

PATENT SPECIFICATION (11)

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(54) IMPROVEMENTS IN AND RELATING TO CAMERAS

(71) We, AGFA-GEVAERT AKTIEN-GESELLSCHAFT, a body corporate recognised under German Law, of Leverkusen, 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 cameras having electrical exposure control means and switch means for connecting the exposure control means to a power supply.

Previously proposed cameras have had two operating switches which are connected in parallel with one another, one switch being closed on actuation of a shutter release and other contact being closed later, for example, by a shutter control magnet. This procedure of bridging the operating switch by means of a further operating switch was adopted to make the duration of the period for which switches is closed independent of the duration of actuation of the shutter release. However, the greater the number of contacts provided in a camera, the greater the risk of susceptibility to failure due to dirtying of the contacts.

It is, therefore, an object of the invention to create a camera of the type outlined above which has a particularly simple operating switch, the actuation duration of which is independent of the duration of actuation of the release member.

The invention provides a camera which includes a shutter operating member, a locking member for the operating member, resilient means tending to urge the locking member into locking engagement with the operating member, electrical exposure control means and switch means comprising first and second resiliently mounted contacts arranged when engaged to connect the exposure control means to a power supply and the first contact being arranged to engage the locking member, and there is provided a shutter release arranged when moved from an initial position to drive the contacts into engagement and when the contacts are engaged to

drive the contacts together with the locking member against the action of the resilient means so that the operating member is released, the resilient means then so urging the locking member that the locking member tends to maintain the contacts in engagement with one another irrespective of the position of the shutter release until the operating member is returned to its initial position.

As the operating switch is simultaneously used as a mechanical connection between the locking member and the shutter release, the advantage is offered that only a single contact need be used as operating switch. When the shutter release is actuated, therefore, the second contact is initially moved towards the first contact, and they then both move together in the same direction. In addition, the locking member is also carried along in the same direction by means of the first contact. Consequently, after a certain actuation travel of the two contact springs the shutter operating member is released to operate the shutter. After the release of the shutter operating member by the locking member, the shutter release member can move in the opposite direction to the original direction of movement under the action of the resilient means driving the first and second contacts with it. During this phase of movement, the switch means remains closed. The movement of the contacts is limited by the camera shutter release.

By ensuring that the force retaining the contacts in engagement is determined substantially by the resilient means and not the shutter release, the time for which the switch means is closed is independent of the time for which the shutter release is actuated by a camera user.

Advantageously, there is provided a further contact so resiliently mounted that it tends to be urged in the direction of action of the resilient means and arranged to engage an extension of the operating member so that when the operating member is released the further contact engages the first contact to drive the first contact towards the second

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contact, the further contact being electrically connected to the second contact. Alternatively, there may be provided on the first contact an extension made of an insulating material which is arranged to engage the operating member, the resilient mounting of the first contact being so biased towards the second contact that when the operating member is released the first contact is urged into engagement with the second contact. These arrangements, by increasing the force between the contacts, substantially reduce contact bounce.

The locking member advantageously comprises a pivotable lever formed with a pawl to engage the operating member and an extension arranged to engage the first contact.

Three forms of camera constructed in accordance with the invention will now be described by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of part of a first form of camera,

Figs. 2a and 2b show two positions of the switch arrangement shown in Fig. 1,

Figs. 3a and 3b show two positions of a second form of switch, and

Figs. 4a and 4b show two positions of a third form of switch.

Throughout the accompanying drawings corresponding parts are denoted by the same reference numerals.

Referring now to Fig. 1, a release pin 1 is provided with a retaining pin 2 supported against a member 3 which is fixed relative to the camera body. The lower free end of the release pin 1 lies in contact with one end of a pivotable lever 4 which is subject to the action of a spring 5. The other end of the lever 4 lies beneath a spring contact 6 of an operating switch 7. A further spring contact 8 is arranged above the contact 6. Furthermore, the operating switch 7 has a pre-tensioned spring contact 9 which is in continuous electrical connection with the contact 6. The free end of the contact 9 lies in engagement with an angled end 10 of an extension 11 of a shutter operating member 12.

The shutter member 12 has a further extension 13 which is engaged by a pawl 14 to hold the shutter member 12 in an initial position. The release pawl 14 is subject to the action of a spring 15 and is pivotable about a pin 16. The release pawl 14 has an L-shaped extension 17, the angled end of which is arranged to lie just above the contact 8.

