Aug. 17, 1926. 1,596,095

D. H. GEHMAN

THREAD TENSION DEVICE

Filed Oct. 8, 1925

FIG. 1.

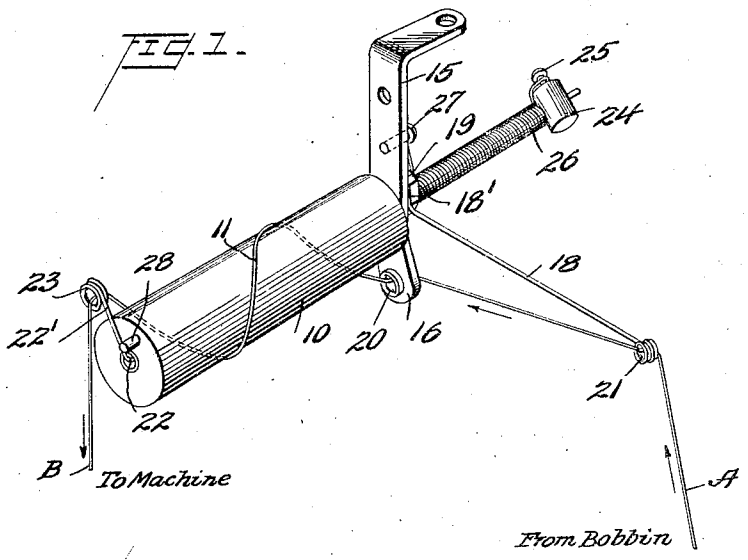


FIG. 2.

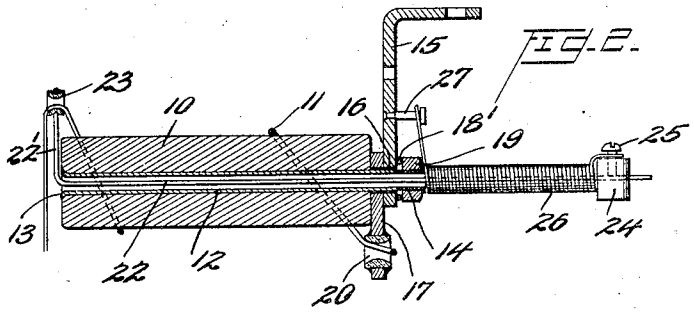


FIG. 3.

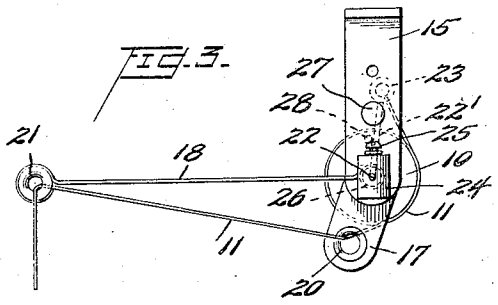
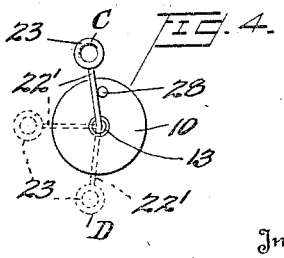


FIG. 4.



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THREAD-TENSION DEVICE.

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The present invention relates to tension devices of the type used in connection with textile machinery, particularly knitting machines.

In feeding threads from bobbins to knitting and other analogous machines it is generally customary to pass the thread over some instrumentality intermediate the bobbin and machine which opposes the movement of such thread with a slight frictional force, thereby keeping that portion of the thread intermediate such device and the machine taut.

Many tensioning devices for this purpose have heretofore been designed or suggested, but the present invention provides such a device or instrumentality which possesses a number of points of superiority over those suggested by prior inventors. In order that the invention and its advantages may be fully understood, a preferred form is herein described and illustrated in the accompanying drawings but it will be understood that this form is set forth by way of example only and that the invention contemplates modification of the design and arrangement of its component elements to suit different operating conditions.

