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PATENT SPECIFICATION



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237,117

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COMPLETE SPECIFICATION.

A New or Improved Reflex Camera.

(A communication from abroad from IHAGEE KAMERAWERK STEENBERGEN & COMPANY, of 24, Schandauerstrasse, Dresden, Germany, a German company).

I, ARTHUR WOOSNAM, of the firm of Lloyd Wise & Co., of 10, New Court, Lincoln's Inn, London, W.C. 2, Chartered Patent Agents, a British subject, do 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:—

10 The present invention relates to a folding reflex camera in which, when the camera is being closed up, the lens carrier is simultaneously moved in its plane, and the principal characteristic
15 feature of the said invention is that, on each side of the camera, one free front end of a pair of lazy-tongs extensors is connected to the lens carrier and also works in a slot in a frame, slidable on
20 said lens carrier, while the corresponding end of the other lazy-tongs extensor is connected to the said slidable frame by a lever link, the rotation of which is arrested to locate the camera front in the
25 extended position.

A particularly advantageous constructional form is obtained by making the arms of the lever link of unequal length, the shorter arm thereof being connected
30 to the lazy-tongs extensor and the longer arm to the frame of the ground glass screen of the camera.

The rear movable end of one extensor arm on each side of the camera is guided
35 in a curvilinear slot in the casing.

In reflex cameras, it is well known to provide for moving the reflex mirror, at the moment of exposure, out of the path of the pencil rays destined to fall on the
40 plate or the like, by means of a mechanical lever arrangement operated by a

trigger lever (generally the shutter release trigger). Now, according to a further feature of the present invention, the mirror lifting lever is pivoted
45 separately from the mirror and acts on the underside thereof.

An improved extra locking device is provided for holding the mirror in the raised position particularly when a
50 "time" exposure is to be given and this device is comprised in a spring controlled trip lever with a ratchet action, which lever is adapted to be tripped by the inner
55 trip wheel of the focal plane shutter of the camera, said wheel being provided, for this purpose, with a fixed lug, arranged to strike said trip lever.

A camera extensor may conveniently be adapted to operate one end of a double
60 armed lever, the other end of which acts against spring pressure on the trip lever, when the extensor is operated, and releases the mirror lever device, so as always to ensure falling of the mirror
65 before the camera is closed.

Great advantage attaches to the provision of an improved mirror support adapted to slide in a slot in the back wall of the camera casing and pivotally connected
70 to the front part of the camera. When the camera is opened out, this device, which is provided with mirror supporting lugs, makes an angle of exactly 45° with the optical axis and
75 acts as a support for the reflex mirror.

A further preferred constructional feature consists in providing the frame of the upper ground glass screen with an extension which, when the camera is
80 closed, covers in the lens.

In the accompanying drawing a constructional form of the invention is shown by way of example.

Figure 1 shows the camera closed up. 85

Figure 2 the same half opened.

Figure 3 the camera ready for use and in position for taking a photograph.

[Price 1/-]

Figure 4 shows the operating mechanism of the reflex mirror as seen from the side.

Figure 5 shows the mirror support also as seen from the side, and

Figure 6 shows a constructional detail thereof in perspective.

The numeral 1 designates the camera casing, to which the upper ground glass screen 2 is connected by means of the hinge 3. The lens 4 is rigidly secured to the lens carrier 5, upon which slides a frame 6, constituting the camera front and having longitudinal slots 7 for said lens carrier, with which it makes light tight, though movable, connection in any known manner. The bellows 8 makes light tight connection with the casing, with the frame of the upper ground glass screen and with the camera front. In order to obtain the correct relative positions between the casing, the camera front and the frame of the ground glass screen while the photograph is being taken, extensor devices are provided between these three parts. The camera front 6 is pivotally connected on each side to the frame of the upper ground glass screen by means of a double armed lever 9, pivoted at 9^a to said camera front. The other end of each double armed lever 9 is connected at 9^b to one of the lazy-tongs extensors 10, the rear end of which is provided with a pin 12 which moves positively in a slot 13 up to a supporting point at the top end of said slot. The other lazy-tongs extensor 11 is pivoted at 14 to the camera casing and at 14^a to the extensor 10 and is provided at its other extremity 15 with a pin which moves in a straight slot 16 in the front 6 when the camera is opened out or closed up. This front end of the lazy-tongs extensor 11 is also pivotally connected at 5^a to the lens carrier 5 and affords means for moving the same in the front of the instrument. In order to retain the apparatus in extended position for the taking of a photograph, the slot 13 is made hook-shaped at the upper end, so that the pin 12, as shown in Figure 3, can catch into the upper angular slot and thus be prevented from sliding back into the normal slot 13. To ensure the pin 12 always jumping to the supporting point, the lazy-tongs extensor 10, is provided, as shown in Figures 2 and 3, with a spring 17 and the extensor 11 with a bent up lug 18. As shown in Figure 3, this lug comes into contact with the spring 17 when the camera is completely opened and thus the lazy-tongs extensor 10 is pressed downwards into the locking position and there held fast. When closing up the camera the lazy-tongs 10 is pressed

