March 9, 1937. E. ROSS 2,073,224

PAD ROLLER AND MOUNTING THEREFOR

Filed June 7, 1935 2 Sheets-Sheet 1

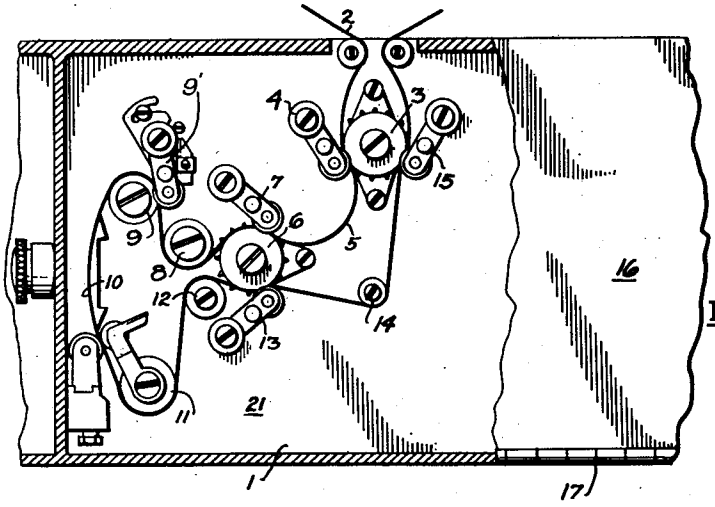


FIG.1.

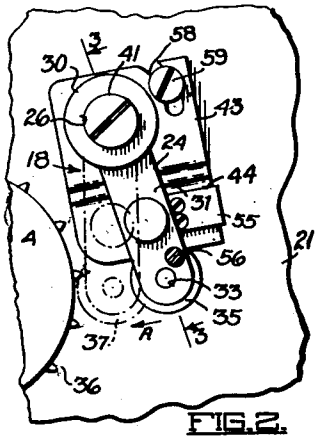


FIG.2.

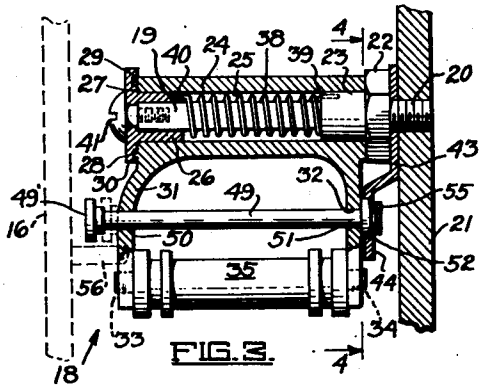


FIG.3.

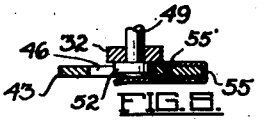


FIG.8.

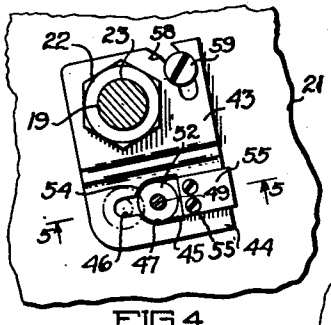


FIG.4.

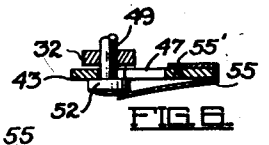


FIG.8.

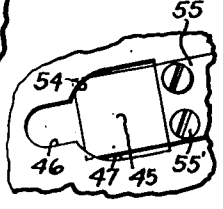


FIG.7.

INVENTOR.
ERNEST ROSS
BY W. C. Beatty
ATTORNEY.

