This invention relates to sound film mechanism and pertains more specifically to an improved type of pad roller for maintaining the film in proper cooperative relation with a sprocket or drum adapted to carry the film. More particularly it pertains to an improved type of spring for maintaining the said pad roller either in cooperative relation with the sprocket or drum or in a position removed from the said sprocket or drum.

Although specifically described as applied to a sound reproducer, the invention is not limited to sound reproducers but may be applied to any type of motion picture apparatus or other apparatus where a strip of flexible material is to be maintained in contact with a supporting roller by means of pad rollers or pressure rollers, the difference between a pad roller and a pressure roller being that the pressure roller rests firmly against the surface of the material and causes it to engage the supporting drum at all times, whereas the pad roller is supported at a predetermined distance from the surface of the supporting drum and only contacts the film when it attempts to rise from the surface or when, for example, a splice passes through the apparatus.

In the application of the invention described in the following specification, it is used in conjunction with a double pad roller which serves to maintain the film in proper cooperative relation to the constant speed sprocket of a sound reproducer.

The invention involves the provision of a C-shaped spring having ends turned in opposite directions to serve as bearings therefor, the said spring being under compression at all times and being more nearly closed at the peak of movement of the arms supporting the pad rollers than at the extreme positions thereof.

One object of the invention is to provide an improved pad roller mechanism.

Another object of the invention is to provide an improved pressure spring for pad rollers.

Another object of the invention is to provide a spring which may be readily installed or removed but which will have no tendency to jump out of place.

Other and incidental objects of my invention will be apparent to those skilled in the art from a reading of the following specification, and an inspection of the accompanying drawing, in which

Figure 1 is a side view of a soundhead including a pad roller and spring arrangement according to my invention, and

Figure 2 is a top view partly in section of the pad roller and spring arrangement.

Referring first to Fig. 1, the soundhead, which is constructed in general accordance with Loomis et al. Patent 2,019,147 as modified in accordance with application Serial No. 214,508, filed June 18, 1938, is provided with a casing member 10. Supported in this casing member are a sprocket 11 and a film drum 12 adapted to support a film 13 and carry it past the optical system 14 which directs a line of light thereupon from the exciter lamp 15. This light after passing through the portion of the film overhanging the drum 12 is directed by a prismatic lens, indicated at 16, to the photocell 17. The sprocket 11 is driven from an appropriate source of power and pulls the film over the drum 12 which is provided with a viscous damper, all as described in the aforesaid Loomis et al. Patent. From the sprocket 11 the film passes downwardly around a double spring idler 18 to the take-up mechanism, as described and claimed in my aforesaid application. The film is kept in contact with the sprocket 11 and is prevented from jumping off the sprocket teeth by the pad rollers 19 and 20 which are carried upon the arm 21 pivoted on the screw 22. This arm when in its "closed" position nearest the sprocket is held spaced therefrom by the screw 23 which cooperates with the stop 24 and in the "open" position, permitting film to be threaded into the apparatus, the arm 21 rests against the pin 25.

It will be apparent that for the spring to maintain the arm 21 in the two positions described it must be under either tension or compression in both end positions but must be under a greater tension or compression at the mid-position. This has been accomplished in the prior art in various ways. For example, one usual form of device has involved a helical spring which pressed a ball into a notch at each of the end positions.

In another form, a spring-pressed plunger cooperated with a properly shaped cam carried on the arm, and many other forms of springs have been provided which were correspondingly complicated, expensive and required considerable machine work in their production. I avoid all these complications and at the same time secure an even superior result by the provision of the C-shaped spring 26, one end of which is turned
downwardly at 27 and fits into the boss 28, and the other end of which is turned upwardly, indicated at 29, and fits into an appropriate hole 30 in the arm 21. The boss 28, or rather the hole in the middle of this boss, is located approximately on the bl-sector of the angle defined by the arm 21 in its two extreme positions, i.e., resting against the stop 24 or against the stop pin 25. The spring 26 is made of appropriate spring material and may be so shaped that when removed from the apparatus it is approximately semi-circular, while when in position at either end of the travel of the pad roller it is approximately C-shaped, and at the midpoint of its travel it is somewhat more closed in form. The holes in the boss 28 and in the arm 21 are substantially perpendicular to the plane of movement of the arm 21, while spring 26 lies in a plane parallel to the said plane of movement. In order for the spring 26 to be moved from its normal position, it is necessary that it be deflected from a plane in order to remove one end or the other of the spring from its hole and the spring, therefore, has no tendency to jump from its operative position, although, if desired, the ends 27 and 29 may be tilted outwardly from each other and slightly away from the true perpendicular to the plane of the curved spring.

It will be apparent that this spring is relatively easily shaped to a high degree of precision and that the tension thereof may be adjusted by either opening or closing the shape of the C slightly when the spring is at rest.

Having now described my invention, I claim:

1. In combination with a roller adapted to selectively rest in a fixed position adjacent a rotary film supporting member or in another fixed position removed therefrom, resilient means for maintaining said pad roller in either of said positions, said resilient means comprising a C-shaped spring member in a single plane having extensions at its ends in opposite directions substantially perpendicular to the said plane.

2. In combination with an arm supporting a roller adapted to selectively rest in a fixed position adjacent a rotary film supporting member or in another fixed position removed therefrom, resilient means for maintaining said pad roller in either of said positions, said resilient means comprising a C-shaped spring member in a single plane having extensions at its ends in opposite directions substantially perpendicular to the said plane, one of said extensions engaging said arm and the other of said extensions engaging a fixed member.

3. In combination with an arm supporting roller adapted to selectively rest against a stop in a fixed position adjacent a rotary film supporting member or against another stop in a fixed position removed therefrom, resilient means for maintaining said pad roller in either of said positions, said resilient means comprising a C-shaped spring member in a single plane having extensions at its ends in opposite directions substantially perpendicular to the said plane, one of said extensions engaging said arm and the other of said extensions engaging a fixed member located approximately midway between said stops.

ARTHUR G. ZIMMERMAN.