

PATENT SPECIFICATION

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(54) PHOTOGRAPHIC CAMERA

(71) We, BALDA-WERKE PHOTOGRAPHISCHE GERÄTE UND KUNSTSTOFF R. GRÜTER KG of 498 Bünde (Westf.), Steinmeisterstrasse 16-20, Germany, a German Company, 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:—

10 The invention relates to a photographic camera for roll film with one perforation hole per image frame, having a feeler member for this perforation and an operating lever for the shutter blade, which lever is under spring action and is pivotally mounted on a displaceable release element, the said lever, with winding of the film, being moved into a tensioning position against the action of a spring by projections formed on the winding wheel or sprocket, a flash cube mount or an intermediate wheel, and thereby unlatching the feeler member so that the said member is able to explore the film and on encountering a film perforation hole, to drop in and lock the film winding mechanism.

The Applicants have described examples of such cameras in Patent Specification No. 1,186,508 and also in Patent Specification No. 1,256,474, in which the several functions, such as actuation of the shutter blade and freeing and locking of the feeler member for the film perforations, are effected by means of an operating lever which is under spring action and is pivotally mounted on the displaceable release element.

The mechanism described in specification No. 1,256,474 particularly takes into account the use of synthetic plastics in camera construction and the trend to electronic shutters.

However, it has proved to be a disadvantage of this design that a relatively long release travel is necessary and that the feeler member has to be withdrawn by the

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release element from the film perforation holes during the release operation. This results in an undesired increase in the release force which, in many cases, in association with the long release travel, can lead to jerking at the instant of exposure and thus to blurred pictures.

In addition, it can be considered as a disadvantage that the operating lever is constructed as a two-armed lever which takes up space and of which the downwardly pointing lever arm must on release be positioned behind a fixed projection, in order to hold the operating lever in its tensioned position until the release point is reached. This holding action is necessary, because during the release movement the operating lever with its upwardly projecting lever arm leaves the effective range of the flash cube or intermediate wheel cam, which has transferred the operating lever during the winding of the film into the tensioned position and held it there in the end position. The present invention is concerned with the design of mechanism by which it is possible to obviate the disadvantages set forth and at the same time to simplify the assembly of the constructional elements concerned.

In accordance with the invention the feeler member is extracted from the film perforation hole directly or indirectly by the action of the operating lever during and/or after completion of the release phase.

In order to achieve this, the coating surfaces of the feeler member and operating lever may be so constructed and arranged with suitable return spring force that the quick return movement of the operating lever itself suffices to remove the feeler member from the film perforation hole. In this case at least one of those coating surfaces may advantageously be formed as an inclined plane.

With mechanism in accordance with the invention the force necessary for the release

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may be substantially reduced, since the kinetic energy of the quickly returning operating lever is used for removing the feeler member from the film perforation hole.

5 Furthermore, the release travel can be reduced to a minimum, because the cam on the flash cube or intermediate wheel takes over the releasing of the operating lever at the end of the release travel as well as the
10 tensioning and the holding in the tensioned position.

The operating lever can be constructed as a space-saving single-armed lever.

The invention is hereinafter more fully
15 explained by reference, by way of example, to the mechanism of a carrier in accordance with it, as shown in the accompanying drawings, in which:—

Figure 1 is a simplified view, omitting un-
20 essential details, showing the arrangement of the most important structural elements, such as an operating lever, feeler member, intermediate wheel or sprocket and shutter blade in the phase prior to winding the film
25 and setting the camera.

Figure 2 is a view similar to Figure 1, but in the phase in which the camera is set and ready for release;

Figure 3 is a similar view in the phase
30 in which the release member is pressed down, just before the instant of release;

Figure 4 is a similar view in the phase in which release is completed and in which the release member is still pressed down;
35 and

Figure 5 is a perspective view showing the spatial arrangement and also the coaction of the most important constructional elements.

