

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO FOLDING SELF-PROCESSING PHOTOGRAPHIC CAMERAS

(71) We, EASTMAN KODAK COMPANY, a Company organized under the Laws of the State of New Jersey, United States of America of 343 State Street, Rochester, New York 14650, United States of America, 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 invention relates to a folding self-processing photographic camera with an electric motor drive and having a housing on which a wall portion is pivotally mounted which wall portion carries at its free end a lens and an exposure device. As is conventional with self-processing cameras, the camera further comprises a pair of rollers for processing exposed film units conveyed to the pair of rollers by means of a claw driven by the motor, and also a camera release member.

An object of the present invention is the provision of a camera of the type mentioned above, where the electric motor drive can, if desired, also be employed for other functions, such as cocking the shutter.

According to the present invention, there is provided a folding self-processing photographic camera with an electric motor drive, the camera comprising a camera housing on which a wall portion is pivotally mounted, by one end, and carries, at its free end, a lens and an exposure device there being light-tight, folding bellows arranged between the lens and the housing, the camera further comprising a pair of rollers for processing exposed film units conveyed to the pair of rollers by means of a claw driven by the electric motor, and also a camera release member, wherein the camera release member is arranged in the camera housing and, via a mechanical transmission, is connected to the exposure device, and wherein the mechanical transmission serves to release and re-cock the exposure device.

The invention will be described further,

by way of example with reference to the accompanying drawings, in which:—

Fig. 1 shows, diagrammatically, a camera in accordance with the invention in cross-section;

Fig. 2 shows the camera of Fig. 1 viewed in the direction of the arrow "A";

Fig. 3 is a graphic illustration of transmission elements of a camera as in Fig. 1; and

Fig. 4 shows a further embodiment of a camera in cross-section.

A self-processing camera according to an embodiment of the invention, comprises a housing 11 and a wall portion 13 which can be unfolded and which is mounted on said housing about an axis 12. This wall portion carries at its free end, in a front portion 54, a lens 14 and an exposure device comprising a shutter arrangement 44, 46 and a diaphragm central lever and blade 25, 26 (see Fig. 3). Folding light-tight bellows 17 are arranged between the lens 14 and the housing 11. A wall portion 55 (Fig. 2), opposite the wall portion 13, is hinged to the front portion 54 and forms part of the rear wall of the camera when the camera is folded up. A release member 18 is arranged to be displaceable in the camera housing 11.

A mechanical transmission is arranged between the release member 18 and the exposure device 25, 26 and 44, 46. Its make-up and function will be described below.

The transmission serves to set the diaphragm arrangement 25, 26 to form a working aperture and to return same to its initial condition. It further serves to release and cock the shutter arrangement 44, 46 and to trigger and tension a flash ignition means 19 (Fig. 3).

The transmission comprises a two-armed lever 20 pivotally mounted on a stud 21 on the wall portion 13. The lever 20 engages by that arm thereof which extends into the camera, one arm of an elbow lever 22, pivotable about a shaft 23, whose free arm is engaged by the release member 18. A

spring 24 urges the lever 20 into an initial position.

The arm of the lever 20 which extends into the front portion 54 co-operates firstly with the diaphragm control lever 25 for setting the diaphragm blade 26 and secondly with a control slider 27. The latter co-operates with the shutter blades 44, 46 and also with the piezo-electric flash ignition means 19. A pawl 30 holds the control slider 27 in its initial position against the force of a drive spring 31. A lug 32 of this pawl 30 projects into the path of movement of the forward arm of the lever 20.

For the purpose of transporting exposed film units 49 from the exposure position, the camera housing 11 further contains a claw 33 which is set into reciprocal motion via an electric motor 34, gears 35, a cam disc 36 and a rocker arm 37.

When the release member 18 is actuated in the direction of the arrow "B" (Fig. 3) the lever 20 is pivoted clockwise by way of the angular lever 22. Said lever 20 thereby leaves the stop 38 of the control slider 27 which latter remains in its position on account of the pawl 30. At the same time the lever 20 pivots the diaphragm control lever 25, against the action of the spring 40, which lever 25, in turn, co-operates with the diaphragm blade 26 by way of a pin 39.

