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J. KATZ

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HARD TWIST SPINNING MACHINE

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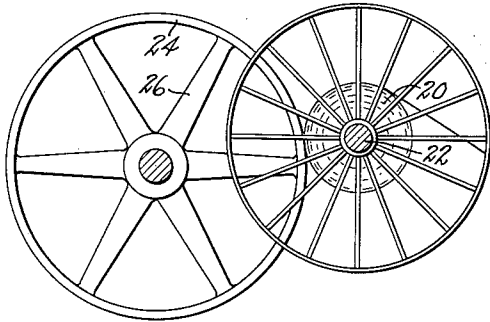


Fig. 1.

Fig. 2.

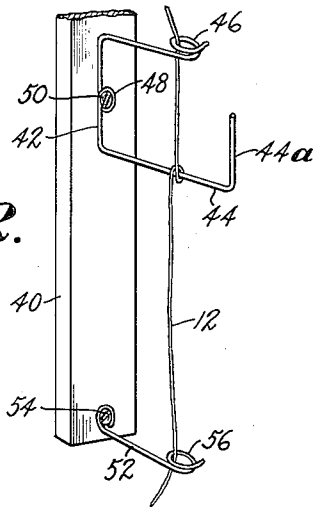
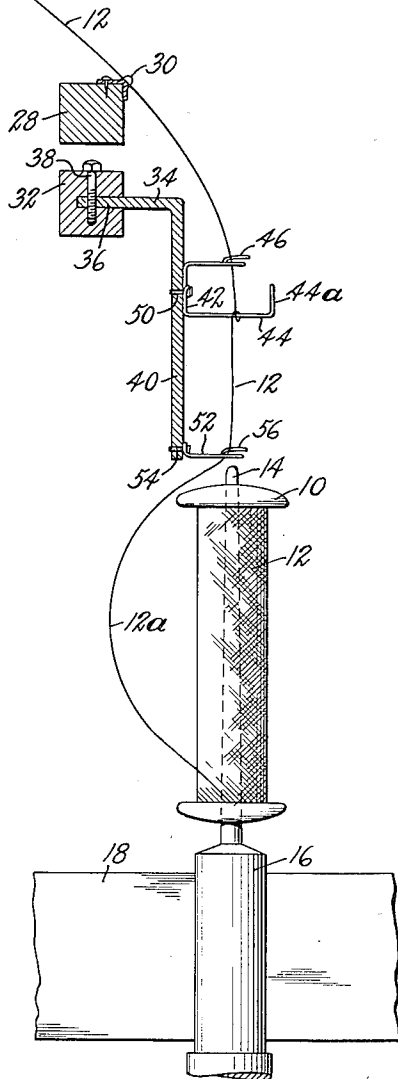
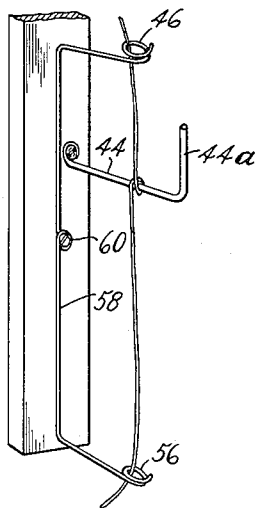


Fig. 3.



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HARD TWIST SPINNING MACHINE

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8 Claims. (Cl. 117—26)

The present invention relates to hard twist spinning machines and has for its general object the provision of improved guiding and tensioning means for providing the proper guiding and also the proper degree of tension to the thread in its passage from one bobbin to another as the hard twist is imparted to the thread by the machine.

In machines of the character to which the present invention relates, hard twisting of the thread is usually effected by winding onto a winding bobbin thread which is taken from a feed bobbin, the axis of rotation of which is angularly disposed usually at right angles, to the axis of rotation of the winding bobbin. Both the winding bobbin and the feed bobbin are mechanically driven, the speed of rotation of the bobbins with respect to each other being regulated by suitable mechanism in the machine and the relative speed of rotation of the two bobbins determining the number of twists made in the thread between the feed bobbin and the winding bobbin. Ordinarily, the thread as wound on the feed bobbin is very slightly twisted, there usually being two twists per inch of the fibers of the thread as it is on the feed bobbin. Depending upon the speed of rotation of the feed bobbin relative to the speed of the winding bobbin, the twisting of the thread is increased to a predetermined number of twists or turns per inch, which may range from ten to sixty-five or more, depending upon the character of the thread and the use for which it is intended.

In order for thread twisting apparatus of the above character to operate properly, it is necessary to guide the thread after it comes off the feed bobbin, and also to provide a certain amount of tension in the thread as it goes to the winding bobbin. For this purpose numerous tensioning devices have been previously proposed, of which the most common are the so-called "basket" type of stationary tensioning device and the so-called "flyers" adapted to be mounted so as to rotate freely on the end of the feed bobbin spindle toward which the thread is drawn by the winding bobbin. The arrangements heretofore proposed are, however, not entirely satisfactory since they are inclined to be subject to undesirable clogging from the lint, and furthermore are subject to wear of such a nature that comparatively frequent replacement of the parts is required.

