F. S. RAND & G. N. TAYLOR.

TENSION DEVICE.

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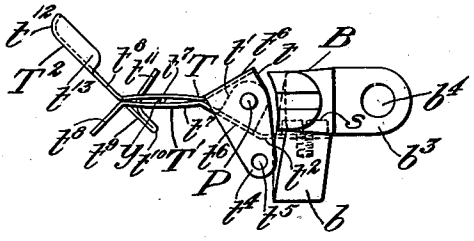


Fig. 2.

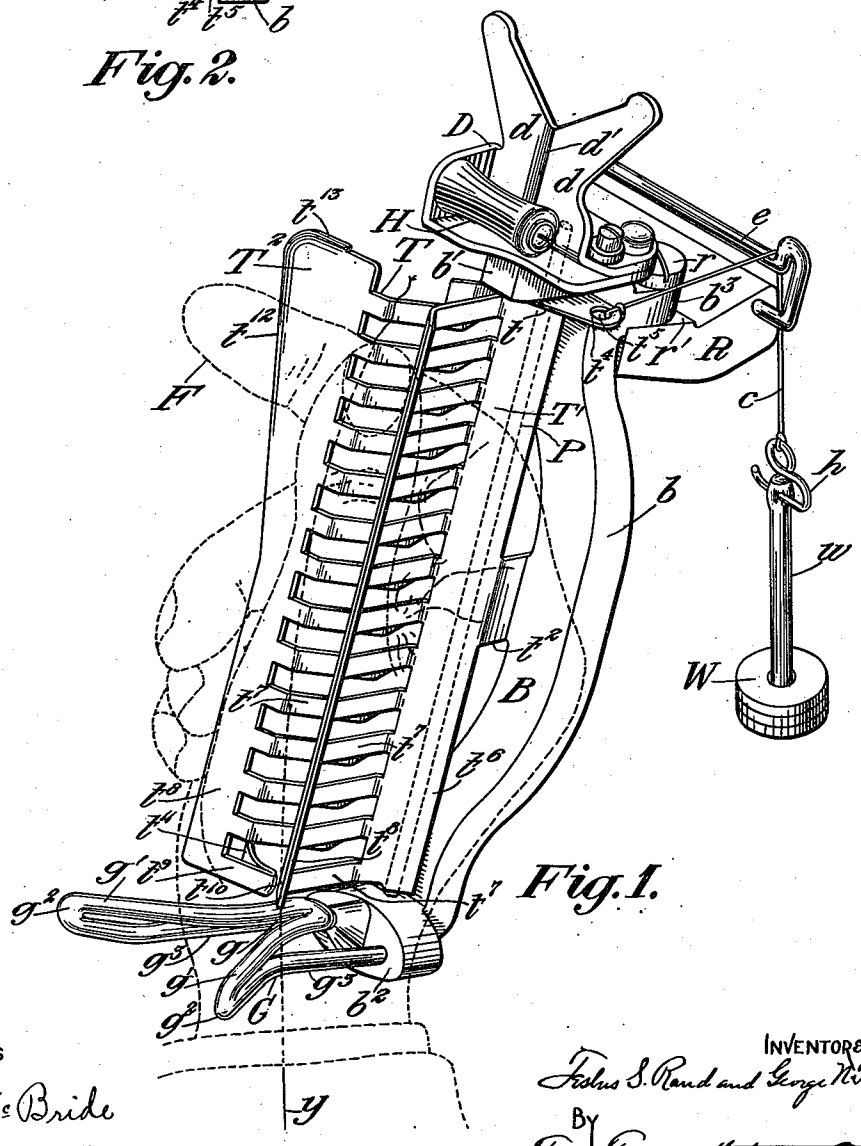


Fig. 1.

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FESTUS S. RAND, OF PROVIDENCE, AND GEORGE N. TAYLOR, OF EAST PROVIDENCE, RHODE ISLAND, ASSIGNORS TO UNIVERSAL WINDING COMPANY, OF PORTLAND, MAINE, A CORPORATION OF MAINE.

TENSION DEVICE.

1,156,927. Specification of Letters Patent. Patented Oct. 19, 1915.

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To all whom it may concern:

Be it known that we, FESTUS S. RAND and GEORGE N. TAYLOR, citizens of the United States, residing at Providence and East Providence, respectively, in the county of Providence and State of Rhode Island, have jointly invented certain new and useful Improvements in Tension Devices, of which the following is a specification.

Our invention relates to tension-devices for use in applying tension to a running thread or yarn in delivering the same to textile apparatus such as winding machines.

