

RESERVE COPY PATENT SPECIFICATION

414,465

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COMPLETE SPECIFICATION.

Improvements in or relating to Roll-film Reflex Photographic Cameras.

We, JOHAN STEENBERGEN, a Dutch subject, OTTO DIEBEL, a German citizen, HUGO FRAUENSTEIN, a German citizen, EMIL ENGLISCH, a German citizen, 5 HERMANN SCHUBERT, a German citizen and CONRAD KOCH, a German citizen, trading as IHAGEE KAMERAWERK STEENBERGEN & COMPANY, of 24, Schandauer Strasse, Dresden A.19, Germany, do 10 hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

15 The present invention relates to roll-film reflex photographic cameras, and more particularly to mirror reflex cameras of this kind having a focal plane shutter of the roller blind type, wherein an adjustable slit formed between two spring-controlled screen members moves over the whole surface to be exposed at a certain distance therefrom.

25 The term "mirror reflex cameras" as used in this specification is intended to denote cameras wherein a mirror arranged within the camera is employed to project an image on to a focussing screen during the focussing operation, the said mirror 30 being displaced on the initiation of the operation of the shutter so as to cover the focussing screen and render the camera light tight during the exposure.

35 One of the principal objects of the invention is to provide a construction, whereby rapid adjustment of the camera for exposure can be obtained, and the focussing operation is facilitated.

40 With this object primarily in view the invention consists in an improved roll-film mirror reflex camera comprising a trapezoidal camera body with forwardly converging sides and having a spring controlled mirror reflex device arranged 45 within it between the film spools which are accommodated in front of a roller blind focal plane shutter, and means for enabling the movement of the film, the winding-up of the shutter, and the movement of the mirror into the operative 50 position to be effected by turning a single winding knob, said means comprising a friction clutch mechanism which consists

of a spring which is frictionally connected with the knob of the film winding axle and is operatively connected with pinions of the shutter winding mechanism whereby, when the film winding axle is turned by means of the knob, the shutter winding mechanism is wound up through the medium of the friction clutch mechanism until it is fully wound and prevented from further movement by means of a stop, whilst the film winding axle can be turned onwards owing to the slipping of the spring, the said shutter winding mechanism being interconnected with the mirror in such manner through the medium of a cam provided on the main axle of the shutter winding mechanism that when the latter is operated the mirror is simultaneously brought into the operative position.

Some preferred constructional forms according to the invention are illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a sectional plan of a camera according to the invention provided with a roller blind shutter,

Fig. 2 is a plan of a similar arrangement in a camera of modified construction,

Fig. 3 is an elevation of the front of the camera with the focussing hood in the raised position.

Figs. 4 to 6 show the means for coupling the slit shutter winding device and the film moving device,

Figs. 7 to 9 illustrate the arrangement of the mirror in the camera.

The outer casing 1 is provided with two cylindrical recesses for the reception of the spools 3 which are arranged between the slit shutter 4 and the objective 5. Between the cylindrical recesses a channel-like space 6 running perpendicularly to the optical axis is provided on the inner body 2, which space communicates with the objective in the direction of the optical axis through the medium of an aperture and thus allows free passage for the rays of light for exposing the film. In the space 6 the mirror reflex device and focussing screen are mounted.

For the purpose of moving the film onwards it is known to connect positively

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the winding device for the film with the winding device for the slit shutter. The known arrangements of this kind have the disadvantage that the mechanism for winding up the shutter must be adapted to be put out of action by the operation of separately manipulated suitable means of some kind in order to be able to turn the film further onwards when necessary, after the shutter has been wound up. According to the invention the positive coupling between the roller blind shutter winding device and the film moving device is replaced by a friction clutch mechanism, and consequently it is rendered possible to move the film further onwards after the roller blind shutter winding device has been fully wound, without transmitting movement to the latter. Figs. 4 and 5 of the drawings are plans and Fig. 6 is a sectional view of a mechanism comprising a friction clutch mechanism according to the invention.

The mode of operation is as follows:

By right-handed rotation of the winding knob 7 which is rigidly connected to the film winding axle 8, the pinions 9—15 of the shutter winding mechanism are operated through the medium of a friction clutch mechanism comprising a spring 16 which is arranged in an annular recess within the winding knob 7 so as to have frictional mechanical connection therewith and which is fixed at one end in a recess 17 provided on the winding pinion 9.