40 As will be seen from the Figures, an intermediate wheel 2 is mounted in the top 1 of the camera by means of a stud 2e. The intermediate wheel 2 is connected to the gear of a film-winding handle
45 or a film-winding sprocket, so that the intermediate wheel 2 is also rotated when this film-winding sprocket is operated. On its underside 2a, the intermediate wheel 2 comprises at least four but preferably five
50 cams, of which for the purpose of simplicity only the cams 2b, 2c, and 2d are shown and mentioned. These cams 2b, 2c, 2d have an operative connection with the slide edge
55 10a of an operating lever 10, in a manner to be more fully explained. The operating lever 10 is under the action of a spring 9 and is rotatably mounted at the point 8 on a displaceable release slide member 4. In
60 addition, the operating lever 10 comprises a projecting impact nose 10e, which co-operates with an impact surface 14a of the shutter blade 14. On its upward pointing lever arm, the operating lever 10 has a bevel
65 surface 10c which acts as an inclined plane and which co-operates with the angled pro-

jection 11a of the feeler slide 11. The surface 10b which encloses the bevel surface 10c and is contained beneath the latter towards the right, serves as a locking surface (10b) for the feeler slide 11 or for the angled
70 projection 11a (Figures 1 and 4).

The release slide member 4 is under the influence of a spring 6, which pulls it into the rest position shown in Figure 1. Furthermore, the release slide member 4
75 displaceably mounted by means of two slots 4b and two fixed bearing pins 5. A release member 4a arranged on its upper end projects through an opening 1a in the camera top 1 and permits a reliable release. Also
80 provided for the operating lever 10 is a fixed projection 3, with a vertical bearing surface 3a, against which the operating lever 10 bears with its bearing surface 10d in its tensioned position according to Figure 2. The
85 shutter blade 14 is mounted on the bearing pin 15 and is held by the spring 16 in its rest position, for example, resting against a holding pin 18. The drop-shaped end section 14b of the shutter blade 14 covers the
90 shutter aperture 17 in the rest position.

The feeler slide 11 (Figure 5) comprises a feeler 11b co-operating with the film perforation 13a, and also a horizontally disposed angled projection 11a formed at right-
95 angles on the upright extension part 11c. As already mentioned, the said projection 11a co-operates with the bevelled surface 10c of the operating lever 10. There will be the usual provision (not illustrated in the simplified views of these drawings) for the slide
100 11 to engage the release member 4a when the feeler is withdrawn.

Figures 1 to 4 show the mechanism in four different phases of the movement cycle,
105 which are hereinafter fully described.

Figure 1 shows the mechanism before actuation of the film-winding sprocket, with the operating lever 10 untensioned. The release member 4a is locked by engagement
110 with the feeler slide 11 and the film-winding sprocket is free to be turned.

The operating lever 10 bears with its slide edge 10a on the cam 2b of the intermediate wheel 2 and the feeler slide 11 withdrawn
115 with its feeler 11b from the film perforation hole 13a is secured by means of its angled projection 11a by the locking surface 10b of the operating lever 10. If now the film winding sprocket is operated, the intermediate
120 wheel 2 connected to it is rotated and pivots the operating lever 10 against the action of the spring 9 and about its bearing point 8 into the position shown in Figure 2. In this case, at the end of this pivotal movement,
125 the feeler slide 11 is freed from the correspondingly formed locking surface 10b of the operating lever 10 and abuts under the action of a spring 12 (Figure 5) with its feeler
130 11b against the film 13. With the arrival of

a perforation hole 13a, the feeler drops into it, locking the film-winding sprocket in the usual way and moving out of engagement with the release member 4a which is thus freed for release.

Figure 2 shows the second phase after film-winding is completed. The film-winding sprocket is locked, the release member 4a is free, the feeler 11b of the feeler slide 11 lies in the film perforation hole 13a. The camera is ready for release.

The operating lever 10 is in its tensioned position, bears with its bearing surface 10d against a fixed bearing surface 3a of the projection 3 and is held in this position by the cam 2b of the intermediate wheel 2.

Figure 3 shows the third phase. The film-winding sprocket is still locked, and the camera is in a position just before the release with the release member 4a almost completely pressed down.

The operating lever 10 is in the tensioned position and the feeler 11b of the release slide 11 rests in the film perforation hole 13a.

