106,884

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Actual Inventor .. .. .. WALTER ZAPP, of Latvia.
Application and Complete Specification .. Accepted, 8th March, 1939.
Acceptance Advertised (Sec. 50) .. 23rd March, 1939.

Class 52.2.

Drawing attached.

COMPLETE SPECIFICATION.

"Improvements in film feeding mechanisms for photographic apparatus."

We, VALSTS ELEKTROTECHNISKA FABRIKA, of Brivibas gatve 19, Riga, Latvia, a State Company of Latvia, incorporated under the Laws of Latvia, Manufacturers, hereby declare this invention and the manner in which it is to be performed, to be fully described and ascertained in and by the following statement:—

The present invention relates to film feeding mechanisms for photographic cameras of the type in which a roller, on to which the exposed film is to be wound, is operatively associated with a manually operated reciprocatory member which imparts to said roller an angular movement when said reciprocatory member is operated.

As the film is wound on to the roller, the diameter of the film roll increases and consequently it is necessary to compensate for this increase in diameter to ensure that only the previously exposed section of the film is wound on to the roller, at each operation of the reciprocatory member.

Heretofore, for this purpose it was proposed to reduce progressively the full stroke of the reciprocatory member, such stroke reduction in one previous suggestion being effected by a spiral cam associated with a picture counting wheel.

The main object of the invention is to provide a simple and positive mechanism by which the film will be fed by steps of equal length, in spite of the increase of the film roll wound on to said roller, and by which the angular movement of said roller will be decreased in the same degree as the diameter of the film roll wound on to said roller is increasing.

According to the present invention, the film receiving roller is adapted to be coupled with uni-directional actuating means therefor, which are operatively engaged by a reciprocatory slide to turn said roller and wind the film thereon, during a part only of the feeding stroke of said slide, which feeding stroke is always of constant length, the

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part of the stroke of the slide during which said engagement takes place being reduced step by step in dependence upon the diametrical increase of the film roll.

In the preferred form of the mechanism according to the invention, the aforesaid actuating means include a rotatable plate having a projection thereon, and a stop located in the path of movement of said projection, said stop being advanced in said path at each feeding stroke of the slide so as to retard the position at which said plate starts to move by one step at each stroke of said slide.

The plate can be rotated in the forward direction, exclusively by the slide, and can be adapted to tension an associated spring during such rotation; the return movement of the plate then being effected first by the slide and then by the spring such movement terminating when the projection is engaged by the stop.

The slide conveniently takes the form of a toothed rack while the plate conveniently takes the form of a toothed segment provided with a radial arm which is disposed in the path of movement of the rack, so that the arm is first engaged by one end of the rack, partially to turn the toothed segment, whereupon the turning movement of said segment is completed by engagement of the rack teeth with the teeth of the segment, during the feeding stroke of the rack.

One suitable embodiment of the mechanism is shown by way of example in the accompanying drawing in which:—

Figure 1 shows the mechanism in its position of rest.

Figure 2 shows the same mechanism in an operative position.

Figure 3 is a section on a larger scale taken on the line **III—III** of Figure 2, and showing the hub of the roller on to which the film is wound.

Figure 4 is a partial perspective view illustrating the housing for the said roller which, together with other parts, is shown broken away.

In the example illustrated the manually operated reciprocating member consists of a rack **1** which may be attached, for instance, to a movable part of a two-piece casing of the photographic camera. The rotatable plate is formed as a segment **2** of a toothed wheel, and has, besides a radial projection **12**, also a radially extending arm **13**. When the rack **1** is moved forwards (to the left in Figure 1), the toothed plate **2** is rotated, first by the front end of the rack which engages the arm **13**, and then by the toothed portion of the rack which engages the teeth of the plate **2**. The toothed plate is connected to the hub **4** of the roller on to which the film is wound. This connection consists of a coupling member **3** and two coil-springs **5** and **6**. The spring **5** has one of its ends secured to the coupling member **3**, while its other end co-operates with the journal of the plate **2**, so as to rotate the coupling member **3**, when the plate **2** is rocked forwards. The action of the spring **5** is due to the fact that said spring is arranged in such manner that the windings of the same run in the same direction as the forward rotation of the journal, and exert a light pressure upon the journal. Now, when the journal is rotated forwards it initially carries the end of the spring a short distance; thus the pressure of the windings of the spring against the journal increases, and the moment of rotation will be transmitted from the journal to the coupling member **3**. On the return of the plate **2** to its position of rest, the end of the spring slides over the surface of the journal because the diameter of the spring is increased as the end of the spring initially is carried a short distance by the journal. The coupling member **3** is prevented from rotating backwards by means of the spring **6**, one end of which is secured to the casing **7**, while its other end engages the coupling member **3**. This spring is arranged in a manner similar to that of the spring **5**, and acts in a corresponding manner. The members **5**, **6** form together a unidirectional feeding and stop mechanism causing the coupling member **3** to rotate stepwise in one direction, while preventing the same from rotating in the opposite direction. The end surface of the coupling member **3** is provided with teeth **3a** (see also Figure 4) which are engaged by corresponding teeth on the hub **4**. Thus, for each stroke of the rack **1** to the left in Figure 1, the film is wound on to the hub **4** a distance corresponding to the length of a picture on the film. Now, the diameter of the film roll

