

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Roll Film Camera

We, FRANKE & HEIDECHE, G.M.B.H., a German Body Corporate, trading as ROLLEI-WERKE FRANKE & HEIDECHE, of 196 Salz-dahlumerstrasse, 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:—

The present invention relates to a roll film camera, the rear part of which is a detachable cassette.

According to the present invention there is provided a roll-film camera having a rear part comprising a detachable cassette provided with a film transport mechanism the camera having means for coupling the mechanism with the shutter cocking gearing of the camera wherein a latch member is provided in the cassette and is capable of extending into a slide guide the slide guide being provided in the cassette to receive a slide which closes the cassette, and a shutter-release lock is provided on the camera and is so arranged that the latch member, when the cassette is attached, prevents the shutter from being released when the cassette is closed, and prevents the cassette when attached to the camera from being closed when the shutter drive is uncocked and prevents the cassette when closed from being attached to the camera when the shutter is uncocked.

Further according to the present invention there is provided a roll-film camera having a rear part comprising a detachable cassette, wherein a latch member of the cassette is constructed in the form of a pivot lever which is equipped with a cam capable of extending into a slide guide and with a pin which extends out of the cassette and into the camera, the slide guide being provided in

the cassette to receive a slide which closes the cassette and wherein a shutter-release lock includes a plate which is movable in relation to the pin and which in co-operation with the latch member, when the shutter of the camera is uncocked and the cassette closed, prevents the cassette from being attached, and prevents the cassette slide from being closed when the cassette is attached and the shutter is uncocked.

The cassette is preferably a cassette for roll films, with a delivery and a take-up spool and with a film gate which can be closed by means of a slide.

Cassettes of this kind are removable and replaceable but remain connected with the camera for a long time in certain cases, possibly even throughout the successive exposure of a number of rolls of film. They are preferably adapted to the contours of the camera, so that they form a compact whole with the camera when attached to the latter. This is why they can be provided with a rear panel which can be moved upwards on a hinge, so that the film can be changed without removing the cassette from the camera. The cassette locking slide is thus only required when the cassette has to be removed from the camera with partly exposed film and replaced by another cassette.

Preferably the cassette is mounted and supported on the camera so that the cassette can be simply placed on the camera and held in position by a resilient catch which can be simply lifted out in order to enable the cassette to be removed but which is locked when the cassette slide is open.

It has already been suggested that the gate lock of the cassette should be combined with the interlocking of the camera, so that the cassette cannot be inadvertently removed from

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the camera when the cassette is in its open position. In contradistinction to the special cassette lock necessary in these cases, it is desirable to provide a normal cassette slide lock and a simple catch-type securing system, enabling the attachment cassette to be mounted and removed in a particularly simple and uncomplicated manner.

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

Fig. 1 is a lateral partial diagram of a camera winding drive;

Fig. 2 shows a similar diagram with the winding drive in a different state;

Fig. 3 is a partial end view of the cassette when the cassette slide has been withdrawn;

Fig. 4 is the same with the cassette slide inserted;

Figs. 5 and 6 show two masking slides for use on the cassette;

Fig. 7 shows, in section, a lateral view of a cassette;

Fig. 8 shows a section through a rear part of a camera;

Fig. 9 shows a lateral view of the part shown in Fig. 8 with the cassette slide open; and

Fig. 10 shows the same view with the cassette slide closed.

The camera control gear or winding drive comprises cogwheels 2 and 3, which engage cogwheel 1. The cogwheel 1 is connected with a manual crank 4; the winding takes place in the direction shown by the arrow "A". The cogwheel 3 is connected with a cocking roller 5, e.g. the cocking roller of a roller-blind shutter, via a pawl which is not shown and of which the release enables the cocking roller drive and thus the shutter to run their course, in the known manner. The gearing ratios in this case are selected to ensure that one movement of the hand crank 4 results in a complete rotation of the cogwheel 2, while the cogwheel 3 is only caused to accompany the movement to the extent of somewhat less than 360°. The cogwheel 2 is connected with a cam disc 6, of which the cam surface 7 interacts with a cam lever 8. Furthermore, the cam disc 6 is equipped with a deflector pin 9, which can act on the lever attachment 10 of a pawl. A ring 11 connected with the cocking roller 5 is provided with a radial groove 12 in which a bent part 13 of a lever 14 can drop radially when it is situated opposite to the said radial groove 12. When the camera control mechanism is cocked the parts assume the position shown in Fig. 1.

