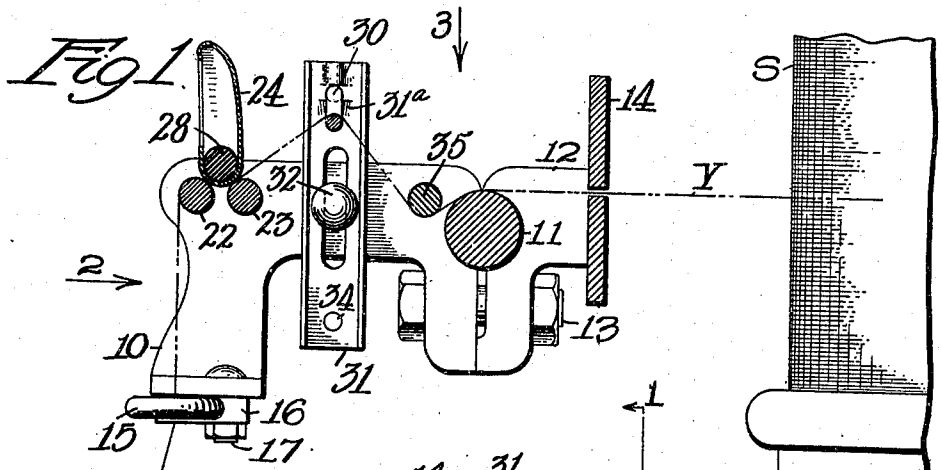
L. T. HOUGHTON.

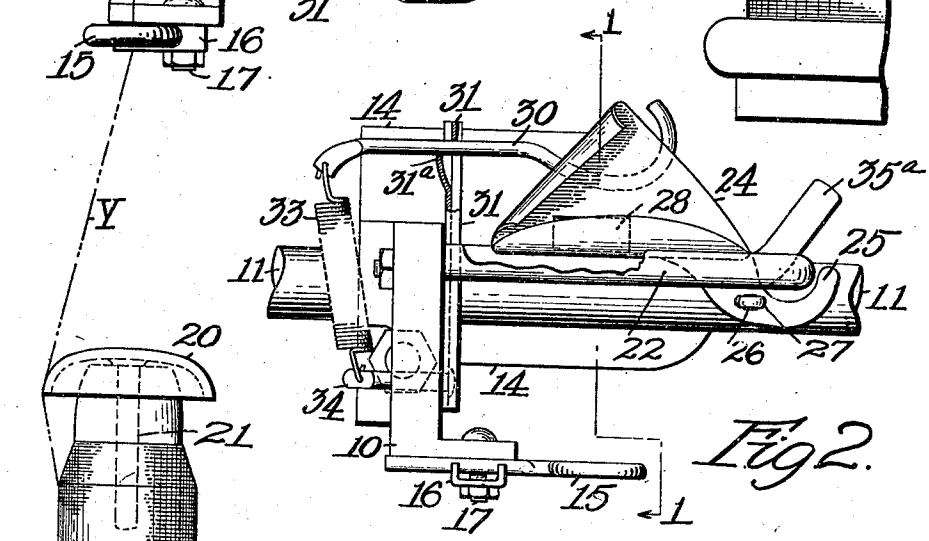
YARN TENSION MECHANISM.

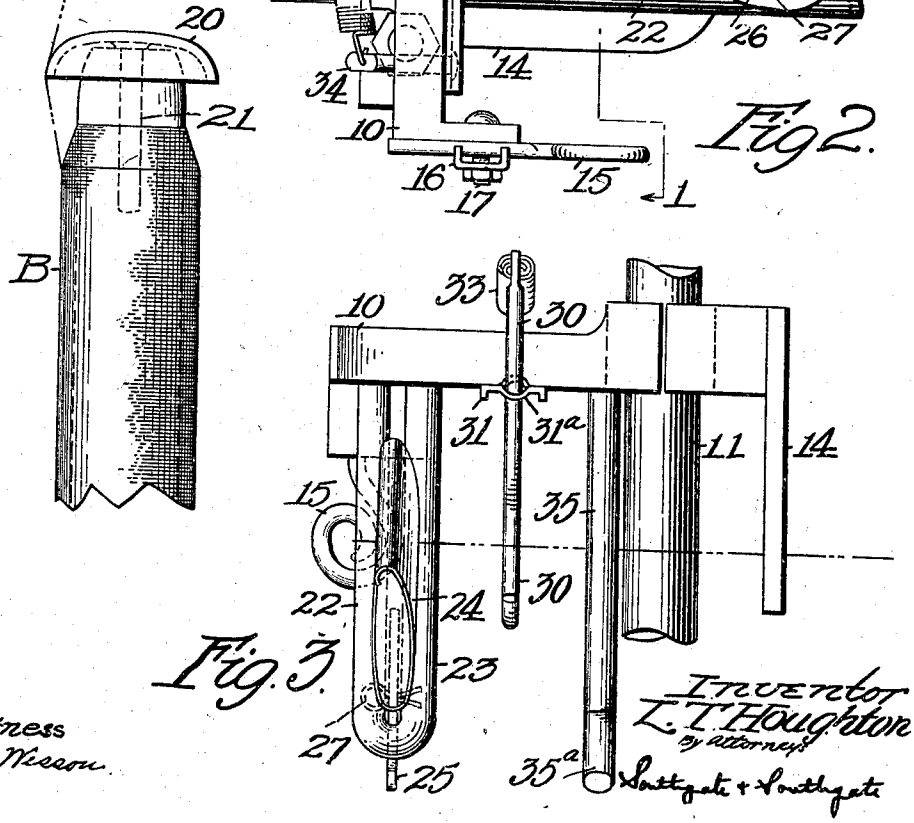
APPLICATION FILED MAR. 24, 1916.