March 9, 1937. E. ROSS 2,073,224

PAD ROLLER AND MOUNTING THEREFOR

Filed June 7, 1935 2 Sheets-Sheet 2

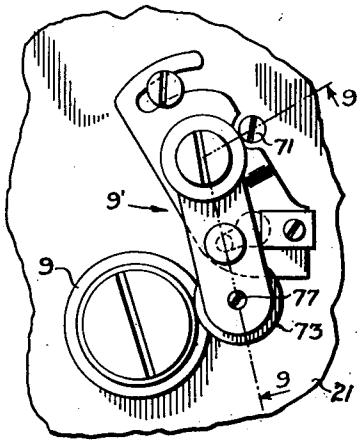


FIG. 8

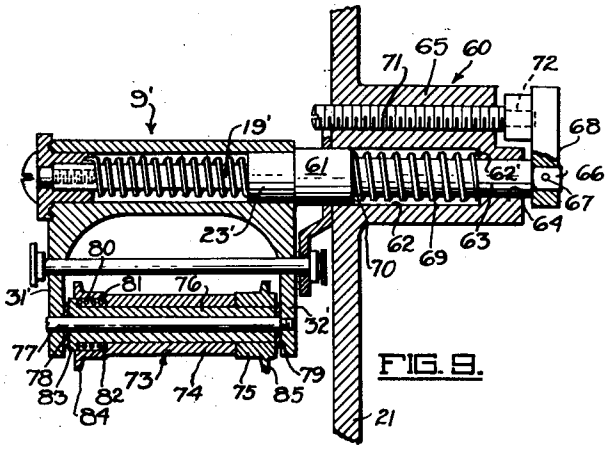


FIG. 9.

INVENTOR.
ERNEST ROSS
BY W. R. Beatty
ATTORNEY.

Patented Mar. 9, 1937 2,073,224

UNITED STATES PATENT OFFICE

2,073,224

PAD ROLLER AND MOUNTING THEREFOR

Ernest Ross, Elmhurst, N. Y., assignor to United Research Corporation, Long Island City, N. Y., a corporation of Delaware

Application June 7, 1935, Serial No. 25,423

5 Claims. (Cl. 271—2.3)

This invention relates to motion picture apparatus and particularly to film guiding mechanism known as pad rollers which are employed to hold the film in engagement with the various film drive sprockets or rollers.

In the advancing or driving of film in cameras, projectors, sound recorders, sound reproducers, and printers, sprockets are employed for advancing the film through the apparatus. The film is maintained in position on the sprockets by means of rollers which bear against the film at the desired points. Rollers, around which the film is threaded, are also employed, the film being pulled over the rollers by the sprockets. Rollers are employed in sound recording units on either side of the sound translation point and guide the film past this point. Pad rollers may be used on one or both of these rollers to cause the film to exert a uniform pressure on the rollers and to maintain one edge of the film at a definite predetermined position.

The present invention is directed to a pad roller construction and a mounting for these rollers which permits adjusting them both with respect to their position transversely of the film, and their position perpendicularly to the surface of the film, the principal object of the invention being to properly guide the film over a sprocket or roller and maintain a uniform pressure thereon in an efficacious manner.

The object of the invention is partially accomplished by features of the mounting structure which provide means for adjusting the bearing tension and means for releasing the pad roller for efficient threading of the film through the apparatus. Another feature of the construction is the means for adjusting the position of the pad roller transversely of the travel of the film and the means for maintaining one edge of the film at a constant predetermined position. A feature of the assembly construction involving the pad roller is the construction of the casing of the unit which prevents the closing thereof when any one of the pad rollers is in an inoperative position.

Other features of the invention will be obvious from the following specification read in conjunction with the accompanying drawings, in which

Fig. 1 is a side elevational view of a sound recording device, partly in section, illustrating diagrammatically a plurality of pad rollers according to the invention.

Fig. 2 is a front view in detail of a preferred form of the pad rollers which are illustrated in Fig. 1.

Fig. 3 is a sectional view taken on a line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 4.

Fig. 6 is a sectional view similar to that of Fig. 5 but showing the locking means in a different position.

Fig. 7 is an enlarged view of the notch which comprises part of the means for locking the pad roller in either open or closed position.

Fig. 8 is a front view of a pad roller which is also used as an edge guiding roller; and

Fig. 9 is a side elevational view in section and is taken along the line 9—9 of Fig. 8.

Referring more particularly to the drawings, the invention is shown as being incorporated in a sound recording unit 1, although it is to be understood that this type of pad roller may be used in any motion picture apparatus wherein the film is fed over sprockets or rollers. The film 2 is fed into the sound recorder 1 from a supply reel (not shown) and is led around one side of a feed sprocket 3 on which it is held into engagement by my preferred form of pad roller 4. The film 2 then forms a loop 5 and is drawn in engagement with a drive sprocket 6 having a pad roller 7 associated therewith, from whence it is drawn under a free roller 8, over guide roller 9, which has an edge guiding pad roller 9' associated therewith, down past the sound gate shoe 10, under roller 11, over free roller 12 and thence back into engagement with the under surface of the sprocket 6 against which it is held by pad roller 13. The film 2 is then led under a roller 14 to the other side of the sprocket 3 which has a pad roller 15 associated therewith. From the sprocket 3 the film travels out of the unit 1 and onto a take-up reel (not shown).