On the pinion 11 of the shutter mechanism (which pinion is shown in full lines in Fig. 6 and indicated in dotted lines in Figs. 4 and 5 of the drawings) a pin 18 is mounted which is located in the gap between the said pinion 11 and the pinion 12 of the shutter mechanism.

When the pin 18 of the shutter mechanism pinion 11 arrives at the stop 19 of the lever 41, the shutter is wound up, whilst by further turning movement of the winding knob 7 the film spool 20 can be turned onwards as desired in consequence of the slipping of the spring 16 against the frictional resistance in the winding knob 7. When the spring 16 slips in the winding knob 7 it becomes further tensioned, as a result of which it has the tendency to fly back when the said knob 7 is released. In order to prevent this possibility a spring 21 is provided which is fixed at one end to the film winding axle 8 and rests at its other end tightly up against the interior of the pinion 9 so that a braking action is exerted which prevents the return movement of the spring 16.

The return movement of the pinions 9—15 is prevented by the pawl 22. The

release of the shutter is effected by operating the button 23 which presses on the lever 24, whereby an arm 25 projecting from a plate which is rotatably mounted on the film winding axle 8 and on which the pinion 10 and the pinion 15 which is in engagement with the shutter mechanism pinion 12 (see Fig. 4) are mounted, is caused to swing about the said axle and the pinions 15 and 12 are uncoupled (see Fig. 5). In consequence of the spring tension of the spring shafts of the roll shutter the first roll of the shutter mechanism together with the pinion 12 then runs down, as hereinafter described.

With reflex cameras it is necessary, as is well known, to provide a mirror for the observation of the object to be photographed, the said mirror being arranged when in use at an angle of 45° to the optical axis. The release of the mirror, i.e. the operation of bringing it out of the path of the rays of light coming through the objective, is generally effected automatically during the release of the shutter. Devices are known in which the bringing of the mirror into the operative position is effected in some cases by hand and in some cases by spring action. In the latter construction the mirror has to be removed by separate means from the operative position. According to the invention the operation of bringing the mirror into the operative position is effected simultaneously with the winding-up of the shutter mechanism. When the shutter is wound up the spring-controlled mirror is brought into the operative position at an angle of 45° to the optical axis, and when the shutter is released the mirror springs upwards and covers the upper focussing screen in a light-tight manner. Fig. 7 shows in side view a mirror controlling device according to the invention with the mirror in the operative position, Fig. 8 is a front elevation corresponding thereto and Fig. 9 is a view in the direction of the arrow A below. When the winding knob is turned an axle 26 is also caused to turn upon which axle a cam 27 and a cam 28 are arranged. On the side wall in which an arcuate recess 29 is provided, a lever 30 is arranged which is mounted so as to be rotatable about the axle 31 and which is provided on the one side with a pin 32 and on the other side with a bent-over portion or lug 33. The pin 32 projects through the recess 29 of the camera wall and bears on the mirror 34. When the axle 26 is turned the cam 27 engages behind the lug 33 and consequently turns the lever 30. The pin 32 arranged on the said lever 30 presses the mirror over the catch 36 arranged on the leaf spring 35. The

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mirror is thereby prevented from swinging back. Whilst the axle 26 which is coupled to the roller blind shutter is turned until the shutter is fully wound up, the cam 27 disengages at the same time the lug 33.

When the winding knob 7 is turned as aforesaid in a clockwise direction the main pinion 12, which engages with the pinion 14 appertaining to the first shutter roll, is turned through the medium of the intermediate pinions 10 and 15 in a counter clockwise direction so as to wind up the shutter mechanism. In the position of the device illustrated in Fig. 4 the shutter mechanism is wound up, the winding up operation being terminated by the action of a metal stop projection (not shown in the drawings) provided on the said roll. The release of the pinion 14 is effected by pressure on the pin 23 whereby the levers 24 and 25 are actuated together with the pinions 15 and 12 and the first roll of the shutter runs down.

In order to prevent the second roll of the shutter mechanism from running down simultaneously the arrangement is such that when pressure is exercised as aforesaid on the pin 23, the stop 19 of the lever 44 moves under the action of the spring 43 into a position in front of the pin 18 on the pinion 11 (see Fig. 5), engaging with the pinion 13 of the second roll and thereby prevents rotation of the said pinion 11.

