

PATENT SPECIFICATION

(11)

1 488 624

(10)

1 488 624

- (21) Application No. 10367/75 (22) Filed 12 March 1975
 (31) Convention Application No. 2 411 845
 (32) Filed 12 March 1974 in
 (33) Fed. Rep. of Germany (DT)
 (44) Complete Specification published 12 Oct. 1977
 (51) INT. CL.² G03B 15/03
 (52) Index at acceptance
 G2X 1K1 1K3A 1K6

(19)



(54) AN ADAPTER DEVICE FOR PHOTOGRAPHIC FLASH APPARATUS

(71) We, AGFA-GEVAERT AKTIEN-GESELLSCHAFT, a body corporate organised according to the laws of Federal Republic of Germany, of Leverkusen, 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 an adapter device for coupling an electronic flash apparatus to a camera having a striker member for operating percussive flash bulbs.

It is an object of the invention to create a device which will enable electronic flash apparatus to be used simply and reliably with cameras which are normally only suitable for use with percussive flash bulbs.

The invention provides an adapter device for coupling an electronic flash apparatus to a camera having a striker member for operating percussive flash bulbs, the device comprising switch means for firing an electronic flash apparatus and a delay mechanism which is so arranged that, when the device is mounted on the camera and the striker member is released, the striker member operates the delay mechanism and after a predetermined time delay the delay mechanism operates the switch means.

Advantageously, the delay mechanism comprises a retarding mass and resilient means tending to urge the mass in one direction, the arrangement being such that, in operation, the striker member urges the mass from a rest position in the other direction and, during movement of the mass under the action of the resilient means, the mass operates the switch means. Thus, in operation, the striker member applies an impulse to the mass which causes the mass to move, against the action of the resilient means. The switch means may be so arranged that it is operated by the mass either during the initial movement against the action of the resilient means, or during a return movement by means of the resilient means. The length of the delay will thus be determined by the size of the mass, the force exerted by the resilient

means and the total distance moved by the mass between leaving its rest position and operating the switch means.

Advantageously, the retarding mass is pivotably mounted and is arranged to operate the switch means after rotation through a predetermined angle from the rest position. The switch means may comprise a fixed contact and a spring contact and the mass includes a projection that is arranged to engage the spring contact to drive the spring contact into engagement with the fixed contact after rotation of the mass through the predetermined angle.

Preferably, the spring contact comprises a hairpin spring one arm of which is held in engagement with a second fixed contact and the other arm of which is arranged to cooperate with the projection on the mass.

The resilient means, advantageously, comprises a hairpin spring one arm of which is engaged with a first fixed contact and the other arm of which is arranged to engage an abutment on the mass to tend to urge the mass in the said one direction and during movement of the mass the said other arm is urged into engagement with a second fixed contact.

Advantageously, the adapter device includes a leaf spring which is arranged to engage the retarding mass when the mass is in the rest position and, in operation, to transmit an impulse from the striker member to the mass. The use of a leaf spring increases the initial force tending to resist rotation of the mass and thus tends to prevent unwanted movement of the mass by a striker member when the device is mounted on a camera. The rest force exerted by the leaf spring is, preferably, greater than the rest force exerted by the striker member.

Advantageously, the separation of the rest position of the mass and the position in which the switch means is operated is adjustable. There may be provided means for adjusting the force exerted by the resilient means on the retarding mass.

Three forms of adapter device constructed in accordance with the present invention will now be described, by way of example, with

reference to the accompanying drawings, in which:

Fig. 1 is a sectional elevation of a first form of adapter,

Fig. 2 is a sectional elevation of a second form of adapter, and

Fig. 3 is a sectional elevation of a third form of adapter.

Throughout the accompanying drawings, equivalent components have been given the same reference numerals.

