June 24, 1958 F. B. BREAZEALE 2,839,887

THREAD GUIDE

Filed Aug. 1, 1955

Fig. 1.

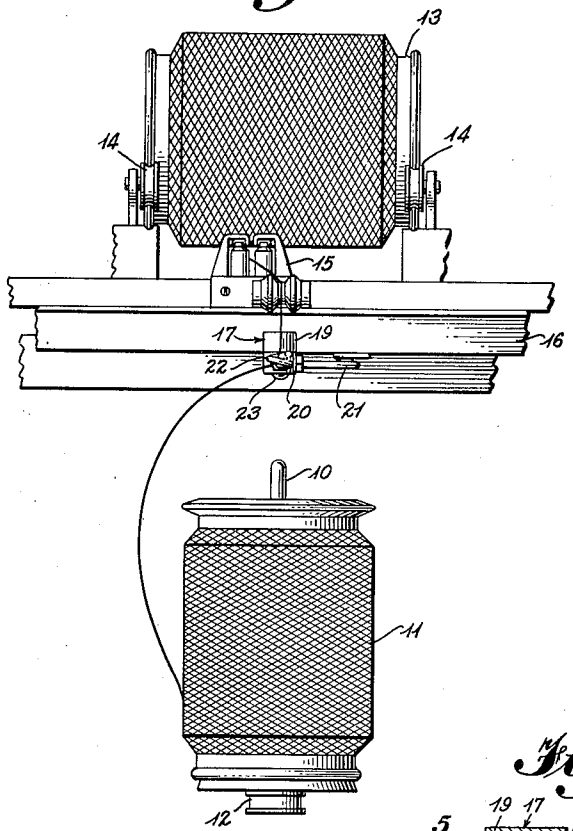


Fig. 2.

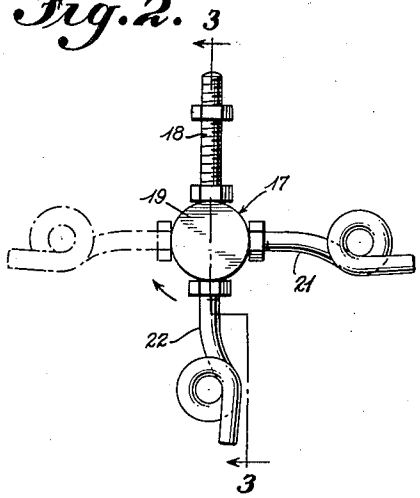


Fig. 3.

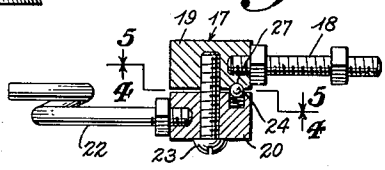


Fig. 4.

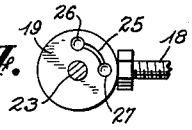
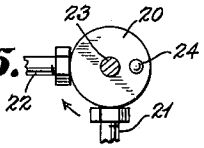


Fig. 5.



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THREAD GUIDE

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3 Claims. (Cl. 57—106)

This invention relates to the twisting of yarns and more particularly to an apparatus for producing twisted threads characterized by a greatly diminished "periodicity" of twist variations in large bodies of twisted thread.

In the operation of twisting threads from yarns such as rayon yarn, it has long been customary to use an apparatus known to the trade as an "up-twister" or "up stroke twister." Essentially, this apparatus consists of a spool mounted on a vertical spindle and rotated at relatively high speed. Yarn is drawn from this spool upwardly in balloon fashion and cross wound into a package. The amount of twist is controlled by varying the ratio of the speed of the spindle to the take-up speed. When yarn is withdrawn in this ballooning fashion, a balloon gathering guide is used. In the textile art it is customary to use a pigtail guide in this position, thereby affording the convenience of self-threading.

With the employment of the conventional up-twisting apparatus it has been found that the variation in the number of turns per inch of twist imparted to a yarn is very large. This twist variation usually expresses itself in a "periodicity" or barre effect in cloth woven from the yarn. This periodicity effect, of course, deleteriously affects the saleability of the product although it has had a high degree of trade acceptance because it was, heretofore, regarded as an unavoidable consequence of the use of an up-twister.

It has been found, as an important part of this invention, that it is possible to control the perodicity in twist variations in thread prepared on an up-twister within quite close limits, and it is an object of this invention to provide apparatus for controlling twist with very small variation from the predetermined, desired number of turns per unit yarn length throughout long lengths of thread.

Other objects and advantages of this invention will be apparent upon consideration of the following detailed description of a preferred embodiment thereof in conjunction with the annexed drawings wherein:

Figure 1 is a somewhat schematic view in front elevation of an up-stroke twisting machine, including the guide of the present invention shown in one of its two operative positions;

Figure 2 is a top plan view of the guide of the present invention illustrating in full lines one of the guide's positions, and in broken lines, the other;

Figure 3 is a view in vertical section taken along the line 3—3 of Figure 2;

Figure 4 is a view in section taken along the line 4—4 of Figure 3; and

Figure 5 is a view in section taken along the line 5—5 of Figure 3.

