W. C. STEVENS.

METHOD OF AND MEANS FOR TENSIONING VARIOUS MATERIALS.

APPLICATION FILED JULY 3, 1918.

1,410,136. Patented Mar. 21, 1922.

Fig. 1.

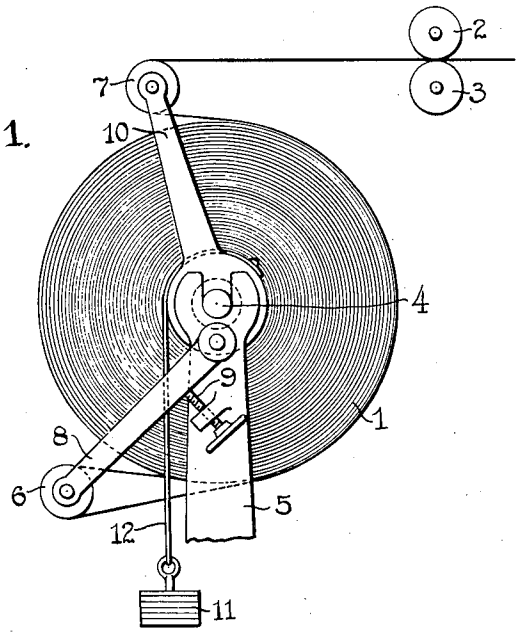
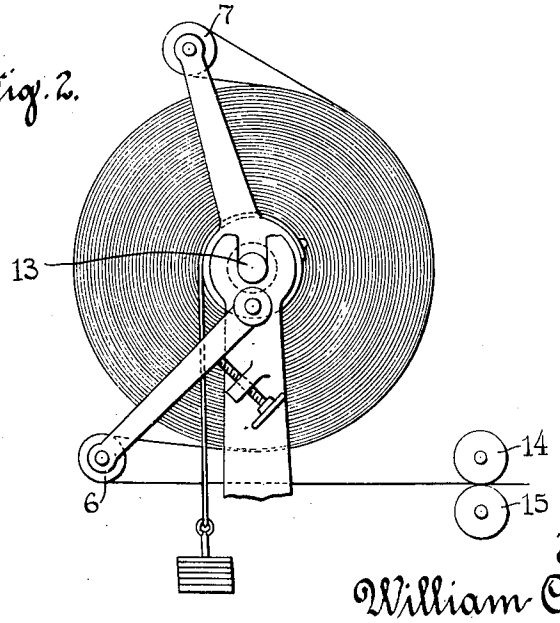


Fig. 2.



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METHOD OF AND MEANS FOR TENSIONING VARIOUS MATERIALS.

1,410,136. Specification of Letters Patent. Patented Mar. 21, 1922.

Application filed July 3, 1918. Serial No. 243,178.

To all whom it may concern:

Be it known that I, WILLIAM C. STEVENS, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Methods of and Means for Tensioning Various Materials, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to a method of and means for tensioning various materials and particularly printing press webs.

As is understood, it is desired to maintain the web fed to printing presses, under a substantially constant tension whereas the gradual decrease in the diameter of the web roll and various other conditions met with in practice tend to effect variations in the tension thereof. Also, as is understood, it is desired to maintain the web under a substantially constant tension as it is wound in roll form for subsequent use and the present invention has among its objects to provide an efficient and convenient method of tensioning during either feeding or winding of the material.

A further object of the invention is to provide simple and efficient means for carrying out the aforesaid method.

Various other objects and advantages of the invention will hereinafter appear.

According to the present invention it is proposed to pass the web or other material over a friction surface, preferably a peripheral portion of the roll from which the material is drawn or onto which it is to be wound, to provide a tension and to vary the area of contact between the material and the friction surface to maintain the tension uniform under varying conditions tending to disturb the tension adjustment.

The accompanying drawing schematically illustrates the preferred means for carrying out the present invention and the same will now be described, it being understood that the means illustrated are susceptible of various modifications.

In the drawing,

Figure 1 shows means for tensioning material as it is drawn from its roll; and,

Fig. 2 shows means for tensioning material as it is wound in roll form.

Referring to Fig. 1, the same shows a roll 1 of web or other material to be supplied to a printing press or other machine, represented by a pair of rollers 2 and 3, said rollers being used to draw the material from its roll. The roll 1 is mounted on a spindle 4 carried by fixed supports 5 (only one of which is illustrated) and said roll has associated therewith rollers 6 and 7 both of an axial length equal to the material of the roll. The roller 6 is carried by a pair of arms 8 (only one of which is illustrated) for support behind the roll 1, said arms being pivotally connected to the supports 5 near the axis of the roll and bearing upon adjustable screws 9 on said supports whereby the roller 6 may be adjusted circumferentially of the roll 1. The roller 7 is supported by a pair of arms 10 (only one of which is illustrated), said arms being revolubly supported by the spindle 4 and being biased to swing in a counter-clockwise direction by a weight 11 attached by a cable 12 to the hub of one of said arms, it being understood that a similar weight might be provided for the other arm.

