

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Photographic Roll Film Camera

We, FRANKE & HEIDECHE, G.m.B.H., a German Body Corporate, trading as ROLLERWERKE, FRANKE & HEIDECHE, of 196 Salzda-
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lumerstrasse, Braunschweig, Germany, 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:—

10 The invention relates to a photographic roll film camera with an axially movable lens tube which can be set in the correct axial position for operation.

15 This type of camera, when the lens unit is inserted, has a compact form enabling it to be easily packed and carried. In order not to reduce this advantage more than necessary, this type of camera has usually been fitted with a slotted shutter, and this, in turn, inevitably led to a certain increase in the dimensions of the housing.

25 It is true that when this type of camera is fitted with a between-lens shutter an increase in the size of the actual housing can be avoided, but it leads to an increase in the diameter of the tube, thus preventing the latter from being pushed into the housing to the extent which is usual in the case of slotted shutters.

30 The invention intends to make it possible to provide between-lens shutter on a photographic roll film camera with an axially movable lens tube which can be set in the correct axial position for operation, and nevertheless can be inserted to at least the extent to which this was hitherto only possible in the case of slotted shutter cameras, at the same time enabling the thickness of the camera in the direction of the optical axis to be considerably reduced, the space for

accommodating the slotted shutter being likewise dispensed with.

According to the present invention there is provided a photographic roll film camera with axially movable lens tube which can be retracted into a non-operative position within the camera body and which can be secured axially in an operative position, wherein the shutter driving mechanism and diaphragm driving mechanism are mounted, separately from the shutter blades and diaphragm blades provided in the lens unit, behind the front of the camera and in the space between the film chambers and the space occupied by the lens tube when in the retracted position.

In French Patent 1025453 it has already been suggested that a complete between-lens shutter should be provided behind the front side of the camera. This was done in order to render the lens unit interchangeable. One of the drawbacks was that the "dead" space available in this case was only partly utilized, with a view to the miniaturization of the camera, another being that this arrangement could not be adopted for cameras of the type of which the invention relates, with its insertable lens tube. According to a further proposal, covered by British Patent 781464, the tube could be inserted into the camera housing through the opened between-lens shutter, a system which, in addition to unusually large shutter dimensions, involved additional driving mechanisms as the shutter had to be opened to enable the lens unit to be inserted, and an additional auxiliary shutter before the film had to be operated. In both cases, the shutter blades could not be accommodated in an optically correct manner in the diaphragm plane of the lens unit.

[Price 4s. 6d.]

Finally, French Patent 1071762 describes a system in which interchangeable lenses are equipped with shutter and diaphragm blades, the driving mechanism for the shutter being mounted on or in the camera housing. In this case, however, the problem with which the present invention is concerned does not arise at all, because no space for the insertable tube has to be provided in the camera.

The system to which the invention relates also enables the adjusting knobs to be mounted immediately before the driving mechanisms, on both sides of the lens, on the front of the camera, also enabling the coupling devices for the shutter blades and diaphragm blades, which engage with the coupling devices for the shutter driving mechanism and diaphragm mechanism owing to the transfer of the lens unit to the operating position, to be mounted on the rear side of the tube, so that they are automatically disengaged when the lens tube is inserted and the lens unit thus transferred to the operating position.

The measure covered by the present invention can also be adopted in conjunction with those covered by patent application No. 23787/66 (Serial No. 1127344) by which, owing to the particular way in which the film is guided and the particular construction of the toothed measuring drum, the dimensions of the camera in the direction in which the film runs have already been considerably reduced, and the dimensions of the camera for 35 mm. film and the usual picture size of 24×36 mm. for instance, can now be reduced to the dimension hitherto known only in connection with 16 mm. cameras.

There is no difficulty, however, in equipping a miniaturized camera of this kind, if necessary, with an exposure regulator likewise, without increasing its dimensions, by providing the shafts of the adjusting knobs with cams which are coupled, via a flat lever differential likewise mounted on the inside of the front of the camera, with the adjusting indicator of the exposure meter on the other side of the camera.

A constructional embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

Figure 1 is a sectional plan view of the camera according to the invention;

Figure 2 is a front sectional view of the camera shown in Figure 1;

Figure 3 is a front view of a further camera showing further features of the invention;

Figure 4 is a plan view of the camera shown in Figure 3;

Figure 5 is a partial front sectional view of a further camera showing further features; and

Figure 6 is a partial plan sectional view of the features shown in Figure 5.

