June 12, 1951 S. C. NELSON 2,556,291

APPARATUS FOR TENSIONING RUNNING STRANDS

Filed Sept. 27, 1946

Fig. 1

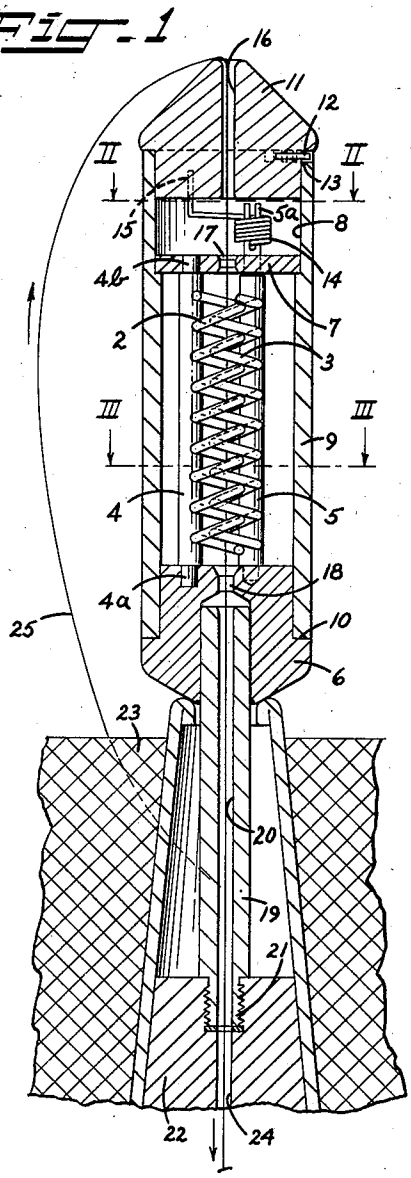
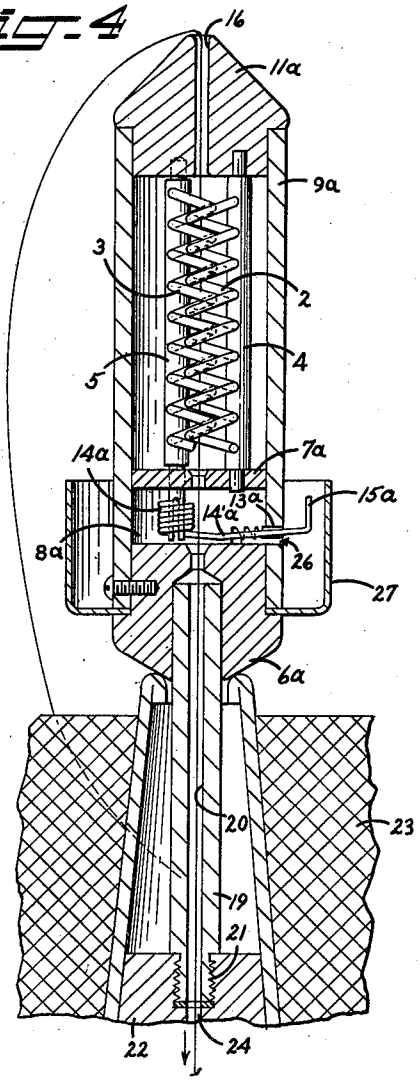


Fig. 4



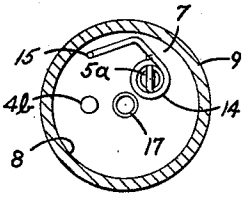


Fig. 2

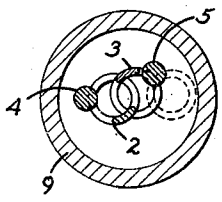


Fig. 3

INVENTOR.
SEDDON C. NELSON
BY
Thomas R. O'Malley

Patented June 12, 1951 2,556,291

UNITED STATES PATENT OFFICE

2,556,291

APPARATUS FOR TENSIONING RUNNING STRANDS

Seddon C. Nelson, Front Royal, Va., assignor to American Viscose Corporation, Wilmington, Del., a corporation of Delaware

Application September 27, 1946, Serial No. 699,734

3 Claims. (Cl. 242—153)

1

This invention relates to tension devices and is particularly concerned with an improved tension device of simple compact form comprising a pair of helical coils mounted on approximately parallel axes for relative translatory movement in a direction transverse of their axes to and from interdigitating positions.