The foregoing arrangement is made for clockwise rotation of the roll 1 and the material drawn from the roll is first passed over and about the roller 6 and then under and about the roller 7 to rollers 2 and 3 whereby the material is reflexed to be drawn over an oppositely moving peripheral portion of the roll and frictioned thereagainst by the weighted roller 7. The friction thus obtained tensions the material to a degree determined by the weight or weights 11 and the arc of contact between the oppositely moving portions of the material, with the result that if the weight or weights be of a given value the roller 7 will initially assume a position to adjust the arc of contact for a definite tension. Then under conditions tending to decrease the tension with a resulting increase in slack of the material the roller 7 will shift under the influence of its

weight or weights to increase the arc of contact and hence augment the friction and resulting tension. Conversely under conditions tending to increase the tension with a resulting decrease in slack of the material the roller 7 will yield to decrease the arc of contact for curtailment of the friction and resulting tension. Also a reduction in the diameter of the roll will decrease the arc of contact with the results described and accordingly the roll will tend to compensate for variations in its diameter independently of the roller 7. Thus under ordinary conditions the play of the roller 7 may be confined within relatively narrow limits and the adjustability of roller 6 enables shifting of the arc of contact for normal positioning of the roller 7 at any preferred point circumferentially of the roll and for subsequent adjustment of the arc of contact, if desired.

Referring to Fig. 2, the same shows the same means employed to tension material to be wound on a core 13 which it may be assumed is driven in a clockwise direction to draw the material from a machine represented by rollers 14 and 15. In this instance the material drawn from the rollers 14 and 15 is first passed under and around the roller 6, then over and around the roller 7 to the core 13. Thus as in the previous instance the roller 7 functions to friction a portion of the material moving in one direction against an oppositely moving peripheral portion of the roll, while the adjustability of roller 6 enables the control above described. Accordingly the means will function to vary the arc of contact as the diameter of the roll increases to maintain the material under a substantially constant tension as it is wound onto the core.

It is, of course, to be understood that the weight or weights 11 might be replaced by any one of the numerous well known devices for performing similar functions, such for example as a spring, torque motor, or fluid pressure device, and it will thus be apparent that the tensioning means is admirably adapted for remote control which is frequently desired especially for printing presses.

What I claim as new and desire to secure by Letters Patent is:

1. The method of tensioning printing press webs and other materials which comprises subjecting the material to friction throughout a limited area thereof to establish a drag or tension on the material in addition to any drag or tension to which the material is previously subjected and varying such area according to such lesser drag, to thereby establish a given total drag or tension on the material.

2. The method of tensioning printing press webs and other materials which comprises passing the material over a friction surface to establish a tension thereon and varying the area of contact between the material and such surface as the linear speed of the material varies, to thereby maintain such tension substantially uniform.

3. The method of tensioning the material of web rolls and the like which comprises frictioning the material against the periphery of its roll and varying the area of contact therebetween according to the diameter of said roll, to thereby establish a given tension on the material.

4. The method of tensioning material of web rolls and the like which comprises frictioning the material against the periphery of its roll to establish a tension on the material and varying the arc of contact as the linear speed of the material varies, to thereby maintain the tension on the material substantially uniform.

5. The method of tensioning the material of web rolls and the like which comprises passing the material over an oppositely moving peripheral portion of its roll under the influence of a given force to tension the material and varying the arc of contact while maintaining such force constant to thereby maintain the tension uniform under varying conditions.

6. A tension device for printing press webs and other materials comprising a friction surface over which the material is passed and means for varying the area of contact between the material and said surface to establish a given total drag or tension on the material regardless of the amount of any lesser drag on the material prior to passing over said friction surface.

7. A tension device for printing press webs and other materials comprising a friction surface over which the material is passed and means for varying the area of contact between the material and said friction surface to maintain the tension on the former substantially uniform during changes in its linear speed.

8. A tension device for the material of web rolls and the like comprising means to effect contact of the material with an oppositely moving peripheral portion of its roll and to afford variation of the area of contact and means acting on the former means to effect variation of the area of contact for establishment of a given total drag or tension regardless of the amount of any lesser drag on the material prior to contact thereof with said peripheral portion of its roll.

9. In a tension device for the material of web rolls and the like, the combination with means for causing the material to pass over an oppositely moving peripheral portion of its roll, said means including a member ad-

justable in response to the pull of the material to vary the arc of contact between the oppositely moving portions thereof and means subjecting said element to a constant opposing pull.

10. A tension device for the material of web rolls and the like comprising a relatively stationary roller and an adjustable roller over which the material is passed to contact with an oppositely moving peripheral portion of its roll, the latter roller being adjustable in response to the pull of the material to vary the arc of contact between the oppositely moving portions of the material and having means exerting a constant opposing pull thereon.

In witness whereof, I have hereunto subscribed my name.

WM. C. STEVENS.