With depression of the release member 4a, the operating lever 10 mounted on the release slide 4 also moved downwards (direction of arrow A), but is still held by the intermediate wheel cam 2b in its tensioned position. Depending on the height of the cam 2b, (2c, 2a), the release travel and thus the instant of release is variable within certain limits.

If now the slide edge 10a has left the region of the cam 2b, the operating lever 10 moves quickly under the action of the spring 9 into its rest position (direction of arrow B), whereupon its bevel surface 10c strikes the angled projection 11a of the feeler slide 11 from below and lifts the said slide with the feeler 11b out of the film perforation hole 13a (direction of arrow D, Figure 5) against the action of the spring 12, which is of suitably low strength.

Simultaneously with this rapid return movement impact nose 10e of the operating lever 10 strikes against the impact surface 14a of the shutter blade 14, which thereupon swings about its pivot 15 to uncover the shutter aperture 17.

Figure 4 shows the fourth phase in which the film-winding sprocket is still locked and the operating lever 10 is again in its reset position. The release member 4a is still completely depressed and the operating lever 10 lies with the locking surface 10b and the bevel surface 10c behind the angled projection 11a of the feeler slide 11, of which the feeler lies outside the film perforation hole 13a.

If now pressure on the release member 4a is removed, the operating lever 10 is moved back into its initial position shown in Figure 1 (direction of arrow

C), with its locking surface 10b sliding under the angled projection 11a of the feeler slide 11. Simultaneously the slide edge 10a is pushed in front of the next following cam 2d of the intermediate wheel 2, so that the movement cycle as explained can take place once again, after locking of the release member 4a and freeing of the film-winding sprocket. With this return movement of the operating lever 10, the impact nose 10e moves without any obstruction past the impact surface 14a of the shutter blade 14.

This return movement of the release slide 4 and operating lever 10, respectively, may also be employed in a modified construction to lift the feeler slide 11 with its feeler 11b out of the film perforation hole 13a by a suitably shaped vertically acting bevel surface 10c on the operating lever 10.

It is also possible to allow the extraction of the feeler slide 11 to be effected in two steps by an appropriately designed bevel surface 10c. For example, in a first step by the rapid return movement of the operating lever 10 by means of a radially acting surface element of the bevel 10c, and in a second step by the upward movement of the operating lever 10 with the removal of pressure from the release member and by means of a vertically acting surface element of the bevel 10c.

Naturally, the movement of the operating lever 10 into its tensioned position shown in Figure 2 can also be effected by a suitably arranged flash cube mount, which takes the place of the intermediate wheel and is also provided with cams, as can be seen from the Patent Specification initially referred to.

WHAT WE CLAIM IS:—

1. A photographic camera for roll film with one perforation hole per image frame, having a feeler member for this perforation and an operating lever for the shutter blade, which lever is under spring action and is pivotally mounted on a displaceable release element, the said lever being moved during the film-winding, by projections formed on the winding wheel, a flash cube mount or an intermediate wheel, against the action of a spring into a tensioned position and thereby unlatching the feeler member, so that the latter is able to explore the film and, with the arrival of a film perforation hole, is able to drop in and lock the film winding mechanism, in which the feeler member is extracted from the film perforation hole directly or indirectly by the action of the operating lever during and/or after completion of the release phase.

2. A camera according to claim 1, in which the coacting surfaces of the feeler member and operating lever are so constructed and arranged with suitable return



a perforation hole 13a, the feeler drops into it, locking the film-winding sprocket in the usual way and moving out of engagement with the release member 4a which is thus freed for release.

Figure 2 shows the second phase after film-winding is completed. The film-winding sprocket is locked, the release member 4a is free, the feeler 11b of the feeler slide 11 lies in the film perforation hole 13a. The camera is ready for release.

The operating lever 10 is in its tensioned position, bears with its bearing surface 10d against a fixed bearing surface 3a of the projection 3 and is held in this position by the cam 2b of the intermediate wheel 2.

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The operating lever 10 is in the tensioned position and the feeler 11b of the release slide 11 rests in the film perforation hole 13a.

With depression of the release member 4a, the operating lever 10 mounted on the release slide 4 also moved downwards (direction of arrow A), but is still held by the intermediate wheel cam 2b in its tensioned position. Depending on the height of the cam 2b, (2c, 2a), the release travel and thus the instant of release is variable within certain limits.

