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STRAND TENSIONING DEVICE

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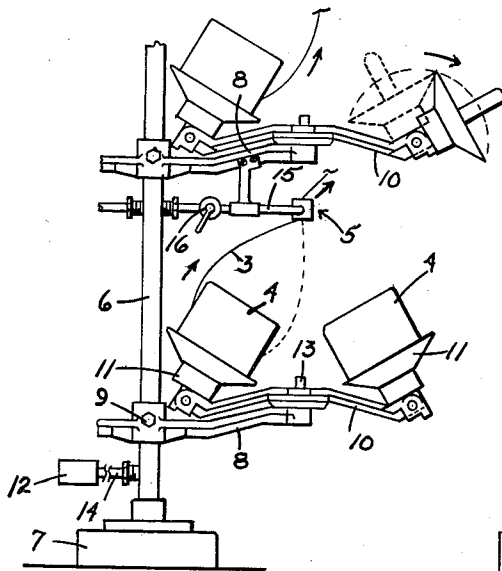


Fig. 1

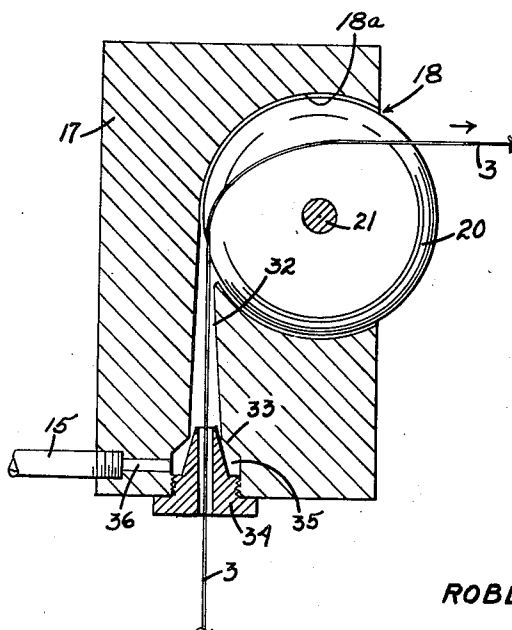


Fig. 3

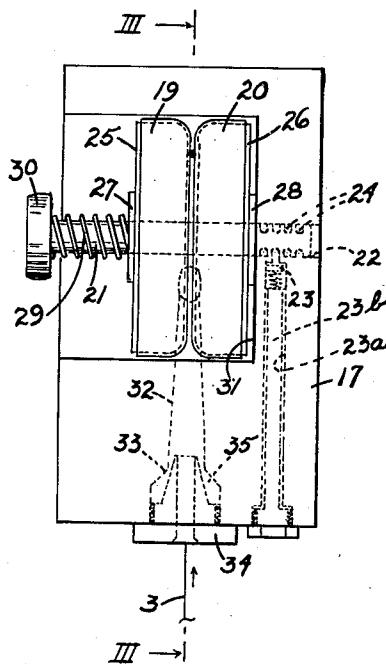


Fig. 2

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STRAND TENSIONING DEVICE

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The present invention relates to a novel and improved strand tensioning device and more particularly to a novel and improved self-threading, self-cleaning tensioning device for a continuously moving filamentary material or the like.

In the textile art the various filamentary processing operations oftentimes require the application of controlled amounts of tension upon a continuously traveling yarn or strand. Thus, for example, in the preparation of a warp beam or the like, tension is applied to each of the component strands or ends of the warp between its associated creel package and the beaming apparatus to facilitate maintenance of the parallel arrangement or array of the warp. Similarly, for various other purposes, many filamentary processing operations require the application of a suitable amount of tension upon the continuously traveling yarn.

Although various types of tensioning devices have been employed in the past, considerable difficulty has been experienced in minimizing the collection of lint and other foreign matter adjacent the opposed strand engaging and tensioning surfaces of the same. Moreover much difficulty has been experienced in the past in threading tensioning devices which have heretofore been conventionally employed in the art.

It is a principal object of the present invention to provide a novel and improved strand tensioning device wherein the collection of lint and other foreign matter between the opposed tensioning surfaces is effectively minimized.

It is a further object of the present invention to provide a novel and improved strand tensioning device which is easily and readily laced or threaded.

Other objects and advantages of the present invention will be apparent from the following description.

In the drawing which is illustrative of the invention,

Figure 1 is a fragmentary elevational view of a creel with which the novel and improved tensioning device of the present invention might be employed;

Figure 2 is an enlarged end view of the novel and improved tensioning device of the present invention; and

Figure 3 is a section on reference line III—III in Figure 2.

In general, the improved tensioning device of the present invention comprises a body member with a cavity having a curvilinear surface formed

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therein, a pair of opposed strand engaging members rotatably mounted in the cavity, and a strand accommodating passage or channel which extends inwardly from one face of the body member to a point on the periphery of the cavity such that the strand in passing therefrom between the strand engaging members will cause a limited rotation thereof. It has been found that a tensioning device which is designed in such a manner exhibits self-cleaning properties during the unique lacing operation as well as during the normal strand tensioning operation.