The shutter member 12 which is arranged to rotate about an axis 19 is subject to the action of a spring 18. There is a third extension 20 of the shutter member 12 against which rests a shutter opening blade 22 which is rotatable about a pin 21 and is subject to the action of a spring 23. Resting against

one side of the shutter opening blade 22 is a pin 25 of a shutter closing blade 24 the shutter closing blade being subject to the action of a spring 26. In addition, the closing blade 24 is held by a pawl 28 which is subject to the action of a spring 27 and can be operated by an electro-magnet 29. The electro-magnet 29 is connected to an electronic exposure control device 30 a power source 31 of which can be connected to the electronic exposure control device 30 by the contacts 6 and 8.

The sequence of operation is shown in Figs. 2a and 2b. As shown in Fig. 2a, the release pin 1 and the lever 4 are in their initial positions. The contacts 6 and 8 are not, therefore, in contact with one another. If the release pin 1 is now moved in the direction of the arrow A, the release lever 4 pivots in the direction of the arrow B against the action of the spring 5 and the contact 6 is moved upwards. Where the two contacts 6 and 8 come into contact, the voltage source 31 is connected to the electronic exposure control device 30 and is, therefore, switched on. As the release pin 1 is pressed further in the direction of the arrow A, the contact spring 8 is also moved upwards. The contact 8 then raises the pawl 14 by way of the L-shaped extension 17 against the action of the spring 15, thus releasing the shutter member 12, which moves in the direction of the arrow C under the action of the spring 18. The shutter blade 22 then follows the member 12 under the action of the spring 23.

During the movement of the shutter member 12 in the direction of the arrow C, the extension 10 releases the downwardly pre-tensioned contact 9 so that the contact 9 engages the contact 8.

The contact spring 8 is then in direct electrical contact with the contact 9 and, by way of the contact 9, with the contact 6.

If the release pin 1 is now released, the lever 4 pivots under the action of the spring 5 in the opposite direction to the arrow B, its initial position. The two contacts 6, 8 and 9 follow the lever 4 under the action of the spring 15 which engages the pawl 14. The force of the spring 15 determines the contact pressure between the two contacts 6 and 8 and the pretensioning force of the additional contact 9 increases this pressure. Fig. 2b shows the operating switch 7 in the operating state after release of the release pin 1.

Referring now to the form of switch shown in Figs. 3a and 3b, beneath the contact spring 8 there is a spacer member 35 made of insulating material which is supported on the shutter member 12. When a release member 36 is actuated, it is moved in the direction of the arrow D. Between the extension 17 and the contact 8 which is

downwardly tensioned, there is an insulating member 37.

When the release member 36 is actuated it carries the contact 6 upwards closing the contacts and then carrying the contact 8 upwards also.

The pawl 14 is thus pivoted in the direction of the arrow E against the force of the spring 15 and the shutter member 12 is released to run down in the direction of the arrow C. The contact force determined by means of the spring 15 is now additionally increased by the pre-tensioning force of the contact which is freed when the insulating member 35 is released by the shutter member 12.

In Fig. 3b, parts are shown in the position in which the release member 36 has been released by the camera-user.

The form of switch shown in Figs. 4a and 4b differs from the switch shown in Figs. 3a and 3b in that a contact screw 40 made of conductive material is provided which is conductively connected with the contact 6. The contact 8 is biased into a horizontal position and the insulating extension 35 omitted. If the release pin is operated, therefore, the member 36 moves in the direction of the arrow D and carries the contact 6 along with it in the direction of the arrow D. After the two contacts 6 and 8 have touched, the contact 8 is also carried in the direction of the arrow D. After a short travel, the contact 8 touches the contact screw 40. The two contacts 6 and 8 are thus conductively connected by way of the contact pin 40.

In Fig. 4b, the individual parts are shown in the position in which the release member 36 is released by the camera-user.

WHAT WE CLAIM IS:—

1. A camera which includes a shutter operating member, a locking member for the operating member, resilient means tending to urge the locking member into locking engagement with the operating member, electrical exposure control means and switch means comprising first and second resiliently mounted contacts arranged when engaged to connect the exposure control means to a power supply and the first contact being arranged to engage the locking member, and there is provided a shutter release arranged when moved from an initial position to drive the contacts into engagement and when the contacts are engaged to drive the contacts together with the locking member against the action of the resilient means so that the operating member is released, the resilient

means then so urging the locking member that the locking member tends to maintain the contacts in engagement with one another irrespective of the position of the shutter release until the operating member is returned to its initial position.

2. A camera as claimed in claim 1 wherein there is provided a further contact so resiliently mounted that it tends to be urged in the direction of action of the resilient means and arranged to engage an extension of the operating member so that when the operating member is released the further contact engages the first contact to drive the first contact towards the second contact, the further contact being electrically connected to the second contact.