The lever 14 is rotatable about a pin 15 and is connected by means of a grooved pin connection 16 and 17 and via a draw rod 18 and a pivotally mounted lever 19 with a release button 20. When the release button is pressed (see Fig. 2) the traction rod 18 is

drawn to the right, taking the lever 14 with it, so that the bent part 13 of this latter can enter the radial groove 12 of the ring 11. A release action is thus only possible, i.e. the release button can only be pressed, if the camera drive mechanism is in the cocked position. The lever 14 is also fitted with a lug 21 which is directed upwards and which interacts with a second three-armed lever 22 rotatable about the pin 15. This lever 22 is influenced by a hairpin spring 23 of which one end rests against a stationary pin 24 while the other end presses against a lug 25, so that the said spring tends to pivot the lever 22 in a clockwise direction. In this process the lug 25 rests against the lug 21 of the lever 14, so that when the release button 20 is operated and the lever 14 pivoted as a result thereof the lever 22 is rotated anti-clockwise. The system is so arranged that the lower end 40 of a plate 26 of this lever 22 moves into position in front of an aperture 27 in the camera casing, through which passes a pin 28 of a lever 29 rotatably mounted in the cassette 35. The cam lever 8 interacting with the cam disc 6 is biased by a spring 30, in an anti-clockwise direction, the arm 31 of the said cam lever being so constructed that this end can pivot into position behind the upper edge 32 of the plate 26, locking the latter in the position mentioned (see Fig. 2). This is conditional on the cam surface 7 being situated opposite the protuberance 33 of the arm 31, which is the case when the control mechanism is cocked (Fig. 1). When the release button 20 is no longer pressed, the lever system 14, 18, and 19 returns to the position shown in Fig. 1, owing to the pressure of spring 34. In this process the lug 21 moves away from the lug 25 of the lever 22, as the latter remains in the position shown in Fig. 2, in which position the lower end of the plate 26 extends across the aperture 27 of the camera. In the run-off movement of the shutter which now follows, the cocking-roller drive 5 rotates clockwise, as shown by its arrow, and comes to a stop in a run-off position in which the radial groove is "staggered" in relation to the bent portion 13 of the lever 14, so that a further shutter-release action is prevented as long as the camera drive mechanism has not been re-cocked by the crank 4 and the gearing has not returned to the position shown in Fig. 1. When the camera is cocked the cam disc 6 is caused to accompany this cocking movement to the extent of 360°. In this process the cam presses the protuberance 33 of the cam lever 8 in an outward direction, as a result of which the locking of the plate 26 is nullified, so that it can again pivot clockwise under the effect of the spring 23 or the pin 9 engaging attachment 10. The lever 29 rotatable about a pin 36 in the cassette 35 is provided with a protuberance

37 by which it extends into the cassette slide guide (Fig. 3). When the cassette is closed, i.e. when the cassette slide 39 is inserted, the said protuberance 37 is displaced from the slide guide 38, so that the lever 29 assumes the position shown in Fig. 4. The lower end 40 of the plate 26 is provided with a step 40A, in such a way that when the cassette is open, i.e. when the slide 39 is withdrawn, the pin 28 of the lever 29 enables the plate 26 to move into the position shown in Fig. 2, which is not possible, on the other hand, when the cassette is closed, i.e. when the cassette slide 39 is inserted (Fig. 4). The release of the camera is thus prevented when the cassette is closed. If, on the other hand, the camera drive has run off (Fig. 2), the step 40A prevents the lever 29 from pivoting into position when the cassette slide is being inserted, so that the said slide cannot be fully introduced until the camera has been recocked.