In the drawing illustrative of the invention,

Figure 1 is a longitudinal transverse cross-section of one embodiment of the invention,

Figure 2 is a section on line II—II of Figure 1,

Figure 3 is a section on line III—III of Figure 1, and

Figure 4 is a longitudinal section through a modification.

With reference to the embodiment of Figures 1 to 3, the tension device comprises a helical coil 2 and a similar helix 3 carried on rods 4 and 5 respectively. The mounting is such as to allow relative translatory movement between the coils from the interleaved or interdigitating position shown in Figures 1 and 3 to the offset position shown in dotted lines in Figure 3.

The coil 2 comprises a plurality of convolutions spaced apart sufficiently to accommodate at least partial entrance of the convolutions of coil 3 into the overlapping or interdigitating position shown in solid lines in Figures 1 and 3. The coils 2 and 3 are secured at one or more points to the supporting rods 4 and 5 respectively. When the coils are of a rigid material, securement to the rod at one or two points, such as at the two end convolutions, is adequate, but if they are of an easily flexed resilient material, it is preferable to secure each convolution to the rod, as by soldering, welding, or cementing. As specifically shown each convolution may be received in a recess or groove in the rod to make the unit more compact.

Rod 4 is secured fixedly such as by press fitting its end 4*a* into a bore within a base 6. The other end 4*b* may likewise be secured in a bore in a plate 7 which may be cylindrical and fit within a recess 8 in a housing 9 of tubular or sleeve-like construction whose other end fits upon a shoulder 10 of the base 6.

Rod 5 is rotatably mounted in suitable bores in base 6 and plate 7, and has a bifurcate end 5*a* projecting into recess 8 beyond plate 7. A cap or bonnet 11 fits rotatably within the end of recess 8 and has a detent pin 12 projecting laterally therefrom to engage a selected one of a plurality of notches 13 provided in the adjacent rim of the sleeve 9. A spring 14 is coiled about the end 5*a* of rod 5 and has one end projecting

2

through the slit between the prongs of 5*a* and the other end projecting away from the coil to a position of securement at 15, as by embedding the bent portion of the end into the bonnet.

The bonnet 11, plate 7, and base 6 are provided with bores 16, 17 and 18 respectively, to provide for passage of the yarn through the device. This is necessary in the specific embodiment shown in which the housing, bonnet, and base enclose the device entirely, though it is obvious that such enclosure is not necessary in all situations. Such enclosure is advantageous when the device is used in a multiple-twist type of twister in which case it is provided with a stem 19 having a bore 20 aligned with bores 16, 17 and 18 and with the passages of the fixed coil 2. The stem 19 is detachably secured, as by a screw thread 21 to the holder 22 receiving the package 23. The holder 22 has an aligned bore 24 and the strand 25 proceeds from the package through bores 16, 17, through the convolutions of the coils 2 and 3, bores 18, 20 and 24 on its way to the ultimate collecting position. This conventional form of twister may be of the specific form shown in my co-pending application Serial No. 580,409, filed March 1, 1945 now Patent 2,442,775, dated June 8, 1948.

For lacing up the device, the operator lists bonnet 11 to move pin 12 out of engagement with notches 13 and turns the bonnet clockwise to bring the coil 3 into the interdigitating solid line position of Figure 3. This provides a free and open longitudinal passage of considerable cross-sectional area common to both coils to facilitate the first introduction of the thread, through the tension device, as by a hook. After lacing up, the operator turns bonnet 11, counterclockwise until the convolutions of coil 3 are displaced to the desired extent from the convolutions of coil 2, thus providing a tortuous or sinuous path of the strand over the alternate convolutions of the two coils. The desired relative position of the coils is set by inserting pin 12 into the nearest appropriate notch 13. During operation, it will be observed that spring 14 resiliently opposes movement of coil 3 in either direction. Such movement is possible, however, and serves to compensate for sudden rises in tension caused by momentary resistances to withdrawal from the package.

