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E. ROSS ET AL
PAD ROLLER ASSEMBLY
Filed June 18, 1935

2,073,225

2 Sheets-Sheet 1

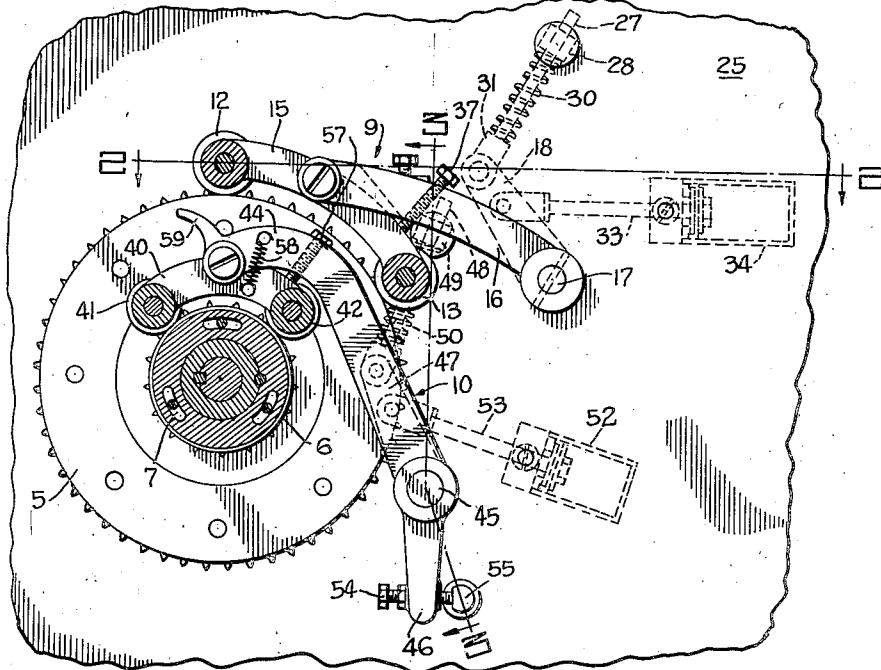


FIG. 1

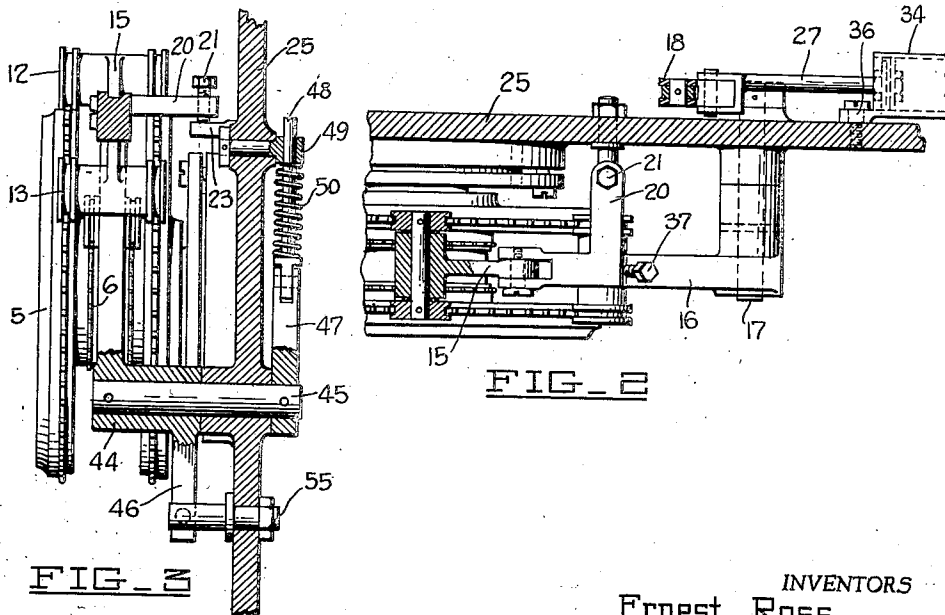


FIG. 3

FIG. 2

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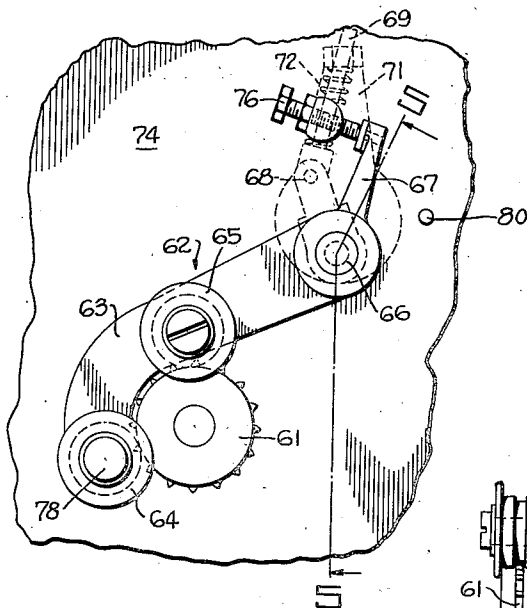


FIG. 4

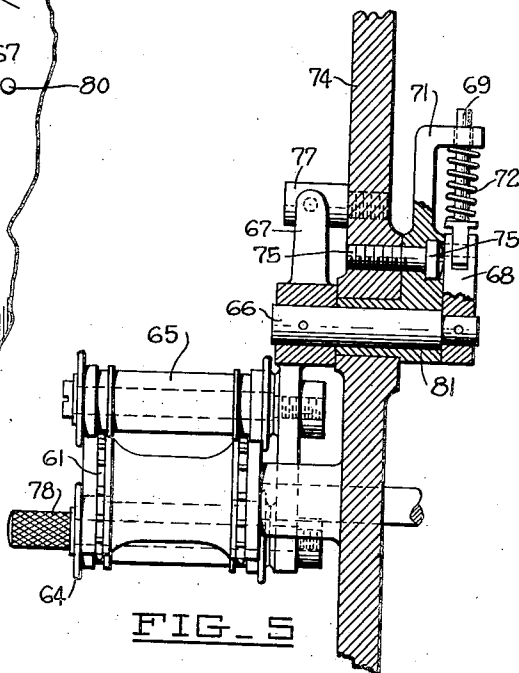


FIG. 5

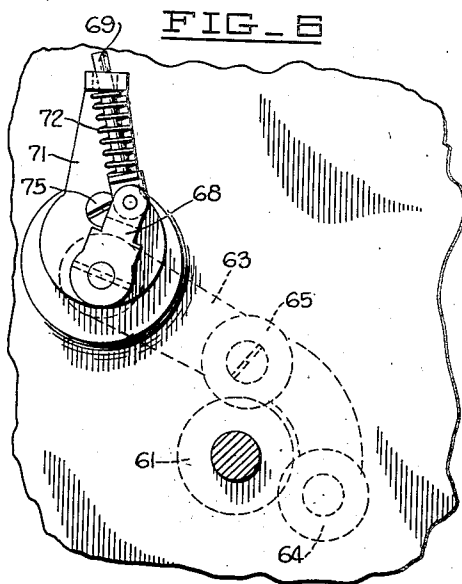


FIG. 6

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PAD ROLLER ASSEMBLY

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Application June 18, 1935, Serial No. 27,157

6 Claims. (Cl. 271—2.3)

This invention relates to motion picture apparatus and particularly to the mechanism directly associated with the sprockets and rollers that drive and guide the film through the apparatus.

In the advancing of motion picture film through cameras, projectors, sound units, printers, and similar apparatus, sprockets are used for advancing the film past the various action points such as the picture taking and projection apertures, sound translation points, and the printing apertures. The film should travel or advance smoothly and uniformly over these sprockets and it becomes necessary, therefore, that the film be held on the sprockets at a uniform pressure and in a definite position. This is particularly true in printing apparatus such as the continuous reduction type of printer, wherein a 35 mm. negative, for instance, is being reduced to a 16 mm. positive by optical reduction. It is necessary in such printing operations that the two films be held in perfect registry, which means that the drive must be uniform at all times and slippage of the films on their sprockets be eliminated or reduced to a safe minimum.

The principal object of the present invention, therefore, is to hold a film on a drive sprocket so that the film travels smoothly and uniformly thereover. Features of the invention are the means provided for maintaining a uniform pressure on the film, the means for equalizing the pressure at all times, and the means for preventing film thickness variations or film splices from affecting the pressure on the film.

Other features and advantages of the invention will be apparent from the following description read in conjunction with the accompanying drawings, in which

Fig. 1 is an elevational view of a pair of pad rollers embodying the invention applied to a reduction printer sprocket.

