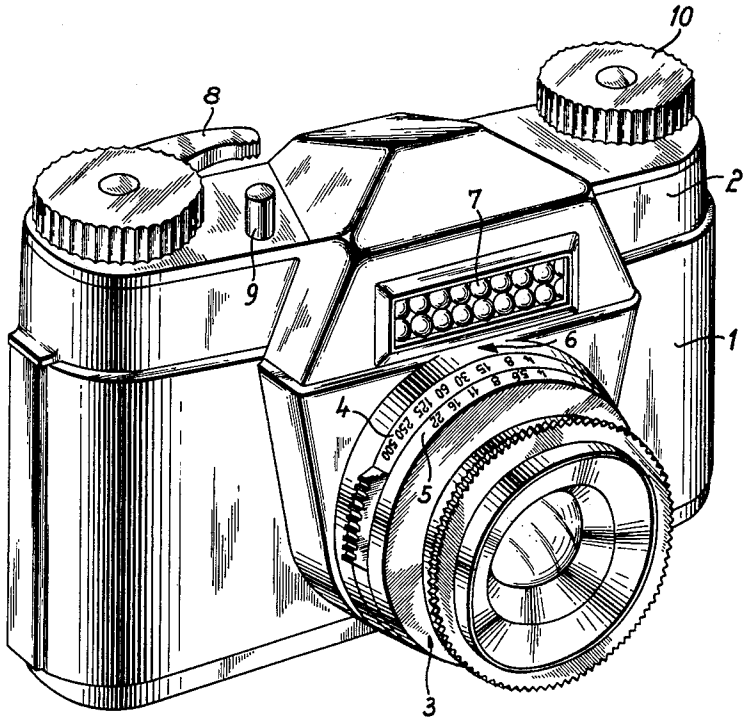
Jan. 29, 1963 W. REICHE 3,075,443

SINGLE LENS PHOTOGRAPHIC REFLEX CAMERA

Filed May 11, 1959

3 Sheets-Sheet 1

FIG. 1



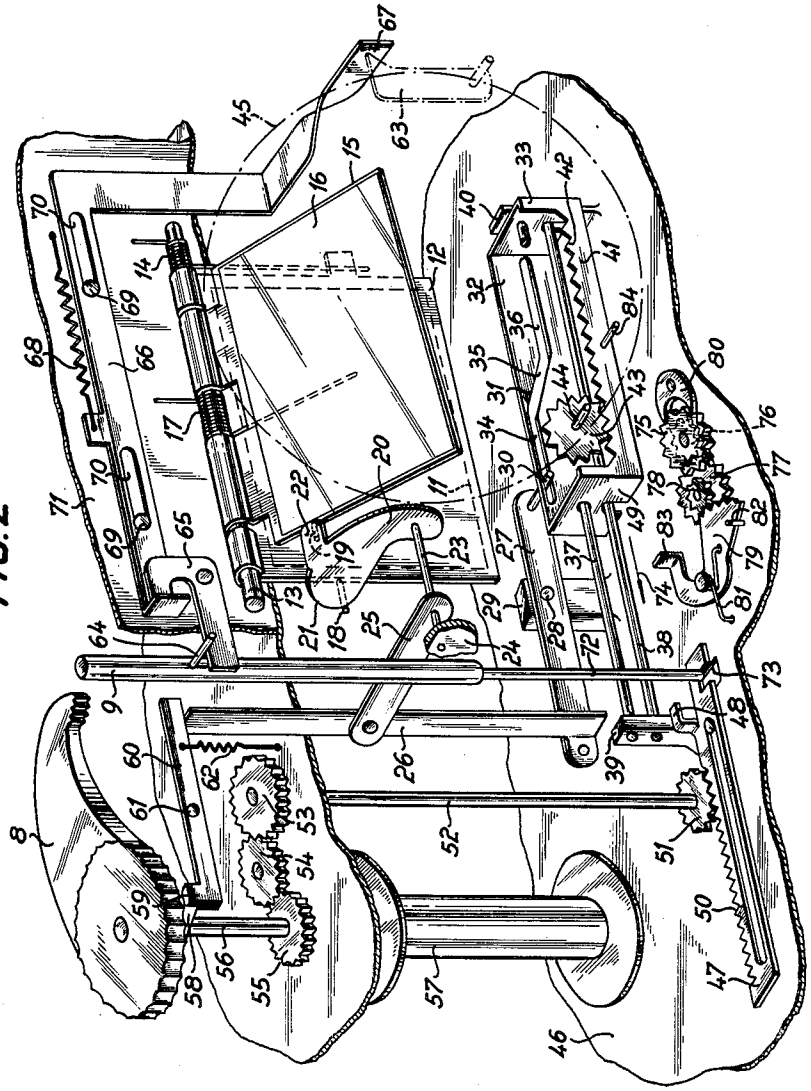
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SINGLE LENS PHOTOGRAPHIC REFLEX CAMERA