It is thus only when the camera is cocked that the cassette can be closed and then removed. If, after the removal of the cassette, the shutter release is operated, then the camera drive mechanism runs off, and the plate 26 resumes the position shown in Fig. 2, in which it is locked by the arm 31. This, however, closes the passage provided in the camera for the cassette pin 28, so that the closed cassette now cannot be re-attached, until the camera operating mechanism has been recocked and the plate 26 thus removed from this passage. The film drive within the cassette is comparatively easy to operate, as the cogwheel 2 performs a rotation of exactly 360° each time the camera is cocked, so that the coupling of the film operating mechanism of the cassette, by the engagement of a cassette cogwheel in the cogwheel 2, can if necessary be brought about in a simple manner via an intermediate cogwheel.

In principle it is also possible, in conjunction with this camera and cassette, for size-limiting masks to be inserted, in place of the cassette slide, in the cassette slide guide. These masks are then given appropriate recesses 41 and 42 (as indicated by the broken lines in Fig. 4). The safety and locking functions performed by the cassette slide are therefore not performed by the masks. The size-limiting mask, of course, is not a substitute for the cassette slide, since it naturally has to be replaced again by the cassette slide before the cassette is removed.

Figs. 5 and 6 show two versions of size-limiting masks of this kind. The masks 43 and 44 are provided with appropriate image-limiting recesses 45 and 46 and with cut-away portions 41 on one or both edges, which leave the scanning lever 29 unaffected when the masks 43 and 44 are inserted in the cassette slide guide 38. To avoid confusions with the cassette slide, the "grip ends" 47 and 48

of the masks are constructed differently from the slide head and extend from the cassette in the manner of roofs.

The camera described is substantially fool-proof, without the need for any signals or indicating devices on the camera or cassette, on which devices the user of the camera would have to keep a watch when changing the cassette.

As shown in Fig. 7 an end panel 1A of a cassette 2A contains the light passage or the film gate 3A. Between the end panel 1A of the cassette and an attached plate 4A, a channel 5A is formed, which, in the upper part of the cassette, leads into an insertion aperture 6A. A sealing strip 7A seals off this channel at the top. Into this channel 5A the cassette slide 39 can be inserted from above, so that the film gate aperture 3A of the cassette can be sealed in a light-proof manner. The rear panel 9A of the cassette is mounted on a hinge 15A on the base of the cassette, so that the latter can be opened even without removing it from the camera. Between the rear panel 9A of the cassette and an additional panel 10A mounted thereon, a further channel slit 11A is formed, which is open on the lower part of the rear panel of the cassette, so that the cassette slide can be inserted therein and retained while not in use in the channel 5A. In the example, the cassette slide is also provided with a handle 12A which is pivotable about a hinge 13A of the cassette slide, in order to facilitate operation. In this case a suitable recess 14A is provided in the base of the cassette, to accommodate the hinge-mounted handle 12A so that when the slide has been introduced and the handle pivoted on its hinge a smooth exterior is obtained. This hinged handle ensures that when the cassette is closed, i.e. when the cassette slide 39 is situated in the guide 5A and the gate is closed, the slide is easier to grip, in addition to which the user is thereby informed that the slide is situated in the gate.

By the additional plate 10A, which is provided for the formation of the pocket-like guide slit 11A on the rear panel of the cassette, this rear cover of the cassette is at the same time strengthened, so that special reinforcement by projecting ribs or similar devices is not necessary.

As shown in Figures 8 to 10, the cassette 1B is provided, in lateral protuberances 2B, with catches 3B, which are pivotable about pins 4B and which are tensioned in the direction shown by the arrow "A" by means of hairpin springs 5B. Catches or pins 7B are provided on the camera housing, the one shown being on the side wall of the housing opposite the side wall 6B. When the cassette is being attached, the catches 3B slide by their oblique surfaces 8B over the pins 7B, whereupon these latter then engage the grooves 9B. The cassette also bears a release

bar 10B, which terminates on the outside in a button 11B, and this bar is positively connected with the catch 3B by means of lugs 12B and perforations 13B. By pressure on the button 11B therefore, the catches can be lifted out of position.

Opposite the inner end 14B of the bar 10B is arm 15B of a crank lever 16B, which is pivotable about pin 17B and which is subjected to the influence of a spring 18B, which presses the lever 16B into the release path of the bar 10B, i.e. in front of the end 14B of the latter. The other end 19B of the lever 16B extends into the guide 20B of the cassette slide 39 in such a way that the lever 16B, when the slide 39 is closed, moves out of the zone of the scanning bar 10B and enables the latter to be operated by the button 11B. The end 15B of the lever can also be shaped in such a way that whilst enabling the release bar to move it at the same time limits the movement of the latter to the distance required for the disengagement of the pawl 3B.

