Oct. 29, 1929. H. PFANNENSTIEHL 1,733,557

FILM RETAINING ROLLER

Filed June 20, 1928

FIG. 1

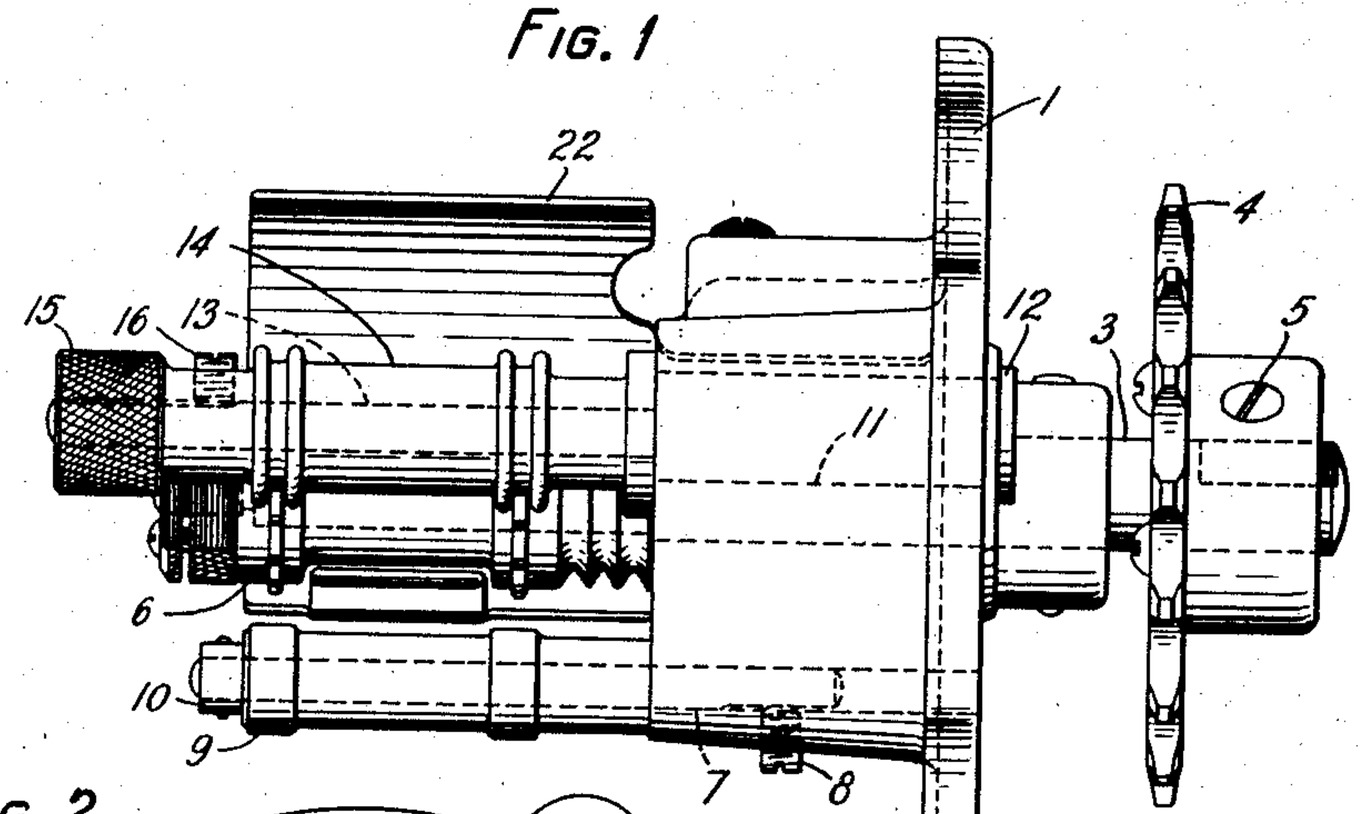


FIG. 2