Our improvement consists particularly in providing means for facilitating the threading of the yarn into the tension-device to prepare it for operation and to insure against improper threading through carelessness or from other cause.

The manner and means for carrying out the improvement are fully described in the following specification, illustrated by the accompanying drawings, in which like reference characters designate like parts.

In the drawings:—Figure 1 is a perspective view of the complete tension-device with the operator's hand shown by dotted lines to illustrate the method of threading the yarn between the tension-members; and Fig. 2 is a plan view of a portion of the mechanism showing the manner in which the tension-members act on the yarn to apply resistance to its draft.

The present improvement is applied to that type of tension-devices generally known as "grid" or "ladder" tensions in which two grid-like members or plates are arranged to press against the yarn running between them. The tension-members may be of any appropriate form or construction and as here shown consist of rectangular sheet-metal plates T and T′ adapted to be supported on a frame or bracket B. The bracket B comprises a bow-shaped upright b formed at its extremities with forwardly-projecting lugs or arms b', b^2, as shown most clearly in Fig. 1. Projecting rearwardly from the top of the member b is a lug b^3 provided with a hole b^4, see Fig. 2, by means of which the bracket is secured to the frame or other part of the machine on which the tension-device is to be used. As illustrated in Fig. 1 the bracket B is secured to a rail R or other support by means of the screw r, and preferably the bearing-face r' on which the lug b^3 rests is slightly beveled off so that the upright b will set at an angle to the perpendicular. This arrangement provides for setting the tension-members T and T′ in an inclined position for a purpose as later described.

Extending parallel with the member b of the bracket B is a pin or rod P having its ends mounted in the lugs b', b^2. The rod P serves as a hinge-pin and support for the tension-members T, T′ which are formed at their top and bottom edges with lugs t, t', see Fig. 2, provided with holes for receiving the rod. One member T′ is preferably held fixedly on the bracket B to prevent it from turning on the rod P, and to provide for this a lug t^2 extending rearwardly from its side is secured to the upright b by means of a screw s, see Fig. 2. The other member T is adapted to swing on the rod P to carry it toward and away from the fixed member T′. For controlling the movement of the member T an arm t^4 is provided, preferably formed as an extension of the upper bearing-lug t. At the end of the arm t^4 is a hole t^5 which serves as a convenient means for fastening the end of a cord c. From the arm t^4 the cord c leads over a wire bail e and to its opposite end is secured a hook h which engages a hole in the end of a rod w. The rod w is adapted to receive one or more perforated disks or weights W which act through the cord c and arm t^4 to swing the movable tension-member T toward the fixed member T′.

As before stated, the tension-members T and T′ might be of any usual construction as generally employed in the art. We prefer, however, to make them of sheet-metal in order to render them relatively light while having the required strength and rigidity, and for economy in manufacture we make use of punchings. Each plate has an upright member t^6 formed at its top and bottom with the bent over bearing-lugs t, t', etc., as before described, and the main portions of the plates are preferably provided with spaced-apart cross-bars or arms t^7, t^7, etc. The cross-bars t^7 are so arranged that when the two plates are placed opposite each other on the frame B they stand in staggered relation. That is to say, the bars on the two plates are arranged alternately, with

those on one plate coming opposite to the spaces on the other plate in the same manner as generally employed in devices of this sort. This provides that the bars of one member will pass by those of the other when the plates are operating to press on the yarn running between them. In this way the yarn is given a more or less tortuous or sinuous course as it passes between the tension-members to provide a resistance to its draft. It will be noted from Fig. 2 that the cross-bars t^7 are formed slightly concaved on their inner, opposed faces, in other words, bowed out away from each other, thus providing a sort of trough or passage for the yarn y so that the tendency will be for it to remain in place at or near the center of the bars.

Below the two tension-members T, T′ is a V-shaped guide-member G which is preferably constructed of wire bent into shape to form a crotch g and two diverging branches g', g'. At g^2, g^2 the wire is doubled back underneath the branches g', g' to form two legs g^3, g^3, the ends of which are driven into holes in the lower lug b^2 of the bracket B. The guide G is designed to assist in threading the yarn y between the tension-plates or member T, T′, as later explained, and also serves to prevent the yarn from whipping back and forth against the faces of the plates as it leads therebetween.