As soon as the pin 23 is released, the lever 44 is acted upon by the pin 38 so that the stop 19 is disengaged from the pin 18, all the levers moving back into their positions of rest. As a result of this the pinion 11 is released and can now run down together with the pinion 13 and the second roll of the shutter. At the same time the pinion 15 again engages with the shutter pinion 12.

On the axle 26 in addition to the cam 27, a further cam 28 located nearer to the base plate of the mechanism, is provided. On the said base plate a further stop member 37 is provided which serves as a stop for the lever 28. When the winding knob 7 is turned the pinions 10, 15 and 12 are actuated with the pinion. The cam 27 engages with a lug 33 and thereby effects movement of the mirror. The cam 28 limits the extent of the winding movement of the main pinion 12 through the medium of the projection 37 which is bent outwardly from the said base plate.

The release of the mirror and of the shutter is effected by pressure on the pin 23 which operates the lever 24. The latter presses in turn on the lever 40 which presses at its other free end 41 against the catch 36 and brings the latter out of the

locking position thus releasing the mirror 34 which is under spring tension. At the same time the release of the roll shutter is also effected inasmuch as the intermediate pinion 15 is brought out of engagement again with the upper main wheel 12 by the lever 24 and consequently the first roll runs down with the pinion 14. By the pressing-in of the pin 23 the lever 24 is actuated and the pin is pressed back, in consequence of which the spring 43 draws back the lever 44 and the other (free) end of the latter presses the projection 19 in front of the pin 18 and locks the pinion 13.

On releasing the pin 23 the spring 45 draws the lever 44 back into its initial position, and brings the pinion 15 back into engagement with the main wheel 12. Owing to the backward movement of the lever 24 into its initial position the hook-shaped free end 19 of the lever 44 releases the pin 18 of the pinion 11 so that the main pinion together with the pinion 13 associated with it can run down.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

A roll-film mirror reflex camera adapted for obtaining rapid adjustment for exposure and easy focussing, comprising a trapezoidal camera body with forwardly converging sides and having a spring controlled mirror reflex device arranged within it between the film spools which are accommodated in front of a roller blind focal plane shutter, and means for enabling the movement of the film, the winding-up of the shutter, and the movement of the mirror into the operative position to be effected by turning a single winding knob, said means comprising a friction clutch mechanism which consists of a spring 16 which is frictionally connected with the knob 7 of the film winding axle 8 and is operatively connected with pinions 9—15 of the shutter winding mechanism whereby, when the film winding axle is turned by means of the knob, the shutter winding mechanism is wound up through the medium of the friction clutch mechanism until it is fully wound and prevented from further movement by means of a stop, whilst the film winding axle can be turned onwards owing to the slipping of the spring, the said shutter winding mechanism being interconnected with the mirror in such manner through the medium of a cam 27 provided on the main axle 26 of the shutter winding mechanism, that when the latter is operated the mirror is simultaneously brought into the operative position, sub-

