

UNITED STATES PATENT OFFICE

2,161,941

FILM FEEDING MECHANISM FOR PHOTOGRAPHIC APPARATUS

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Application December 6, 1937, Serial No. 178,388
In Finland December 21, 1936

4 Claims. (Cl. 242—71)

This invention relates to film feeding mechanisms for photographic apparatus of the type having a roller carrying the film which is to be exposed, a second roller on to which the film exposed is wound, and a manually operated member imparting to said second roller an angular movement when said member is operated.

One object of this invention is to feed the film by steps of equal length, in spite of the increase of diameter of the film roll wound on to the second roller.

Another object of this invention is to provide a simple and positive mechanism by which said angular movement of said second roller will be decreased in the same degree as the diameter of the film roll wound on to said second roller is increasing.

One embodiment of the invention is shown in the annexed drawing.

Fig. 1 shows said mechanism in its position of rest.

Fig. 2 shows the same mechanism in an operative position.

Fig. 3 is a section on a larger scale taken on the line III—III in Fig. 2 and showing the hub of the second roller.

Fig. 4 is a partial perspective view of the photographic apparatus showing the housing for the second roller, said roller and some other parts being broken away.

Fig. 5 is a longitudinal section on the line V—V in Fig. 1.

The invention is especially intended to be used in connection with photographic apparatus of the type described in my co-pending patent application entitled "Improvements in photographic apparatus", Serial No. 178,389, filed December 6, 1937. Some features herein shown and described are claimed in said co-pending application.

Referring now to the drawing 1 indicates a reciprocating member which is manually operated. On a part of its length the reciprocating member is formed as a rack. When applied to the photographic apparatus described in my co-pending patent application mentioned above this member 1 is secured to a movable part 41 of the two piece casing of the apparatus, but said rack 1 may be actuated directly by hand, if desired. The stroke of the rack is always of constant length.

The reference numeral 2 indicates a toothed plate which is rotatably mounted in the frame or casing of the apparatus. The toothed plate 2 has a radial projection 12 and a radially ex-

tending arm 13. When the rack 1 is moved forwards (to the left in Fig. 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 15 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 cooperates with the journal 2a 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 the 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 2a. 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. At 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 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. This spring is arranged in a manner similar to that of the spring 5, and acts in a corresponding manner. The spring 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 Fig. 4) which are engaged by corresponding teeth 4a on the hub 4. Thus, for each stroke of the rack 1 to the left in Fig. 1 the film is wound on to the hub 4a distance corresponding to the length of a picture on the film.

Now, the diameter of the film roll increases as the film is wound on to the roller 4. Thus, for feeding the film, for each stroke of the rack 1, by 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

