

1.127.344



PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Photographic Camera for use with Perforated Roll Film

We, FRANKE & HEIDECHE G.M.B.H., a German body corporate, trading as ROLLEI-WERKE FRANKE & 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:—

This invention relates to a photographic roll film camera of the kind in which during both winding-on and re-winding the film is led over a toothed counter or measuring drum arranged between the image aperture guide and the take-up spool and cooperating with perforations in the film.

The film supply spool or cassette, the toothed drum and the take-up spool were hitherto so arranged that the film travels tangentially over the toothed counter drum on to the take-up spool, the structural length of the camera being determined by the sum of the length of the image aperture, and the diameters of the supply spool or cassette, the toothed drum and the take-up spool. It has subsequently become known to locate the take-up spool nearer both to the front of the camera and to the camera optical axis without intercepting the path of the light rays, such an arrangement however, necessitating the employment of a counter drum having a substantial number of teeth, usually eight, so as to ensure accurate engagement of the teeth with the film perforations during re-winding. Due to the resulting substantial diameter of the counter drum only limited reduction was possible in the structural length of the camera. The invention has for an object further to shorten the overall length of miniature cameras which are to be loaded with perforated film by means of an arrangement enabling the diameter of the counter drum to be reduced.

According to the invention there is provided a photographic roll film camera of the kind

referred to, wherein the film extends from the film guide to the counter drum in a direction tangentially of the drum, the take-up spool being located nearer the front of the camera than the drum and being spaced from the optical axis of the camera by a distance not substantially greater than is necessary to ensure that it will not intercept the path of the light rays, the film thereby being caused to wrap partially around said drum and forming during re-winding a loop of predetermined radius extending from the drum to the take-up spool, and the drum teeth being of involute form with the leading flanks in the winding-on direction shaped to form a part of a hypocycloid determined by the radius of the film loop and the radius of the drum.

During the winding-on operation by rotation of the take-up spool, the film travels approximately tangentially from the toothed counter drum on to the take-up spool because of a strong braking action on the unwinding film within the cassette. When a re-winding, however, the film forms a pronounced loop along this path, because of its inherent springiness and the lack of or reduced braking action. By shaping to a part hypocycloid those drum tooth flanks which are leading in the winding-on direction the number of teeth on the drum can be substantially reduced and this enables a more compact camera to be produced than hitherto in which damage to the film during re-winding is avoided. Extensive looping of the film during re-winding, due to the reduced tension on the film, is preferably limited by a roller located so that the loop radius, relative of the drum radius, provides the required hypocycloid form for the drum tooth flanks. This is also advantageous when winding on the film in the case where the counter drum pulls the film out from the image aperture and the take-up spool is driven by friction.

An embodiment of the invention is shown diagrammatically and by way of example in

the accompanying drawings, wherein:

Figure 1 shows the basic features of the camera; and

Figure 2 is an enlarged fragmentary view of the sprocket drum.

The camera shown in Figure 1 consists of the objective 1 and the image aperture guide 2, against which the film 4 is pressed by the presser plate 3. The film 4 passes from the supply cassette 5 through the image aperture guide to the toothed counter drum 6 and from the latter to the take-up spool 7. The spool 7 is located nearer the front of the camera than the counter drum 6 and at a distance from the optical axis such that it is not spaced substantially further from said axis than is necessary to avoid intercepting the light rays.

During winding-on, that portion of the film between the counter drum 6 and the take-up spool 7, due to the braking action within the cassette, follows a shallow curved or substantially linear path so that the film disengages approximately tangentially from said drum and engages approximately tangentially with said take-up spool. The film, after exposure, is wound back into the cassette and due to the decreased tension on the film and to its resiliency, it tends to form a pronounced loop 8 the radius of which is determined by a guide roller 9 against which the film abuts. The film 4 is formed with perforations 10 which are engageable by the teeth 11 on the counter drum 6, here shown as having five teeth. During re-winding, the film 4 runs tangentially off the counter drum into the image aperture for which reason an involute form is given to the tooth flanks 12. A similar involute formation of the other flanks 14 of the teeth would, however, produce disturbances in the winding-on direction, as will be seen from the full tooth shown in broken lines at 13 at the left-hand side of Figure 2. To avoid such disturbances, each tooth flank 14 is formed as an involute, part hypocycloid determined by the radius R

of the film loop as limited by the roller 9 and the radius r of the counter drum. The roller 9 is positioned to provide a radius R consistent with the required hypocycloidal tooth flanks.