If now the slide edge 10a has left the region of the cam 2b, the operating lever 10 moves quickly under the action of the spring 9 into its rest position (direction of arrow B), whereupon its bevel surface 10c strikes the angled projection 11a of the feeler slide 11 from below and lifts the said slide with the feeler 11b out of the film perforation hole 13a (direction of arrow D, Figure 5) against the action of the spring 12, which is of suitably low strength.

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If now pressure on the release member 4a is removed, the operating lever 10 is moved back into its initial position shown in Figure 1 (direction of arrow

C), with its locking surface 10b sliding under the angled projection 11a of the feeler slide 11. Simultaneously the slide edge 10a is pushed in front of the next following cam 2d of the intermediate wheel 2, so that the movement cycle as explained can take place once again, after locking of the release member 4a and freeing of the film-winding sprocket. With this return movement of the operating lever 10, the impact nose 10e moves without any obstruction past the impact surface 14a of the shutter blade 14.

This return movement of the release slide 4 and operating lever 10, respectively, may also be employed in a modified construction to lift the feeler slide 11 with its feeler 11b out of the film perforation hole 13a by a suitably shaped vertically acting bevel surface 10c on the operating lever 10.

It is also possible to allow the extraction of the feeler slide 11 to be effected in two steps by an appropriately designed bevel surface 10c. For example, in a first step by the rapid return movement of the operating lever 10 by means of a radially acting surface element of the bevel 10c, and in a second step by the upward movement of the operating lever 10 with the removal of pressure from the release member and by means of a vertically acting surface element of the bevel 10c.

Naturally, the movement of the operating lever 10 into its tensioned position shown in Figure 2 can also be effected by a suitably arranged flash cube mount, which takes the place of the intermediate wheel and is also provided with cams, as can be seen from the Patent Specification initially referred to.

WHAT WE CLAIM IS:—

1. A photographic camera for roll film with one perforation hole per image frame, having a feeler member for this perforation and an operating lever for the shutter blade, which lever is under spring action and is pivotally mounted on a displaceable release element, the said lever being moved during the film-winding, by projections formed on the winding wheel, a flash cube mount or an intermediate wheel, against the action of a spring into a tensioned position and thereby unlatching the feeler member, so that the latter is able to explore the film and, with the arrival of a film perforation hole, is able to drop in and lock the film winding mechanism, in which the feeler member is extracted from the film perforation hole directly or indirectly by the action of the operating lever during and/or after completion of the release phase.

2. A camera according to claim 1, in which the coacting surfaces of the feeler member and operating lever are so constructed and arranged with suitable return



spring force that the rapid return movement of the operating lever itself suffices to withdraw the feeler member from the film perforation hole.

5 3. A camera according to claim 2, in which at least one of those coacting surfaces is formed as an inclined plane.

4. A camera according to claim 3, in which the operating lever comprises an inclined plane such that the first stage of the removal of the feeler member from the film perforation hole is effected by the rapid return movement of the operating lever and the rest of the removing operation is effected by the upward movement of the release element in its rest position.

5. A camera according to claim 3, in which the operating lever comprises an inclined plane such that the feeler member is extracted from the film perforation hole solely by the upward movement of the release element towards its rest position.

6. A camera according to any of claims 3 to 5, in which the said inclined plane is within a locking surface of the operating lever and is such that the holding or lock-

ing function of this surface is not impaired in any phase of the movement cycle of the operating lever.

7. A camera according to any preceding claim, in which cams on the winding sprocket, flash cube mount or intermediate wheel move the operating lever into its tensioned position and hold it there and also take over the holding of the operating lever during the release movement.

8. A camera according to claim 7, in which the release travel and/or the instant of release can be predetermined by choice of dimensions of the said cams.

9. A photographic camera in accordance with claim 1, having mechanism substantially as described with reference to the accompanying drawings.

SEFTON-JONES, O'DELL
& STEPHENS,
Chartered Patent Agents,
Beacon House,
113 Kingsway,
London, W.C.2.
For the Applicants.