In the drawings:

Figure 1 is a perspective view of the thread tensioning device;

Figure 2 is a vertical axial section therethrough;

Figure 3 is an elevation of the device as seen from its right end, Figure 2; and

Figure 4 is an elevation as seen from the left in Figure 2.

The device as illustrated includes a cylindrical member or drum 10, the outer surface of which is smooth and constitutes a friction surface over which the thread or yarn 11 is passed. This drum is preferably of metal, but may be of glass, composition, wood or other material. It is centrally apertured and extending thru such aperture and closely fitting therein is a tube 12, one end of which is swaged outwardly at 13 and the other end of which projects from the drum and is provided with threads 14 on its outer surface. The tube fits tightly within the central aperture of drum 10, so that the drum is not rotatable relatively thereto.

A bracket member 15, by means of which the tensioning device may be supported upon a knitting or similar machine, has an aperture 16 which receives the tube 12 and a short member or arm 17 is likewise mounted upon tube 12 and extends therefrom radially outward in a direction substantially diametrically opposite that in which the bracket 15 extends. An arm 18, conveniently formed of relatively stiff wire, also has its inner end encircling tube 12 as shown at 18′, this arm being disposed at substantially 90° to bracket 15 and to arm 17. A clamping nut 19 threaded on the threads 14 of tube 12 holds the arms 17, 18 and bracket 15 against rotation on the tube 12 by clamping these members against the end of the drum 10. The arms 17 and 18 are provided with suitable thread guides 20 and 21, respectively, these guides being formed of glass or other suitable material.

Extending thru tube 12 and projecting from the ends thereof is a rod 22. Both ends of this rod extend beyond the ends of the drum 10 and the end 22′ thereof is turned radially and is provided with a thread guide 23. The opposite end of rod 22 extends axially of the drum and tube 12 and supports an adjustable spring abutment 24. Member 24 is provided with an aperture thru which rod 22 extends and is rotatable relatively to rod 22, except when frictionally held against such rotation by set screw 25. A light coiled spring 26 having a large number of turns has one end secured to set screw 25 and the opposite end of this spring encircles a stud 27 secured to the bracket 15. A stop pin 28 is secured to the outer end of drum 10 and spring 26 is so adjusted as to exert a force on rod 22 which tends to keep the radial arm 22′ thereof in constant engagement with stop pin 28. By loosening the set screw 25 and rotating the spring abutment 24 on rod 22, arm 22′ may be caused to bear against stop 28 with varying degrees of pressure

The tensioning device may be positioned in various ways depending upon the machine to which it is applied. In Figure 1 it is shown as it would be conveniently applied to a knitting machine such as one for knitting stockings. The direction of movement of the thread is indicated by the arrows and the end A of the thread stretches to a bobbin from which the thread is being unwound, while the end B extends downwardly to the machine. The machine, of course, exerts a pull on the end B of the thread and draws it continually, while the machine is in operation, thru the

three thread guides 20, 21 and 23 and around the drum 10. The device, therefore, frictionally opposes movement of the thread to the machine, the principal frictional force being that between the thread and drum 10. The surface of this drum is smooth, altho not necessarily highly polished, and opposes movement of the thread without in any way obstructing the passage of knots or irregularities of the thread itself. A knot passing thru the device will simply cause a slight downward rocking movement of the arm 22′ of rod 22, against the action of the spring 26, as it passes the thread guide 23 but the frictional force with which movement of the thread is opposed is not increased or decreased to any noticeable extent by knots or irregularities in the thread or unevenness of any usual character.

It will be obvious that the frictional force which opposes the free movement of the thread is proportional to the area of contact between the thread and the drum 10. By adjusting the spring abutment 24, therefore, and positioning the arm 22′ in various positions, as shown in Figure 4, the amount of friction may be regulated. Thus, with the arm 22′ in position C, Figure 4, it will be seen that the thread makes considerably more than one complete turn around drum 10, while with this arm in position D it makes considerably less than one complete turn around the drum. Any intermediate position of the arm may be selected by properly adjusting the spring abutment 24 and the position of the arm is largely determined by the character of the thread or yarn which is passing over the tensioning device.