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FIG. 2



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SINGLE LENS PHOTOGRAPHIC REFLEX CAMERA

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FIG. 3

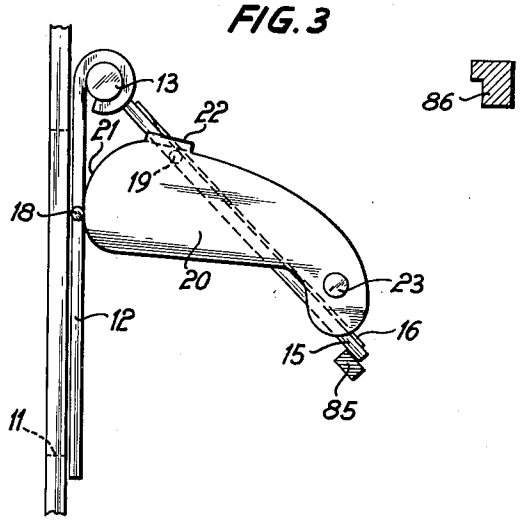
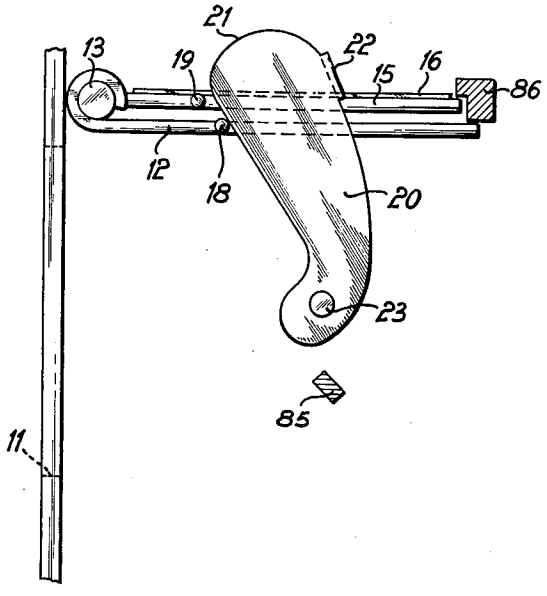


FIG. 4



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SINGLE LENS PHOTOGRAPHIC REFLEX CAMERA

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5 Claims. (Cl. 95—42)

This invention relates to single lens reflex cameras and it has particular relation to such photographic cameras provided with an objective shutter, a control mechanism for transport or feed of the film, setting of the shutter and movement of the mirror and light hood.

In view finder position of such cameras, the objective shutter is open and the light rays passing therethrough are deflected into a finder device, for example a ground-glass plate, by means of a mirror tilted into the path of rays. At the same time, a light hood covers the image window of the camera to prevent exposure of the film. At the start of the shutter operation—which takes place upon operation of the shutter release means—the shutter is first closed for a short period of time, during which the mirror and the light hood must shift to the picture taking position, whereupon the shutter is opened and closed again in order to bring about exposure of the light sensitive layer. During the subsequent film transport and resetting of the shutter, the mirror and the light hood must be brought again to the positions which they occupy during view finding or sighting. They must reach this position before the shutter opens again, for view finding, in the last part of its resetting movement.

It is, therefore, necessary to adapt the movements of the reflex mirror and light hood to the operation of the shutter.