In Figure 4 there is shown a modification in which the coils 2 and 3 are carried by rods 4 and 5 respectively. Rod 4 is fixedly secured in bores in bonnet 11*a* and plate 7*a* so that the passage through the convolutions of coil 2 is in align-

ment with the bores 16 (in the bonnet) and 17a (in plate 7a). Rod 5 is rotatably mounted in bores in bonnet 11a and plate 7a and has its bifurcate end 5a projecting into a recess or chamber 8a between the plate 7a and base 6a. The sleeve 9a encloses the tension unit except for a slot 26 extending partially around the periphery adjacent the base 6a and provided with notches 13a.

The coil spring 14a surrounding the prongs 5a has one end extending therebetween and the other end 14a' projecting through the slot 26. This latter end 14a' serves as a lever and is provided with a bent end 15a to facilitate manipulation thereof externally of the housing 9a. A cup-shaped shroud or skirt 27 may be secured to the base 6a to surround the projection 15a to prevent any possible entanglement of the strand thereon.

The remaining elements are the same as described in connection with Figures 1 and 3. The operation is similar to that in Figure 3 except that instead of manipulating the bonnet 11a, the operator presses 15a downwardly to disengage the lever 14a from notches 13a and swings it counterclockwise (when looking from the top of Figure 4) to bring coil 3 into interdigitating position for lacing. After lacing, the operator swings 15a clockwise to displace coil 3 from coil 2 and then sets the lever 14a' in the desired notch 13a. The lever 14a' is normally biassed by spring 14a into engagement with the notches 13a.

The present invention provides a compact tension device which is particularly useful in situations, such as illustrated hereinabove, where a relatively long but narrow space is available. Its use is possible in such situations by virtue of the fact that its adjustment consists of a translatory relative movement of the coils in all positions of which their axes are substantially parallel, such movement preferably being such that each individual point in such coils as move lies at all times in a flat plane at right angles to the axes of the coils. Such translatory adjustment has another important advantage, viz., that each convolution exerts substantially the same tensioning effect as each other of the coil. This not only avoids excessive friction against the strand by a few convolutions (as is the case when one of the coils swings about an axis at one end at right angles to the axis of the helix) but distributes the wear uniformly among the several convolutions. This provides a more durable strand and a more lasting tension device.

The coils may be made of any desired material, e. g., spring steel, rigid or flexible, extruded plastics, such as vinyl resins, polyvinylidene chloride, urea-formaldehyde or phenol-formaldehyde resins, cellulose acetate, nylon, etc. Both coils 2 and 3 may be right-hand coils or they may be left-hand coils. However, in the preferred embodiments specifically shown one is right-hand (coil 2) and the other is left-hand (coil 3). The latter system provides the most uniform spacing between the adjacent convolutions of the two coils and allows the greatest number of convolutions in a given length of tension device.

It is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A tension device comprising two helical coils each having spaced convolutions, means for mounting the coils for relative movement comprising two relatively movable parallel supporting rods one for each coil, each convolution of each coil being fixedly secured to its respective rod with the axis of the coil substantially parallel to the rod.

2. A tension device comprising two helical coils each having spaced convolutions, a housing surrounding the coils, parallel supporting rods one for each coil, a plurality of convolutions of each coil being fixedly secured to its respective rod with the axis of the coil substantially parallel to the rod, one of said rods being fixed, the other being rotatably mounted on its axis extending longitudinally of the rod, adjusting means comprising a manipulative member extending outside the housing for rotating the latter rod about its axis to move the coil secured thereto to a predetermined position relative to the fixed coil, and resilient means connecting and secured to the manipulative member and the rotatably mounted rod for opposing while permitting rotation of the movable coil from said predetermined relative position.

3. A tension device comprising two helical coils, each having spaced convolutions, a housing surrounding the coils, parallel supporting rods one for each coil, a plurality of convolutions of each coil being secured to its respective rod with the axis of the coil substantially parallel to the rod, one of said rods being fixed, the other being rotatably mounted on its axis, adjusting means comprising a manipulative member outside the housing for rotating the latter rod about its axis to move the coil secured thereto to a predetermined position relative to the fixed coil, and a spring attached to the rotatable rod and having a lever extension thereof extending through the housing and terminating in the manipulative member for opposing while permitting rotation of the movable coil from said predetermined relative position.

SEDDON C. NELSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
613,474	Richards	Nov. 1, 1898
1,064,292	Crawford	June 10, 1913
2,209,398	Garrett	July 30, 1940
2,245,490	McHale	June 10, 1941
2,397,153	Naumann	Mar. 26, 1946