On the top of the bracket B is illustrated a slub-catcher or yarn-clearer of usual form, but this is not essential to the operation of the tension-device. Usually some arrangement of this sort is employed, however, for cleaning the yarn before it passes to the machine, and the most convenient position for locating it is in combination with the tension-bracket. As shown in Fig. 1, the slub-catcher D comprises two plate-like members d, d arranged in substantially the same plane and formed with coöperating edges which are spaced slightly apart at d' to provide a slit through which the yarn draws. The upper edges of the members d, d are preferably formed at divergent angles to provide a V-shaped trough which serves to guide the yarn into the slit between the two members. Placed in front of the plates d, d is a roll or guide H over which the yarn leads as it draws through the slit d'.

Referring again to the two tension-members T, T′, the outer ends of the cross-bars t^7, t^7 are connected by upright pieces t^8, made integral with the main plates and bent at an angle thereto, as shown more clearly in Fig. 2. When the members T, T′ are assembled on the bracket B their flaring sides or upright portions t^8, t^8 will set at substantially right-angles to each other so as to form a trough-like opening for directing and leading the yarn y in place between the bars t^7. At the bottom of the movable tension-member T is a finger t^9 which is bent back on itself at t^{10} forming a curved cross-piece t^{11}. When the two tension-members are assembled in operative relation with their cross-bars bearing on the yarn y, as shown in Fig. 2, the finger t^9 lies across the lower edges of the members to prevent the yarn from whipping out of place. When the movable member T is swung away from the fixed member T′, as shown in Fig. 1, the elbow-like end of the finger t^9 will be carried out away from the lower cross-bar t^7 on the member T′ to allow the entrance of the yarn between the two members.

The means for swinging the movable tension-member away from the fixed member in threading the yarn therebetween constitutes the essential feature of the present invention and will next be described. It consists simply of a wedge-shaped, wing-like projection T^2 on the outer edge of the tension-member T adapted to be engaged by the operator's finger F, as shown by the dotted lines in Fig. 1. This engagement takes place during the normal operation of drawing the yarn up through the guide G, so that the natural movement of the hand acts to open the tension-device without conscious effort on the part of the operator. The projection T^2 may be formed integral with the member T or may be made separate therefrom and attached by rivets, solder or in any other suitable manner. Preferably, its outer edge t^{12} is curled or rolled over to provide a smooth, front surface on which the finger bears, and its upper corner is rounded off and continued in the rounded top-edge t^{13}.

The method of operation of the complete device is as follows:

The supply-cop or spool, not here shown, from which the yarn is delivered to the winding machine or other apparatus, is located below the tension-device in line with the crotch g of the guide G. The most convenient and natural way of threading the yarn into the device is for the operator to grasp the end between the thumb and forefinger, letting the free length pass back of the other fingers as illustrated in Fig. 1. The hand is then drawn up in front of the guide G and along the front edges of the tension-members T, T′, then over the guide G and slub-catcher D, and thence the yarn passes through suitable guides, not here shown, to the winding-spindle or other part of the machine to which it is to be supplied. As the hand draws up in front of the plates T, T′ the yarn y will seat itself of its own accord in the crotch g of the guide G. Now, as the movement of the hand is continued the back of the forefinger F will engage the wedge-member T^2 on the plate T and sliding up the incline of its outer edge will act to swing the plate T away from the

plate T'. In other words, the natural movement made by the hand in drawing the yarn into position between the flaring edges t^8, t^8 of the tension-members T, T', will cause the finger F to be engaged with the projection T^2 on the member T to swing the latter backwardly to open up a space between it and the fixed tension T'. During this opening movement of the movable member T its finger t^9 will be swung clear of the lower cross-bar t^7 on the member T' so that the yarn will have free access to its place between the two members. Now, since the tension-members are set at an angle to the perpendicular, as previously described, the hand in passing over the top of the device to seat the yarn in the slub-catcher D will naturally draw the yarn well in between the opposed faces of the cross-bar t^7 so that there is no possibility of the device being improperly threaded. When the yarn is taken up by the draft of the winding-spindle, or other machine element to which it is being supplied, it will be drawn taut in a straight line between the crotch g of the guide G and the outer face of the roll or guide H. The yarn is thus maintained in position crossing the bars t^7 substantially midway of their ends and the weights W acting through the cord c and arm t^4 serve to swing the movable tension-member T toward the fixed member T' to apply a pressure which sinuates the course of the yarn over the cross-bars and thus applies resistance to its draft.

