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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Roll film cassette.

We, FRANK & HEIDECHE G.m.b.H., a German Body Corporate, trading as ROLLEI-WERKE FRANK & HEIDECHE, of 196 Salzdahlumerstrasse, 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 roll film cassette having a film wind-on mechanism, which can be connected with the wind-on and shutter-cocking mechanism of the camera so as to be operated thereby when
15 the cassette is attached to the camera.

Due to the constantly varying film roll diameter during winding-on of the film it is necessary to provide means so that as the wind-on mechanism is moved in equal steps the film is also. This means can either be provided in the wind-on mechanism of the camera or the cassette and in this invention such means is provided in the wind-on mechanism of the cassette which simplifies
20 the construction of the wind-on mechanism of the camera.

It is desirable to be able to wind the leading edge of the film on to the take-up spool even when the cassette is not in the
30 camera so that when the cassette is inserted into the camera, the film is immediately ready for exposure. It is also desirable for the cassette to be removable from the camera regardless of the number of pictures
35 which have been taken and without the danger of double exposures, unexposed pictures or overlapping pictures occurring.

According to the present invention there is provided a roll film cassette having a film
40 wind-on mechanism for step by step winding of a film which mechanism is connected to the wind-on mechanism of a camera when the cassette is placed in the camera, wherein the wind-on mechanism of the cassette has a winding knob which is movable
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to a depressed position in which it can no longer be gripped for rotation and wherein there is provided locking means for locking said knob in said depressed position and means for preventing the locking means
50 locking the knob during winding-on of lead and follower strips of a film.

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

Figure 1 shows an illustration of the essential parts of the cassette wind-on mechanism;

Figure 2 shows the mechanism parts
60 which are effective when in the film is being attached to the take-up spool; and

Figure 3 shows a cross-section through the cassette film wind-on knob.

The discs 1, 2, 3 and 4 are rotatably
65 mounted on a common spindle. The disc 1 has spur teeth (not shown) on its periphery and is coupled, on attachment of the cassette to the camera, with the wind-on mechanism of the camera, which carries out a forward and return movement at every picture change for the cocking of the shutter, so that this disc 1 is also rotated forwards and back with constant stroke. An engaging
70 pawl 6, which engages with the disc 2 comprising a pawl wheel below disc 1, is rotatable on the pin 5 of the disc 1. On rotation of the disc 1 in the clockwise direction (as seen in Fig. 1) the pawl wheel 2 is entrained. The disc 3 comprising a toothed
80 wheel, above disc 1, drives the film winding wheel 7 and is rigidly connected with this wheel 2. The disc 4, below wheel 2, carries a toothed segment 8 which engages with the toothed wheel 9 of the indicator disc 10. Moreover the disc 4 also carries ratchet teeth 11 with which the blocking pawl 12 and the stepping pawl 13 co-operate. Furthermore, a guide rib 14 for the end 15 of the pawl 6 is also arranged
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on the disc 4. The pawl 13 is pivotable about the pin 17 and lies with its end 16 in the region of a dog 18 of the disc 1 in such manner that this dog 18, on rotation of the disc 1 in the clockwise direction, strikes against the pin 16, brings the pawl 13 into engagement with the teeth 11 and thus steps the disc 4 further by one step. By means of a lever 19 which is rotatable about the pin 20 it is possible to adjust the position of the pawl 13 and the stop 21 for the pawl end 22, and in fact the arrangement is so selected that according to the position of the lever 19 the pawl 13 steps the disc 4 further by one or two tooth divisions. The adjustable window 24 for the indicator disc 10 is connected with this adjustable lever 19 through a draw rod 23, and in fact in this way it is possible to change the window 24 so that the indicator disc shows "1" to "12" or "1" to "24". The rib 14 of the disc 4 accompanies this step by step further movement of the disc 4 and thus step by step varies the point of engagement of the pawl 6. Thus the angle of rotation of the toothed wheel 3 is shortened step by step, and thus the increasing roll diameter of the take-up spool is compensated, so that equal picture intervals are obtained. When film without protective paper for 24 exposures is used, in this case by appropriate setting of the lever 19 the disc 4 is stepped by one tooth division further at each feed step, in the case of backed film for 12 exposures on the other hand it is stepped by two tooth divisions, in order to take account of the increase of diameter of the film roll. The disc 4 has an arcuate slot in which a control cam recess 25 with the steps 26 and 27 is provided. On this stepped cam there rests a pin 28 which is seated on a double-armed lever 29, below disc 4, which is pivotable about the peg 30 and which lever 29 can drop as locking lever into a groove 31 (Fig. 3) of the spool spindle 32. When the pin 28 rests on the cam part 25, the lever 29 is pivoted out so far that it just engages in the groove 31. When the pin 28 slides up on to the step 26 the lever 29 is lifted out of the groove 31 of the spool spindle 32. The end 33 of the lever 29 (Figure 2) co-operates with the extension 34 of a pawl 35 which is rotatable about the pin 36. On pivoting of the lever arm 29 in the clockwise direction this pawl 35 is pivoted in the anti-clockwise direction, so that a tab 37 of the resilient lever 40 can slide beneath its edge 38 and holds it fast in the position as illustrated in Figure 2, in which it is lifted out of the pawl wheel 39. The pawl wheel 39 is rigidly connected with the film feed wheel 2 or 3. The resilient lever 40 is pivotable about the pin 41 and carries roller 42 between which roller and a film guide roller 43, there is a narrow space.