lightly upwards against the spring 17, the pin 12 deflected into the slot 13 again and the frame of the upper ground glass screen closed over the front part, the double armed lever 9 turning, at the same time, about the pivot 9^a.

The frame 2 of the ground glass screen is provided with an extension 20, firstly to act as a skyshade for the lens when taking the photograph and secondly, when the camera is closed, to protect the lens from dirt, dust or the like. 21 is the upper focussing hood and 22 the winding-up knob for the focal plane shutter.

The two shutter blinds are operated by two superposed toothed trip wheels 25 and 26 (see Figure 4). These two wheels are mounted on the same spindle (in the drawing they are shown in perspective, for the sake of clearness) and the inner trip wheel 25 is provided with a lug 27. The reflex mirror 28 is pivotally attached, either at 28^a (Figure 4) to the camera casing or, at 28^b to a mirror positioning-frame 48 (see Figure 5) hereinafter referred to, and against the back of said mirror bears the free extremity of a lever 29. (In the drawing the raised position of the mirror with its lever 29 is indicated in dotted lines). This lever 29 is rigidly connected to the shaft 30 as is also a second lever 31, to the other end of which is pivotally connected a rod 32. This rod is provided with a lateral pin 33 which is passed through a slot 34 in the camera casing and which travels in said slot whenever the mirror is raised or lowered. It will be apparent that when the camera is closed up (as in Figure 1) the mirror 28 and lever 29 recede into the camera casing 1 and the pin 33 is drawn up to a position at or adjacent the upper end of the slot 34 which must, of course, be long enough to permit of such movement. The trigger or shutter release lever 35, pivotally mounted at 36, passes over this pin so that when the trigger is depressed the pin 33 is drawn downwards in the slot 34. The rod 32 is likewise drawn downwards, the spindle 30 is rotated by the lever 31 and thus the lever 29 is raised, carrying the mirror 28 with it. When the trigger 35 is depressed the weight of the mirror or a spring (not shown in the drawing) which forces the mirror downwards, returns the mechanism to its original position. In order to prevent the mirror from falling back when time exposures are being made, a trip lever 37 is provided on the camera casing. This trip lever is pivoted at the point 38 and the small spiral spring 39, which is attached below the pivot point draws the lower end

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of the said trip lever towards the right (Figure 4). At its other end this trip lever is provided with a projection or lug 40 which, when the trigger lever is depressed and the pin 33 brought down, holds the same in the lower position, provided that the action of the spring 39 is not interrupted by any other means. At the end of a time exposure, the inner trip wheel 25 will operate the second blind. When this takes place the lug 27 on the trip wheel 25 will press the upper end of the trip lever 37 towards the right in opposition to the action of the spring 39. At this moment the pin 33 will be released and will fly upwards; the mirror 28 can then drop back into its original position. If, with the mirror remaining in the raised position, an attempt were made to close the camera, such closure would be prevented and any efforts to effect it might have disastrous effects on the mirror. In order to prevent this, there is provided a double armed lever 46 pivoted at the fixed point 47 to the camera casing and at the point 47^a to a draw plate 45 of the lazy tongs extensor 10. This double armed lever is so arranged at its free end that, when the lazy tongs extensor 10 with the plate 45 is pressed upwards, the left hand end of the lever 46 (Figure 4) is pressed downwards onto a cam surface 37^a of the trip lever 37, which is thus turned so that its lower end moves towards the left and the pin 33 is consequently released.

In order to keep the inclination of the reflex mirror 28 exactly at 45° to the optical axis when in the focussing position, that is to say in order to keep the angle α constant at 45°, a mirror support 48 is provided. This mirror support is pivotally connected at 48^a (see Figure 5) to the camera front 6 and has, at its rear end, a pin 49 (Figure 6) which slides to and fro in the slot 50, so that the mirror support is brought into contact with the casing of the camera when the latter is closed up, while the lower end of the mirror support describes an arc (as shown by a dotted line in Figure 5) during such closure. The mirror support may conveniently be provided with mirror supporting lugs 51 which normally support and hold the mirror 28, excepting when, in the open position of the camera, said mirror is raised by the lever 29 aforesaid.