By the time the diaphragm blade 26 has moved in front of the lens aperture 41, the forward arm of the lever 20 has reached the lug 32 and unlatches the pawl 30. The force of the drive spring 31 draws the control slider 27 in the direction of the arrow "C", during which movement a pin 42 engages and pivots a detent 43, mounted on a shutter plate 56, out of blocking engagement with the shutter opening blade 44. The latter moves to uncover the lens aperture 41 under the action of the force of spring 45.

The closing blade 46 follows, in dependence upon a timing device (not illustrated) covering the lens aperture 41 once more.

The piezo-electric flash ignition means 19 is also triggered in that a pawl 47 is pivoted whereby a pretensioned striking element 48 is released.

Following the completion of an exposure operation, the respective film unit 49 which has been exposed is conveyed to the processing rollers 50 by the claw 33, driven by the electric motor, on the return stage of the reciprocal movement of the claw 33. The processing rollers cause the processing solution to be distributed over the exposed image surface and the developing photograph to be ejected from the camera.

The forward stage of the reciprocal movement of the claw 33 is used to cock the shutter arrangement 44, 46, to tension the flash ignition means 19, and to return the diaphragm blade 26 to its initial position.

For this purpose, the claw 33 is arranged to engage, by a forked portion 51 thereof, the arm of the elbow lever 22 which is in engagement with the lever 20, rotating said lever 22 clockwise and, simultaneously, the lever 20 anticlockwise. The forward arm of the lever 20 engages the stop 38 on the control slider 27, lifting the latter against the bias of the spring 31 until it is held by the pawl 30. The diaphragm control-lever 25 simultaneously follows the arm of lever 20 due to the spring 40, moving the diaphragm blade 26 back from the lens aperture 41 into its initial position.

The pin 42 disengages the detent 43 which pivots into the run-down path of the opening blade 44. Via a cam 52 of the control slider 27, the opening blade 44 is pivoted back into its aperture covering position again, in front of the lens aperture 41, and is held there by the detent 43. As it pivots back, the opening blade 44 moves the closing blade 46 into its open, initial position via a stop on the opening blade. At the same time, the flash ignition means 19 is tensioned once more via a lug 53 of the control slider 27.

The release of the exposure device for operation and the cocking thereof into its ready position, in spite of the fact that the release member 18 is arranged in the housing 11, is simplified by using the mechanical transmission 22, 20, 27.

Fig. 4 shows a further embodiment featuring two two-armed levers 20a and 20b instead of a single lever 20. The lever 20a serves to actuate the shutter arrangement 44, 46 whereas the lever 20b is associated with the diaphragm arrangement 25, 26. In a corresponding manner the elbow lever 22 has three arms, one actuated by the release and one co-operating with each of levers 20a and 20b. This arrangement of two levers makes factory adjustment, in relation to the shutter and diaphragm arrangement, easier. The camera corresponds to that described with reference to Figs. 1 to 3 as far as the other aspects of its construction are concerned.

A further advantageous development of the camera is to have the connection points between the lever 20, or levers 20a and 20b, and the elbow lever 22 in the region of the pivot axis 12 and to retain these positive connections even when the wall portions 13 and 55 are folded together. This measure makes the operation of the camera more reliable and the adjustment of its components simpler.

WHAT WE CLAIM IS:—

1. A folding self-processing photographic camera with an electric motor drive, the camera comprising a camera housing on which a wall portion is pivotally mounted, 130

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spring 24 urges the lever 20 into an initial position.

The arm of the lever 20 which extends into the front portion 54 co-operates firstly with the diaphragm control lever 25 for setting the diaphragm blade 26 and secondly with a control slider 27. The latter co-operates with the shutter blades 44, 46 and also with the piezo-electric flash ignition means 19. A pawl 30 holds the control slider 27 in its initial position against the force of a drive spring 31. A lug 32 of this pawl 30 projects into the path of movement of the forward arm of the lever 20.

For the purpose of transporting exposed film units 49 from the exposure position, the camera housing 11 further contains a claw 33 which is set into reciprocal motion via an electric motor 34, gears 35, a cam disc 36 and a rocker arm 37.

When the release member 18 is actuated in the direction of the arrow "B" (Fig. 3) the lever 20 is pivoted clockwise by way of the angular lever 22. Said lever 20 thereby leaves the stop 38 of the control slider 27 which latter remains in its position on account of the pawl 30. At the same time the lever 20 pivots the diaphragm control lever 25, against the action of the spring 40, which lever 25, in turn, co-operates with the diaphragm blade 26 by way of a pin 39.