It is apparent that this drum tooth formation is effective both when re-winding the film and also in all other cases where there is formation of the film loop 8 when the film is fed by the sprocket drum 6 to the take-up spool 7 and is connected to the latter by a frictional drive.

WHAT WE CLAIM IS:—

1. A photographic roll film camera of the kind referred to, wherein the film extends from the film guide to the counter drum in a direction tangentially of the drum, the take-up spool being located nearer the front of the camera than the drum and being spaced from the optical axis of the camera by a distance not substantially greater than is necessary to ensure that it will not intercept the path of the light rays, the film thereby being caused to wrap partially around said drum and forming during re-winding a loop of predetermined radius extending from the drum to the take-up spool, and the drum teeth being of involute form with the leading flanks in the winding-on direction shaped to form a part of a hypocycloid determined by the radius of the film loop and the radius of the drum.

2. A photographic roll film camera as claimed in claim 1, wherein the radius of the film loop during re-winding is determined by a guide roller against which the film abuts.

3. A photographic roll film camera as claimed in claim 1 substantially as described with reference to the accompanying drawing.

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the accompanying drawings, wherein:

Figure 1 shows the basic features of the camera; and

5 Figure 2 is an enlarged fragmentary view of the sprocket drum.

The camera shown in Figure 1 consists of the objective 1 and the image aperture guide 2, against which the film 4 is pressed by the presser plate 3. The film 4 passes from the supply cassette 5 through the image aperture guide to the toothed counter drum 6 and from the latter to the take-up spool 7. The spool 7 is located nearer the front of the camera than the counter drum 6 and at a distance 15 from the optical axis such that it is not spaced substantially further from said axis than is necessary to avoid intercepting the light rays.

During winding-on, that portion of the film between the counter drum 6 and the take-up spool 7, due to the braking action within the cassette, follows a shallow curved or substantially linear path so that the film disengages approximately tangentially from said drum and engages approximately tangentially with 25 said take-up spool. The film, after exposure, is wound back into the cassette and due to the decreased tension on the film and to its resiliency, it tends to form a pronounced loop 8 the radius of which is determined by a guide roller 9 against which the film abuts. The film 30 4 is formed with perforations 10 which are engageable by the teeth 11 on the counter drum 6, here shown as having five teeth. During re-winding, the film 4 runs tangentially off the counter drum into the image aperture for 35 which reason an involute form is given to the tooth flanks 12. A similar involute formation of the other flanks 14 of the teeth would, however, produce disturbances in the winding-on direction, as will be seen from the full tooth shown in broken lines at 13 at the left-hand side of Figure 2. To avoid such disturbances, each tooth flank 14 is formed as an involute, 40 part hypocycloid determined by the radius R

of the film loop as limited by the roller 9 and the radius r of the counter drum. The roller 9 is positioned to provide a radius R constant with the required hypocycloidal tooth flanks.

It is apparent that this drum tooth formation is effective both when re-winding the film 50 and also in all other cases where there is formation of the film loop 8 when the film is fed by the sprocket drum 6 to the take-up spool 7 and is connected to the latter by a frictional drive.

WHAT WE CLAIM IS:—

1. A photographic roll film camera of the kind referred to, wherein the film extends from the film guide to the counter drum in a direction tangentially of the drum, the take-up spool being located nearer the front of the camera than the drum and being spaced from the optical axis of the camera by a distance 60 not substantially greater than is necessary to ensure that it will not intercept the path of the light rays, the film thereby being caused to wrap partially around said drum and forming during re-winding a loop of predetermined radius extending from the drum to the take-up spool, and the drum teeth being of involute 70 form with the leading flanks in the winding-on direction shaped to form a part of a hypocycloid determined by the radius of the film loop and the radius of the drum.

2. A photographic roll film camera as claimed in claim 1, wherein the radius of the film loop during re-winding is determined by a guide roller against which the film abuts. 75

3. A photographic roll film camera as claimed in claim 1 substantially as described 80 with reference to the accompanying drawing.

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