The above described invention enables the bellows of a collapsible reflex camera to be closed up diagonally. In this way an extremely simple and strong construction has been provided which combines a very compact arrangement with all the

advantages of the reflex camera and which can be easily manipulated even by those unacquainted with photographic apparatus. As the construction is a very simple one it must naturally be extraordinarily stable and reliable in use.

A further advantage resides obviously in the fact that the lens carrier with the lens is arranged movably in the front of the instrument so that the extension of the frame of the upper ground glass screen covers in the lens when the camera is closed up. This feature is of very great value when the apparatus is being carried about or is much used, as it is impossible for any dirt to get at the lens or for this latter to be damaged while the camera is closed up. The same extension of the frame of the upper ground glass screen which covers up the lens when the camera is closed serves, when the camera is opened out for taking a photograph, as a skyshade for the lens, so that a special skyshade, as frequently employed with other apparatus of a similar kind is no longer necessary.

The above described invention has enabled a mirror construction to be obtained which ensures the mirror working in an absolutely reliable manner and renders impossible any damage to the apparatus or to the mirror by not folding in this latter before closing up the camera. A releasing mechanism for the mirror when making time exposures is also provided which, in comparison with previously known arrangements affords great advantages on the score of reliability of action, simplicity and cheapness.

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

1. A folding reflex camera in which, when it is being closed up, the lens carrier is moved simultaneously in its plane, characterised by the fact that on each side of the camera one free front end of a pair of lazy-tongs extensors is connected to the lens carrier and also works in a slot in a frame slidable on said lens carrier, while the corresponding end of the other lazy-tongs extensor is connected to the said slidable frame by a lever link, the rotation of which is arrested to locate the camera front in the extended position.

2. A reflex camera according to Claim 1, characterised by the fact that the lever link is made with arms of unequal length, the shorter arm being pivoted to the lazy-

tongs extensor and the longer arm to the frame of the ground glass screen.

3. A reflex camera according to Claims 1 and 2, characterised by the fact that the rear movable free end of one arm of the extensor is guided on the camera casing in a curvilinear-shaped slot.

4. A reflex camera according to Claims 1 to 3 and wherein the reflex mirror is raised at the moment of exposure out of the path of the pencil of rays destined to fall on the plate or the like, by means of a mechanical lever device which is operated by a trigger lever, characterised by the fact that the lever device is pivoted separately from the mirror and acts on the underside thereof.

5. A reflex camera according to Claims 1 to 4, characterised by the provision of an extra locking device for holding the mirror in the raised position, said device comprising a spring controlled trip lever with a ratchet action, adapted to be tripped by the inner trip wheel of the focal plane shutter of the camera, which wheel is provided, for this purpose, with a fixed lug arranged to strike said trip lever.

6. A reflex camera according to Claims

1 to 5 characterised by the fact that one of the lazy-tongs extensors of the camera is adapted to operate one end of a double armed lever the other end of which acts against the spring pressure of the trip lever when the extensor is operated and releases the mirror lever apparatus.

7. A reflex camera according to Claims 1 to 6, characterised by a mirror support, with mirror supporting lugs, which works in a slot in the rear wall of the camera casing and is pivotally connected to the front part of the camera and which, when the camera is opened out, forms an angle of exactly 45° with the optical axis of the camera and acts as a support for the reflex mirror.

8. A reflex camera according to Claims 1 to 7, characterised by the fact that the frame of the upper ground glass screen is provided with an extension which when the camera is closed up covers in the lens.

Dated this 25th day of August, 1924.

For the Applicants,
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W.C. 2,
Chartered Patent Agents.