1,306,148.

Patented June 10, 1919.







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YARN-TENSION MECHANISM.

1,306,148. Specification of Letters Patent. Patented June 10, 1919.

Application filed March 24, 1916. Serial No. 86,524.

To all whom it may concern:

Be it known that I, LEWIS T. HOUGHTON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Yarn-Tension Mechanism, of which the following is a specification.

This invention relates to a yarn tension mechanism particularly designed for use on spoolers and other similar winding machines in which yarn is wound at high speed from one yarn carrier or bobbin to a second and generally larger yarn carrier or spool.

It is a matter of great importance to maintain uniform tension upon the yarn in order to prevent kinks and breakage, to preserve the elasticity of the yarn, and to secure uniform winding upon the spools. A number of devices have been designed for this purpose but as far as I can learn they have none of them proved entirely satisfactory.

It is the general object of my invention to improve the construction and mode of operation of such yarn tension mechanism and for the accomplishment of this object I have designed the novel and useful structure herein described and claimed.

A principal feature of my invention relates to the provision of an improved retarding device which acts to apply a certain amount of frictional resistance to the passage of the yarn through the winding machine, thereby securing a firm and solid winding upon the spool.

Another important feature of my invention relates to the provision in combination with said retarding device of a supporting arm which is adapted to yield whenever necessary to relieve unusual or excessive tension upon the yarn, thereby preserving the elasticity of the yarn.

In the preferred form of my invention I provide separated yarn guides and I position the retarding and supporting devices between the two guides. Both the retarding and the supporting devices as well as the lower yarn guide are so constructed that they will thread themselves automatically whenever the yarn is drawn from the bobbin to the spool through the second yarn guide, and this provision for automatic threading of the yarn I consider a most important feature of my invention.

A still further feature of my invention relates to the provision of a spreader or cap for the yarn carrier or bobbin from which the yarn is unwound by the use of which breakage of the yarn is greatly reduced when unwinding from the smaller portions of the bobbin.

Further features of my invention relate to certain arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of my invention is shown in the drawings in which

Figure 1 is a vertical sectional view of my improved tension mechanism taken along the line 1—1 in Fig. 2;

Fig. 2 is a front elevation of the tension mechanism, looking in the direction of the arrow 2 in Fig. 1, and

Fig. 3 is a top plan view, looking in the direction of the arrow 3 in Fig. 1.

Referring to the drawings, the bobbin or yarn carrier is indicated at B, and the spool upon which the yarn is wound at S, the yarn itself being marked Y. The several parts of the yarn tension mechanism are mounted upon a stand 10, secured to a supporting bar 11 by a clamp 12 and a clamping bolt 13. The bar 11 extends throughout the length of the machine and a separate set of tension mechanism is provided for each bobbin B and spool S.

The usual spooler guide 14 is mounted upon or secured to the clamp 12, and an additional yarn guide 15 is secured to the lower end of the stand 10 by a plate 16, (Fig. 2) and bolt 17. The shape of the guide 15 is best shown in Fig. 3 in which it will be seen that the guide is formed from a single piece of wire bent into a spiral and forming a guide-eye into which the yarn will automatically insert itself, as it is drawn upward from the bobbin B.

In order to avoid a direct upward pull of the yarn from the smaller portions of the bobbin B, I provide a cap or spreader 20 (Fig. 1), said cap having a spur 21 extending downward therefrom and fitting loosely into the bore of the bobbin. The cap is preferably formed of metal smoothly polished upon its convex surface and is found to greatly reduce the breakage of yarn when unwinding at high speed from the smaller portions of the bobbin B, particularly when the bobbin is warp-wound.

After passing through the yarn guide 15 the yarn is led over a retarding device comprising a pair of parallel rods 22 and 23 and

a retarding member 24. The rods 22 and 23 are shown in Fig. 3 as forming portions of a single wire loop, the ends thereof being rigidly secured in the stand 10, and this construction, while not essential, possesses important structural advantages.

The retarding member 24, in the preferred form, comprises a sheet metal casing or shell having a substantially triangular appearance in front elevation, the left-hand upper portion of the shell being brought forward to form a curved surface along which the yarn will slide easily downward until it passes around the left-hand end of the member 24. In returning to its direct line of travel it passes beneath the member 24 and is frictionally engaged between said member and the rods 22 and 23.