It is the principal object of my invention to provide an improved form of apparatus for effecting the guiding and tensioning of the thread, which apparatus is adapted to be readily installed on existing spinning machines now in use, which is not subject to the disadvantages of the types of

apparatus heretofore employed for this purpose, and which is of such simple and inexpensive construction that when for any reason either the tensioning or guiding portion of the apparatus, or both, require replacement, such replacement can be made at substantially negligible cost.

For a better understanding of the more detailed nature of my invention and the advantages to be derived from its use, reference may be had to the following description of apparatus suitable for carrying the invention into effect and illustrated in the accompanying drawing forming a part of this specification.

In the drawing, Fig. 1 is a more or less diagrammatic view, partly in elevation and partly in section, of a portion of a hard twist spinning machine of known construction showing my invention applied thereto;

Fig. 2 is a perspective view on enlarged scale of a part of the apparatus shown in Fig. 1; and

Fig. 3 is a perspective view similar to Fig. 2 and showing another embodiment of the invention.

Referring now to Fig. 1, reference numeral 10 indicates a feed bobbin having wound thereon the thread 12 to be twisted. Bobbin 10 is detachably mounted to rotate with a vertical spindle 14 the lower portion of which is enlarged to provide a driven roller 16 which is driven by means of frictional contact with an endless belt 18. The lower end of the spindle is mounted in the usual manner in a bearing (not shown). It will be evident that other means for rotating spindle 14 may be employed, but I have shown by way of example the manner in which such spindles are driven in commercial forms of spinning machines.

The winding bobbin 20 is mounted in known manner to rotate about a horizontal axis provided by spindle 22, and in the embodiment illustrated is shown as being rotated by means of frictional contact with the rim 24 of the driving wheel 26. Rim 24 is usually covered with cork, rubber or like frictional material to provide the necessary friction drive.

A guide bar 28 mounted for reciprocating movement on an axis parallel to the axis of the spindle 22 is provided with a guiding device 30, which is ordinarily in the form of an open groove through which the thread passes on its way to the winding bobbin. This reciprocating guide bar serves to feed the thread evenly along the length of the winding bobbin. All of the structure described is of known form and arrangement.

In order to provide the desired guiding and tensioning of the thread between the feed bobbin

and the reciprocating guiding device 30, I provide, in accordance with my invention, a stationary tensioning member disposed transversely of the general line of travel of the thread between the feed bobbin and the reciprocating guide device 30. Preferably, the tension member or bar is disposed substantially at right angles to the axis about which the feed bobbin rotates. Advantageously, the tensioning member is formed of a bar or wire of circular cross section, although members of other cross-sectional form may be employed. Preferably, I provide guide members to each side of the tensioning member, which guide members are advantageously in the form of open eyes or loops into which the thread may readily be inserted. In some instances, it may be sufficient to employ only one guide member, situated between the tensioning member and the end of the feed bobbin. The tensioning member and guide members are mounted in any suitable manner between the feed bobbin and the reciprocating guide.

The specific construction of the mounting structure may vary depending upon the specific design of the spinning machine for which the guiding and tensioning apparatus is intended to be used. In the present embodiment I have illustrated one form of apparatus suitable for attachment to a known type of spinning machine which is provided with a stationary transverse bar 32 situated adjacent to the reciprocating bar 28. In this form of apparatus a metal angle bracket 34 is provided, one end 36 of which is adapted to be inserted into a bore or slot in bar 32 and to be retained therein by means such as a stud or screw 38. The vertical or depending arm 40 of bar 34 serves to carry the tensioning and the guiding apparatus which, in the present embodiment, is shown as consisting of a wire 42 bent to provide a tension bar portion 44 and a guide eye 46 disposed above the tension bar. These portions of the wire 42 are connected by an intermediate portion having a loop 48 adapted to be engaged by the head of a machine screw or the like 50 threaded into the bracket 34. Preferably the outer end of the tension bar portion of the wire is bent upwardly at 44a, to prevent any possibility of the thread leaving the tension bar. A separate wire 52, attached to the lower portion of the arm 40 as by means of a machine screw 54, provides a second guide loop or eye 56 disposed below the tension bar 44. Bar 44 and loops 46 and 56 are preferably in alignment as shown.

The operation of the apparatus will be largely evident to those skilled in the art from the drawing. The thread 12 from the feed bobbin is first passed through the guide eye 56, then wrapped one or more times around the tension bar 44, then passed through the guide eye 46 and the guide slot of the reciprocating guide 30, before being attached to the winding bobbin 20. When bobbins 10 and 20 are rotated at their properly related corollary speeds the thread 12 is unwound from bobbin 10, and centrifugal force throws the thread as it comes from this bobbin out into the loop 12a, the size of which will depend upon whether the thread is coming off bobbin 10 from the upper or lower portion of the bobbin. The guide eye 56 serves to bring the thread to a feed point from which it can pass steadily to the tension bar around which it is wrapped to provide the desired degree of tension. Thereafter, the thread passes through the guide eye 46 to the reciprocating guide 30, which acts as a distributing guide for the winding bobbin 20.