Thus, certain yarns or threads, because of their nature, slide much more easily over the surface of drum 10 than other yarns or threads. For yarns of this character position C of arm 22 may be selected. Arm 22′ is adjusted to position D for yarns which move over the surface of drum 10 with greater difficulty. Generally it is preferred to have the spring 26 under some tension whatever the kind of thread or yarn fed to the machine, inasmuch as the spring will act, when the machine is stopped, to move arm 22′ in a clockwise direction, Figure 4, to take up any slack which may result due to the stoppage of the machine.

Without departing from the spirit and scope of my invention its various elements may be modified to suit conditions, but that form of the invention which is illustrated in the accompanying drawings and above described has proven to give eminently satisfactory results when used with knitting machines handling numerous kinds of threads and yarns, either silk, cotton, wool or mixtures of these fibres.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A tension device of the character described, comprising in combination, a member having a surface to frictionally oppose the passage of thread thereover, guiding means for directing said thread over said surface, and means for supporting said guiding means for movement about said member responsive to a change of pull on the thread for adjusting the area of sliding contact between the thread and surface.

2. A tension device of the character described, comprising in combination, a drum having a cylindrical surface to frictionally oppose the passage of thread thereover, guiding means for directing said thread over said cylindrical surface, and means for supporting said guiding means for movement about said drum responsive to a change of pull on the thread for adjusting the area of sliding contact between the thread and drum surface.

3. A tension device of the character described, comprising in combination, a drum having a cylindrical surface to frictionally oppose the passage of thread thereover, a pair of thread guides for directing said thread over said surface, and means for supporting one of said thread guides for movement about said drum responsive to a change of pull on the thread for adjusting the area of sliding contact between the thread and drum surface.

4. A tension device of the class described, comprising in combination, a drum having a cylindrical surface to frictionally oppose the passage of thread thereover, and means for decreasing the area of sliding contact between the thread and surface when the pull on the thread is increased, said means including a thread guide, a support for said thread guide movable about said drum, and a spring yieldingly opposing movement of the support in one direction.

5. A tension device of the class described, comprising in combination, a drum having a friction surface and a plurality of thread guides associated therewith, said guides being relatively movable about said drum in response to a change in the pull on the thread to vary the area of contact between the thread and drum surface.

6. A tension device of the class described, comprising in combination, a drum having an axial aperture, a rod extending thru the drum and rotatable relatively thereto said rod having an outwardly extending arm provided with a thread guide, and means yieldingly opposing rotation of said rod in one direction.

7. A tension device of the class described, comprising in combination, a drum having

a friction surface, a radially extending arm at one end of the drum adapted to swing about the axis of the drum, a thread guide on said arm, a stop for limiting the movement of the arm in one direction, and means yieldingly opposing movement of the arm in the opposite direction.

8. A tension device of the class described, comprising in combination, a drum having a friction surface, a radially extending arm at one end of the drum adapted to swing about the axis of the drum, a thread guide on said arm, a stop for limiting the movement of the arm in one direction, means yieldingly opposing movement of the arm in the opposite direction, and a thread guide at the opposite end of the drum.

9. A tension device of the class described comprising in combination, a drum having a friction surface, a radially extending arm at one end of the drum adapted to swing about the axis of the drum, a thread guide on said arm, and means yieldingly opposing movement of the arm in one direction.

10. A tension device of the class described comprising in combination, a drum having a friction surface, an arm at one end of the drum adapted to swing about the axis of the drum, a thread guide on said arm, means yieldingly opposing movement of the arm in one direction, and a thread guide at the opposite end of the drum.

In testimony whereof I hereunto affix my signature.

DAVID H. GEHMAN.