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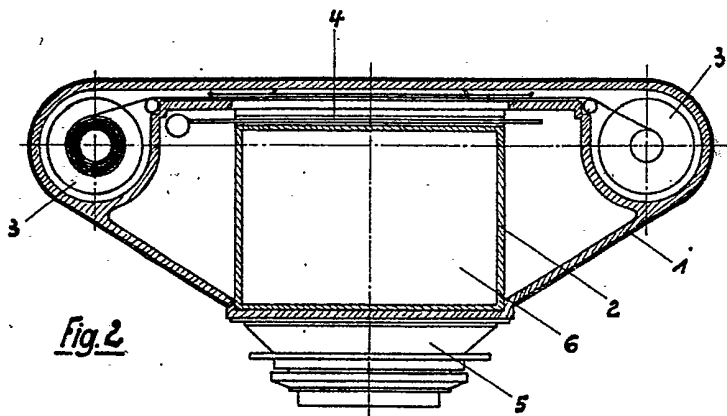
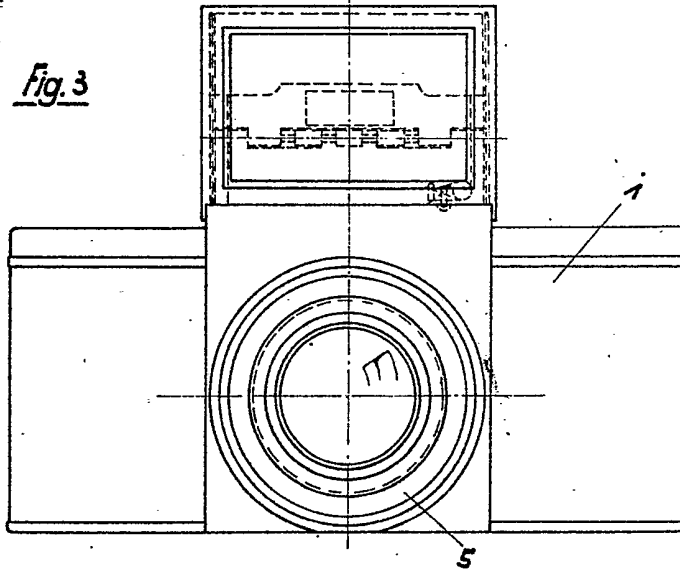
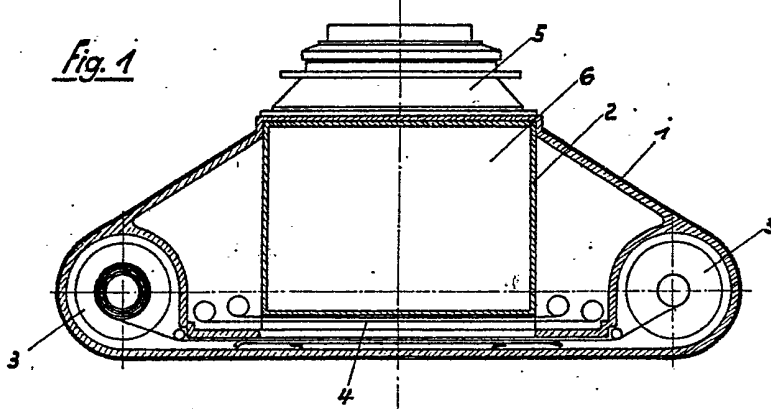
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stantially as and for the purposes set forth.

Dated the 27th day of March, 1933.

S. SOKAL,
1, Great James Street,
Bedford Row, London, W.C.,
Chartered Patent Agent.

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[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 6

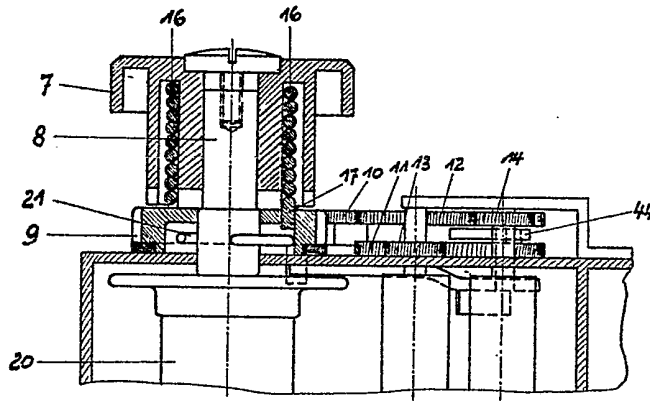


Fig. 5

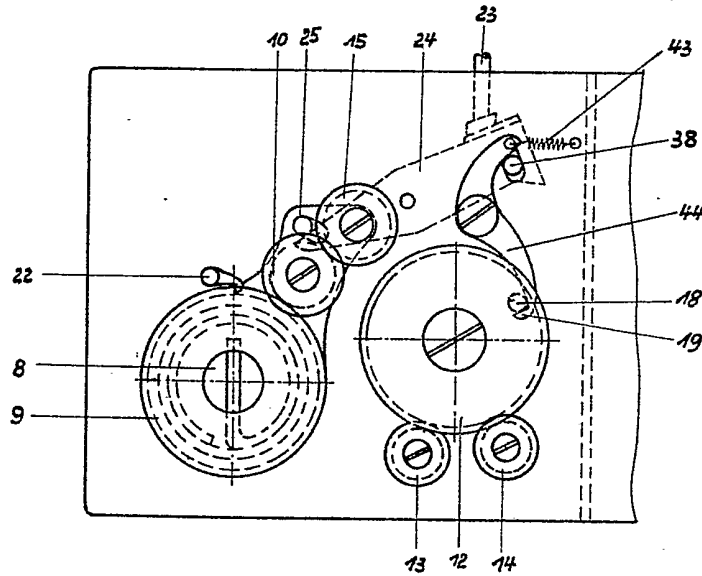


Fig. 4