Particular difficulties are encountered in bringing the mirror and the light hood, within the beforementioned short period of time between closing and reopening of the shutter, from the viewfinding position of the picture taking position.

It has been known to spring bias the mirror and the light hood from the viewing position to the picture-taking position of the camera. The latch which holds the mirror and the light hood in the viewing position is released by a ring of the shutter setting device of the camera, which ring moves backward upon shutter release and operates the release lever of the shutter. In order to make sure that the mirror and the light hood have attained the picture taking position before the shutter opens for exposure, in this known construction a braking anchor, which engages the ring, is provided, in order to brake the ring during the extent of such backward or reverse movement.

It has been also suggested to effect unlatching of the mirror and light hood by means of the shutter setting shaft, which latter turns backward upon release of the shutter, and to provide means for retarding the movement of the shutter in the interval between the closing of the sectors and their reopening for exposure.

According to the present invention, in a camera of the above mentioned type, a member rigidly connected with the shutter setting shaft is provided and movement of this member during shutter release is retarded, during part of its movement, by a braking mechanism acting on this member. Thus, the shutter setting shaft can move freely during a part of its backward rotation, which takes place upon shutter release. During this time interval, the shutter, which was open during observation, can be closed and, in addition, subsequently, movement of the mirror and light hood to the initial position can take place. In order to safely attain that these two parts have

reached their end position before the shutter opens again for exposure, further movement of the shutter setting shaft is now retarded by the action of the braking mechanism on the member rigidly connected therewith, because release of the shutter for exposure takes place only upon termination of the backward rotation of the shutter setting shaft.

It is of advantage if the member, which cooperates with the braking mechanism, is simultaneously the control means for the mechanism acting on movements of the mirror and of the light hood.

According to a preferred embodiment, this member is a control slide which has a rack engaging a pinion seated on the shutter setting shaft and also carries a control cam for movement of the mechanism acting on the mirror carrier and the light hood and cooperating with a braking mechanism which is capable of retarding its runing down movement in the range between the effected unlocking of the mirror carrier and light hood and the release of the shutter.

It is preferred to use for this retardation a braking mechanism composed of wheels, the drive of which is effected by the arm of a toothed lever, this arm projecting into the range of movement of the control slide.

The appended drawings illustrate by way of example some specific embodiments of and best modes for carrying out the invention to which the invention is not limited.

In the appended drawings

FIG. 1 is a perspective view of a camera embodying the present invention;

FIG. 2 is likewise a perspective view of the camera shown in FIG. 1, in which the camera walls are broken away so that the components according to the invention are visible;

FIG. 3 is a side elevation view of the device for displacement of the reflex mirror and the light hood, in the viewing condition of the camera, and

FIG. 4 illustrates the parts shown in FIG. 3 in the picture-taking condition of the camera.

The camera shown in the drawings is a single lens reflex camera, i.e. a camera, in which, in the path of rays between the picture-taking objective and the light sensitive layer a tiltable mirror is arranged which, when tilted into said path of rays, deflects the light to a finder device. After tilting the mirror out of the path of rays, the light can act on the light sensitive layer. Cameras of this type have been known from the art.

Referring now to the drawings in detail, in FIG. 1 reference symbol 1 denotes the body of a cemera, the upper narrow side of which is covered by a camera cap 2. The objective mount body 3 forms a structural unit with an objective shutter, the adjusting rings of which for exposure time and diaphragm are denoted 4 and 5, respectively. The scales for exposure time and diaphragm applied to these rings cooperate with a common stationary mark 6. Above the objective mount 3, the photocell 7 of an electric exposure meter built in in the camera cap 2 is arranged. Furthermore 8 denotes the operating lever of the mechanism for film transport, shutter setting and mirror movement, described hereinafter. Near to lever 8, shutter release key 9 can be seen. On the other end of the camera cap 2, a control knob 10 is located.

FIGURE 2 shows the camera in a condition in which transport of the film and setting of the shutter are completed and the camera is in viewing condition.

