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TENSIONING DEVICE FOR THREAD WINDING MACHINES

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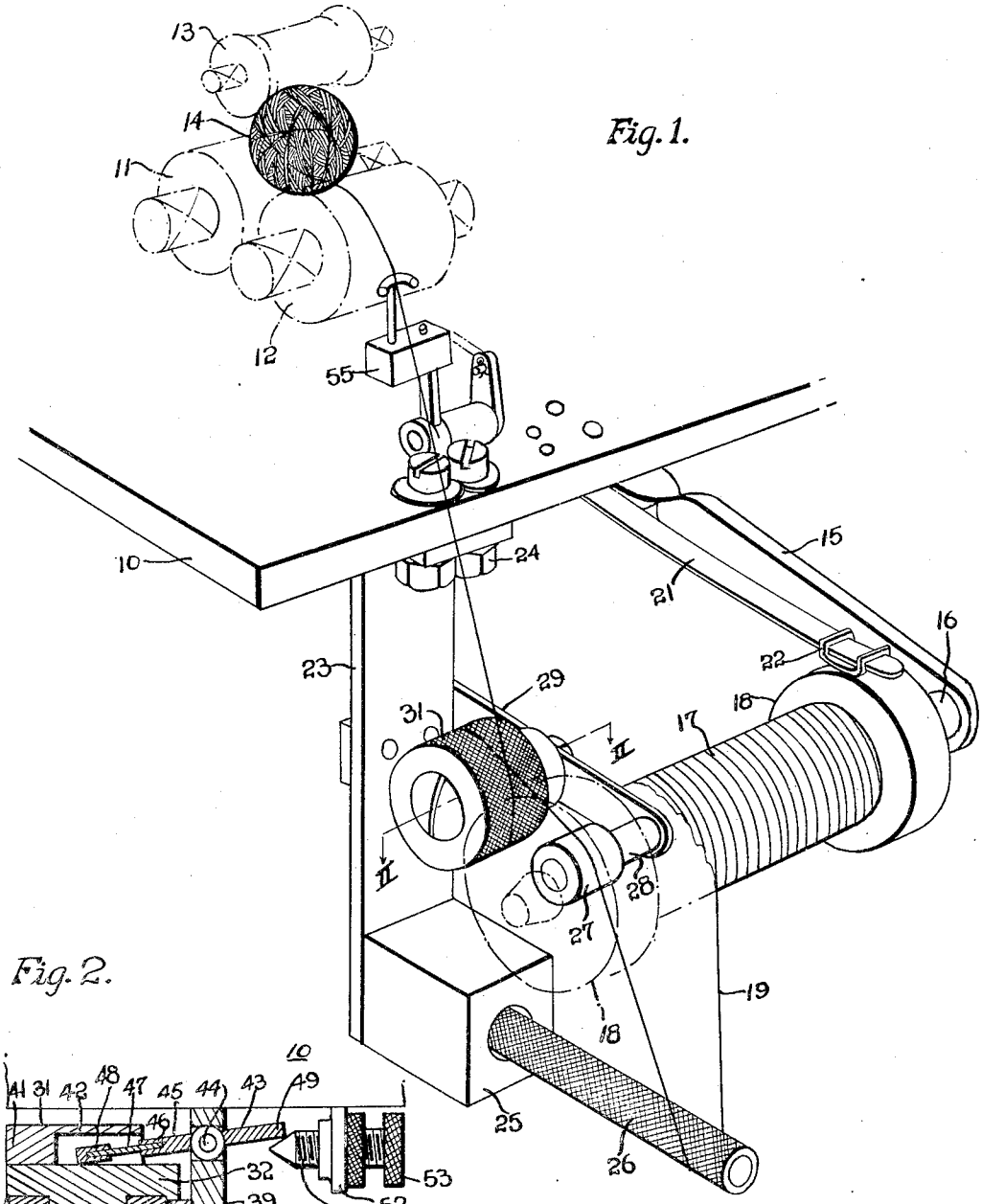
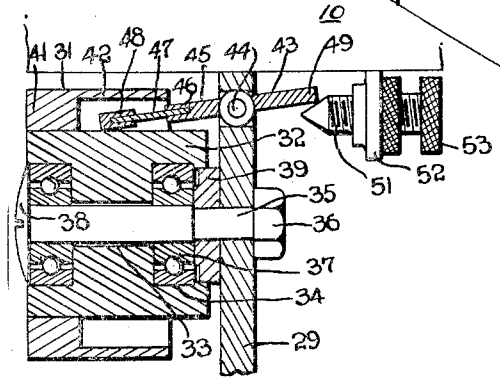


Fig. 1.

Fig. 2.



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TENSIONING DEVICE FOR THREAD-WINDING MACHINES.