A cover door 16 is provided at the front of the sound recorder 1 and is hinged as at 17 to the base of the unit to provide access to the interior thereof for threading the film.

Referring now to Figs. 2 to 6 which show in detail the pad rollers 4, 7, 13, and 15, a unit generally indicated at 18 comprises a stud member 19 which has a threaded end portion 20 adapted to be threadedly secured within a wall 21. An enlarged hexagonal section 22 is provided adjacent the threaded portion 20 which serves as a shoulder and also as a head to receive a wrench for the purpose of securing the stud 19 to the

wall 21. An enlarged bearing portion 23 is provided on the stud 19 adjacent the head 22. A yoke member 24 is provided with a longitudinally extending opening 25 in the upper part thereof, one end of which is adapted to be journaled upon the bearing portion 23 of the stud 19. The other end of the opening 25 is journaled on a sleeve member 26 which is in turn rotatably mounted upon the outer end of the stud 19. The outer end face 27 of the yoke member 24 is provided with a projection 28 adapted to engage any one of a number of detents 29 spaced around a flange 30 provided on the end of the sleeve 26. The yoke member 24 is provided with a pair of downwardly extending legs 31 and 32 having bearing portions 33 and 34 provided in the ends thereof in which are journaled the ends of a pad roller 35.

Referring again to Fig. 3, it will be noted that a torsion spring 38 is loosely mounted over the stud 19 and with one end 39 thereof embedded within the end of the bearing portion 23 of the stud 19. The other end 40 of the spring 38 is secured within a slot provided in the end of the sleeve member 26.

Thus it will be seen that by unscrewing a retaining cap screw 41, mounted in the end of the stud 19, the sleeve member 26 may be drawn outwardly until the projection 28 clears the detents 29 at which time the sleeve 26 may then be rotated to vary the amount of torque of the spring 38 and thus vary the spring pressure on the pad roller 35.

I will now describe the locking means whereby the pad rollers may be locked in a retracted position to facilitate threading the film over the sprockets. Mounted between the head portion 22 of the stud 19 and the wall 21 is a rectangular plate 43 having a raised portion 44 at its lower end which lies adjacent the inner surface of the leg 32 of the yoke member 24. The raised portion 44 is provided with an opening 45, as shown in Fig. 4, comprising a small notch 46 which communicates with a larger notch 47.

Referring to Fig. 3, it will be noted that a lock releasing or detent rod 49 having a finger piece 49' is mounted in bearings 50 and 51 provided in the legs 31 and 32 to permit longitudinal movement of the rod 49. An enlarged head 52 is provided on the inner end of the rod 49 and forms the locking member. Fig. 3 shows the rod 49 in the locked position with the pad roller 35 out of engagement with the sprocket. In this position the head 52 will rest in the larger notch 47, as seen in Figs. 4 and 5, and the pad roller 35 will be held in retracted position against the action of the torsion spring 38 due to the engagement of the head 52 with the front edge 54 of the notch 47 (see Figs. 4 and 7). Therefore, it will be seen that when finger piece 49' is pushed to press the rod 49 inwardly, the head 52 will be disengaged from the notch 47 and will allow the spring 38 to rotate the yoke member 24 in the direction of the arrow A (Fig. 2) until the rod 49 and its head 52 assume the position shown in Fig. 6 and in the dotted lines of Fig. 4 wherein the head 52 is below and out of engagement with notch 47, the rod 49 coming to rest against the left edge of notch 46. Consequently, the pad roller 35 is brought adjacent the sprocket 36 as shown in dotted lines in Fig. 2, but is stopped from actual contact with said sprocket by rod 49 resting against the left edge of notch 46. The distance between the surfaces of the sprocket 36 and the pad roller 35 is preferably .001" to .002" more than the thickness of the film used. A U-shaped spring 55 attached to the plate 43 as by screws 55' tends to force the head 52 of the rod 49 into locked position when the yoke member 24 is rotated so as to align the head 52 with the opening 47.

In order to adjustably limit the travel of the pad roller 35, I provide an arcuate slot 58 in the plate 43 in which is mounted an adjusting screw 59. Thus it will be seen that by releasing the screw 59, the plate 43 may be rotated one way or the other about the axis of stud 19 to limit the travel of the yoke 24 and the pad roller 35 about the stud 19.