The image aperture of the camera, which is denoted 11 and in which the layer to be exposed is located, is closed by a light hood 12, which is swingably arranged on a stationary shaft 13 and is biased by a spring 14, which tends to move hood 12 away from aperture 11 to the open position. Also arranged on shaft 13 is a

carrier 15 for mirror 16 which—in the position shown in the drawing—is in the path of rays passing through the objective and the open shutter and by which the light is deflected to a finder device not specifically shown, for example a ground-glass plate. Mirror carrier 15 is likewise biased by a spring 17, which tends to move the carrier out of the path of rays. The light hood 12 and mirror carrier 15 are held in the position shown in the drawing by pins 18 and 19 seated thereon, these pins lying against a locking member 20. While pin 18 of light hood 12 lies against the cam-shaped edge 21 of locking member 20, pin 19 of mirror carrier 15 is overlapped by a flap 22 bent from locking member 20.

Locking member 20 is fixed on a shaft 23, which is rotatably arranged in a stationary bearing 24 and also carries a lever 25 fixedly connected therewith. Lever 25 is linked to a slide lever 26, which, in turn, is pivotally connected to a two-armed lever 27. Lever 27 is tiltably arranged about a pin 28 in a stationary bearing 29 and carries on its other or free arm a bolt 30, which engages a control cam 31 located in wall 32 of a frame-like control slide 33. The control cam 31 is composed of three portions 34, 35 and 36, of which portions 34 and 36 extend rectilinearly and parallel to each other but at different levels within the wall of control slide 33, while the sloping cam portion 35 connects portions 34 and 36.

Control slide 33 is slidable on two guide rods 37 and 38, the ends of which are fixed in stationary bearings 39 and 40, respectively. Wall 41 of control slide 33 carries a rack 42 which is engaged by a pinion 43 fixed on setting shaft 44 of the camera shutter. The setting shaft 44 projects from the rear wall, turned toward the camera body, of the shutter casing. In FIG. 2 the rear wall of the shutter casing is indicated by dash-and-dot line 45.

Arranged on a camera wall 46 is a setting slide 47 having a nose 48, which is bent in such a manner that it can engage wall 49 of control slide 33. A rack 50 of setting slide 47 is engaged by a pinion 51, which—through its shaft 52, gears 53, 54, 55 and shaft 56—is fixedly connected with operating lever 8 and thus moves when the latter is oscillated. Seated on shaft 56 is also a film-take-up spool 57, which is connected therewith in conventional manner over a one-way coupling whereby the spool 57 participates only in oscillations of the shaft 56 in the direction of film feed, but does not turn when lever 8 is oscillated reversely.

On the surface of operating lever 8 facing camera cap 2, there is a locking cam 58, into the range of movement of which projects a nose 59 (which passes through camera cap 2) of a locking lever 60, which latter is rockable about a pin 61 and is held in engagement with the upper free end of slide lever 26 by a tension spring 62.

Connection between shutter release key 9 and shutter release lever 63, seated on shutter rear wall 45, is established by a pin 64 on key 9, a pivoted lever 65 engaging pin 64 and a release slide 66 which, in turn, engages lever 65. The release slide 66 has a bent arm 67 engaged by the shutter release lever 63. The release slide 66 is biased by a spring 68 and is slidably mounted on wall 71 by means of a pin-slot guide 69, 70.

An extension 72 of shutter release key 9 extends adjacent setting slide 47, which latter is provided with a recess 73 which can be entered by extension 72 upon release movement of key 9. If recess 73 is not located in the range of movement of extension 72, i.e. when setting slide 47, during its setting movement, is in a position other than that shown in the drawing, then operation of shutter release key 9 is prevented.

Also seated on camera wall 46 is a braking device, by means of which movement of the control slide 33 (which takes place upon shutter release) can be retarded within a predetermined range. The braking device is formed by gears 75, 76, 77 and 78, rotation of which is effected

by rocking a sector gear 79 and braking of which is effected by engagement of gear 75 by an anchor or escapement member 80. The sector gear 79 is biased by a spring 81 which tends to keep it in engagement with a pin 82. A stop flap 83, bent from sector gear 79, projects into the range of movement of a pin 84 on control slide 33. When this pin 84 engages stop flap 83, the sector gear 79 is rocked whereupon the rocking motion is braked by gears 75—78, which are then rotated, and engagement of gear 75 by anchor 80.