Application filed August 28, 1926. Serial No. 132,101.

My invention relates to thread winding machines, and it has particular reference to a device for applying tension to the thread during the winding thereof.

The invention is particularly applicable to machines for winding golf balls, which have a body portion of rubber thread that is wound under a high degree of tension. The thread breaks occasionally, due to the high stress to which it is subjected, and, if the tensioning device does not operate properly, the breakages occur so often that satisfactory operation becomes difficult. Breakage due to the application of an excessive tensioning force is often noted upon starting the machine, when the frictional resistance is at a maximum value.

It is the primary object of the invention to provide a tensioning device that shall be efficient and satisfactory in operation, and wherein the tensioning force exerted shall be substantially uniform and independent of the speed of the ball supporting rollers. Other objects, and the advantages to be derived from a practice of the invention, will become apparent from a perusal of the following detailed description of a preferred form of tensioning device, illustrated in the accompanying drawing, wherein:

Fig. 1 is a perspective view of the device, as it appears when assembled on a winding machine, portions of which are indicated schematically; and,

Fig. 2 is a cross-sectional view of a roller, taken substantially along the line II—II of Fig. 1.

The winding machine, which is described in greater detail in the copending application of Joseph P. Griggs, Serial No. 138,714 filed Sept. 30, 1926, comprises a frame having a deck 10, upon which is rotatably mounted a plurality of ball supporting rollers 11 and 12. A pressure roller 13 is yieldably mounted above the rollers 11 and 12, and it is adapted to retain a ball core 14 in proper position for winding.

A bracket 15, secured to the deck 10, projects outwardly therefrom, and it has an axle 16 disposed at its outer end extending parallel to the rollers 11 and 12. The axle 16 serves as a support for a rotatably mounted cylindrical spool or reel 17, that preferably is provided with annular collars 18 at its ends, and upon which is wound rubber thread 19.

A brake member is provided for the spool 17, and it comprises a strip of spring steel 21, one end of which is clamped to the deck 10 adjacent the bracket 15, and the other end of which overlaps one of the collars 18. A piece of lagging 22, composed of suitable material, such as soft leather, is positioned on the end of the spring 21, and it bears against the surface of the collar 18 to increase the resistance to rotation. The lagging may be moved along the spring, and hence variations in the pressure exerted are readily attainable.

The thread 19 is led from the spool 17 over a plurality of members that are adapted to exert tension therein, and which form the essential parts of the tensioning device. These members are mounted upon a supporting bracket 23 that extends downwardly from the deck 10 to which it is secured, in approximate alignment with the rollers 11 and 12, by means of bolts 24. A block 25 projects outwardly from the lower end of the bracket 23, and in it is rotatably mounted a spindle 26, which extends at right angles to the spool 17, and which is disposed an appreciable distance below it.

It is desirable to space the spindle 26 from the spool 17, in order to obtain a greater length of thread between the spool and the ball core 14. It has been found that a uniform tension is more readily maintained with a long lead of thread. For the purpose of insuring rotation of the spindle 26 when the thread is pulled around it, the outer surface may be roughened or knurled.

The thread 19, as it moves upwardly from the spindle 26 to the core 14, passes over an idle roller 27, that is rotatably mounted on a stub shaft 28 positioned at the end of an outwardly extending bracket 29 that is secured to the bracket 23. This roller is disposed with its axis parallel to the axis of the spool 17, and the axes of the ball supporting rollers 11 and 12, and it directs the thread inwardly to a primary tensioning roller 31, that is also mounted on the bracket 29.

As shown in Fig. 2, the roller 31 comprises a cylindrical member 32 that is provided with a centrally disposed aperture 33 and annular recessed portions 34 at its ends. A stub shaft 35, which is secured to the bracket 29 by means of a nut 36, projects within the aperture 33, and on it are dis-

posed anti-friction bearings 37 that are seated also in the annular recesses 34. The shaft 35 is provided with an enlarged head 38 at its end to retain the outer bearing in proper position, and a collar 39, interposed between the bracket 29 and the end of the cylinder 32, performs a like function for the inner bearing 37.

An annular collar member 41 is firmly secured to the outer surface of the cylinder 32, and it is provided with a concentrically disposed flange portion 42, that is formed with a knurled outer surface. A brake member is inserted in the space between the cylinder 32 and the flange 42, for the purpose of increasing the rotational resistance of the freely rotatable roller 31.