The amount of tension imparted to the thread will depend upon the diameter of the tension bar 44, the larger the diameter the greater being the tension. As will be appreciated by those skilled in the art, the amount of tension desired will vary depending upon the character of the thread being twisted. I have found, for example, that a tension bar having a diameter of approximately one-tenth of an inch is suitable for the usual weights of silk thread twisted in machines of this character to the usual commercial degrees of twist. I prefer to loop the thread but once around the tension bar, although two loops may be employed to materially increase the tension without changing the tension bar. In order to change the tension bar it is, of course, only necessary to detach the wire 42 from the supporting bracket and substitute another wire of different diameter. I have found by actual test that a tension bar of the character described wears very much more slowly than those heretofore employed, and have also found that the arrangement shown is subject to much less difficulty due to fouling from lint than the arrangement heretofore used.

It will be evident that many changes of the specified construction may be employed within the scope of the invention, and in Fig. 3 I have illustrated another embodiment in which the tension bar 44 is provided by a wire part separate from a second wire part 58 bent to provide a loop 60 and upper and lower guide eyes 46 and 56. With this arrangement the tension bar can be changed without disturbing the guide loops and vice versa.

Obviously, other specific arrangements may be used. For example, the guide and tensioning members may be made from a single piece of wire suitably bent and with the tensioning member in the form of a single section of wire or a multiple section formed by bending the wire back on itself.

While in compliance with the Patent Statutes I have illustrated by way of example suitable forms of apparatus for carrying the invention into effect, it is to be understood that the invention is not limited in its scope to the embodiments shown, but is to be understood as including all forms of apparatus falling within the scope of the appended claims when they are construed as broadly as is consistent with the state of the prior art.

What I claim is:

1. In a hard twist spinning machine, the combination with feed and winding bobbins of a thread tensioning device comprising a stationary tension bar of circular cross-section disposed generally transversely of the path of the thread in its travel from the feed bobbin to the winding bobbin, the thread making at least one complete turn around said bar.

2. In a hard twist spinning machine, the combination with a feed bobbin and a winding bobbin of a thread tensioning and guiding device comprising a stationary tension member disposed generally at right angles of the path of the thread in its travel from the feed bobbin to the winding bobbin said thread passing at least once completely around said member, and stationary guide loops in the form of open eyes, one of said loops being disposed between the tension member and the feed bobbin and another of said loops being disposed between the tension member and the winding bobbin.

3. In a hard twist spinning machine, the combination with a feed bobbin and a winding bobbin of a thread tensioning and guiding device com-

prising a stationary tension bar disposed generally transversely of the path of the thread in its travel from the feed bobbin to the winding bobbin and a pair of stationary guide loops in the form of open eyes, said loops being disposed adjacent to said tension bar at either side thereof and said bar and said eyes being substantially in alignment whereby the thread passes at least once completely around said bar.

4. A tensioning and guiding device for hard twist spinning machines comprising a mounting bracket adapted to be fixed to the machine, a tension bar formed by a bent wire member detachably secured to said bracket and projecting laterally therefrom, and wire guide loops detachably connected to said bracket at either side of said tension bar, said guide loops being in the form of open eyes and said tension bar extending substantially at right angles to a line connecting said guide loops.

5. A tensioning and guiding device for hard twist spinning machines comprising a mounting bracket, a tension bar projecting laterally from said bracket and adapted to carry a turn of thread to provide the required tension, said tension bar having a portion at the outer end thereof positioned to retain the turn of thread on the tension bar, and guide loops projecting outwardly from said bracket, said guide loops being substantially in alignment with the tension bar at a place on the bar intermediate its ends, the laterally extending portion of said tension bar being substantially at right angles to a line connecting said guide loops.

6. A tensioning and guiding device for hard twist spinning machines comprising a mounting bracket, a wire tension bar secured to the bracket and

projecting laterally therefrom, the outer end of said bar being bent at substantially right angles to the laterally extending portion of the bar, and a pair of wire guide loops in the form of open eyes fixed to said bracket, said tension bar being disposed between said loops and the bent end of said bar being located laterally further from said bracket than said loops.

7. A tensioning and guiding device for hard twist spinning machines comprising a metal bracket, a wire tension bar formed with a loop at one end for removable attachment of the bar to said bracket by a screw, said loop being bent so that when attached the bar projects laterally from the bracket and the outer end of the bar being provided with an upturned end portion and a wire guide member having an attaching loop formed therein for removable attachment of the member to the bracket by a screw and having spaced end portions bent in the form of open eyes, said guide member and said tension bar being attached to said bracket with the tension bar located between said eyes.

8. In a hard twist spinning machine, a rotatably mounted feed bobbin, a rotatably mounted winding bobbin, a stationary guide member in substantially axial alignment with said feed bobbin for guiding the thread unwound therefrom, and a thread tensioning device including a stationary member disposed substantially at right angles to the path of travel of the thread between said guide means and said winding bobbin, said thread passing in at least one complete turn around said member.

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