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The closing blade 46 follows, in dependence upon a timing device (not illustrated) covering the lens aperture 41 once more.

The piezo-electric flash ignition means 19 is also triggered in that a pawl 47 is pivoted whereby a pretensioned striking element 48 is released.

Following the completion of an exposure operation, the respective film unit 49 which has been exposed is conveyed to the processing rollers 50 by the claw 33, driven by the electric motor, on the return stage of the reciprocal movement of the claw 33. The processing rollers cause the processing solution to be distributed over the exposed image surface and the developing photograph to be ejected from the camera.

The forward stage of the reciprocal movement of the claw 33 is used to cock the shutter arrangement 44, 46, to tension the flash ignition means 19, and to return the diaphragm blade 26 to its initial position.

For this purpose, the claw 33 is arranged to engage, by a forked portion 51 thereof, the arm of the elbow lever 22 which is in engagement with the lever 20, rotating said lever 22 clockwise and, simultaneously, the lever 20 anticlockwise. The forward arm of the lever 20 engages the stop 38 on the control slider 27, lifting the latter against the bias of the spring 31 until it is held by the pawl 30. The diaphragm control lever 25 simultaneously follows the arm of lever 20 due to the spring 40, moving the diaphragm blade 26 back from the lens aperture 41 into its initial position.

The pin 42 disengages the detent 43 which pivots into the run-down path of the opening blade 44. Via a cam 52 of the control slider 27, the opening blade 44 is pivoted back into its aperture covering position again, in front of the lens aperture 41, and is held there by the detent 43. As it pivots back, the opening blade 44 moves the closing blade 46 into its open, initial position via a stop on the opening blade. At the same time, the flash ignition means 19 is tensioned once more via a lug 53 of the control slider 27.

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A further advantageous development of the camera is to have the connection points between the lever 20, or levers 20a and 20b, and the elbow lever 22 in the region of the pivot axis 12 and to retain these positive connections even when the wall portions 13 and 55 are folded together. This measure makes the operation of the camera more reliable and the adjustment of its components simpler.

WHAT WE CLAIM IS:—

1. A folding self-processing photographic camera with an electric motor drive, the camera comprising a camera housing on which a wall portion is pivotally mounted,



by one end, and carries, at its free ends, a lens and an exposure device, there being light-tight, folding bellows arranged between the lens and the housing, the camera further comprising a pair of rollers for processing exposed film units conveyed to the pair of rollers, by means of a claw driven by the electric motor, and also a camera release member, wherein the camera release member is arranged in the camera housing and, via a mechanical transmission, is connected to the exposure device, and wherein the mechanical transmission serves to release and recock the exposure device.

2. A camera as claimed in Claim 1, wherein the mechanical transmission comprises a two-armed lever which is mounted on the wall portion and is directly or indirectly connected by a camera arm with the release member and by the other arm which extends forwardly, with the exposure device.

3. A camera as claimed in Claim 2, wherein the camera arm of the two-armed lever is connected with an elbow lever pivotable by the release member, and the forwardly extending arm of the two-armed lever is associated with a diaphragm control lever and a control slide by which the release of the shutter and, if desired, the synchronous actuation of a flash ignition means can be controlled.

4. A camera as claimed in Claim 3, wherein, during idle movement of the claw

it engages the camera arm of the two-armed lever, or the angular lever which is in engagement with said arm, whereby the lever can be pivoted in the opposite direction to that associated with release, and the exposure device and, if provided, the flash ignition means can be returned to their tensioned, ready positions.

5. A camera as claimed in Claim 1 wherein the mechanical transmission comprises two two-armed levers pivotally mounted on the wall portion, one of the levers being associated with a diaphragm arrangement and the other of the levers with the shutter arrangement.

6. A self-processing photographic camera as claimed in any of Claims 1 to 5, wherein the two-armed lever or levers is or are positively connected to the release member or to the elbow lever pivotable thereby and that the connection point or points are located in the region of the pivotal axis of the wall portion and also that the positive connection between these components is retained even when the wall portion is folded into the housing.

7. A self-processing photographic camera substantially as hereinbefore described with reference to and as illustrated in Figs. 1 to 3 or Figs. 1 to 3 as modified by Fig. 4 of the accompanying drawings.

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