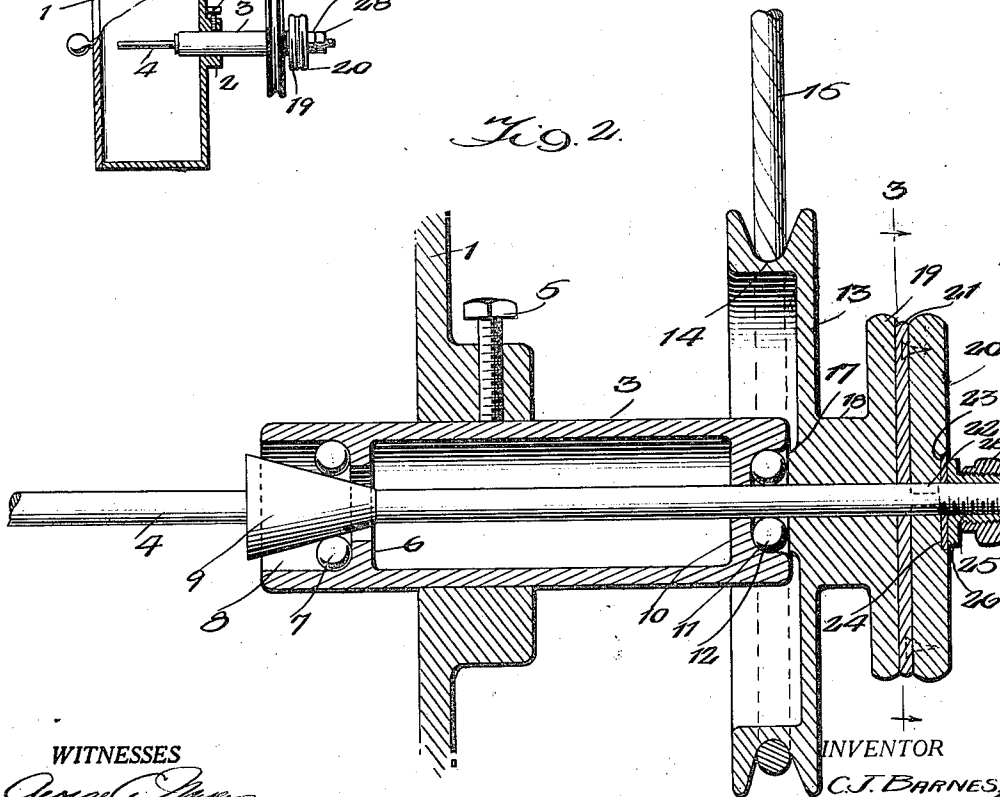
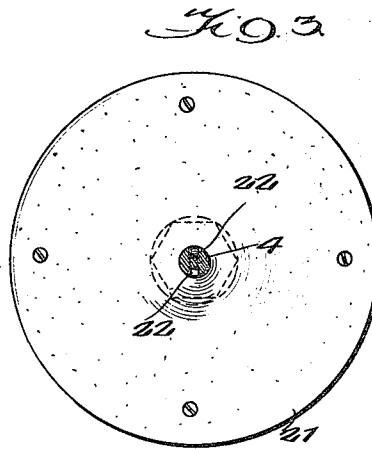
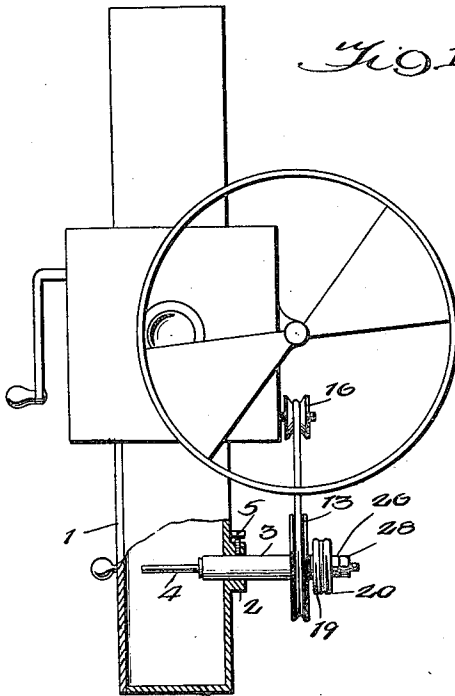


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C. J. BARNES
MOVING PICTURE MACHINE
Filed March 25, 1924



WITNESSES

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UNITED STATES PATENT OFFICE.