This narrow space is so dimensioned that the backing strip of a film can run between the rollers 42 and 43, but that the leading edge of the protective paper on the film forces the roller 42 so far outwards that the tab 37 is lifted away from the pawl 38 and the pawl 35 can drop into the ratchet teeth 39, whereby further stepping of the film is prevented. By means of the double-armed lever system 44, 45, which is rotatable about the pin 46 and the free end 47 of which lies in the region of the cassette cover, when the rear wall of the cassette is opened the lever 29 is pivoted outwards in the clockwise direction by means of the pin 48, so that the pawl 35 is lifted out of the ratchet teeth 39 and is held in this position by the tab 37 of the linkage 40. On closing of the rear wall of the cassette the lever 47 is pressed inwards so that the lever 29 can pivot in on to the spindle 32 in the anti-clockwise direction (see position in dot-and-dash lines in Figure 2). The film feed knob 49 according to Figure 3 is pressed outwards by a spring 50 out of the opening 51 of the cassette wall 52, so that its spindle 32 does not hinder the pivoting-in of the lever 29. The end 53 of the knob spindle 32 is conical, so that on pressing-in of the knob 49 the lever 29 can be forced away and snap into the groove 31 of the knob spindle shaft, so that the knob is locked in this pressed-in position. In this position (in solid lines in Figure 2) the pawl 35 is held lifted out of the ratchet teeth 39 by the lever arm end 33.

When the cassette is loaded with a new film spool and the paper lead is drawn through between the rollers 42 and 43 and fastened to the take-up spool, and then the cassette is closed, the lever 47 is pressed inwards as described hereinbefore and is pivoted in the clockwise direction and thus releases the lever 29, so that the latter is pivoted by the spring 54 in the anti-clockwise direction. With its end 33 the lever 29 releases the extension 34 of the pawl 35, which however is prevented from dropping into the ratchet teeth 39 by the tab 37 of the lever 40. The film lead is wound-on by rotation of the film winding knob 49, until the sensitive film strip comes between the rollers 42 and 43 and forces the roller 42 outwards. Thus the tab 37 of the lever 40 slides off from the pawl 35, which now drops into the ratchet teeth 39 and prevents further film winding. In this position the first picture field is situated in the picture window and the indicator disc is in its initial position in which the number "1" appears behind the window 24. Further conveying of the film by the cassette rotating knob 49 is now prevented, as also transport of the film after the attachment of the cassette to the camera by the wind-on mechanism.

ism of the camera. If now the film winding knob 49 is pressed into the cassette housing, its conical tip 53 displaces the lever arm 29 outwards until it can drop back again into the groove 31 and thus locks the knob 49 in the pressed-in position. Due to the pivoting of the lever 29 in the clockwise direction thus effected, the pawl 35 is and remains lifted out of the ratchet teeth 39, so that the film feed can now be effected by the wind-on mechanism of the camera.

At every actuation of the camera wind-on mechanism the disc 1 is rotated forwards and back and in this rotation entrains the film spool 7. At the same time at every film feed action the counting disc 8 is stepped further by one or two tooth divisions. Thus the control stop 14 for the pawl 6 also travels, so that a continuously diminishing rotation of the film spool takes place at every stroke. The pin 28 of the lever here travels on the cam part 25. When the full picture number is reached, the step 26 of this cam lifts the pin 28 so that the lever 29 is pivoted outwards and is lifted out of the groove 31 of the knob spindle, so that the latter springs outwards under the influence of its spring 50. This makes free the possibility of winding-on the film follower strip by means of the knob 49. At the same time thus the complete exposure of the contents of the cassette is indicated.

WHAT WE CLAIM IS:—

1. A roll film cassette having a film wind-on mechanism for step by step winding of an inserted film which mechanism is connected to the wind-on mechanism of a camera when the cassette is placed in the camera, wherein the wind-on mechanism of the cassette has a winding knob which is movable to a depressed position in which it can no longer be gripped for rotation and wherein there is provided locking means for locking said knob in said depressed position and means for preventing the locking means locking the knob during winding-on of lead and follower strips of the inserted film.

