

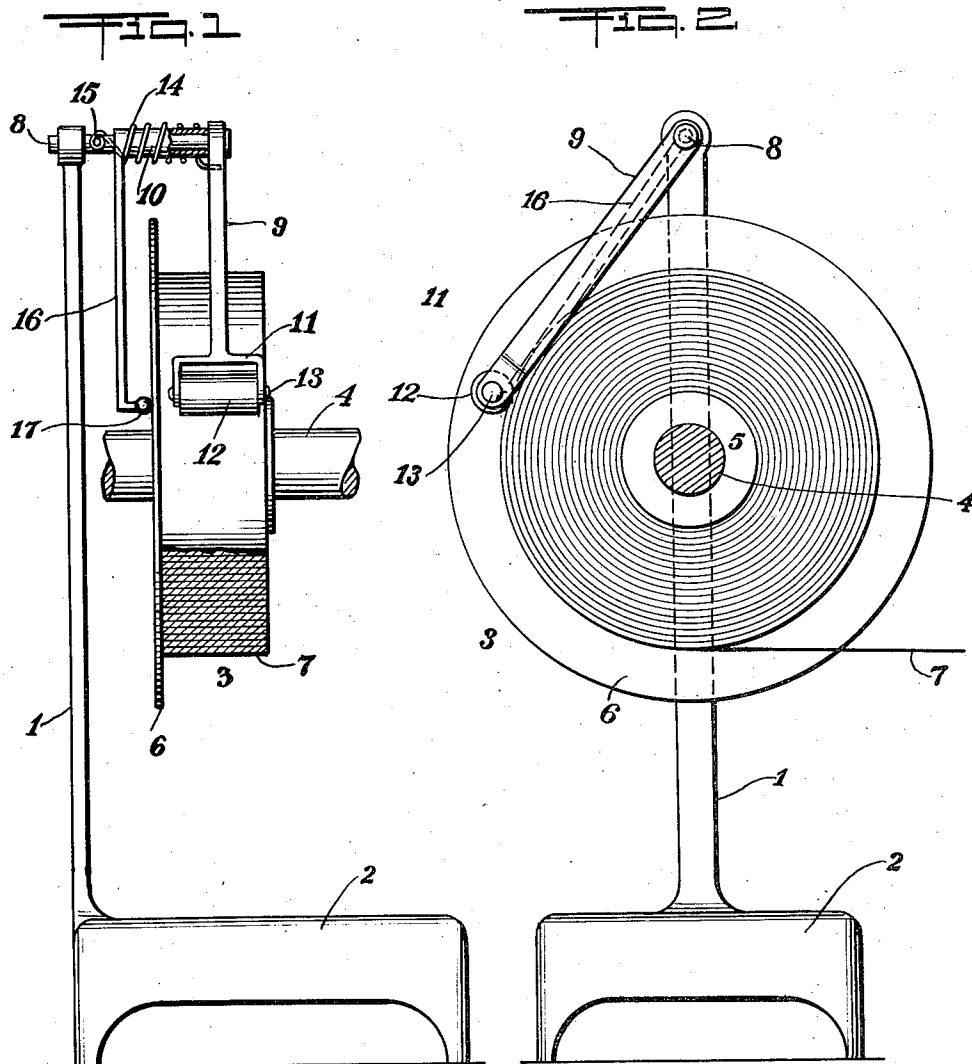
July 10, 1928.

1,676,797

A. NYMAN

TENSION REGULATOR

Filed Dec. 18, 1925



INVENTOR
Alexander Nyman

BY
William F. Nickel
ATTORNEY

UNITED STATES PATENT OFFICE.

ALEXANDER NYMAN, OF TUCKAHOE, NEW YORK, ASSIGNOR TO DUBILIER CONDENSER CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TENSION REGULATOR.

Application filed December 18, 1925. Serial No. 76,266.

This invention relates to tensioning devices; especially tensioning devices for reels from which a strip of paper or other flexible material is to be unwound.

5 An object of the invention is to provide a device for enabling a strip of paper or other flexible material to be unwound from a reel without surface friction, and at the same time, maintain the tension upon said strip substantially constant, while the unwinding is in progress.

10 Other objects and advantages of the invention are set forth in the following description taken with the accompanying drawings; and the novel features of the invention are pointed out in the appended claims. But this specification discloses only one embodiment of my invention and I reserve the right to make changes in the structure actually shown without departing from the principle by which the invention is governed.

On the drawings,

25 Figure 1, is a side view of a tensioning device according to my invention; and Figure 2, is a front view of the same.

The same numerals identify the same parts throughout.

30 The structure in which the invention is embodied, comprises a standard 1, rising from a base or foot 2, and adjacent this standard is mounted a reel 3 upon a shaft or spindle 4 supported in any suitable manner. This reel comprises a central hub 5 attached to a disc 6 and on the hub is fixed 35 a roll of paper or other flexible material indicated by the numeral 7. The shaft 4 may be either fixed or rotatable, so long as the reel can turn freely thereon, and when the paper 7 is pulled, the reel, of course, will 40 rotate and permit the paper or other strip to be unwound.