Referring now to Figs. 8 and 9, the edge guiding pad roller 9' is shown in detail. The general construction of the pad roller 9' is quite similar to that of 18 having a similar limiting plate and slot (Figs. 2 to 7) except that it is provided with means generally indicated at 60 to adjust it in an axial direction to locate the film in the correct lateral position as it passes the sound gate 18. The stud 19' is provided with an enlarged bearing portion 61 adjacent the portion 23' which is adapted to slide within an aperture 62 in the wall 21. An extending portion 63 of the stud 19' extends through a bearing 64 provided in a projection or extension 65 of the wall 21. A reduced portion 66 at the end of the stud 19' is secured as by a pin 67 within the lower end of a cross-piece 68. A compression spring 69 is provided on the stud 19' and engages at one end a shoulder 70 formed by the bearing portion 61, and at the other end, a shoulder 62' formed in the aperture 62 to urge the pad roller 9' away from the wall 21. This action is resisted by an adjusting screw 71 which is threadably mounted within the projection 65. The rear end of the screw 71 is provided with a reduced portion 72 received in a bearing provided at the upper end of the member 68. Thus by rotating the screw 71 the pad roller 9' may be moved in or out to correctly position the film laterally in respect to the film gate 18.

The roller 73 of the pad roller unit 9' is composed of two parts 74 and 75, part 75 being a press fit and part 74 being loosely mounted upon a sleeve member or cylinder 76 which, in turn, is rotatably mounted upon an axle 77. The axle 77 is secured between the lower portions of the downwardly extending legs 31' and 32'.

A pair of washers 78 and 79 are provided on either side of the sleeve 76 to provide side bearing members for the roller 73. The part 74 of the roller 73 is provided with an enlarged annular groove 80 which accommodates a spring 81. The spring 81 engages at one end a shoulder 82 at the inner end of the groove 80 and at the other end a shoulder 83 provided on the sleeve 76. Thus it will be seen that the film is always kept in engagement with the guide flange 85 formed on the part 75. Both the flange 85 and a corresponding flange 84 on the part 74 are slightly bevelled to prevent undue friction between the film and the sides of the flanges.

It sometimes happens that the operator may forget to release all of the pad rollers from their retracted positions after he has completed the film threading operation. To insure against this, projecting lugs such as 56, one for each pad roller, may be provided on the front door 16 of the apparatus as shown by the dotted lines in Fig. 3. Each of the lugs 56 is adapted to strike against the outer face of one of the legs 31 only in case the pad roller is in the retracted position as shown in Fig. 2, and thereby prevent the closing of

the door 16 until all of the pad rollers are released.

What is claimed is:

1. A pad roller assembly comprising a yoke, a pivotal support therefor, a pad roller carried by said yoke, adjustable tensioning means concentric of said support and urging said pad roller towards a film support, stops at different distances from the film support, manually operative means carried by said yoke and selectively engageable with said stops, and tensioning means releasably engaging said detent with one of said stops to hold said pad roller open.

2. A pad roller assembly comprising a stud adapted to be fastened to a wall supporting film driving apparatus, a yoke having a spring barrel around said stud, a spring in said barrel around said stud, means for adjusting the tension of said spring, a pad roller carried by said yoke, a detent rod slidably supported by said yoke, a stop plate on said stud and having stops cooperating with said detent rod, and means for angularly adjusting said stop plate to adjust said stops in the arc of travel of said detent rod.

3. A pad roller assembly according to claim 4, wherein the inner end of said detent rod is provided with a head, one of said stops comprising a slot to receive said head, another of said stops comprising a smaller slot adapted to receive and stop said rod when said head is pushed through the said slot therefor and when said yoke is rotated by said spring, means for resiliently retaining the head of said detent rod in said head receiving slot, and a finger piece on the outer end of said detent rod.

4. A pad roller assembly for guiding film over a moving surface comprising a supporting wall, a stud mounted in said wall, a yoke mounted on said stud, a pad roller mounted on said yoke, an extension on said wall for accommodating said stud, a spring surrounding said stud within said extension and urging said stud from said extension, and screw means for resisting said spring action, said screw means determining the position of said pad roller with respect to said supporting wall and being operable from the yoke side of said wall.

5. A system for guiding film over a moving surface comprising a roller adapted to bear on said film at a point of contact between said roller and said film, a stud for mounting said roller, means on said stud for varying the pressure exerted by said roller on said film, a resiliently mounted portion of said roller bearing on the edge of said film, and means for adjusting said roller transversely of said film.

ERNEST ROSS.