The camera shutter, which does not form part of the present invention, is conventionally constructed in such a manner that, in its setting movement, which is brought about by rotation of setting shaft 44, in addition to setting the shutter mechanism, the shutter sectors are opened for viewing the image. Upon the occurrence of shutter release, which is effected by rocking release lever 63, setting shaft 44 turns back to its uncocked position. Thereby first the shutter sectors are closed, while subsequently—when mirror 16 and light hood 12 have been moved from the illustrated viewing position to the picture-taking position—the sectors are opened again for the adjusted period of exposure time.

The above described camera is constructed in conformity with these shutter functions.

As already mentioned above, in FIG. 2 the mechanism is shown in viewing position of the camera. If in this position, by operating shutter release key 9, the shutter is released, the setting shaft 44 turns so that pinion 43 seated thereon, moves shutter slide 33 in the direction of arrow 74. During closing of the shutter—which takes place thereby—with the exception of control slide 33, the parts remain in the position shown in the drawing, because portion 34 of the cam in control slide 33, does not yet exert a displacing movement on the bolt 30 engaging it. When the shutter sectors are closed, the control slide 33 will have reached a position in which the bolt 30 starts to enter cam portion 35. During its passage through this portion 35, bolt 30, and together with it lever 27, slide lever 26, lever 25 and thus locking member 20, are moved in such a manner that flap 22 of locking member 20 releases pin 19 on mirror carrier 15 and shortly thereafter edge 21 of member 20 disengages pin 18 of light hood 12. The mirror carrier 15 and light hood 12 can swing to their initial positions under the effect of springs 17 and 14, respectively.

This can be seen particularly in FIGS. 3 and 4. In the viewing position shown in FIG. 3 it can be seen that locking member 20 acts through its edge 21 on pin 18 of light hood 12 and keeps it in firm engagement with the camera wall formed with image aperture 11. Simultaneously, through flap 22 which is bent from locking member 20, pin 19 seated on mirror carrier 15 is overlapped, whereby mirror carrier 15 is held in firm engagement with a stop 85 by which its viewing position is determined.

Upon its pivoting to the position shown in FIG. 4, locking member 20 releases pins 19 and 18 so that mirror carrier 15 and light hood 12 can swing to the viewing position which is determined by their engagement at the common stop 86.

In order to make it sure that this tilting of mirror carrier 15 and light hood 12 to the picture taking position is safely completed before the shutter is opened for exposure, a braking of the movement of control slide 33 is brought about by means of a braking mechanism, when bolt 30 enters cam portion 36. When bolt 30 moves in the last part of cam portion 36, pin 84 seated on control slide 33 engages stop flap 83, whereby braking mechanism 75—80 is started and thus sector gear 79, which swings under the effect of the braking action, reduces the velocity of movement of control slide 33. Shortly before control slide 33 reaches its left end position, as viewed in FIG. 2 the shutter will open and close for the period of time corresponding to the adjusted setting of ring 4 (FIG. 1).

During run-down of the shutter, the control slide **33** engages bearing **39**.

Upon movement of slide lever **26**, its free end causes rocking of locking lever **60**, so that nose **59** is moved out of the range of movement of locking cam **58**. If now the released operating lever **8** is rocked, in addition to the film transport—through gears **55**, **54**, **53**, shaft **52** and gear **51**—movement of the setting slide **47** takes place. Nose **48** of the latter, which now engages wall **49** of control slide **33**, displaces the latter to the setting position shown in the drawing. During rotation of setting shaft **44**, which thereby takes place, the shutter is cocked. During passage of bolt **30** through cam portion **35**, displacement of parts **27**, **26**, **25** and **23** takes place. Thereby locking member **20** engages, with its flap **22** and its edge **21**, pins **19** and **18**, respectively, whereby mirror carrier **15** and light hood **12** are moved to the positions shown in FIGS. 2 and 3. Locking lever **60** can likewise enter, after return of lever **8** to its initial position, the locking position shown in the drawing and thus prevent repeated operation of operating lever **8**. Furthermore, the braking device, which acts on control slide **33**, also reaches, under the bias of spring **81**, the position shown in the drawing, right at the start of the setting movement. While control slide **33** is held in the shutter set position by setting shaft **44**, which is then arrested, upon return of operating lever **8**, the setting slide **47** moves again to the initial position shown in the drawing.