50 In the top of the upright or standard 2 is mounted a fixed journal 8 which supports a movable arm 9 having a hollow boss or bearing 10, which is slipped upon the spindle or journal 8, the latter passing through this boss which acts as a bearing for the swinging arm 9. The lower end of this arm is in the form of a yoke 11 between the arms of which is mounted a roller 12, turning upon a pin or journal 13, supported in the ends of the yoke 11. This roller 13 is intended to rest upon the roll of

paper 7 and be maintained in contact with the outermost layer thereof.

55 Encircling the bearing 10 is a coil spring 14 made fast to this bearing or to the arm 9 at one end and being affixed at its opposite end 13 to some stationary point such as the spindle or journal 8, or the upright 1. This 60 spring 14 is so stressed that it normally acts to press the roller 12 against the paper on the reel; and as the paper or the like is unwound so that the reel carries less and less of it, the spring 14 acts to keep the roller 12 65 in contact, with the strip on the reel and move the roller, gradually towards the shaft 4.

70 Integral with the bearing 10 and therefore rigid with the arm 9 is an arm 16 which carries at its lower end, a head or button 17. This head or button normally makes contact with the disc 6 of the reel and as the strip on the reel unwinds, and the distance from the axis of the shaft 4 to the outer surface of the rolled strip on the reel decreases, 75 the spring 14 will cause both the arm 9 and the arm 16 to move in unison keeping the roller 12 pressed against the strip on the reel and at the same time, moving the lower 80 end of the arm 16 closer towards the center or axis of rotation of the shaft 4.

85 In practice, the roll of paper or other material on the reel 3 is mounted upon the shaft 4 in some manner that will enable the reel to turn either on the shaft or with it; while at the same time, axial movement of the reel along the shaft or with the shaft 4 is prevented. The base 2 and upright 1 are then moved into position so that the roller 90 13 can rest upon the strip on the reel and the lower end of the arm 16 bearing the head or button 17 can make contact with the outer face of the disc 6. As the two arms 9 and 16 are substantially parallel, their outer 95 or free ends will always be at substantially the same distance from the axis of the shaft 4. Then, as the reel is unwound by tension on the strip of material which it carries, the rotation of the reel will be checked to 100 some extent by the friction between the reel and the arm 16, with its button 17.

105 If, for example, the reel be filled to half the extent shown in Figures 1 and 2, and a given force be exerted on the strip 7 to unwind the strip from the reel, the moment

of this force will be equal to the pull in pounds multiplied by the distance of the outer layer from the axis of the shaft 4. But with the reel filled to a greater extent as indicated in the drawings, the moment of such a force if the pull on the strip 7 is constant, will be much greater because the lever arm or distance of the outer layer from the axis of the shaft 4 is greater. Therefore, a pull on the strip 7 great enough to unwind it, when all but a few layers have been removed from the hub 5, will be too great when the reel is full, and some regulation is necessary. Such regulation is provided by the friction member 16, the position of which is governed by the arm or element 9. The friction between the disc or flange 6 and the head or button 17 of the arm 16, will be constant, that is to say, the button 17 will press against the flange 6 with the same force throughout the unwinding operation; but as one continues the pull on the strip 7, the lever arm or distance of the point of contact of the head 17 and the flange 6 from the axis of the shaft 4, will change, due to the fact that the spring keeps the roller 12 pressed on the rolled up strip 7 and moves both the arm 9 and the member 16 towards the shaft 4 as the unwinding operation proceeds. Thus the pull on the strip 7 multiplied by the distance of the outer layer of the rolled up strip from the axis of the shaft 4 is opposed by the value of the friction between the head 17 multiplied by the distance of this head from the same point. The moment of the force or pull to unwind the strip 7 is greatest when the unwinding commences and is then opposed by the moment of the force due to the friction of the member 17 which is also maximum at this point. As the moment of the pull on the strip 7 decreases, the moment due to the friction also decreases and thus the tension on the strip 7 can be kept constant. The roll then unwinds evenly and the strip 7 as it comes off the reel 3 is kept stretched at a uniform tension from one end of the unwinding operation to the other.

Having described my invention, what I believe to be new and desire to secure and

protect by Letters Patent of the United States is:—

1. The combination of a reel from which a strip of rolled material is to be unwound, a friction member to engage said reel and an element rigidly attached to the said member to make contact with the strip of rolled material and regulate the position of said friction member to enable the moment of the force due to the friction to be varied.

2. A tension device comprising a reel, a friction member to engage said reel, an arm rigid with said member to rest upon the surface of a strip wound upon said reel, and a spring normally tending to urge said arm and said member toward the center of said reel.

3. The combination of a base, having an upright support thereon, a reel adjacent said support, a pair of arms in frictional engagement therewith movably supported in spaced relation upon said upright and rigidly connected to move in unison, and a spring to urge said arms to move their free ends towards the axis of rotation of the reel to control the rotation of said reel.

4. The combination of a base, an upright thereon, a journal carried by said upright, a reel having a strip wound up thereon rotatably disposed adjacent said upright, an arm having a bearing engaging said journal, and a roller to rest upon the strip wound upon the reel, a second arm rigidly connected to the first arm to engage the flange of said reel and act as a brake therefor, and a spring connected to said arms and designed to actuate said arms to move their free ends towards the axis of rotation of said reel.

5. The combination of a reel, a roll of material wound thereon, a member engaging the surface of the roll and a co-operating member rigid therewith and in frictional engagement with the reel, to exert a constant tension on the material during the unwinding thereof.

In testimony whereof I affix my signature.

ALEXANDER NYMAN.