Fig. 2 is a detail section of the pad rollers of Fig. 1 taken along the line 2—2.

Fig. 3 is a detail section of the pad rollers of Fig. 1 taken along the line 3—3.

Fig. 4 is a front elevational view of a pad roller embodying the invention applied to a single drive sprocket.

Fig. 5 is a sectional view of the pad roller of Fig. 4 taken along the line 5—5; and

Fig. 6 is a rear elevation of the pad roller of Fig. 4.

Referring now to Figs. 1, 2, and 3, a reduction printer type of sprocket rotatably mounted on a supporting wall 25 includes a large diameter section 5 and a smaller diameter section 6 which have been assembled to rotate as a single unit after having been adjusted by pins and slots shown at 7 to provide the proper registry between a negative film carried by section 5 and a posi-

tive film carried by section 6 if the films are properly positioned on their respective sprocket teeth. A pad roller assembly 9 functions to properly hold the negative film on section 5 and a pad roller assembly 10 likewise functions for the positive film on section 6.

The pad roller assembly 9 includes pad rollers 12 and 13 rotatably mounted at the ends of a curved arm 15 to which is pivoted a second curved arm 16 which in turn is pivoted at 17 and rotatably attached to an arm 18 on the opposite side of wall 25. The arm 16 has a bracket 20 extending laterally therefrom in which is threaded a bolt 21 for limiting the travel of the arm 16 and consequently the position of the pad rollers 12 and 13 with respect to sprocket section 5, the bolt 21 abutting an extension 23 mounted on the wall 25 of the printer (see Figs. 2 and 3).

Rotatably mounted on one terminal of the arm 18 is a toggle rod 27 slidable in a bearing 28 which is rotatably mounted in the wall 25. A spring 30 under compression is positioned between the bearing 28 and a shoulder 31 on the rod 27. Intermediate the ends of arm 18, a pneumatic dash pot arm 33 is connected, this arm being connected to the piston of a dash pot 34 which is permitted to rotate about a connection 36 (see Fig. 2).

A threaded bolt 37 is threadedly mounted in the arm 16 for positioning the arm 15 with respect to arm 16. By the adjustment of this bolt the pressure of the pad rollers 12 and 13 may be equalized and the pad rollers be given a position to conform with the diameter of the section 5 in the event of the use of different size sprockets. In the operation of this pad roller the spring 30 maintains the pressure of the pad rollers at a uniform value upon the film travelling over the section 5. The pad rollers do not come in contact with the surface of the sprocket but are maintained at a distance slightly less than the minimum thickness of the film by the adjustment of the screw 21. The dash pot 34 eliminates any jumps of the rollers in the case of inequalities in the film or film splices passing under the rollers. The dash pot also damps the natural period of the spring 30 and also prevents the pad rollers from striking the sprocket with sufficient force to dent the contact surfaces or injure the sprocket teeth when the pad roller is closed.

For the smaller sprocket section 6, the pad roller 10 includes a curved arm 40 carrying pad rollers 41 and 42 rotatably mounted at the ends thereof. The arm 40 has pivoted thereto a curved arm 44 which is secured to a shaft 45 rotatably mounted within the wall 25. An arm 47 on the opposite side of the wall 25 is also secured to shaft 45. The arm 40 is totally within the pitch circle of the teeth of sprocket section 5 while

the arm 44 extends within and without it. The arm 44 has an extension 46 therefrom which is threaded with a bolt 54 bearing on a stop 55 fastened in the wall 25. This arrangement functions to adjust the position of arm 44 and the bearing pressure of the pad rollers 41 and 42 upon the positive film travelling over the sprocket section 6. A bolt 57 and a tension spring 58 function to equalize the pressure of the pad rollers 41 and 42 upon the sprocket section 6 when the proper adjustment is made. A horn 59 is provided on the arm 44 to aid in releasing the pad rollers from the sprocket.

The arm 47 is connected to a toggle rod 48 passing through a rotatable bearing 49, the rod 48 having mounted thereon a coil compression spring 50 in the same manner as rod 27 for assembly 9. A pneumatic dash pot 52 having a piston rod 53 is connected intermediate the ends of rod 47 similar to the construction for assembly 9.

The pad roller 10 just described operates in the same manner as the pad roller 9 in that the compression spring 50 maintains a uniform pressure upon the positive film on the sprocket section 6 while the dash pot 52 damps oscillations and protects the sprocket from shock when the pad rollers are closed.