increases as the film 15 is wound on to the roller 4. Thus, for feeding the film, step by step, at each stroke of the rack 1 in steps of a constant length corresponding to the length of a picture, it is necessary to decrease the angle of rotation of the toothed plate 2 in the same degree as the diameter of the film roll increases. For this purpose, a stop 17 is formed on the end of a lever 10 fulcrumed in the casing of the camera. This lever 10 is held by a spring against a helical cam 9 attached to a graduated toothed disc 8, indicating the number of pictures exposed. The rack 1 carries a spring plate 14, acting as a pawl for feeding the disc 8 stepwise when the rack 1 is moved forwards. A spring 11 is secured to a stationary stud and rests on a pin 2a of the plate 2, to be tensioned when the rack 1 is moved forwards.

This mechanism acts as follows:—

Assuming that the parts of the mechanism are in the position shown in Figure 2 and that the film roll on the roller 4 has its smallest diameter, corresponding to the first picture. Now, when the rack 1 is moved backwards (to the right in Figure 2), said rack 1 will operate the toothed plate 2 only as long as the teeth of the rack 1 engage those of the plate 2. During the subsequent part of the backward motion of the rack 1, the plate 2, under the action of the spring 11, will continue its rocking motion until the arm 13 engages the end of the rack 1. For the next picture, the rack 1 is moved forwards causing the plate 2 to be rocked through an angle as described above, and simultaneously causing the parts 8, 9 to be turned one step forwards by the action of the plate 14. Consequently also the lever 10 with its stop 17 is turned through a corresponding angle. Thus, the stop 17 causes the plate 2, during its returning motion, to stop at an earlier point. For each subsequent picture the stop 17 will be turned a certain distance forwards in the path of motion of the projection 12 and the angle of rotation of the toothed plate 2 will decrease in the same degree as the diameter of the film roll on the roller 4 increases. When the film roll has attained its maximum diameter, the projection 12 will meet the stop 17 already as the teeth of the plate 2 disengages the rack 1.

Having now fully described and ascertained our said invention and the manner in which it is to be performed, we declare that what we claim is:—

1. A film feeding mechanism for photographic cameras, of the type having a film receiving roller which is rotated step-by-step by means of a manually operated reciprocatory slide, wherein the film receiving roller is coupled with uni-directional actuating means therefor, which are operatively engaged by the slide to turn said roller and wind the film thereon during a part only of the feeding stroke of said slide which feeding stroke is always of constant length the part of the stroke of said slide during which said engagement takes place being reduced step-by-step in dependence upon the diametrical increase of the film roll.

2. A film feeding mechanism according to Claim 1, wherein said actuating means include a rotatable plate which is partially rotated by the slide at each feeding stroke thereof, and is provided with a projection thereon for engagement with a stop on the return movement of said plate, said stop being advanced in the path of return movement of said projection at each feeding stroke of the slide so as to re-set the plate for operative engagement by the slide at a later stage in the next feeding stroke thereof.

3. A film feeding mechanism according to Claim 2, wherein the plate is rotated in the forward direction, exclusively by the slide and during such rotation is adapted to tension an associated spring and wherein the rotation of said plate in the rearward direction is effected first by the slide and then by said spring until the projection is engaged by the stop.