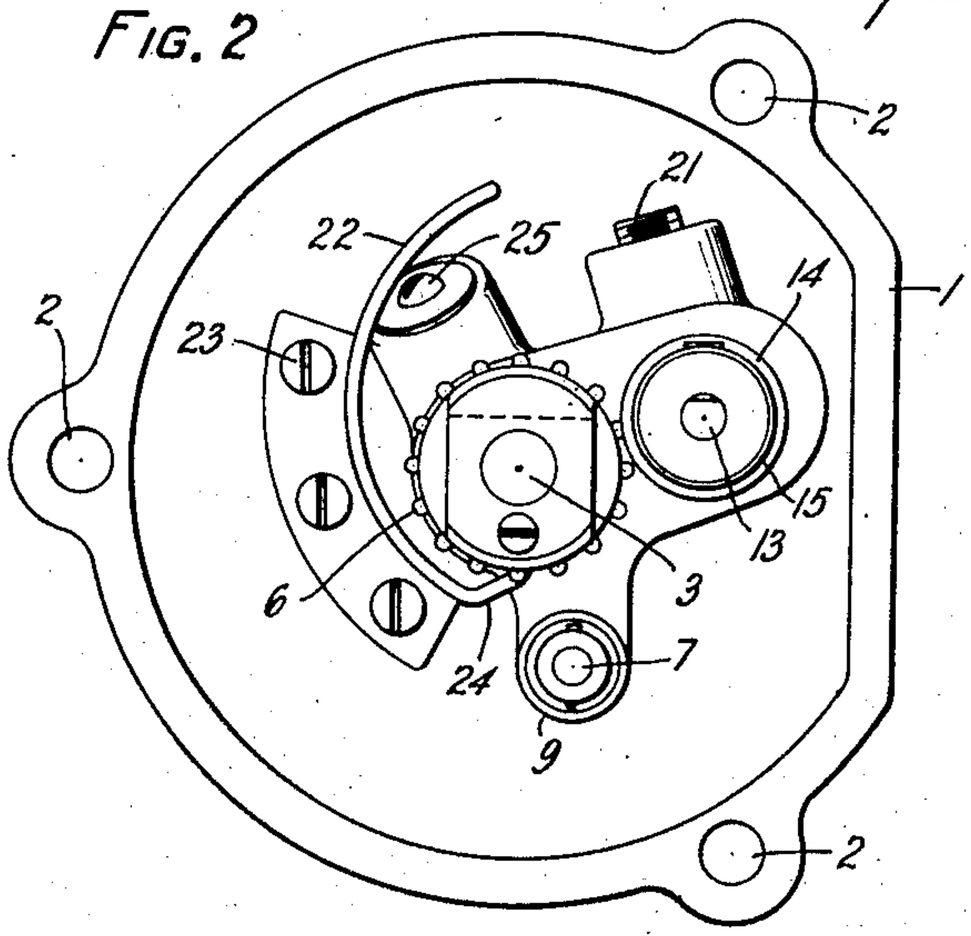


FIG. 4

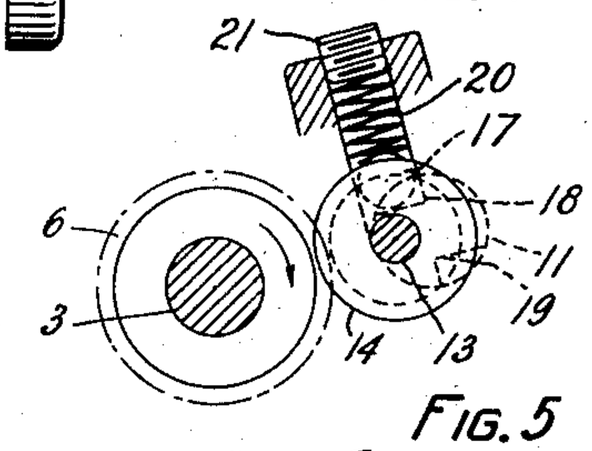


FIG. 5

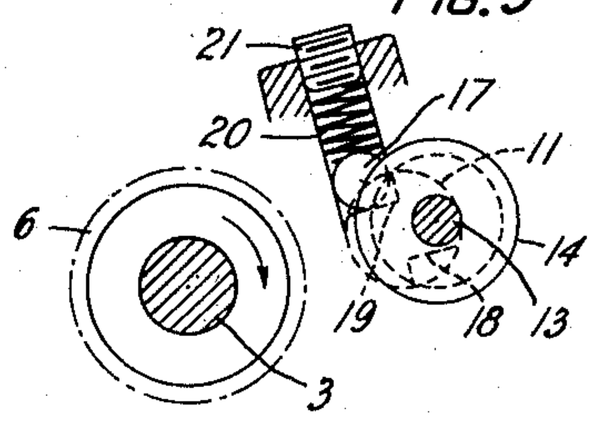
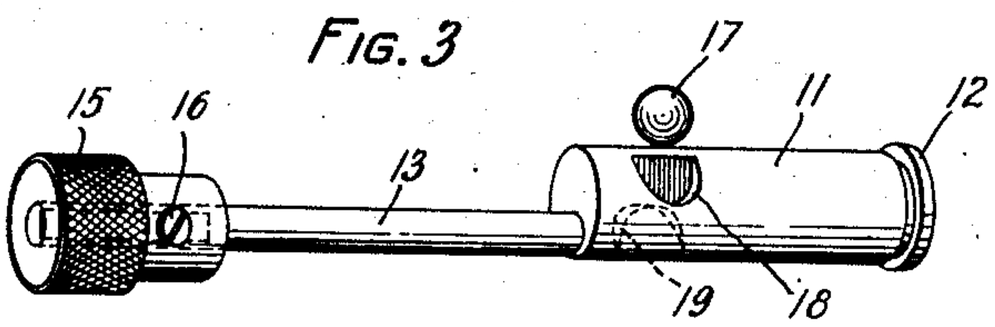