In the drawings the numeral 10 designates the twisting spindle which supports a yarn supply spool 11 having wound thereon a supply of untwisted yarn. The spindle 10 is adapted to be rotated by a belt acting on a sheave 12 in a manner which is entirely conventional in up-stroke twisting apparatus. The numeral 13 designates

a take-up spool which is rotated by a pair of friction driven rollers 14. The spool 13 is so mounted and is so driven that its peripheral speed is maintained substantially constant throughout the take-up operation so that the ratio between the running speed of the thread and its rotation about the axis of the spool 10 will be constant.

The yarn is laid upon the spool 13 by a traverse mechanism 15 which is reciprocated by conventional means known to the art. The entire apparatus is supported on a frame which is generally designated as 16. A yarn running from the supply spool 11 to the traverse mechanism 15 is shown in Figure 1. The resulting balloon is gathered in a guide assembly 17 which is mounted on the frame 16. Guide assembly 17 constitutes an important part of the present invention and it is shown in detail in Figures 2–5, inclusive.

The assembly 17 includes a threaded spindle 18 which passes through the front of the frame 16 and functions to support the guide assembly therefrom. The assembly 17 includes two cylindrical bodies 19 and 20, mounted for relative rotation about a common axis concentric to both. The threaded spindle 18 extends outwardly from the body 19 and, extending from the body 20, are two pigtail guides 21 and 22 disposed 90° apart. The pigtails 21 and 22 are alike except that the wire, in the case of the guide 21, is wound in a clockwise fashion as one follows the spiral downwardly from the top, whereas the eyelet 22 is wound counterclockwise as the spiral is followed in the same fashion. The two guides are provided with threaded ends which are received in threaded sockets in the cylinder 20. A screw 23 interconnects the cylinders 19 and 20 for relative rotation about a common vertical axis. The relative rotation is limited by a spring pressed ball 24 which is mounted to project from the upper surface of the cylinder 20, this ball coacting with an arcuate groove 25 in the upper surface of the cylinder 19. The groove 25 terminates in hemispherical sockets 26 and 27 at its opposite ends. Thus, the sockets are adapted to receive the ball 24 and quick detachably to latch the cylinders 19 and 20 against accidental relative rotation at the extremes of the 90° relative movement.

It can now be seen that either of pigtail guides 21 or 22 may be brought into balloon gathering position above the spindle 10. In Figures 1 and 2 the guide 22 is shown in operative positions. However, to bring guide 21 to operative position it is necessary only to rotate cylinder 20 90° clockwise from the Figure 2 position. This is done by manually overcoming the latching effect of the ball 24 in the socket 27 and allowing it to click stop in the socket 28.

It has been discovered, as an important part of this invention, that if the yarn is being given a Z twist a right-hand pigtail guide should be used, i. e., one such as guide 22. On the other hand, if the yarn is being given an S twist a left-hand pigtail guide should be used, as in the case of guide 21. For example, a large quantity of 100/40 viscose rayon yarn was twisted to around 12 turns per inch in both S and Z twist. The speed of the twisting spindle was 4170 R. P. M. These S and Z twisted yarns were both twisted using a right-hand pigtail balloon gathering guide. Investigations into the twist evenness of this yarn revealed that the S twist yarn showed a pronounced periodicity in twist, this twist period being about 173 cm. and corresponding with the length of yarn per full traverse stroke in the spool on which the yarn was collected when spun. Large ranges were found to exist in the amount of twist imparted to the yarn, amounting to as much as 2½ turns per inch above and below the average. The Z twist yarn did not show the pronounced periodicity in twist evenness. An indication of the same twist period (173 cm.) was present but it

was well broken up compared to the S twist yarn. A similar range in twist evenness existed in the case of the Z twist yarn. Similar investigations have revealed that the use of a left-hand pigtail guide for S twist yarn reduces the perodicity in yarn twist unevenness. By mounting a right and left-hand guide on a rotatable support so that either may be presented in the yarn path, it is possible to reduce greatly the periodicity of the twist variation in succeeding lengths of yarn being twisted on an up-stroke twister.

What is claimed is:

1. In an up-twister including a rotatable spindle and a take-up device thereabove, the improvement that comprises a support, a pair of oppositely wound pigtail guides extending from said support in spaced relationship and means mounting said support for rotation to bring either of said guides into balloon gathering position between said spindle and said take-up device.

2. In an up-twister including a rotatable spindle and a take-up device thereabove, the improvement that comprises a support, a pair of oppositely wound pigtail guides, said guides being mounted in said support and extending therefrom in spaced relationship, means mounting said support for rotation about a vertical axis to locate either of said guides in balloon gathering position

vertically above said spindle and between it and said take-up device.

3. In an up-twister including a rotatable spindle and a take-up device thereabove, the improvement that comprises a pair of oppositely wound pigtail guides, a support comprised of a pair of elements mounted for relative rotation about a vertical axis, said guides extending in spaced relationship from one of said elements in a plane normal to the axis of relative rotation and intersecting the axis of said spindle at a balloon gathering position thereabove, said elements including quick detachable latching means to hold them in the extreme of their relative movement with the respective guide in balloon gathering position above said spindle.

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