Referring now to Fig. 1 of the accompanying drawings, a first form of adapter, indicated generally by the reference numeral 1, is shown inserted in a socket 2 of a camera 3. The adapter 1 has a housing 4 within which a retarding mass 6 is pivotally mounted on an axis 5. Looped round the axis 5 is a hairpin spring 7, one arm of which is supported on an abutment 8 in the housing, and the other arm of which is supported on a projection 9 on the mass 6. The force of the hairpin spring 7 acts in the opposite direction to that of the arrow A. A second hairpin spring 10, acting as a contact spring, is also arranged in the housing 4, and is looped round an axis 11 in the housing. One arm 10a of the hairpin spring 10 lies within the path of movement of the projection 9 on the mass 6, and is movable by the projection 9 into engagement with a fixed contact 12. The other arm 10b of the contact spring 10 rests against a fixed contact 13. The contacts 12 and 13 are electrically connected to a socket 14, provided on the adapter housing 4, for an electronic flash apparatus, which is not shown. When the mass 6 is in its rest position, a projection 15 provided on it rests against a fixed stop 16 in the housing 4. Provided in the camera 3 is a striker member 17 for firing percussive flash bulbs and which, on the release of the camera 3, applies an impulse to the mass 6, so that the mass is pivoted, against the force of the spring 7, in the direction of arrow A, and after a predetermined delay time closes the contacts 12 and 13.

To adjust the delay time, the contact spring 10 together with the contacts 12 and 13, may be displaced in a slot 18. It is also possible to mount the abutment 8 eccentrically to enable the force of the hairpin spring 7 on the mass 6 to be adjusted.

In the second form of adapter shown in Fig. 2 a hairpin spring 20, which acts as a contact spring is looped round the axis 5 of the mass 6. One arm 20a of the spring 20 is supported against the contact 12, and the other arm 20b is supported against a projection 21 on the mass 6. A further projection 22 on the mass 6 is urged by the action of the spring 20 against a leaf spring 23 one of the ends of which is clamped by a member 24, whilst the free end bears against an abutment 25 in the housing 4.

When the adapter 1 is mounted on the camera 3 the striker member 17 is disposed in a position corresponding to the position in which it would sense the presence or absence of a flash bulb and presses against the leaf spring 23.

If the release of the camera 3 is now effected, in a manner not shown the striker member 17 applies an impulse to the leaf spring 23, which impulse is transferred to the projection 22 on the mass 6, pivoting the mass in the direction of arrow A. After a delay time determined by the mass of the disc 6, by the force of the springs 20 and 23 and by the position of the contact 13 the arm 20b of the contact spring 20 strikes against the contact point 13 and thus causes the closure of the synchronous contact and consequently the firing of an electronic flash apparatus (not shown).

In the third form of adapter shown in Fig. 3 a synchronous contact 26, 27 is so arranged that a pin 28 on the mass 6 only actuates the contact after the return movement of the mass in the opposite direction to the arrow A. The striker member 17 applies an impulse, through the projection 9, to the mass 6 so that the mass is pivoted in the direction of arrow A. Simultaneously the spring 7 is put under tension. After rotation through a predetermined angle the direction of rotation of the disc reverses and the mass 6 returns, on account of its inertia, beyond its initial position into an operative position in which the synchronous contact 26, 27 is closed by the pin 28. Fixed stops 29 and 30 in the housing 4 and in contact with the synchronous contact 26, 27 simultaneously serve to locate the initial position of the disc 6.

WHAT WE CLAIM IS:—

1. An adapter device for coupling an electronic flash apparatus to a camera having a striker member for operating percussive flash bulbs, the device comprising switch means for firing an electronic flash apparatus and a delay mechanism which is so arranged that, when the device is mounted on the camera and the striker member is released, the striker member operates the delay mechanism and after a predetermined time delay the delay mechanism operates the switch means.

2. A device as claimed in claim 1, wherein the delay mechanism comprises a retarding mass and resilient means tending to urge the mass in one direction, the arrangement being such that, in operation, the striker member urges the mass from a rest position in the other direction and, during movement of the mass under the action of the resilient means, the mass operates the switch means.

