seen more particularly from Figures 2a and 2b, the spindle 11 is prevented from operating by means of a shutter release lever 12. This is likewise a two-armed lever which is rockable about a pin 12a and the front end of which engages in a slot in the spindle 11.

The catch lever 9 and the lever 12 are operatively coupled together by means of a release rod 14. The latter is articulated at its bottom end to the catch lever 9, while its upper end is bent over and this bent-over end is situated above the free end of the lever 12.

The release rod 14 is actuable by a shutter release button 15, which is supported by the body casing 1 and which is accessible outside the camera for manual operation by a user.

Figures 1a and 2a show in front and side views the components in the cocked position. The catch lever 9 holds the locking lever 6, and consequently the carrier arm 3a, in their swung-in position. Similarly, the lever 12 prevents the spindle 11 of the first shutter blind from operating. In this phase of operation the bent-over end of the release rod 14 is situated opposite, but at a distance from the free end of the lever 12. This distance may conveniently amount to 1.2 mm.

On the other hand, Figures 1b and 2b show the shutter mechanism after the photoresistor has been swung out of the light path and immediately before release of the spindle 11. It may be seen particularly from Figure 2b that the release button 15 has been pressed down. The catch lever 9 has thus been turned in the counter-clockwise direction, thereby freeing the projection 6b of the locking lever 6. Under the tension of the spring 5 the carrier arm 3a has thus likewise been able to turn in the counter-clockwise direction, and by means of the pin 3b to

press the locking lever 6 in the clockwise direction (Figure 1).

At the end of its movement the carrier arm 3a presses by means of its pin 3b against a pin 9a which is fastened on the front end of the catch lever 9. In Figure 2a the pin 3b is approaching the pin 9a from below. The moment of impact is illustrated in Figure 2b. As is likewise shown in Figure 2b in this position the release rod 14 lies with its bent-over end directly above the free end of the lever 12, and it is therefore easily understandable that the action of the pin 3b on the pin 9a leads to further rotation of the catch lever 9 in the counter-clockwise direction, while at the same time the release rod 14 is pulled down further. This second downward movement of the release rod likewise conveniently amounts to 1.2 mm., and in this way the bent-over end of the release rod 14 now also turns the lever 12 in the counter-clockwise direction, whereby the spindle 11 and the first shutter blind are freed for operation.

The entire mechanism is thus released in two stages, but by means of the same release rod 14. The pressure on the release button 15 moves the rod 14 downwards and effects the outward swinging of the photoresistor, the carrier arm of which acts on the release rod 14 to cause the latter to move further downwards, thereby finally releasing the shutter.

During winding-on of the film, which is accompanied by the recocking of the shutter, the photoresistor is again swung into the light path. This is effected with the aid of an element 16 which on the operation of a film transport and shutter cocking lever 17 is moved to- and-fro once in the direction of the double arrow A (Figure 1a) by means of an eccentric (not shown). The element 16 acts on the locking lever 6 and pivots the latter in the counter-clockwise direction until the catch lever 9 once again drops behind the projection 6b. By means of its curved portion, the locking lever 6 thus presses the carrier arm 3a back by means of pin 3b so that the photoresistor is once again situated in the light path of the lens.

WHAT WE CLAIM IS:—

1. A shutter mechanism for a camera, comprising a release rod actuable to operate a shutter and coupled to a taking light path barrier component, the arrangement being such that upon actuation the release rod moves to render the barrier component movable by urging means out of an operative position in the taking light path and that the barrier component during said movement thereof causes the release rod to execute further movement and thereby to release the shutter upon the barrier component having moved out of the taking light path.



The carrier arm is prevented from turning out of the taking light path by a locking lever 6, which is rockable about a pin 7 and which at its end nearer the photoresistor is formed into a curve 6a. A pin 3b fastened on the carrier arm 3a lies against this curve, and the locking lever 6 is in turn prevented from rocking by a catch lever 9, one end of which engages behind a projection 6b on the locking lever 6. The catch lever 9 is in the form of a two-armed lever (Figure 2a) and is rockable about a pin 10.

The shutter of the camera is a roller-blind shutter moving from top to bottom, only the spindle 11 of the first shutter blind being shown in Figures 2a and 2b.