In both of these pad roller assemblies the springs 30 and 50 also function to hold the pad rollers in an inoperative position away from the sprockets for threading film in the machine. After the pivot connections between the rod 27 and arm 18 and between the rod 48 and the arm 47 have passed dead center, the springs 30 and 50 reverse their action.

Referring now to Figs. 4, 5, and 6, a pad roller assembly 62 is shown for a single drive sprocket 61. This pad roller includes a curved arm 63 having mounted at one end thereof a pad roller 64 and intermediate the ends, a pad roller 65. The other end of the arm 63 is secured upon a shaft 66 rotatably mounted within a bearing 81 in a wall 74. A toggle arm 68 on the opposite side of wall 74 is attached to shaft 66 to rotate with arm 63. Pivoted on the end of arm 68 is a toggle rod 69 slidably mounted in an aperture in a flange of an L-shaped extension 71 (see Fig. 5). Between the flange on the arm 71 and the toggle joint is a compression spring 72 similar to the arrangement of rod 27 and spring 30 in Fig. 1.

This mechanism is all mounted on the wall 74 which may be the same as wall 25 in Figs. 1, 2, and 3 if both sprockets are on the same machine. The arm 71 may be attached to the wall 74 by means of screw 75, the bearing 81 extending through the wall 74. Arm 63 has an extension 67 which is positioned by a bolt 76 threaded through a stop 77 screwed in the wall 74. A knurled hand knob 78 is provided for releasing and positioning the pad rollers 64 and 65 on the sprocket 61, the bolt 76 adjusting the position of arm 67 and thus providing the desired pressure for the pad rollers upon the film travelling over the sprocket 61. In this assembly, the spring 72 also functions to hold the pad rollers in an inoperative position for threading the film after the toggle joint has passed dead center.

To prevent the arm 63 from swinging too far in the open position, a stop 80 adapted to engage the extension 67 is mounted on the wall 74. In

the modification shown in Figs. 1, 2, and 3, the dash pots limit the open positions of the pad rollers.

What is claimed is:

1. A pad roller assembly for a film sprocket for accommodating films of different sizes comprising a first pad roller assembly including an arm pivoted adjacent one end thereof, a second arm pivoted at the other end of said first arm, pad rollers mounted on the ends of said second arm, spring tensioning means for maintaining said pad rollers against one of said films at a substantially constant pressure and damping means connected to said spring tensioning means, and a second pad roller assembly, including an arm pivoted adjacent one end thereof, a second arm, pad rollers mounted at the ends of said second arm, spring tensioning means for maintaining said pad rollers at a substantially constant pressure against another of said films, and individual dampening means connected to said spring tensioning means for dampening the oscillations of said spring tensioning means.

2. A pad roller assembly in accordance with claim 1 in which said dampening means comprises an individual dash pot connected to said tensioning means.

3. A pad roller assembly for a sprocket for advancing film of different sizes having their longitudinal axes in a common plane, comprising a supporting wall, an arm pivoted on said wall and extending inside the pitch circle of the teeth of the larger sprocket, a second arm pivoted to said first arm and having a pad roller at each end thereof, means for adjusting the position of said second arm with respect to said first arm, a third arm pivoted to said wall and extending outside the pitch circle of the teeth of the large sprocket, an arm pivoted on said last mentioned arm and having pad rollers rotatably mounted at the ends thereof, and individual tensioning means for each arm attached to said wall.

4. A pad roller assembly in accordance with claim 3 in which each of said tensioning means has an individual dampening means.

5. A pad roller assembly in accordance with claim 3 in which said arms directly supporting said pad rollers have a curvature comparable to the curvature of their respective sprockets.

6. A pad roller assembly for a film sprocket adapted to accommodate films of different sizes comprising a first pad roller assembly including an arm pivoted adjacent one end thereof, a second arm pivoted at the end of said first arm, pad rollers mounted on the ends of said second arm for maintaining one of said films at a definite position against one portion of said sprocket, spring tensioning means for maintaining said pad rollers against said film at a substantially constant pressure and damping means connected to said spring tensioning means, and a second pad roller assembly including an arm pivoted adjacent one end thereof, a second arm pivoted at the other end of said first arm, pad rollers mounted on the ends of said second arm for maintaining a second film at a definite position against another portion of said sprocket, and spring tensioning means for maintaining said pad rollers at a substantially constant pressure against said other film.

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