A preferred embodiment of the improved tensioning device of the present invention as it might be employed to control the delivery of a given strand or end of yarn from a conventional creel package is shown in Figure 1 of the drawing. As illustrated therein, the strand or end 3 progresses upwardly from its associated creel package 4 through the tensioning device, which is generally designated by the reference character 5, toward any suitable warp beaming apparatus or the like not shown on the drawing.

The creel frame, a portion of which is shown in Figure 1 of the drawing, preferably includes the tubular rod or post 6, which is maintained generally in an upright position by the base member 7, and the horizontally disposed bracket members 8 which are adjustably secured to the post 6 by the set screws 9. The turntable members 10 which pivotally support the yarn package holders 11 and the associated yarn packages 4 at opposite ends thereof are themselves pivotally mounted upon the vertically disposed pin members 13 which extend upwardly from the extremity of the bracket member 8.

The interior of the tubular rod or post 6 is preferably connected by means of the pipe or conduit 14 to any suitable pressurized source of gas 12 such as air or the like. The horizontally disposed pipes or tubings 15, one of which is suitably positioned above each of the turntable members 10 are also connected with the interior of the rod or post 6 through the associated valve 16. In this way, when it is so desired, controlled amounts of pressurized gas may be delivered to the tensioning devices which are secured to the extremity of each pipe or tubing 15 in a manner which is disclosed more fully hereinafter.

A preferred embodiment of the improved tensioning device of the present invention is shown in Figures 2 and 3 of the drawing. As illustrated therein, the body member 17 of the tensioning device is preferably threadedly supported on the end of the pressurized gas supply pipe or tubing

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15. The cavity or notch 18 with the curvilinear surface 18a formed in one edge of the body member 17 acts as a shroud for the opposed strand-engaging disc members 19 and 20 which are rotatably mounted therein on the stud-like member 21. The shank of the stud-like member extends through the aperture 22 in the body member 17 and is adjustably positioned therein by the upwardly biased latching mechanism 23 which engages the spaced annular notches 24 adjacent the end of the stud-like member which is positioned in the aperture 23a by the elongated stud 23b.

The strand-engaging disc members 19 and 20 are preferably cup-shaped as shown in Figure 2 of the drawing so as to accommodate the resilient pads 25 and 26 which may be constructed of any suitable material such as felt or the like. In this way, as will be more apparent hereinafter, the rotation of the strand-engaging disc members 19 and 20 on the stud-like member 21 is slightly but appreciably resisted and a material amount of tension upon the strand 3 which passes between the disc members is insured. The pads 25 and 26 preferably protrude slightly from the cup-shaped disc members 19 and 20 as shown and contact the washers 27 and 28 which are also axially mounted on the shank of the stud-like member. The washers 27 and 28 may be formed from any suitable type of material and/or the washer 28 may be eliminated to control the manner in which the disc members 19 and 20 rotate about the stud-like member 21 during the tensioning operation. The spiral spring 29 or the like which is positioned on the stud-like member between its knob-like portion 30 and the washer 27 normally biases each of the disc members on the stud-like member toward the inner wall 31 of the cavity such that a suitable amount of tension may be exerted upon the strand as it passes between the disc members.

As shown in Figure 3 of the drawing, the channel or passage 32 extends preferably substantially tangentially as shown from a point on the cavity downwardly through the bottom of the tensioning device. The lower portion of the passage 32 preferably flares outwardly as at 33 and is suitably threaded at its extremity to engage the complementary threads of the centrally apertured frusto-conical cap or plug 34 through which the strand 3 passes upwardly from its package 4 toward the opposed disc members 19 and 20.

The upper portion of the plug 34 and the adjacent flared portion of the passage 32 are preferably contoured to provide therebetween the annular region 35 to which the pressure supply of air or the like in the pipe 15 is delivered through the connecting passageway 35. As will be explained more fully hereinafter, in order to properly thread the tensioning device of the present invention, the passageway 33 is adapted to join the annular region 35 adjacent a lower portion thereof as shown such that the supply of air or the like delivered thereto is directed upwardly past the centrally located aperture in the plug 34 and through the passage 32.

In operation, the strand 3 which is to be tensioned in accordance with the present invention normally progresses upwardly from the yarn storage package 4 through the centrally located aperture in the plug 34, through the passage or channel 32 in the body member of the tensioning device, between the contiguous strand-engaging disc members 19 and 20 and toward any suitable subsequent handling or treating appa-

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ratus not shown on the drawing. As the strand contacts the edge of each of the disc members and passes therebetween, a suitable amount of torque is developed which causes the disc members to turn slowly on the stud member 21 whereby undue collection of lint and other foreign matter between the discs is effectively prevented. By varying the position of the stud member in the aperture 22 and thereby causing the latching mechanism 23 to engage the various annular notches 24, predetermined amounts of tension are readily applied to the continuously moving strand as it passes between the disc members.