It will be seen that our improvement provides a very simple and efficient means for opening the tension-device which can be operated automatically from the natural or normal movement of the hand in drawing the yarn up into place, and without conscious effort on the operator's part. The operator is simply instructed to draw the yarn up between the tension-members in the easiest and most convenient way, and during this operation the hand will invariably strike against the opener-device and swing the movable tension-member back so that the yarn will fall into place of its own accord. In this way there is no danger of the yarn catching on obstructions or being otherwise prevented from entering between the tension-members, so that improper threading of the device is well nigh impossible. It will also be observed that only one hand is required to thread the yarn into place while in some devices of this sort it is necessary to use both hands. This improvement allows the use of the other hand for drawing out the end in piecing or tying up after a yarn has broken and consequently this work can be done much more expeditiously so that a considerable saving is made in the operation of the whole machine, whereby its rate of production is materially increased. Furthermore, the product of the machine will be greatly improved in many instances because a uniform and constant tension on the yarn is insured without defects from lack of tension due to improper threading. In many cases carelessness on the part of the operator will result in the yarn not being properly drawn into the tension-device and hence either no tension at all will be applied thereto or else the yarn will catch on some protruding part and be strained or broken. As before stated, with the present arrangement it is practically impossible for the operator to fail to thread the device properly and hence a considerable saving is made in time and also in material on account of the elimination of waste.

We are aware that it has previously been proposed to provide means for mechanically opening a tension-device to insure the proper threading of the yarn therein. Heretofore, however, such arrangements have usually been operated from a moving member of the machine to which the device is attached and this entails the use of more or less complicated and expensive mechanism. The importance of having the tension-members opened to receive the yarn in threading up the machine can be seen from the fact that these complicated devices have previously been experimented with, and the benefit of the present improvement will be all the more apparent when it is realized how simple and efficient the new arrangement is.

In some tension-devices both tension-members are adapted to be moved to press upon the yarn, and with such a form of construction each member could be provided with the opening-device T^2. It is obvious, also, that other modifications might be made in the form and arrangement of the parts of the complete device without departing from the spirit or scope of the invention; therefore, without limiting ourselves to the exact construction shown and described,

What we claim is:—

1. In a tension-device for applying tension to a traveling yarn, the combination of two members arranged to press upon the yarn running between them, with a projection on one of said members formed with an inclined face adapted to be engaged by the operator's hand during the movement made in drawing the yarn up between the members so that said member will be forced away from the other member to allow free entrance of the yarn therebetween.

2. In a tension-device, the combination of two members, one fixed and the other hinged to swing toward and away therefrom, said hinged member provided with a projection on its outer edge having an inclined face adapted to be engaged by the operator's hand during the movement made thereby in drawing the yarn up between the members

to force the hinged member back from the fixed member to allow free entrance of the yarn therebetween.

3. In a tension-device, the combination with a fixed member, of a movable member arranged in opposition thereto and adapted to press upon the yarn as it draws between the two members, said movable member having a triangular finger-piece with an inclined face adapted to be engaged by the operator's hand in drawing the yarn up between the members to force said movable member away from the fixed member and allow free entrance of the yarn therebetween.

4. In a tension-device, the combination with two members arranged opposite each other, of means to press said members together to apply tension to the yarn as it draws between them, with one or each of said members having a wedge-shaped projection on its outer edge adapted to be engaged by the operator's hand during the movement made thereby in drawing the yarn up between the members to force said members apart and allow free entrance of the yarn therebetween.

5. In a tension-device, the combination with two grid-like plates formed with parallel bars across which the yarn draws, of means to press one plate toward the other to sinuate the course of the yarn as it passes over the bars, with one or each of the plates having a projection on its outer edge formed with an inclined face adapted to be engaged by the operator's hand to force the plates apart to facilitate threading the yarn therebetween.

6. In a tension-device, the combination with two plates arranged with their opposed faces bearing on the yarn running between them, of means to press said plates against the yarn to apply tension thereto, the edges of the plates being flared outwardly to provide a trough-like entrance for the yarn, and one or each of said edges formed with an upwardly inclined projection adapted to be engaged by the operator's hand to force the plates apart to facilitate threading the yarn therebetween.

7. In a tension-device, the combination with a bracket, of a tension-member held fixedly on said bracket, a second tension-member hinged on the bracket to swing toward and away from the fixed member, means acting to yieldingly press the hinged member toward the fixed member, and said hinged member formed with an upwardly inclined face on its outer edge adapted to be engaged by the operator's hand in drawing the yarn up in front of the members to carry the hinged member back into open position.

In testimony whereof we affix our signatures in presence of two witnesses.

FESTUS S. RAND.
GEORGE N. TAYLOR.

Witnesses:
ARTHUR A. ARMINGTON,
HERBERT K. ALLARD.