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

Fig. 1

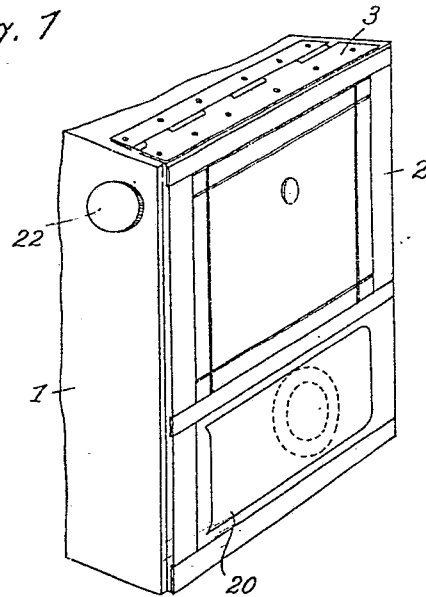


Fig. 4

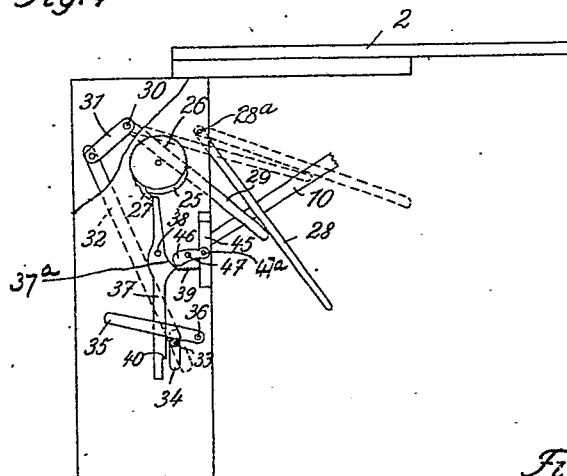


Fig. 5

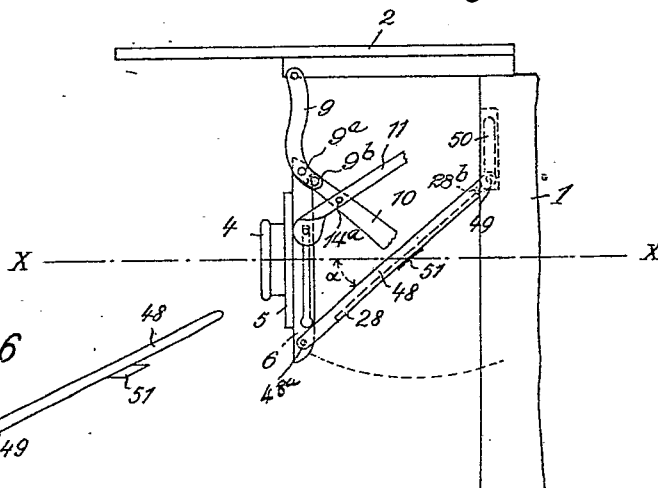
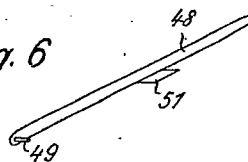
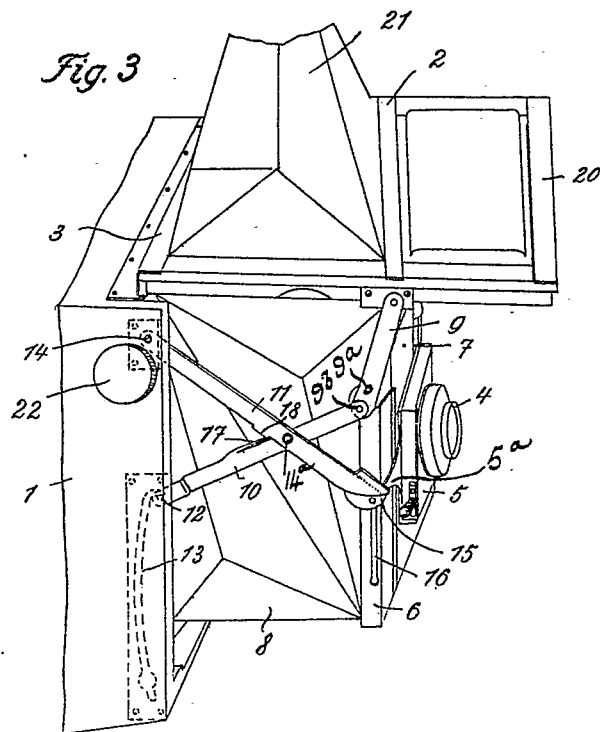
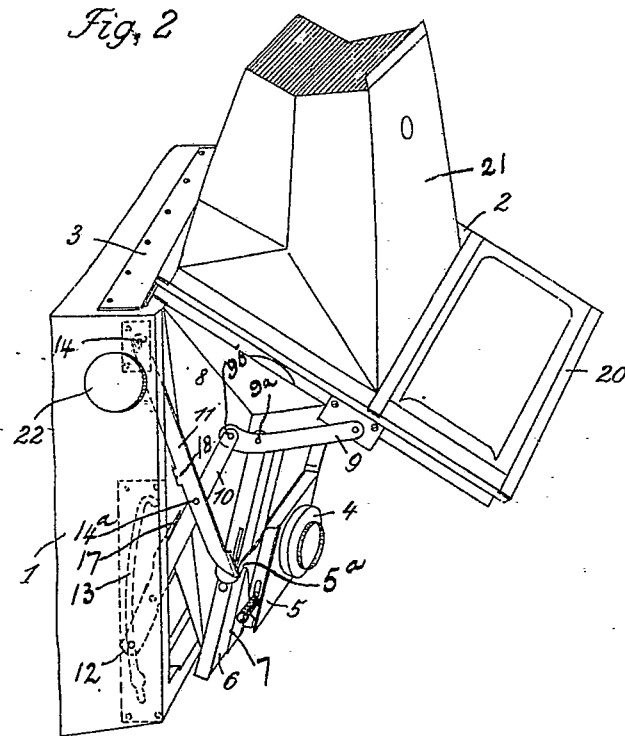