4. A film feeding mechanism according to Claim 2 or 3 wherein the slide is in the form of a toothed rack and the plate is in the form of a toothed segment provided with a radially disposed arm which extends into the path of movement of the rack rotation of the toothed segment being effected first by engagement of its arm by one end of the rack and then by engagement of its toothed portion by the toothed portion of said rack.

5. A film feeding mechanism according to Claim 2, 3 or 4 having a helical cam provided on a picture counting disc such cam

being fed one step forwards at each stroke of the slide and wherein the stop for the rotatable plate is formed on a lever which is pressed against the cam by means of a spring.

6. A film feeding mechanism according to Claim 5 wherein the slide is provided with a spring plate which, during the feeding stroke of said slide, engages a crown of teeth on the picture counting disc so that this disc and the cam are rotated by one step forward.

7. A film feeding mechanism constructed and adapted to operate substantially as hereinbefore described with reference to the accompanying drawing.

Dated this 12th day of September, A.D. 1938.

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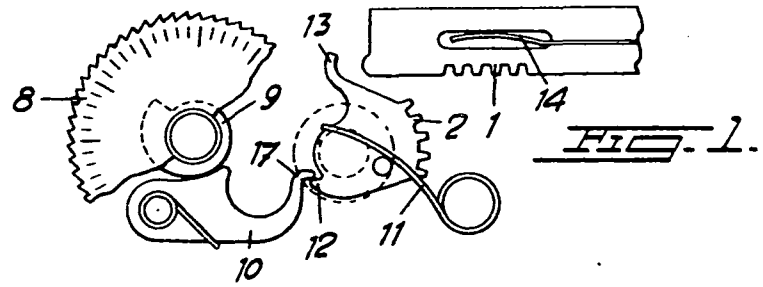

FIG. 1.

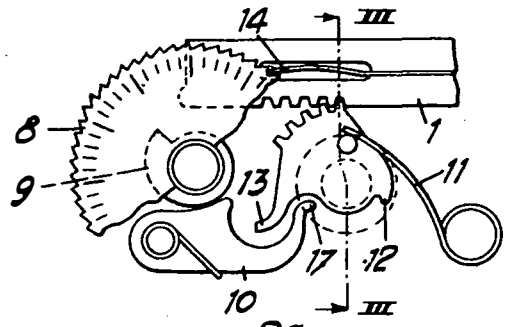

FIG. 2.

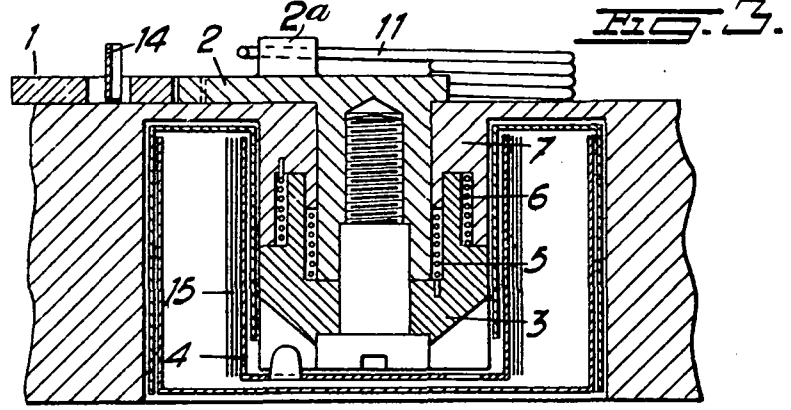

FIG. 3.

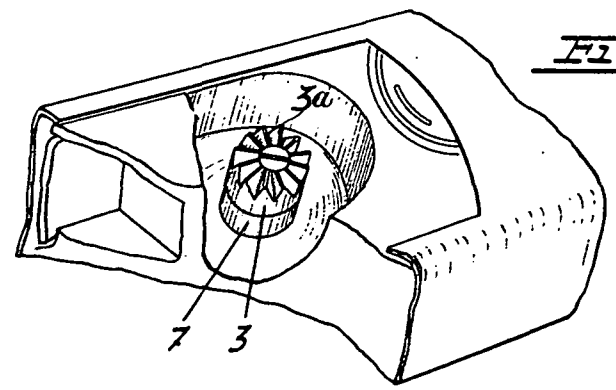

FIG. 4.