3. A camera as claimed in claim 1 wherein there is provided on the first contact an extension made of an insulating material which is arranged to engage the operating member, the resilient mounting of the first contact being so biased towards the second contact that when the operating member is released the first contact is urged into engagement with the second contact.

4. A camera as claimed in claim 1, wherein there is provided an adjustable contact pin electrically connected to the second contact and so arranged that as the first and second contacts are driven to release the locking member the first contact is brought into engagement with the adjustable contact.

5. A camera as claimed in claim 1 or claim 4, wherein there is provided, on the first contact, insulation between the first contact and the locking member.

6. A camera as claimed in any one of claims 1 to 5, wherein the locking member comprises a pivotable lever formed with a pawl to engage the operating member and an extension arranged to engage the first contact.

7. A camera substantially as hereinbefore described with reference to and as shown in Figs. 1, 2a and 2b of the accompanying drawings.

8. A camera substantially as hereinbefore described with reference to and as shown in Fig. 1 of the accompanying drawings modified substantially as hereinbefore described with reference to and as shown in Figs. 3a and 3b or Figs. 4a and 4b of the accompanying drawings.

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downwardly tensioned, there is an insulating member 37.

When the release member 36 is actuated it carries the contact 6 upwards closing the contacts and then carrying the contact 8 upwards also.

The pawl 14 is thus pivoted in the direction of the arrow E against the force of the spring 15 and the shutter member 12 is released to run down in the direction of the arrow C. The contact force determined by means of the spring 15 is now additionally increased by the pre-tensioning force of the contact which is freed when the insulating member 35 is released by the shutter member 12.

In Fig. 3b, parts are shown in the position in which the release member 36 has been released by the camera-user.

The form of switch shown in Figs. 4a and 4b differs from the switch shown in Figs. 3a and 3b in that a contact screw 40 made of conductive material is provided which is conductively connected with the contact 6. The contact 8 is biased into a horizontal position and the insulating extension 35 omitted. If the release pin is operated, therefore, the member 36 moves in the direction of the arrow D and carries the contact 6 along with it in the direction of the arrow D. After the two contacts 6 and 8 have touched, the contact 8 is also carried in the direction of the arrow D. After a short travel, the contact 8 touches the contact screw 40. The two contacts 6 and 8 are thus conductively connected by way of the contact pin 40.

In Fig. 4b, the individual parts are shown in the position in which the release member 36 is released by the camera-user.

WHAT WE CLAIM IS:—

1. A camera which includes a shutter operating member, a locking member for the operating member, resilient means tending to urge the locking member into locking engagement with the operating member, electrical exposure control means and switch means comprising first and second resiliently mounted contacts arranged when engaged to connect the exposure control means to a power supply and the first contact being arranged to engage the locking member, and there is provided a shutter release arranged when moved from an initial position to drive the contacts into engagement and when the contacts are engaged to drive the contacts together with the locking member against the action of the resilient means so that the operating member is released, the resilient

means then so urging the locking member that the locking member tends to maintain the contacts in engagement with one another irrespective of the position of the shutter release until the operating member is returned to its initial position.

2. A camera as claimed in claim 1 wherein there is provided a further contact so resiliently mounted that it tends to be urged in the direction of action of the resilient means and arranged to engage an extension of the operating member so that when the operating member is released the further contact engages the first contact to drive the first contact towards the second contact, the further contact being electrically connected to the second contact.

3. A camera as claimed in claim 1 wherein there is provided on the first contact an extension made of an insulating material which is arranged to engage the operating member, the resilient mounting of the first contact being so biased towards the second contact that when the operating member is released the first contact is urged into engagement with the second contact.

4. A camera as claimed in claim 1, wherein there is provided an adjustable contact pin electrically connected to the second contact and so arranged that as the first and second contacts are driven to release the locking member the first contact is brought into engagement with the adjustable contact.

5. A camera as claimed in claim 1 or claim 4, wherein there is provided, on the first contact, insulation between the first contact and the locking member.

6. A camera as claimed in any one of claims 1 to 5, wherein the locking member comprises a pivotable lever formed with a pawl to engage the operating member and an extension arranged to engage the first contact.

7. A camera substantially as hereinbefore described with reference to and as shown in Figs. 1, 2a and 2b of the accompanying drawings.

8. A camera substantially as hereinbefore described with reference to and as shown in Fig. 1 of the accompanying drawings modified substantially as hereinbefore described with reference to and as shown in Figs. 3a and 3b or Figs. 4a and 4b of the accompanying drawings.

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