FIG. 3



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UNITED STATES PATENT OFFICE

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FILM-RETAINING ROLLER

Application filed June 20, 1928. Serial No. 286,829.

This invention relates to improvements in film feeding devices, as for example, those used in motion picture projection machines and cameras.

It is the object of this invention to provide an improved form of film retaining roller which cooperates with a driving sprocket to prevent the film losing engagement with the driving teeth of said sprocket.

It is more specifically the object of the invention to provide a mounting for a film retaining roller which shall be compact and capable of use in a minimum of space and which shall be easy of and positive in operation.

A feature of the invention is the use of a manually rotatable shaft for mounting the retaining roller, said shaft being so mounted that its continued rotation in one direction moves said roller into and out of engagement with said driving sprocket.

A further feature of the invention results from the use of a latching device to hold said roller in either its in or out position. Said device also permits rotation of the control shaft in one direction only.

It may also be noted that the control shaft is latched in such a manner that the pull of the film in passing between the driving sprocket and the retaining roller cannot tend to force the retaining roller out of engagement with the sprocket.

A more complete understanding of the invention may be had from a consideration of the following detailed description, reference being had to the accompanying drawings.

In the drawings Fig. 1 is a side view of the assembled mechanism showing the retaining roller and part of the film driving sprocket with a chain-driven sprocket wheel for imparting motion thereto;

Fig. 2 is an end view of the device and shows the driving sprocket, retaining roller and control knob with other details of the structure;

Fig. 3 is a perspective view of the shaft on which the retaining roller is mounted. This figure also shows the main bearing on which the roller shaft is eccentrically mounted;

Fig. 4 is a sectional view showing the retaining roller in operative position with the retaining catch in position;

Fig. 5 is a view corresponding to that of Fig. 4, except that the roller is shown in inoperative position, in which position it is latched.

Referring now to Figs. 1 and 2, 1 indicates a base plate which may be bolted to the projector base by means of the bolt holes 2. Suitably journaled in the mounting plate is a main shaft 3, to which a chain-driven sprocket wheel 4 is secured by means of a set screw 5. Secured to the shaft 3 is a roller 6 provided with toothed sprockets to engage with the film perforations and thus impart movement to the film. The lower part of the housing is drilled to receive a shaft 7 which is secured by means of a set screw 8. On this shaft is mounted an idler roller 9. This idler roller is free to rotate on the shaft 7 and is held in position by means of a thrust washer 10, which is suitably secured to the shaft 7. Rotatably mounted in the main housing 1 is a shaft 11, which may be best seen by reference to Fig. 3. A flange 12 holds this shaft from axial motion in one direction. A shaft 13 is formed integrally with the shaft 11, but is eccentric with respect thereto. A retaining roller 14 is mounted so as to be freely rotatable on the shaft 13. The retaining roller is provided with double flanges at each end and when in operative position presses the film against the driving sprocket 6. The teeth of this sprocket at such time fit in between the flanges of the idler 14 so that the sprocket holes on the film are firmly held in engagement with the sprocket teeth of the driving roller and the film has no opportunity to slip. In order to move the retaining roller into and out of engagement with the driving sprocket a knurled knob 15 is secured to the shaft 13 by means of a set screw 16, which engages a flattened portion of the shaft 13.