At its right-hand end the member 24 is provided with a hook-shaped depending projection 25 adapted to extend downwardly between the rods 22 and 23 and having a hole 26 formed therein through which a cotter-pin 27 may be inserted to prevent accidental upward displacement of the retarding member. As the rods 22 and 23 form a closed loop, the member 24 cannot be displaced endwise therefrom.

The weight of the member 24 may be varied in accordance with the size of the yarn being wound and also with the winding speed, this variation in weight being accomplished by the use of sheet metal of different thicknesses or by the addition of a weight 28 as shown in Figs. 1 and 2. A series of different weights may be provided and a weight of the proper size may be readily inserted within the retarding member to suit the conditions of operation.

A hook-shaped yarn support or lever 30 (Fig. 2) is movably mounted in a support 31, adjustably secured to the stand 10 by a bolt or screw 32. A spring 33 is connected at its upper end with the rear end of the lever 30 and at its lower end to a stud 34 fixed in the support 31. The spring 33 is of comparatively light tension and will yield readily, permitting the lever 30 to swing downward whenever the tension upon the yarn is increased. The connection between the lever 30 and the support 31 also permits the lever to slide longitudinally in the support to adjust itself to the direction of the yarn pull. A portion 31^a (Fig. 2) of the support 31 is pressed outward to form a stop which limits the movement of the lever under the influence of the spring 33.

After leaving the tension arm 30 the yarn passes under a guide rod 35 and over the supporting bar 11 to the yarn guide 14 and the spool S. The guide rod 35 is upturned at its outer end as shown at 35^a in Fig. 2. In the threading of this tension mechanism it is necessary merely to place the yarn in the spooler guide 14 and under the rod 35, dropping the yarn over the support 30 with the same motion. The pull of the yarn when released will cause it to automatically position itself in the hook-shaped portion of the support 30 and under the retarding member 24, and will also draw the yarn into the yarn guide or eye 15.

Having thus described my invention the operation thereof will be clearly apparent. The yarn passing upward from the bobbin B first engages the spreader 20 which reduces breakage of the yarn as it leaves the bobbin. The yarn then passes through the guide 15 to the rods 22 and 23 and under the retarding member 24, at the same time changing its direction or path of travel. This member provides most of the necessary tension upon the yarn and prevents too free delivery of the yarn to the spool S. The yarn then passes over the yarn support 30 which is normally inoperative, but which will yield instantly to relieve the yarn whenever any excessive drag or pull is applied to the yarn, thus preventing breakage and preserving the elasticity of the yarn. In its further travel the yarn passes from the supporting lever 30 under the guide rod 35 and over the supporting bar 11 to the spooler guide 14 through which it is drawn to the spool S.

The arrangement of tension mechanism herein described has been found in practice to be particularly efficient in providing even tension upon the yarn and in relieving and equalizing sudden strains thereon, thereby rendering unusual winding speeds available.

Having thus described my invention it will be evident that changes and modifications can be made therein by those skilled in the art without departing from the spirit and scope of my invention as herein set forth and I do not wish to be otherwise limited to the details herein disclosed, but what I claim is:—

1. A yarn tension mechanism comprising a spooler guide, a retarding device, and a yielding yarn supporting device, each of said two devices being effective to automatically direct the yarn to operative position relative to itself.

2. In a yarn tension mechanism, a yarn retarding device comprising spaced parallel rods mounted in substantially horizontal position, a retarding member loosely supported on said rods and adapted to rest on the yarn and force it into frictional engagement between said rods and said member, and a fastening device for said member permitting said member to be lifted out of contact with said rods, but preventing dislodgment of said member from operative position.

3. A yarn tension mechanism comprising spaced parallel fixed rods mounted in substantially horizontal position, a weighted retarding member loosely supported on said

rods and adapted to rest on and retard the yarn passing over said rods, said member being held from rotation on said rods, and a yielding tension arm coöperating with said retarding member to temporarily relieve the drag on the yarn under abnormal conditions.

4. In a yarn tension mechanism, a yarn retarding device comprising spaced parallel rods mounted in substantially horizontal position, and a movable retarding member supported on said rods and effective to force the yarn into frictional engagement therewith, said member having an upwardly extending projection effective to guide the yarn around an end of said member to operative position beneath said member.

5. In a yarn tension mechanism, a yarn retarding device comprising spaced parallel rods mounted in substantially horizontal position, and a movable retarding member supported on said rods and effective to force the yarn into frictional engagement therewith, said member having an upwardly extending projection effective to guide the yarn around an end of said member to operative position beneath said member, and said member having provision for increasing the retarding effect thereof upon the yarn.

6. A yarn tension mechanism comprising a spooler guide, a retarding device, and a yielding arm support positioned between said retarding device and said spooler guide, said yielding support comprising a substantially horizontal arm slidably and pivotally supported at a point intermediate its ends, and yieldingly movable from normal position by excessive yarn tension.

7. A yarn tension mechanism comprising a spooler guide, a retarding device and a yielding yarn support positioned between said retarding device and said spooler guide, said yarn support comprising a substantially horizontal arm slidably and pivotally supported at a point intermediate its ends, and a spring to move the yarn-engaging end of said arm upwardly.

In testimony whereof I have hereunto set my hand.

LEWIS T. HOUGHTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."