The camera housing 1 contains the chamber 2 for the film cassette and the chamber 3 for the winding spool, as well as the toothed drum 4, serving in the usual manner as a measuring and stepping drum. In the front panel 5 the lens tube 6 is axially displaceable. In the operation position shown in Figure 1 it can be secured in position as shown by 7 and it can be inserted in the housing, in the position shown by the dot and dash lines 8, when the camera is not in use. The lens tube contains the lens unit 9, the shutter blades 11 and the diaphragm blades 10, which are provided with coupling devices 12 and 13 respectively, on that end of the tube nearest the back of the camera, and these coupling devices engage with entrainment devices 14 and 15 of the shutter driving mechanism 16 and of the diaphragm driving mechanism 17 respectively, when the tube 6 has been extended, while when the latter has been retracted they are automatically disengaged. One constructional version of a coupling system of this kind is described in greater detail and illustrated in Patent Application No. 23788/66 (Serial No. 1109036). The shutter driving mechanism 16 and the diaphragm mechanism 17 are mounted on the back of the front panel 5 of the camera, in the "dead" space between the chamber occupied by the tube 6 in its retracted position on the one hand and the film chambers on the other. Their adjusting shafts 18 and 19 respectively pass through the front panel 5 to the outside and bear the adjusting knobs 20 and 21 for the exposure time setting and the diaphragm setting.

As shown in Figure 2, there is no difficulty, despite this compact arrangement, in coupling the follow-up indicator of the exposure meter to these two adjusting knobs 20 and 21, this being done by means of a lever differential. The shafts 18 and 19 of the knobs bear the adjusting cams 22 and 23. A single armed lever 24 is pivotally connected to the slide 25 which rests, via an entrainment device 26, in a manner already known in itself, against the follow-up indicator scanning lever 27 of the exposure meter 28. The double lever 30, of which one end 31 rests directly on the control cam 23, is pivotable about a pin 29 on the lever 24, while the other end 32 of the said double lever is connected via a slide 33 with the control cam 22. The force connection with the cams 22 and 23 is maintained by a spring 34. A further camera incorporating the above features is shown in Fig. 3. In the upper part of the camera shown in Figure 3, the viewfinder 2A and the exposure meter with the photoelectric cell or the photo resistance 3A are accommodated above the lens unit 1A. On the upper side 4A of the camera housing are the film winding lever 5A, the shutter

release knob 6A and the release knob 7A for the insertable lens tube 8A. The inspection window 9A for the exposure meter instrument can also be accommodated in this position. The lower side 10A of the camera bears the usual nut 11A, on both sides of which are provided the hinged rewinding handle 12A and a bracket 13A to receive, e.g. a flash-gun, these parts being constructed in such a way that the re-winding handle 12A, the tripod nut 11A and the bracket 13A together provide a flat surface on which the camera can stand. This system enables the camera to be assembled on particularly compact lines, in accordance with the desired over-all height. A further camera incorporating the features shown in Figs. 1 and 2 is shown in Figs. 5 and 6. To enable the space above the lens unit to accommodate the complete exposure meter, the exposure meter provided according to Figures 5 and 6 is combined to form a unit consisting substantially of the cylindrical housing part 3B which is open towards the top and into which the exposure meter instrument 4B is inserted from above, while the other housing part 5B, likewise cylindrical, is open towards the bottom and thus accessible from the interior of the camera, to enable the battery to be inserted. The photoelectric cell 6B is situated on the casing of the battery housing and is illuminated through a window in the cover of the camera housing when the camera is assembled. The two housings 3B and 5B are interconnected by a crosspiece 7B, thus forming a cohesive unit. If the exposure meter is equipped with an adjusting indicator 8B, for example, this latter is connected up by means of a scanning slide 9B which projects from the exposure meter instrument and can be coupled with the operating devices for the shutter and diaphragm of the camera.

WHAT WE CLAIM IS:—

1. A photographic roll film camera with axially movable lens tube which can be retracted into a non-operative position within the camera body and which can be secured axially in an operative position, wherein the shutter driving mechanism and diaphragm driving mechanism are mounted, separately from the shutter blades and diaphragm blades provided in the lens unit, behind the front of the camera and in the space between the film chambers and the space occupied by the lens tube when in the retracted position.

2. A photographic roll film camera as claimed in claim 1, wherein adjusting knobs

for the shutter and diaphragm driving mechanisms are mounted immediately in front of the shutter and diaphragm driving mechanisms on both sides of the lens unit, in front of the camera front.

