

Photographic Shutter and Flash Actuating Mechanism

The invention relates to a photographic shutter and flash actuating mechanism of the type usable with a piezo-electric generator.

5 Publication 17,049 in the British journal "Research Disclosure" of June 1978, discloses a photographic camera with a shutter and a flash actuating mechanism of the generic type. A drive member, specifically, a leaf spring, has a free end movable
10 from a cocked position to a released position. A flash hammer mounted on the spring is movable into contact with a piezo-electric generator to fire a flash. A mechanical pulse produced by the hammer is transmitted by the piezo-electric generator to a
15 shutter blade resting against said generator, as a result of which the blade swings open rapidly. In the case of other embodiments of this known camera, the piezo-electric generator is arranged directly on the striking spring or on the shutter blade itself,
20 and the firing pulse is transmitted directly to the shutter blade.

With such device, synchronization of flash and shutter is assured, but it is restricted to certain camera configurations, that is, the shutter must
25 be opposite the drive member and the generator must be mounted to transmit the mechanical pulse.

It is the object of the invention to provide a shutter and flash actuating mechanism which provides reliable synchronisation and does not have the space
30 restrictions of the prior art.

According to the present invention there is provided a shutter and flash activating mechanism for a camera having a piezo-electric generator for firing a flash, the mechanism having a drive member movable
35 between a cocked and a released position, a hammer mounted on the drive member for engagement with the generator on movement to its released position, and a shutter driver mounted on or integral with the drive member for movement with the drive member characterised

in that the shutter driver is arranged for continued movement, upon the drive member reaching its released position, to actuate the shutter whereby to synchronise the opening of the shutter with the firing of a flash.

5 Advantageously, the drive member is designed as a leaf spring which is fixed at the end opposite the free end. The flash hammer is arranged between said shutter driver and the fixed end. To facilitate movement of the portion of the spring between the
10 flash hammer and the shutter driver, that portion has a reduced cross-section in comparison with the rest of the leaf spring.

 As a result of the design, a shutter and flash actuating mechanism is provided which is inex-
15 pensively manufactured and assembled, fits into camera space conveniently, and provides synchronized operation.

 The drawing shows a schematic view of the shutter and flash actuating mechanism.

20 The shutter and flash actuating mechanism to be described can be accommodated in a camera housing of any type. However, for sake of simplicity and clarity it is assumed that all elements of the device are arranged on one component 3 of the camera.

25 A leaf spring 2 mounted at its one end on a pin 3c by means of a bore hole serves as a drive member of a shutter blade 7 and as a striking member for a piezo-electric generator 4.

 The pin 3c is located on one of two oppositely arranged clamping portions 3a and 3b whose
30 surfaces facing each other have the shape of a roof. The leaf spring 2 is clamped between portions 3a and 3b. A portion 2d of the leaf spring 2, bent-off in an inclined manner, facilitates assembly of the leaf
35 spring with the pin 3c.

 The free end of the leaf spring 2 has a

portion 2a whose cross-section is reduced in comparison with the rest of the leaf spring. A shutter driver 2c is attached to the outer end of said reduced portion, which shutter driver is associated with the shutter blade 7.

A flash hammer 2b is arranged on the outer end of the broader part of the leaf-spring 2, said hammer being associated with the piezo-electric generator 4. Both said flash hammer 2b and said shutter driver 2c could be made integral with the drive member 2.

The shutter blade 7 is pivotably mounted about an axle 5 and is biased clockwise by a leg spring 8 into contact with a projection 3e of a ring portion 3d encircling the taking raypath 9.

The mechanism has the following mode of operation:

In the drawing, the mechanism is shown in its released position in which the shutter blade 7 is arranged in the raypath 9.

To render the camera ready for exposure, the leaf spring 2 is moved to its cocked position indicated in dash-dotted lines by means not illustrated, for instance, by means associated with the film transport device or the body release.

When in its cocked position, the free end of the leaf spring 2 engages a hook 1a of a release 1 pivotable about a mount 6.

For making an exposure, the release 1 is depressed. During this operation, it pivots counter-clockwise so that its hook 1a releases the cocked leaf spring 2 for run-down movement.

During this operation, the running down leaf spring 2 strikes the piezo-electric generator 4 with its flash hammer 2b which moves clockwise. In a known manner, the generator produces an electric

firing pulse for firing a flash lamp not illustrated.

The run-down movement of the broader part of the leaf spring 2 is interrupted abruptly when the flash hammer 2b of said spring strikes the piezo-electric generator 4.

However, the narrower portion 2a of the leaf spring 2 and the shutter driver 2c attached thereto continue to move clockwise due to the mass of the shutter driving hammer 2c and the reduced cross-section of portion 2a and as a result of the kinetic energy still effective in the narrower portion 2a.

During this operation, the shutter driver 2c actuates the shutter by striking a driving arm 7a of the shutter blade 7 and rapidly moving it counter-clockwise opposite to the action of the leg spring 8 so that the taking raypath 9 is cleared and an exposure takes place.

By predetermining the moments at which the flash is fired and the shutter opened, synchronism of both operations is ensured.

After the exposure has taken place, leg spring 8 moves the shutter blade 7 back into its closing position shown.

Although in the case of the mechanism described, firing of the flash and the run-down movement of the shutter are synchronized, firing of the flash can be prevented without the actual concept of this mechanism having to be changed.

This requires only that a cover means (not illustrated) be inserted between the piezo-electric generator 4 and the associated flash hammer 2b, for example by means of a slider which can be actuated from outside the camera or in response to the absence or presence of a flash lamp, so that the running down leaf spring 2 does not cause firing of the flash but

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drives the shutter blade 7 as described.

5 The invention can also be used with a double-blade shutter instead of the single-blade shutter. In such case, the opening blade is rapidly moved into its open position as described and the exposure is controlled again by a closing blade in response to illumination.

10 The mechanism described can also be used for driving a multiple-blade shutter controlled by a driving ring such that the shutter driver 2c then moves a shutter blade driving ring.

15 The drive member can also be designed as a rectilinearly moving slider acting on the piezo-electric generator. In that case, a mass portion in the form of a pivoting arm is arranged on said slider, said mass portion being positioned transverse to the direction of movement of said slider, pivotably mounted and biased by a spring of low force opposite to the direction in which the
20 slider runs down.

As soon as the running down slider is abruptly stopped when striking the piezo-electric generator, the free end of the pivoting arm mounted thereon pivots due to its kinetic energy and actuates
25 a shutter of the type described above.



Claims

1. A shutter and flash activating mechanism for
a camera having a piezo-electric generator for firing
a flash, the mechanism having a drive member movable
5 between a cocked and a released position, a hammer
mounted on the drive member for engagement with the
generator on movement to its released position, and
a shutter driver mounted on or integral with the drive
member for movement with the drive member characterised
10 in that the shutter driver is arranged for continued
movement, upon the drive member reaching its released
position, to actuate the shutter whereby to synchron-
ise the opening of the shutter with the firing of a
flash.
 - 15 2. A mechanism as claimed in claim 1 wherein the
drive member is fixed adjacent one end, the shutter
driver is mounted between the hammer and the free end of
drive member and towards the free end thereof.
 - 20 3. A mechanism as claimed in claim 2 wherein the
drive member is a leaf spring having a portion of re-
duced cross-section between the hammer and the shutter
driver.
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