In Figures 1a and 1b the shutter elements (blinds and rollers) lie in front of the upper parts of the carrier arm and locking lever, and if shown, would have masked these elements.

As may be seen more particularly from Figures 2a and 2b, the spindle 11 is prevented from operating by means of a shutter release lever 12. This is likewise a two-armed lever which is rockable about a pin 12a and the front end of which engages in a slot in the spindle 11.

The catch lever 9 and the lever 12 are operatively coupled together by means of a release rod 14. The latter is articulated at its bottom end to the catch lever 9, while its upper end is bent over and this bent-over end is situated above the free end of the lever 12.

The release rod 14 is actuable by a shutter release button 15, which is supported by the body casing 1 and which is accessible outside the camera for manual operation by a user.

Figures 1a and 2a show in front and side views the components in the cocked position. The catch lever 9 holds the locking lever 6, and consequently the carrier arm 3a, in their swung-in position. Similarly, the lever 12 prevents the spindle 11 of the first shutter blind from operating. In this phase of operation the bent-over end of the release rod 14 is situated opposite, but at a distance from the free end of the lever 12. This distance may conveniently amount to 1.2 mm.

On the other hand, Figures 1b and 2b show the shutter mechanism after the photoresistor has been swung out of the light path and immediately before release of the spindle 11. It may be seen particularly from Figure 2b that the release button 15 has been pressed down. The catch lever 9 has thus been turned in the counter-clockwise direction, thereby freeing the projection 6b of the locking lever 6. Under the tension of the spring 5 the carrier arm 3a has thus likewise been able to turn in the counter-clockwise direction, and by means of the pin 3b to

press the locking lever 6 in the clockwise direction (Figure 1).

At the end of its movement the carrier arm 3a presses by means of its pin 3b against a pin 9a which is fastened on the front end of the catch lever 9. In Figure 2a the pin 3b is approaching the pin 9a from below. The moment of impact is illustrated in Figure 2b. As is likewise shown in Figure 2b in this position the release rod 14 lies with its bent-over end directly above the free end of the lever 12, and it is therefore easily understandable that the action of the pin 3b on the pin 9a leads to further rotation of the catch lever 9 in the counter-clockwise direction, while at the same time the release rod 14 is pulled down further. This second downward movement of the release rod likewise conveniently amounts to 1.2 mm., and in this way the bent-over end of the release rod 14 now also turns the lever 12 in the counter-clockwise direction, whereby the spindle 11 and the first shutter blind are freed for operation.

The entire mechanism is thus released in two stages, but by means of the same release rod 14. The pressure on the release button 15 moves the rod 14 downwards and effects the outward swinging of the photoresistor, the carrier arm of which acts on the release rod 14 to cause the latter to move further downwards, thereby finally releasing the shutter.

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WHAT WE CLAIM IS:—

1. A shutter mechanism for a camera, comprising a release rod actuable to operate a shutter and coupled to a taking light path barrier component, the arrangement being such that upon actuation the release rod moves to render the barrier component movable by urging means out of an operative position in the taking light path and that the barrier component during said movement thereof causes the release rod to execute further movement and thereby to release the shutter upon the barrier component having moved out of the taking light path.

2. A mechanism as claimed in claim 1, comprising a catch lever so coupling the release rod to the barrier component that upon actuation the release rod pivots the catch lever in one sense out of a position in which the catch lever prevents movement of the barrier component out of the operative position, and that during said movement of the barrier component out of the operative catch lever further in said one sense.

3. A mechanism as claimed in either claim 1 or claim 2, comprising a shutter release lever which is actuated by the release rod during the further movement of the release rod.

4. A mechanism as claimed in any one of the preceding claims, wherein the barrier component comprises a reflex mirror.

5. A mechanism as claimed in any one of claims 1 to 3, wherein the barrier component comprises a photoresistor of a light intensity measurement device.

6. A mechanism as claimed in any one of the preceding claims, wherein the release rod is actuable by a manually operable shutter release button.

7. A shutter mechanism for a camera, substantially as hereinbefore described with reference to the accompanying drawings.

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