When it is desired to thread the tensioning devices of the present invention it is merely necessary to insert an end of the strand 2 into the centrally located aperture in the plug 34 and to open the valve 16 in the pipe 15. As the blast of air rushes upwardly from the annular region 35 through the chamber 32, the strand is drawn upwardly through the aperture in the plug 34 by the Bernoulli effect and is thereafter carried upwardly with the air blast through the chamber and out from the cavity 18 in the body member. Thereafter the strand may be properly delivered to the subsequent handling or processing apparatus in any convenient manner.

It is to be pointed out that each blast of air or the like which is supplied to the device also tends to turn or rotate and separate the strand-engaging disc members on the stud member 21 and thereby further insures removal of lint and other foreign matter from between the disc members.

Though not shown on the drawing, it is to be understood that any conventional indicia or the like could be suitably placed on the shank of the stud member 21 to clearly indicate which of the annular notches 24 is engaged by the latching member 23 and thus the relative amount of tension which is applied to the strand 3 without departing from the spirit or scope of the present invention.

While preferred embodiments of the invention have been disclosed, the description is intended to be illustrative only and it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. A strand tensioning device comprising a body member with a cavity formed therein; a portion of the cavity being curvilinear; a pair of opposed strand-engaging members rotatably mounted in the cavity; a channel in the body member which extends substantially tangentially from the curvilinear portion of the cavity and passes through the body member; and means for directing a gaseous medium through the channel.

2. A strand tensioning device comprising a body member with a cavity formed therein; a portion of the cavity being curvilinear; a pair of opposed strand-engaging members rotatably mounted in the cavity; a passage in the body member which extends from one face thereof to a point on the curvilinear portion of the cavity; and means for directing a gaseous medium through the channel.

3. A strand tensioning device comprising a body member with a cavity formed therein; a portion of the cavity being curvilinear; a pair of opposed strand-engaging members rotatably mounted in the cavity; a passage in the body member which extends from one face thereof to a point on the curvilinear portion of the cavity; a centrally apertured plug which extends from the said face

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of the body member into the passage; and means for delivering a gaseous medium to the passage adjacent the base of the plug.

4. A strand tensioning device comprising a body member with a cavity formed therein; a portion of the cavity being curvilinear; a pair of opposed strand-engaging members rotatably mounted in the cavity; a passage in the body member which extends from one face thereof to a point on the curvilinear portion of the cavity; the outer extremity of the passage being enlarged; a frusto-conical centrally apertured plug which extends into the enlarged extremity of the passage; and means for delivering a gaseous medium to the enlarged extremity of the passage adjacent the base of the frusto-conical plug.

5. A strand tensioning device comprising a body member with a cavity formed therein; a portion of the cavity being curvilinear; a pair of opposed strand-engaging members rotatably mounted in the cavity; a passage in the body member which extends from one face thereof to a point on the curvilinear portion of the cavity; the outer extremity of the passage being enlarged; a frusto-conical centrally apertured plug which extends into the enlarged outer extremity of the passage; a pressurized source of a gaseous medium; and a conduit which connects the pressurized gaseous source with the enlarged extremity of the passage adjacent the base of the frusto-conical plug.

6. A strand tensioning device comprising a body member with a cavity formed therein; a portion of the cavity being curvilinear; a pair of opposed strand-engaging members rotatably mounted in the cavity; a passage in the body member which extends from one face thereof to a point on the curvilinear portion of the cavity; the extremity of the passage being enlarged; a frusto-conical centrally apertured plug which extends into the enlarged extremity of the passage; a pressurized source of a gaseous medium; and means for controlling the delivery of the gaseous medium to the passage.

7. A strand tensioning device comprising a body member with a cavity formed in the front face thereof; a portion of the cavity being curvilinear; an aperture which extends between the cavity and a lateral face of the body member; a stud-like member; means for adjustably positioning the

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stud-like member in the aperture; a pair of strand-engaging members rotatably mounted on the stud-like member; a channel in the body member which extends from the curvilinear portion of the cavity through the body member; and means for directing a gaseous medium through the channel.

8. A strand tensioning device comprising a body member with a U-shaped cavity formed in the front face thereof; an aperture which extends between the cavity and a lateral face of the body member; a stud-like member with a plurality of spaced annular notches formed adjacent one extremity thereof; latching means which cooperates with the annular notches to adjustably position the stud-like member in the aperture; a pair of strand engaging discs rotatably mounted on the stud-like member; means for biasing the strand engaging discs toward one another; a channel formed in the body member which extends substantially tangentially from the curvilinear surface of the U-shaped cavity and passes through the body member, the extremity of the channel being enlarged; a frusto-conical centrally apertured plug which extends into the enlarged extremity of the channel; and means for delivering a gaseous medium to the enlarged extremity of the channel adjacent the base of the frusto-conical plug.

9. A strand tensioning device comprising a body member with a cavity formed therein, a pair of opposed strand-engaging members rotatably mounted in the cavity, a strand conduit for directing a strand to the strand-engaging members, and means for directing a gaseous medium through said conduit.

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