It will be understood from the above that this invention is not limited to the specific constructions, arrangements, designs and other details specifically described above and illustrated in the drawings and can be carried out with various modifications without departing from the scope of the invention, as defined in the appended claims.

What is claimed is:

1. In a single lens reflex camera having an objective, an image aperture aligned with the objective, an objective shutter normally open in its set position and, when released, first closing, then reopening, and finally reclosing, film transport mechanism effective, when operated, to advance film across the aperture, a reflex mirror movable between a viewfinding position, in which it is positioned in the path of light from the objective to the aperture to reflect such light to a viewfinder, and a retracted position out of the path of such light, a light protector flap movable between a light blocking position, covering the aperture, and a retracted position, a shutter setting component operable conjointly with the shutter, shutter release means operable to release the shutter, means biasing the mirror and flap to their retracted positions, control means effective, when operated to a first position, to move the flap to the light blocking position and the mirror to the viewfinding position and, when operated to a second position, to release the mirror and the flap for return to their retracted positions, and a movable control member operable conjointly with the shutter setting component and operatively connected to the control means, the shutter setting component, upon operation of the release means, moving the control member in a first direction to operate the control means to its second position, during an initial part of the movement of the control member and after the shutter has closed: the improvement comprising braking means in the path of movement of said control member in said one direction and engaged thereby, only during a following part of its movement in said one direction, to retard movement of said control member to delay re-opening movement of said shutter; and shutter re-set mechanism operable by said film transport mechanism, during the advance of film, to move said control member in the opposite direction to operate said shutter setting component to re-set said shutter and to operate said control means to its first position; said braking means being ineffective on said control member during movement of the latter in such opposite direction.

2. The improvement defined in claim 1 including a latch operatively associated with said film transport mechanism and said control means; said control means, upon movement thereof to its second position, operating said latch to release said film transport mechanism.

3. The improvement defined in claim 1 in which said shutter setting means comprises a rotatable gear; said control member includes a rack engaged with said gear and is formed with a longitudinally extending cam slot engaged by a pin on said control means; and abutment means on said control member engageable with an operating element of said braking means.

4. The improvement defined in claim 3 in which said operating element comprises an oscillatable sector gear; rotatable reduction gearing meshing with said sector gear; and an escapement anchor associated with said reduction gearing to delay rotation thereof when said sector gear is oscillated by said abutment.

5. In a single lens reflex camera having an objective, an image aperture aligned with the objective, an objective shutter normally open in its set position and, when released, first closing, then re-opening, and finally re-closing, a reflex mirror movable between a viewfinding position, in which it is positioned in the path of light from the objective to the aperture to reflect such light to a viewfinder, and a retracted position out of the path of such light, a light protector flap movable between a light blocking position, covering the aperture, and a retracted position, a shutter setting component operable conjointly with the shutter, shutter release means operable to release the shutter, means biasing the mirror and flap to their retracted positions, control means effective, when operated to a first position, to move the flap to the blocking position and the mirror to the viewfinder position and, when operated to a second position, to release the mirror and flap for return to their retracted positions, a movable control member operable conjointly with the setting component and operatively connected with the control means, and shutter setting means operable, when actuated, to move the control member in a first direction to operate the shutter setting component to move the shutter to the viewfinding position and to operate the control means to its first position, the setting component, upon operation of the shutter release means, moving the control member in the opposite direction to operate the control means to its second position, during an initial part of the movement of the control member and after the shutter has closed: the improvement comprising braking means in the path of movement of said control member in such opposite direction and engaged thereby, only during a following part of its movement in such opposite direction, to retard movement of said control member to delay re-opening movement of said shutter.

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