The brake comprises a lever 43 that is pivotally mounted on a pin 44 which is secured to the bracket 29. The inner arm 45 of the lever 43 is formed with a slot 46 for the reception of a piece of spring steel 47, the outer end of which is covered with a piece of lagging 48, that may be made of soft leather. The opposite end 49 of the lever 43 loosely engages a tapered screw 51, that is mounted in a bracket 52 secured to the framework of the deck 10 adjacent the bracket 29, and which is provided with a knurled head 53, by means of which it may be turned readily. When the screw 53 is moved inwardly, the portion 48 of the lever 43 is forced into yielding engagement with the cylinder 32 to alter the frictional resistance to rotation of the roller 31.

The thread 19 is wrapped once around the roller 31, and it is then led over a guide member 55 to the core 14. The required tension is imparted to the thread as it is wound on the core by means of the brakes 21 and 48, which increase the resistance to rotation of the spool 17 and the roller 31. The force exerted by both brakes may be varied, and hence the tension on the thread may be controlled within reasonable limits.

It will be observed that the thread passes completely around only the roller 31, and that the rollers 26 and 27, which are employed primarily as guide rollers, offer practically no resistance to the movement of the thread. The provision of a tensioning device employing but one primary tensioning roller is particularly advantageous, because the starting resistance is but slightly greater than the running friction, and hence the frequency of thread breakage at starting is reduced to a minimum. Due to the long length of stretched thread, which is obtained by inserting the spindle 26 in the system, the tension is maintained at substantially uniform value, thus insuring a satisfactory winding.

The device, while simple in construction and operation, is highly efficient, and it may, of course, be employed on winding machines other than those primarily intended for the manufacture of golf balls. The preferred form of the invention described is to be regarded as illustrative, and only such limitations should be imposed on the scope of the invention as are set forth in the following claims.

What I claim is:

1. A tensioning device for thread winding machines comprising a support, a shaft on the support, a roller disposed in concentric relation to the shaft and supported thereon by means of anti-friction bearings, a lever pivoted on the support, means to move one end of the lever toward the periphery of the roller, and yieldable means on the lever adapted to exert pressure upon the roller.

2. A tensioning device for thread winding machines comprising a support, a roller mounted for free rotation thereon, and means to impart a frictional drag to the roller including a lever pivotally mounted adjacent the roller, a screw threaded member disposed in contact with one end of the lever, and a spring member secured to the opposite end of the lever and adapted to bear against the roller.

3. The combination with a ball winding machine of a thread tensioning device comprising a supporting member disposed on the frame of the machine, a roller rotatably mounted on the supporting member, an additional roller mounted parallel to the first named roller, and a third roller mounted below the first and second rollers with its axis disposed at right angles to the axis of the first and second named rollers.

4. The combination with a ball winding machine having a plurality of ball supporting rollers mounted in a frame, of a thread tensioning device comprising a supporting bracket positioned on the frame and extending downwardly from the ball supporting rollers, a pair of tensioning rollers rotatably mounted on the bracket with their axes disposed parallel to each other and to the axes of the ball supporting rollers, means associated with one of the rollers to impose thereon a variable resistance to rotation, and a third tensioning roller mounted upon the bracket below the ball supporting rollers and having its axis disposed at right angles thereto.

5. A thread winding machine comprising a frame, a thread spool rotatably mounted on the frame, and a frictional drag member for the spool including a resilient member extending from the frame to the periphery of the spool, and lagging positioned on the resilient member for sliding movement therealong to effect a variation in the frictional resistance of the spool to rotational forces.

6. The combination with a ball winding

machine having a frame, ball supporting rollers mounted therein, and a thread spool disposed adjacent the frame, of a tensioning device for the thread comprising an adjustable member adapted to exert a yielding force against the spool, a knurled roller mounted below the spool with its axis disposed at right angles to the axis of the spool, a pair of rollers mounted between the spool and the ball supporting rollers with their axes disposed parallel thereto, one of the rollers being knurled, and means associated with one of the rollers to impart a frictional resistance to motion of rotation.

7. A tensioning device for thread winding machines comprising a support, a roller mounted for free rotation thereon, a lever pivotally mounted with an end adjacent the roller and adjustable means carried by the support and engaging the other end of the lever to vary the pressure with which the lever engages the roller.

8. In a tensioning device for thread winding machines, a bolt, a collar on the bolt, a member rotatably mounted on the bolt between the head thereof and the collar, and a collar member formed with an internal annular recess secured on the member.

9. In a tensioning device for thread winding machines, a bolt, a collar on the bolt, a cylindrical member rotatably mounted on the bolt between the head thereof and the collar, and a collar member formed with an internal annular recess defining with the cylindrical member a brake receiving chamber secured on the cylindrical member.

10. In a tensioning device for thread winding machines, a bolt, a collar on the bolt, a member rotatably mounted on the bolt between the head thereof and the collar, and a collar member formed with an internal annular recess and an outer knurled surface secured on the member.

In witness whereof, I have hereunto signed my name.

WALTER J. ELDRIDGE.