2. A cassette as claimed in claim 1, wherein the knob is mounted on a spindle movable axially against the action of a spring into said depressed position, the end of the spindle remote from the knob being provided with a groove which comprises the locking means with a lever arm which lies

in the plane of the groove when the knob is depressed, the means for preventing locking comprising a cam on a rotatable disc adapted to be driven by the camera wind-on mechanism and a cam follower pin mounted on said lever and engaging said cam.

3. A roll film cassette as claimed in claim 2, wherein said lever lies by means of an extension in the path of a ratchet pawl in such manner that this pawl is held during the winding-on of the lead strip and can engage ratchet teeth when released by a sensing mechanism which holds the pawl while the lead strip is being wound on and releases it when the mechanism senses the leading edge of the sensitive film itself, the pawl being lifted out of the ratchet teeth during the winding-on of the film and its follower strip, by said lever.

4. A roll film cassette as claimed in claim 3, wherein said lever additionally lies in the path of a feeler lever operated by the rear wall of the cassette, in such manner that on opening of the cassette rear wall said lever is transferred into the inoperative position, entraining the ratchet pawl.

5. A roll film cassette as claimed in any one of claims 1 to 4, wherein the coupling of a film wind-on wheel takes place through a pawl arranged on a cassette drive wheel, the duration of engagement of which pawl is varied step by step by a control rib of a counting mechanism drive disc, which in turn is actuated step by step by means of a stepping pawl by an engaging piece of the cassette drive wheel.

6. A roll film cassette as claimed in claim 5 wherein the feed stroke of the stepping pawl is adjustable to two feed steps by shifting of its pivot point by a lever connected with means for the change-over of the counting mechanism to count in accordance with a different feed step.

7. A roll film cassette substantially as described with reference to and as illustrated in the accompanying drawings.

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ism of the camera. If now the film winding knob 49 is pressed into the cassette housing, its conical tip 53 displaces the lever arm 29 outwards until it can drop back again into the groove 31 and thus locks the knob 49 in the pressed-in position. Due to the pivoting of the lever 29 in the clockwise direction thus effected, the pawl 35 is and remains lifted out of the ratchet teeth 39, so that the film feed can now be effected by the wind-on mechanism of the camera.

At every actuation of the camera wind-on mechanism the disc 1 is rotated forwards and back and in this rotation entrains the film spool 7. At the same time at every film feed action the counting disc 8 is stepped further by one or two tooth divisions. Thus the control stop 14 for the pawl 6 also travels, so that a continuously diminishing rotation of the film spool takes place at every stroke. The pin 28 of the lever here travels on the cam part 25. When the full picture number is reached, the step 26 of this cam lifts the pin 28 so that the lever 29 is pivoted outwards and is lifted out of the groove 31 of the knob spindle, so that the latter springs outwards under the influence of its spring 50. This makes free the possibility of winding-on the film follower strip by means of the knob 49. At the same time thus the complete exposure of the contents of the cassette is indicated.

WHAT WE CLAIM IS:—

1. A roll film cassette having a film wind-on mechanism for step by step winding of an inserted film which mechanism is connected to the wind-on mechanism of a camera when the cassette is placed in the camera, wherein the wind-on mechanism of the cassette has a winding knob which is movable to a depressed position in which it can no longer be gripped for rotation and wherein there is provided locking means for locking said knob in said depressed position and means for preventing the locking means locking the knob during winding-on of lead and follower strips of the inserted film.

2. A cassette as claimed in claim 1, wherein the knob is mounted on a spindle movable axially against the action of a spring into said depressed position, the end of the spindle remote from the knob being provided with a groove which comprises the locking means with a lever arm which lies

in the plane of the groove when the knob is depressed, the means for preventing locking comprising a cam on a rotatable disc adapted to be driven by the camera wind-on mechanism and a cam follower pin mounted on said lever and engaging said cam.

3. A roll film cassette as claimed in claim 2, wherein said lever lies by means of an extension in the path of a ratchet pawl in such manner that this pawl is held during the winding-on of the lead strip and can engage ratchet teeth when released by a sensing mechanism which holds the pawl while the lead strip is being wound on and releases it when the mechanism senses the leading edge of the sensitive film itself, the pawl being lifted out of the ratchet teeth during the winding-on of the film and its follower strip, by said lever.

4. A roll film cassette as claimed in claim 3, wherein said lever additionally lies in the path of a feeler lever operated by the rear wall of the cassette, in such manner that on opening of the cassette rear wall said lever is transferred into the inoperative position, entraining the ratchet pawl.

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6. A roll film cassette as claimed in claim 5 wherein the feed stroke of the stepping pawl is adjustable to two feed steps by shifting of its pivot point by a lever connected with means for the change-over of the counting mechanism to count in accordance with a different feed step.

7. A roll film cassette substantially as described with reference to and as illustrated in the accompanying drawings.

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