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MOVING-PICTURE MACHINE.

Application filed March 25, 1924. Serial No. 701,833.

To all whom it may concern:

Be it known that I, CHARLES J. BARNES, a citizen of the United States, and a resident of Goldsboro, in the county of Wayne and State of North Carolina, have invented certain new and useful Improvements in Moving-Picture Machines, of which the following is a specification.

This invention relates to moving picture machines and has for its object the automatic or self-adjusting tension take-up for moving picture reels when the film is being rewound on a spool so that at the beginning of the winding when substantially the weight of the reel is only applied to the spindle the automatic tensioning take-up device will cause a slippage between the driving mechanism and the spindle, the slippage being decreased in proportion to the weight of the film which is progressively being added to the reel so that when near the end of the winding operation the weight will be such that tension is sufficient to cause the reel to be driven at substantially the same speed as the operating mechanism that drives the same.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawing forming a part of the specification; nevertheless it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications which shall define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a front view of a moving picture machine partly in section and showing my improved tensioning device applied thereto.

Figure 2 is a vertical longitudinal section of the tensioning device.

Figure 3 is a transverse vertical section taken along the lines 3—3 of Figure 2.

Referring more particularly to the drawing, 1 designates the magazine of a moving picture machine having a perforated boss 2 in which is adapted to be inserted a housing 3 for a spindle 4 which carries the winding reel of the moving picture film. The cylinder is held in place in the perforated boss 2 by means of a set screw 5.

The housing 3 is provided with an internal annular flange 6 through which is inserted

the spindle 4. The outer face of the flange is curved to form a ball race for the ball bearings 7 which are engaged and maintained within the chamber 8 in the housing 3 by means of a cone-shaped enlargement 9 on the spindle 4.

The inner end of the housing 3 is provided with an internal annular flange 10 having its outer face curved to form a ball race for the balls 12, the balls being in engagement with the spindle 4 at this point.

A pulley 13 has a groove 14 adapted to receive the belt 15 which is driven through a pulley 16 operatively connected with the operating mechanism of the moving picture machine. A groove 14 is in vertical alignment with the balls 12 and for a purpose which will be presently described. The inner face of the pulley is provided with a boss 17 adapted to engage the balls 12 for aiding in maintaining the balls in place within the race 11.

The outer face of the pulley 13 is provided with a hub section 18 which is enlarged at its outer end into a disc 19. The pulley 13 and its hub 18 are mounted for rotation on the spindle 4. A second disc 20 has secured to its inner face a fibrous or leather disc 21 adapted to engage the outer face of the disc 19 at times and lock said disc with disc 20 for simultaneous rotation.

The outer end of the spindle 4 is provided with diametrically disposed grooves 22 parallel to the axis of the spindle 4 adapted to receive the inner end of diametrically disposed pins 23 and 24 formed in a countersunk portion on the outer face of the disc 20 so that the disc 20 will be locked to spindle 4 for simultaneous rotation but permitting sliding movement of the disc on the spindle. The outer end of the spindle as shown at 25 is threaded to receive a nut 26, which has its cylindrical portion 27 split and its outer surface threaded to receive a lock nut 28. Nut 26 is screwed on the threaded end of spindle 4 for locking the disc 20 in position on the spindle. When the nut 28 is screwed upon the nut 26 said nuts are locked against movement.