3. A photographic roll film camera as claimed in claim 1 or 2, wherein coupling devices for the shutter blades and diaphragm blades which devices interact with coupling devices of the shutter driving mechanism and diaphragm mechanism as a result of the transfer of the lens tube to the operating position, and mounted on that end of the tube which is nearest to the film.

4. A photographic roll film camera as claimed in claim 2, wherein shafts of the adjusting knobs bear cams which are coupled, via a flat lever differential mounted on the inside of the front of the camera, with a follow-up indicator of an exposure meter on the upper side of the camera.

5. A camera as claimed in any one of claims 1 to 4, wherein a film winding lever, a shutter release knob and a lens securing device release knob, are mounted on the upper side of the camera.

6. A camera as claimed in any one of the claims 1 to 5, wherein a re-winding handle and a bracket are mounted on either side of a tripod nut on the lower side of the camera, and are designed in such a way that in conjunction with one another they provide a flat surface by which the camera can be stood up.

7. A camera as claimed in any one of claims 1 to 6, wherein a photo-resistance, an exposure and meter battery are combined in a housing consisting of two cylindrical housing parts, which are parallel to each other, interconnected by a crosspiece and open towards opposite sides, the housing open towards the top containing the exposure meter, while the other housing opens towards the interior of the camera, serves as a battery housing and is fitted on the outside with a mount for the photo-resistance.

8. A photographic roll film camera substantially as described with reference to and as shown in Figures 1 and 2 or Figures 1 to 4 or Figures 1, 2, 5 and 6 of the accompanying drawings.

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release knob 6A and the release knob 7A for the insertable lens tube 8A. The inspection window 9A for the exposure meter instrument can also be accommodated in this position. The lower side 10A of the camera bears the usual nut 11A, on both sides of which are provided the hinged rewinding handle 12A and a bracket 13A to receive, e.g. a flash-gun, these parts being constructed in such a way that the re-winding handle 12A, the tripod nut 11A and the bracket 13A together provide a flat surface on which the camera can stand. This system enables the camera to be assembled on particularly compact lines, in accordance with the desired over-all height. A further camera incorporating the features shown in Figs. 1 and 2 is shown in Figs. 5 and 6. To enable the space above the lens unit to accommodate the complete exposure meter, the exposure meter provided according to Figures 5 and 6 is combined to form a unit consisting substantially of the cylindrical housing part 3B which is open towards the top and into which the exposure meter instrument 4B is inserted from above, while the other housing part 5B, likewise cylindrical, is open towards the bottom and thus accessible from the interior of the camera, to enable the battery to be inserted. The photoelectric cell 6B is situated on the casing of the battery housing and is illuminated through a window in the cover of the camera housing when the camera is assembled. The two housings 3B and 5B are interconnected by a crosspiece 7B, thus forming a cohesive unit. If the exposure meter is equipped with an adjusting indicator 8B, for example, this latter is connected up by means of a scanning slide 9B which projects from the exposure meter instrument and can be coupled with the operating devices for the shutter and diaphragm of the camera.

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for the shutter and diaphragm driving mechanisms are mounted immediately in front of the shutter and diaphragm driving mechanisms on both sides of the lens unit, in front of the camera front.

3. A photographic roll film camera as claimed in claim 1 or 2, wherein coupling devices for the shutter blades and diaphragm blades which devices interact with coupling devices of the shutter driving mechanism and diaphragm mechanism as a result of the transfer of the lens tube to the operating position, and mounted on that end of the tube which is nearest to the film.

4. A photographic roll film camera as claimed in claim 2, wherein shafts of the adjusting knobs bear cams which are coupled, via a flat lever differential mounted on the inside of the front of the camera, with a follow-up indicator of an exposure meter on the upper side of the camera.

5. A camera as claimed in any one of claims 1 to 4, wherein a film winding lever, a shutter release knob and a lens securing device release knob, are mounted on the upper side of the camera.

6. A camera as claimed in any one of the claims 1 to 5, wherein a re-winding handle and a bracket are mounted on either side of a tripod nut on the lower side of the camera, and are designed in such a way that in conjunction with one another they provide a flat surface by which the camera can be stood up.

7. A camera as claimed in any one of claims 1 to 6, wherein a photo-resistance, an exposure and meter battery are combined in a housing consisting of two cylindrical housing parts, which are parallel to each other, interconnected by a crosspiece and open towards opposite sides, the housing open towards the top containing the exposure meter, while the other housing opens towards the interior of the camera, serves as a battery housing and is fitted on the outside with a mount for the photo-resistance.

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