Fig. 6





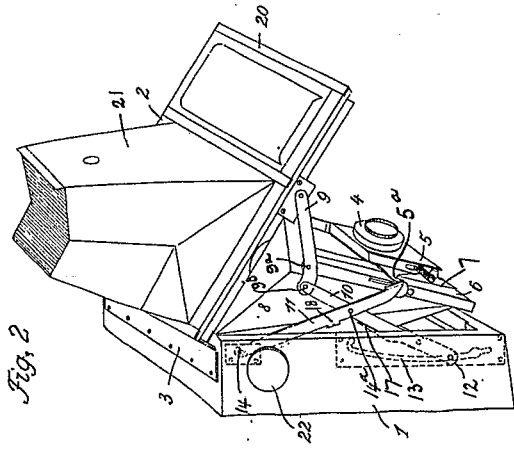


Fig. 2

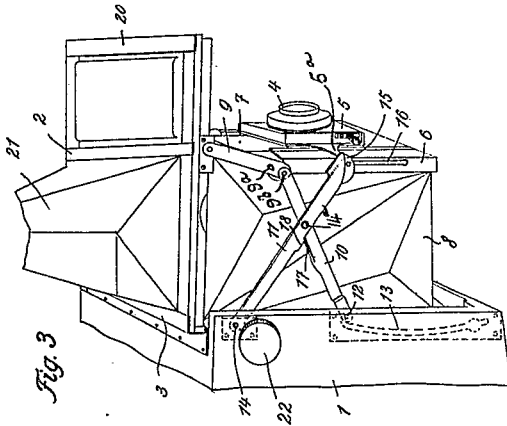


Fig. 3

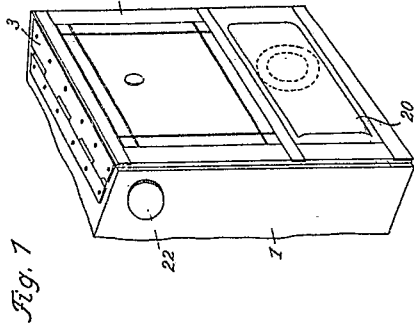


Fig. 7

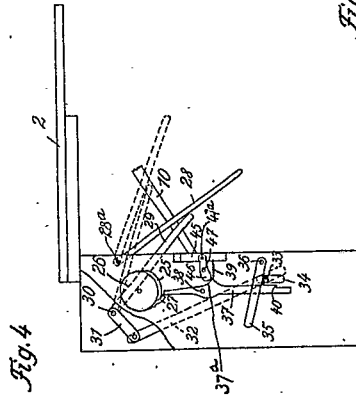


Fig. 4

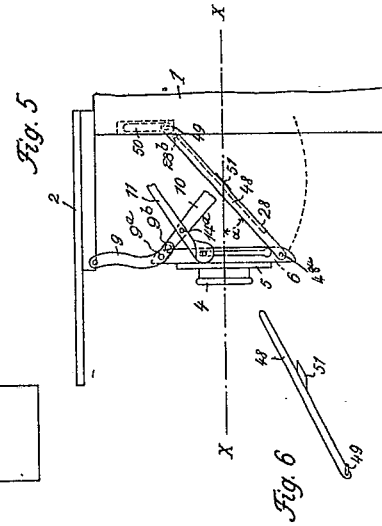


Fig. 5



Fig. 6

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