3. A device as claimed in claim 2, wherein the retarding mass is pivotally mounted

15 accompanying drawings, a first form of adapter, indicated generally by the reference numeral 1, is shown inserted in a socket 2 of a camera 3. The adapter 1 has a housing 4 within which a retarding mass 6 is pivotally mounted on an axis 5. Looped round the axis 5 is a hairpin spring 7, one arm of which is supported on an abutment 8 in the housing, and the other arm of which is supported on a projection 9 on the mass 6. The force of the hairpin spring 7 acts in the opposite direction to that of the arrow A. A second hairpin spring 10, acting as a contact spring, is also arranged in the housing 4, and is looped round an axis 11 in the housing. One arm 10a of the hairpin spring 10 lies within the path of movement of the projection 9 on the mass 6, and is movable by the projection 9 into engagement with a fixed contact 12. The other arm 10b of the contact spring 10 rests against a fixed contact 13. The contacts 12 and 13 are electrically connected to a socket 14, provided on the adapter housing 4, for an electronic flash apparatus, which is not shown. When the mass 6 is in its rest position, a projection 15 provided on it rests against a fixed stop 16 in the housing 4. Provided in the camera 3 is a striker member 17 for firing percussive flash bulbs and which, on the release of the camera 3, applies an impulse to the mass 6, so that the mass is pivoted, against the force of the spring 7, in the direction of arrow A, and after a predetermined delay time closes the contacts 12 and 13.

20 To adjust the delay time, the contact spring 10 together with the contacts 12 and 13, may be displaced in a slot 18. It is also possible to mount the abutment 8 eccentrically to enable the force of the hairpin spring 7 on the mass 6 to be adjusted.

25 In the second form of adapter shown in Fig. 2 a hairpin spring 20, which acts as a contact spring is looped round the axis 5¹ of the mass 6¹. One arm 20a of the spring 20 is supported against the contact 12¹, and the other arm 20b is supported against a projection 21 on the mass 6¹. A further projection 22 on the mass 6¹ is urged by the action of the spring 20 against a leaf spring 23 one of the ends of which is clamped by a member 24, whilst the free end bears against an abutment 25 in the housing 4¹.

80 delay time determined by the mass of the disc 6¹, by the force of the springs 20 and 23 and by the position of the contact 13¹ the arm 20b of the contact spring 20 strikes against the contact point 13¹ and thus causes the closure of the synchronous contact and consequently the firing of an electronic flash apparatus (not shown).

85 In the third form of adapter shown in Fig. 3 a synchronous contact 26, 27 is so arranged that a pin 28 on the mass 6¹¹ only actuates the contact after the return movement of the mass in the opposite direction to the arrow A¹¹. The striker member 17¹¹ applies an impulse, through the projection 9¹¹, to the mass 6¹¹ so that the mass is pivoted in the direction of arrow A¹¹. Simultaneously the spring 7¹¹ is put under tension. After rotation through a predetermined angle the direction of rotation of the disc reverses and the mass 6¹¹ returns, on account of its inertia, beyond its initial position into an operative position in which the synchronous contact 26, 27 is closed by the pin 28. Fixed stops 29 and 30 in the housing 4¹¹ and in contact with the synchronous contact 26, 27 simultaneously serve to locate the initial position of the disc 6¹¹.

WHAT WE CLAIM IS:—

1. An adapter device for coupling an electronic flash apparatus to a camera having a striker member for operating percussive flash bulbs, the device comprising switch means for firing an electronic flash apparatus and a delay mechanism which is so arranged that, when the device is mounted on the camera and the striker member is released, the striker member operates the delay mechanism and after a predetermined time delay the delay mechanism operates the switch means.
2. A device as claimed in claim 1, wherein the delay mechanism comprises a retarding mass and resilient means tending to urge the mass in one direction, the arrangement being such that, in operation, the striker member urges the mass from a rest position in the other direction and, during movement of the mass under the action of the resilient means, the mass operates the switch means.
3. A device as claimed in claim 2, wherein the retarding mass is pivotally mounted