It is obvious that the pawl 3B and the catch 7B can also be arranged conversely, i.e. that the pawl 3B with the bar 10B and the button 11B can be mounted on the camera, while the catch 7B can be mounted on the cassette. In this case, of course, the lever 16B in the cassette must be so shaped that its end 15B extends into the path of the bar 10B of the camera.

WHAT WE CLAIM IS:—

1. A roll-film camera having a rear part comprising a detachable cassette provided with a film transport mechanism, the camera having means for coupling the mechanism with the shutter cocking gearing of the camera wherein a latch member is provided in the cassette and is capable of extending into a slide guide, the slide guide being provided in the cassette to receive a slide which closes the cassette, and a shutter-release lock is provided on the camera and is so arranged that the latch member, when the cassette is attached, prevents the shutter from being released when the cassette is closed, and prevents the cassette when attached to the camera from being closed when the shutter drive is uncocked and prevents the cassette when closed from being attached to the camera when the shutter is uncocked.

2. A roll-film camera having a rear part comprising a detachable cassette, wherein a latch member of the cassette is constructed in the form of a pivot lever which is equipped with a cam capable of extending into a slide guide and with a pin which extends out of the cassette and into the camera, the slide guide being provided in the cassette to receive a slide which closes the cassette and wherein a shutter-release lock includes a plate which is movable in relation to the pin and

which in co-operation with the latch member, when the shutter of the camera is uncocked and the cassette closed, prevents the cassette from being attached, and prevents the cassette slide from being closed when the cassette is attached and the shutter is uncocked.

3. A roll-film camera as claimed in claim 2, having a locking device for locking the movable plate in a position to which it moves when the shutter is released and the slide is not in the cassette.

4. A roll-film camera as claimed in claim 3, wherein the locking device is constructed as a spring-biased arm and is provided with a cam with which it can be released from its locking position by a cam disc of the film transport mechanism.

5. A roll-film camera as claimed in claim 4, having a pin on the cam disc, for automatically moving the movable plate when the camera is being wound.

6. A roll-film camera as claimed in claim 4 or 5, having a second disc which is connected with a shutter cocking roller and which has an aperture into which a release lever can drop to prevent depression of a shutter release button before cocking of the shutter.

7. A roll-film camera as claimed in any one of claims 1 to 6, having aperture masks which can be substituted for the cassette slide and which are provided, on the edges interacting with the latch member, with recesses, so that the latch member is not affected when the masks are inserted.

8. A roll-film camera as claimed in any one of claims 1 to 7, having a delivery spool and take-up spool and a film gate which can be closed by means of the slide, wherein a plane rear panel situated parallel to the gate is made double, thus forming a pocket-like gap to accommodate the cassette slide.

9. A roll-film camera as claimed in claim 8, wherein the pocket-like gap in the rear panel is positioned on the side of the cassette opposite to that of the gate side.

10. A camera as claimed in any one of claims 1 to 9, wherein a spring-biased catch is provided on the cassette to engage a pin on the camera and a lock is situated in the path of the cassette slide and which, when the cassette slide is closed, is inoperative, while when the cassette slide is open it locks the catch.

11. A camera as claimed in claim 10, having a button which, at least when moving in a direction to release the latch, is positively connected with this latter, and in the path of which button the lock is operative.

12. A camera as claimed in claim 11, wherein the lock consists of a crank lever of which one end extends into the cassette slide guide, while the other end extends into the path of the button.

13. A camera as claimed in claim 12, wherein the crank lever prevents the button from being operated when the cassette is open,



bar 10B, which terminates on the outside in a button 11B, and this bar is positively connected with the catch 3B by means of lugs 12B and perforations 13B. By pressure on the button 11B therefore, the catches can be lifted out of position.

