

1,209,755.

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UNITED STATES PATENT OFFICE.

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TENSION DEVICE FOR MOVING-PICTURE-FILM REELS.

1,209,755.

Specification of Letters Patent.

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Application filed June 4, 1913. Serial No. 771,589.

To all whom it may concern:

Be it known that I, NICHOLAS POWER, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Tension Devices for Moving-Picture-Film Reels, of which the following is a specification.

This invention relates to tension devices for moving picture film reels and has for its object to provide a mechanism of this character which will cause the film to be wound with an even tension throughout the entire operation of the machine regardless of the increasing size of the receiving reel as the film is wound thereon.

A further object of my invention is to provide a mechanism of this character which will be simple to manufacture, efficient in operation, and which will at all times prevent injurious tension being put on the film.

In the accompanying drawings I have illustrated a preferred embodiment of my invention, and in the said drawings, Figure 1 shows my improved tension device in side elevation applied to a moving picture machine of standard construction; and Fig. 2 is a sectional view of a portion of Fig. 1, looking from the right.

Referring now to the drawings, 1 indicates a portion of the "head" of the machine through which the film is fed to effect the production of the picture. The film feeding mechanism comprises an intermittent sprocket for successively feeding the pictures on the film strip 3 into position for projection and a continuously driven sprocket 4 which advances the film from the head into the receiving magazine 5. Within the magazine a winding reel 6 is mounted, which reel is preferably driven from one of the continuously rotating shafts of the feeding mechanism, for instance the shaft 7, by means of a crossed belt 8 on suitable pulleys 9 and 10 on the shaft 7 and the spindle 11 of the receiving reel, respectively. The belt 8 is of sufficient length to but loosely engage the pulley so that unless deflected from its normal path its driving effect on the pulley 10 will be practically nil.

Loosely mounted on the spindle 11 between the pulley and the magazine is an arm 12 having at its free end a belt tightening roller 13 engaging the belt 8 adjacent the pulley 10. A link 14 is connected to the

arm 12 and at its opposite end is pivotally attached to an arm 15, fixed to and depending from a short shaft 16 rotatably mounted in the wall of the magazine and projecting slightly within the magazine. The hub of the arm 15 is provided with an ear 17 to which is connected a pull spring 18 whose other end is adjustably attached to an ear 19 on the wall of the magazine, the effect of the spring being to normally hold the roller 13 yielding against the belt to tighten the same to a degree depending upon the tension of the spring and the extent of the movement of the roller permitted.

The film 3 passes into the magazine through suitable guide rollers 20 substantially above the shaft 16 and thence to the underside of the reel. Attached to the inner end of the shaft 16 is an upwardly projecting arm 21 carrying at its free end an idle roller or spool 22 engaging the film and tending through the action of the spring 18 to deflect the film from its normal path of movement.

The operation of the machine will be obvious from the above description. The speed of rotation of the pulley 9 must obviously be sufficient to drive the reel, when the belt is tightened by the full tension of the spring 18, fast enough to wind the film on the empty reel as fast as it is delivered by the sprocket 4. As the reel increases in size the pull of the film on the spool 22 draws the arm 21 to the right, turning the shaft 16 and drawing the roller 13 away from the belt 8 allowing the belt to slacken and slip on the pulley and relieving the tension on the film. Of course as the film slackens the spring again tightens the belt causing the reel to wind again. In practice the tightening and releasing of the belt cannot be distinguished, the effect being to maintain just sufficient tension on the belt to drive the same at the proper speed.

I am aware that slip pulleys and friction devices of various kinds are old but such devices present the same driving tension at all times, whereas the variations in size of the reel as winding progresses gives a different leverage, as it were, to the film so that the winding is not uniform.

With my invention the tension on the film itself controls the tension of the belt so that the winding is uniform throughout.

Having thus described my invention,

what I claim and desire to secure by Letters Patent is:

1. In a mechanism of the class described, the combination of a magazine for receiving
5 the film from a moving picture projection machine, a shaft for supporting the receiving reel for the film in the wall of the magazine, a driving pulley attached to the shaft
10 outside of said magazine, a belt therefor and a belt-tightening roll engaging said belt, a support for said belt-tightening roll comprising an arm pivotally mounted on the
15 outside of said magazine, a rock shaft mounted in the wall of said magazine, an arm attached to said rock shaft within said
20 magazine and a film engaging roll carried by said arm in position to engage the film between the winding reel and its point of entrance to the magazine, an arm connected
25 to said rock-shaft without said magazine and operatively connected to said belt-tightening arm and a spring connected to said rock-shaft tending to turn the same in a direction to yieldingly press said belt-tightening roll against the belt.

2. In a mechanism of the class described, the combination of a magazine for receiving the film from a moving picture projecting

apparatus, a shaft rotatably mounted in the wall of said magazine at about the center thereof for supporting the film-receiving reel, a guide for directing the film into the magazine near one corner thereof, a driving pulley on the reel shaft without the magazine, a belt therefor, an arm pivotally
35 mounted on the reel-shaft adjacent the pulley and a belt-tightening roll carried by the end of said arm, a rock-shaft mounted in the wall of the magazine and an arm attached to the rock-shaft within the magazine, a film engaging roll supported in the
40 free end of said last mentioned arm and adapted to engage the film adjacent the film guide, a second arm attached to the rock-shaft without the magazine, a link connecting the second arm with the arm of the belt-tightening roll and a spring operatively
45 connected to the rock-shaft and acting to turn the latter in a direction to yieldingly press the belt-tightening roll against the belt.
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Signed at New York, in the county of New York and State of New York, this 24th day of May, 1913.

NICHOLAS POWER.