In order to latch the retaining roller in either of two positions a spring pressed ball 17 is provided and cooperates with notches 18 and 19 in the bearing 11. A spring 20 exerts pressure on the ball to tend to force it into

one or the other of the notches when the bearing 11 has been rotated into suitable position. Tension on the spring 20 may be regulated by means of a set screw 21 threaded into the bearing portion of the mounting plate 1. A guard flange 22 (best seen in Fig. 2) is secured to the mounting plate by means of screws 23 and has an extension 24 which sweeps the surface of the sprocket roller between the sprockets to prevent any tendency of the film to wrap itself around the sprocket in case of film breakage. An oil-cup is indicated at 25.

Referring now to Figs. 4 and 5, a detailed description of the arrangement whereby the retaining roller may be latched either in engagement with or out of engagement with the driving sprocket will be made.

Fig. 4 shows the retaining roller in engagement with the driving sprocket. It will be seen that the spring pressed ball 17 is cooperating with notch 18 in the bearing 11. If now an attempt is made to rotate shaft 11 in a counter-clockwise direction the shoulder of notch 18 presses against the surface of ball 17 at a point above its center. The result is to tend to force the ball downward and thus firmly hold the bearing 11 against rotation. The rotation of the sprocket roller 6 is as indicated by the arrow. As a result, it is clear that the pull of the film on the roller 14 will tend to cause a counter-clockwise rotation of the bearing 11. Since the bearing is securely latched against counter-clockwise rotation the passage of the film under the pull of the driving sprocket 6 can have no tendency to force the retaining roller out of engagement with the sprocket.

Further inspection of Fig. 4 will show that bearing 11 is free to rotate in a clockwise direction under the influence of knurled knob 15. When moved in a clockwise direction the lower shoulder of the notch 18 strikes the surface of ball 17 well below its center and therefore can force the ball up into position to ride on the peripheral surface of bearing 11. It is further obvious that continued rotation of bearing 11 will cause shaft 13 to move around the central axis of shaft 11. Thus, clockwise rotation of bearing 11 moves shaft 13 upward and to the right in an arc centered about the axis of bearing 11. As shaft 13 moves upward and to the right the retaining roller 14 is carried out of engagement with the driving sprocket 6 and continues to move away from said driving sprocket until notch 19 is brought into registration with the ball check 17. When bearing 11 has revolved through 180° the shaft 13 and roller 14 will be at a maximum distance from the driving sprocket. In this way maximum clearance is provided for the convenient threading of the film through the machine and onto a sprocket 6. It is believed to be obvious that the bearing 13 is latched against counter-clockwise rotation in its "out" position in a manner identical with that previously described in connection with the "in" position. Fig. 5 shows the retaining roller latched in its "out" postion.

In order to bring the retaining roller back into engagement with the driving sprocket, the bearing 11 is again rotated in a clockwise direction by means of knob 15. A revolution of 180° will cause the roller 14 to complete a movement downward and to the left and then upward and to the left until the roller has returned to the position shown in Fig. 4.

What is claimed is:

1. In a film feeding device, a driving sprocket, a retaining roller for holding a film against said sprocket, a shaft on which said roller is rotatably mounted, a bearing in which said shaft is eccentrically mounted, and means to rotate said shaft in said bearing to move said roller into and out of engagement with said sprocket, the direction of the rotation for both operations being the same.

2. In a film feeding device, a driving sprocket, a retaining roller for holding a film against said sprocket, a shaft on which said roller is rotatably mounted, a bearing in which said shaft is eccentrically mounted, means to rotate said shaft in said bearing to move said roller into and out of engagement with said sprocket, the direction of the rotation for both operations being the same, and latching means to hold said roller in operative postion with respect to said sprocket.

3. In a film feeding device, a driving sprocket, a retaining roller for holding a film against said sprocket, a shaft on which said roller is rotatably mounted, a bearing in which said shaft is eccentrically mounted, means to rotate said shaft in said bearing to move said roller into and out of engagement with said sprocket, the direction of the rotation for both operations being the same, and latching means to hold said retaining roller in operative position and to prevent rotation of said shaft in a non-operating direction.

4. In a film feeding device, a driving sprocket, a retaining roller for holding a film against said sprocket, a shaft on which said roller is rotatably mounted, a bearing in which said shaft is eccentrically mounted, means to rotate said shaft in said bearing to move said roller into and out of engagement with said sprocket, the direction of the rotation for both operations being the same, and means to overcome the tendency of the film to force the retaining roller away from the sprocket by rotating said shaft in a direction opposite to the direction in which the film travels.

In witness whereof, I hereunto subscribe my name this 18th day of June, 1928.

HARRY PFANNENSTIEHL.