Opposite the inner end 14B of the bar 10B is arm 15B of a crank lever 16B, which is pivotable about pin 17B and which is subjected to the influence of a spring 18B, which presses the lever 16B into the release path of the bar 10B, i.e. in front of the end 14B of the latter. The other end 19B of the lever 16B extends into the guide 20B of the cassette slide 39 in such a way that the lever 16B, when the slide 39 is closed, moves out of the zone of the scanning bar 10B and enables the latter to be operated by the button 11B. The end 15B of the lever can also be shaped in such a way that whilst enabling the release bar to move it at the same time limits the movement of the latter to the distance required for the disengagement of the pawl 3B.

It is obvious that the pawl 3B and the catch 7B can also be arranged conversely, i.e. that the pawl 3B with the bar 10B and the button 11B can be mounted on the camera, while the catch 7B can be mounted on the cassette. In this case, of course, the lever 16B in the cassette must be so shaped that its end 15B extends into the path of the bar 10B of the camera.

WHAT WE CLAIM IS:—

1. A roll-film camera having a rear part comprising a detachable cassette provided with a film transport mechanism, the camera having means for coupling the mechanism with the shutter cocking gearing of the camera wherein a latch member is provided in the cassette and is capable of extending into a slide guide, the slide guide being provided in the cassette to receive a slide which closes the cassette, and a shutter-release lock is provided on the camera and is so arranged that the latch member, when the cassette is attached, prevents the shutter from being released when the cassette is closed, and prevents the cassette when attached to the camera from being closed when the shutter drive is uncocked and prevents the cassette when closed from being attached to the camera when the shutter is uncocked.

2. A roll-film camera having a rear part comprising a detachable cassette, wherein a latch member of the cassette is constructed in the form of a pivot lever which is equipped with a cam capable of extending into a slide guide and with a pin which extends out of the cassette and into the camera, the slide guide being provided in the cassette to receive a slide which closes the cassette and wherein a shutter-release lock includes a plate which is movable in relation to the pin and

which in co-operation with the latch member, when the shutter of the camera is uncocked and the cassette closed, prevents the cassette from being attached, and prevents the cassette slide from being closed when the cassette is attached and the shutter is uncocked.

3. A roll-film camera as claimed in claim 2, having a locking device for locking the movable plate in a position to which it moves when the shutter is released and the slide is not in the cassette.

4. A roll-film camera as claimed in claim 3, wherein the locking device is constructed as a spring-biased arm and is provided with a cam with which it can be released from its locking position by a cam disc of the film transport mechanism.

5. A roll-film camera as claimed in claim 4, having a pin on the cam disc, for automatically moving the movable plate when the camera is being wound.

6. A roll-film camera as claimed in claim 4 or 5, having a second disc which is connected with a shutter cocking roller and which has an aperture into which a release lever can drop to prevent depression of a shutter release button before cocking of the shutter.

7. A roll-film camera as claimed in any one of claims 1 to 6, having aperture masks which can be substituted for the cassette slide and which are provided, on the edges interacting with the latch member, with recesses, so that the latch member is not affected when the masks are inserted.

8. A roll-film camera as claimed in any one of claims 1 to 7, having a delivery spool and take-up spool and a film gate which can be closed by means of the slide, wherein a plane rear panel situated parallel to the gate is made double, thus forming a pocket-like gap to accommodate the cassette slide.

9. A roll-film camera as claimed in claim 8, wherein the pocket-like gap in the rear panel is positioned on the side of the cassette opposite to that of the gate side.

10. A camera as claimed in any one of claims 1 to 9, wherein a spring-biased catch is provided on the cassette to engage a pin on the camera and a lock is situated in the path of the cassette slide and which, when the cassette slide is closed, is inoperative, while when the cassette slide is open it locks the catch.

11. A camera as claimed in claim 10, having a button which, at least when moving in a direction to release the latch, is positively connected with this latter, and in the path of which button the lock is operative.

12. A camera as claimed in claim 11, wherein the lock consists of a crank lever of which one end extends into the cassette slide guide, while the other end extends into the path of the button.

13. A camera as claimed in claim 12, wherein the crank lever prevents the button from being operated when the cassette is open,



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while when the cassette is closed the crank lever limits the operation of the button to the extent required for the disengagement of the catch.

- 5 14. A roll-film camera substantially as described with reference to and as illustrated by the accompanying drawings.

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