The operation of my device is as follows:

It will be seen that the housing 3 may be readily removed from the magazine 1 by releasing the set screw 5 and the parts of the take-up shown in Figure 2 may be readily disassembled by the removal of the nuts 26 and 28 from said spindle. The spindle may

then be withdrawn from the inner end of the housing. The reel is placed upon the inner end of the spindle 4 which projects into the magazine 1 and during the first
 5 part of the reeling operation and when the film is being applied to the reel, the weight on the spindle 4 and the slight pull on the film will aid in maintaining the spindle in its proper position within the housing 3 so
 10 that there will be little or no pull upon the spindle 4 for causing the faced disc 20 to be moved into rigid engagement with the disc 19 so that when the pulley 13 is driven at a certain speed the slippage will occur between the disc 20 and the disc 19 and there-
 15 by permit spindle 4 to be driven at a slower speed than the pulley 13. As the weight of the film on the reel increases, the pressure between discs 19 and 20 will be likewise in-
 20 creased, nevertheless the slippage will be increased and thus diminish the speed of rotation of the spindle 4. When the reel is nearing the end of its reeling operation the weight of the film and the reel will be suf-
 25 ficient to maintain the discs 19 and 20 in such frictional engagement that the spindle 4 will be driven at substantially one third of the speed at which it was originally driven.
 30 The speed of the spindle will gradually decrease to about one revolution per three seconds for a thousand foot film which will be about 10 inches in diameter at the end of the rewinding operation. The frictional en-
 35 gagement between the discs 19 and 20 must not be too tight to prevent the slip or the slip too weak to prevent the pull. The frictional engagement at the beginning of the winding should be just strong enough to
 40 propel the spindle and reel but when the load grows heavier it will be too weak to propel the increasing load unless the frictional engagement between discs 19 and 20 is increased to correspond. The frictional en-
 45 gagement at this time must not be such as to prevent slippage since the speed of spindle when rewinding of the film is nearing completion must diminish from three revolutions per second at the beginning of the
 50 rewinding to one revolution every three seconds near the end.

The groove 14 and pulley 13 are main-
 55 tained in vertical alinement with the ball bearings 12 so that the line of force on the ball bearings through the spindle 4 may be directly in line with the action of the strap 15.

When, through wear, or when desired the
 60 nuts 26 and 28 may be adjusted for moving the cone 9 into or out of the outer end of the housing 3 and for adjusting the tension of the pulley on the ball bearings 7.

It will be seen by the use of the pins 23
 65 and 24 and the groove 22 the disc is slidable longitudinally on the spindle 4.

What I claim is:

1. A tension take-up for moving picture machines comprising a spindle, a housing to receive the spindle, said housing adapted to be connected with the magazine of the mov-
 70 ing picture machine, ball bearings at the opposite ends of the housing, a cone-shaped enlargement on the spindle adapted to engage one set of ball bearings, a pulley loosely
 75 mounted for rotation on the spindle and having a hub portion and an annular disc integrally formed with the pulley, a second disc slidably mounted on the spindle and adapted to be simultaneously rotated with
 80 the spindle and adapted to have frictional engagement with the first mentioned disc, and means for locking the second mentioned disc against disengagement from the spindle.

2. A tension take-up for moving picture machines comprising a spindle, a housing
 85 adapted to receive such spindle and having its opposite ends provided with ball races, a cone-shaped enlargement on the spindle and seated within one of the ball races, ball
 90 bearings located in the race and adapted to engage the cone-shaped enlargement, the ball bearing in the other race adapted to engage the spindle, a hollow pulley having an enlargement projecting from its inner
 95 face and adapted to engage the ball bearings in the last mentioned race, said pulley being provided with a disc integrally formed with the pulley and loosely mounted with said
 100 pulley for rotation on the spindle, a second disc mounted for simultaneous rotation with the spindle, means for connecting said disc with the spindle and permitting sliding
 105 movement of the disc on said spindle, and means for locking the last mentioned disc to the spindle.

3. A tension take-up for moving picture machines comprising a spindle, a housing
 110 adapted to receive such spindle and having its opposite ends provided with ball races, a cone-shaped enlargement on the spindle and seated within one of the ball races, ball
 115 bearings located in the race and adapted to engage the cone-shaped enlargement, the ball bearings in the other race adapted to engage the spindle, a hollow pulley having an enlargement projecting from its inner
 120 face and adapted to engage the ball bearings in the last mentioned race, said pulley being provided with a disc integrally formed with the pulley and loosely mounted with said
 125 pulley for rotation on the spindle, a second disc mounted for simultaneous rotation with the spindle, means for connecting said disc with the spindle and permitting sliding
 movement of the disc on said spindle, means for locking the last mentioned disc to the spindle, and means between the two discs for causing at times frictional engagement between the discs.

CHARLES J. BARNES.