TEXTILE YARN CARRIER WITH CIRCUMFERENTIAL GROOVE

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ABSTRACT

A core for winding yarn or thread having a circumferential groove of a desired width at any depth is provided by a double-sided, double-tapered blade or a single-sided, double-tapered blade.
TEXTILE YARN CARRIER WITH CIRCUMFERENTIAL GROOVE

This invention relates generally to an improvement in cores or bobbins for winding of yarn thread of filaments having a circumferential groove and to blades for grooving the blade.

It has long been a problem in the textile industry to accomplish the making of a package of yarn or thread of a synthetic material on a core or bobbin. For example, once a package has been made, it is necessary to remove the package from the spindle and replace the cores with new ones. During this time the machine continues to make the thread or yarn which is being received by a sucker gun. Once the new core has been properly located on the spindle the sucker gun permits the yarn to travel the length of the core. In order to accomplish the winding of the yarn, it is necessary that the traveling portion of the yarn be attached in some way to the core and the used portion severed while the new material is wound to form the yarn package. It has been known in the past to use, for example, a double-width groove as shown in U.S. Pat. No. 3,103,305, issued to J. M. Heatherly, on Sept. 10, 1963. However, these grooves have a substantial disadvantage in that the yarn tends to jump out of the groove and it is extremely difficult to get the yarn to catch and break as is necessary.

It is an object of the instant invention to provide an improved core for the winding of synthetic yarns and threads and filaments which utilizes a circumferential groove having any desired width at any given depth.

It is another object of this invention to provide a blade for cutting a groove having a double taper on each side thereof.

A further object of the instant invention is to provide a blade for cutting a circumferential groove having a double taper on one side and a single taper on the other side of the groove.

Yet another object of this invention is to provide a textile yarn core having a circumferential groove that has a double taper on each side thereof.

A still further object of the instant invention is to provide a textile yarn core having a circumferential groove with a double taper on one side and a single taper on the other side.

The above objects are accomplished and the disadvantages overcome by the hereinafter described grooving blades and improved cores which will become readily apparent by reference to the accompanying drawings wherein like numerals refer to like parts and wherein:

FIG. 1 is an elevation view of a portion of a yarn package utilizing an improved core with a groove formed by the novel blades of this invention;

FIG. 2 shows an enlarged cross-sectional portion of one embodiment of the groove of the instant invention;

FIG. 3 shows an alternative embodiment for the cross-section of the groove of the instant invention;

FIG. 4 shows a side view of the blade of the instant invention;

FIG. 5 shows a portion of the blade for forming the groove of FIG. 2; and

FIG. 6 shows an alternative embodiment of a blade for forming the groove of FIG. 3.

Referring now to the drawings and more particularly to FIG. 1 wherein an improved textile core 10 is shown to include outer circumferential surface 14 and as having longitudinal centerline 12. Yarn, thread or filament material is wound on core 10 forming yarn package 16 with start-up thread 18 extending therefrom into groove 20.

Groove 20 is shown in FIG. 2 as having an outer or sharply angled portion 22 and an inner portion 24 having a smaller included angle between the respective inner portions 24 than the angle between portions 22. Centerline 26 of groove 20 is substantially at a right angle to centerline 12 of core 10. Thus, it is seen that groove 20 is a double-sided, double-taper groove which permits any desired width at any desired depth of groove.

FIG. 3 shows single-sided, double-taper groove 30 having outer portion 32 and inner portion 34 which are substantially similar to the respective portions 22 and 24 of groove 20. The single side 36 of groove 30 is utilized in order to provide greater yarn catching ability. Centerline 38 of groove 30 is at substantially a right angle to longitudinal centerline 12 of core 10. It is to be understood that typically side 36 is at an angle of inclination to centerline 38 of from 0° to 5°. Thus, it is seen that groove requirements which are unable of accomplishment by use of a single tapered blade as suggested by the prior art can be met by provision of a grooving blade in accordance with the instant invention. Blades 40 and 50 effect a "pinch point" for positive holding of the yarn as well as providing a groove having specified widths at various groove depths.

Referring now to FIGS. 4-6 wherein the body portion of blade 40 is shown as having a central bore 42 and hub 44 for permitting the attachment of the blade to the driving mechanism with which it is associated in order to accomplish the grooving of core 10. Blade 40 includes periphery 47 which is sharp and formed at the juncture of the outer portion of groove forming section 46. Blade 40 has planar sides 43 which are connected to outer portion forming sections 46 by interconnecting section 48. It is observed in FIG. 5 that included angle 60 between sections is substantially larger than included angle 62 between sections 46. This relationship of section 46 and 48 to centerline 41 establishes the double-sided, double-taper blade 40 utilized for forming the groove shown in Section in FIG. 2.

FIG. 6 shows single-sided, double-tapered blade 50 which has central bore 42, hub 44 and planar side 43 similar to blade 40. Blade 50 also includes outer forming section 46 and inner forming section 48 having respective angles 62 and 60 to centerline 49 of blade 50. Peripheral cutting edge 47 of blade 50 is formed by single-sided taper 52 which connects hub 44 with edge 47 in a substantially planar arrangement and outer groove forming section 46 of the double-tapered side of blade 50 as observed in FIG. 6.

As a typical example for the various angles which would be involved in the 2.975 inch diameter blade utilized for grooving a tube having a 5.281 inch length, a 3.686 inch internal diameter and a 0.221 inch wall thickness. The angles 60, as seen in FIGS. 5 and 6, would be approximately 30° to 50° and angles 62 would be in the range of 0° to 5°. The centerline dimension of section 46 should be approximately 36 to 40
thousandths of an inch for a blade thickness of 0.032 inch. It is to be observed that the blades 40 and 50 may be circumferential or depending upon the equipment on which such blades are to be utilized may be substantially semi-circular. The configuration of the blade may have some effect as to the dimension of the groove around the circumference of core 10 in that it may be desirable to form the groove throughout the circumference of core 10 or merely a portion of the circumference thereof. It is to be understood also that each of the embodiments of the instant invention has application to different operations and it may be advisable to put grooves 20 or 30 near one end of core 10 or at any location between the two ends of the core. The single-sided feature of blade 50 permits location of the groove much closer to the end of the tube or some other feature such as a second groove or a core to thereby provide maximum surface plane flatness between the groove and the second feature. Furthermore, it may be advisable to form the grooves at an angle to centerline 12 of core 10. It has been found that the grooves formed by the blades in accordance with the instant invention provide a start-up groove having excellent characteristics for a pinch-point to secure the yarn or filament to the tube in order to permit winding as well as severing of the tail of the yarn.

What is claimed is:

1. A textile yarn core having a groove therein extending at substantially a right angle to the centerline and throughout a substantial portion of the circumference of said core; and said groove in cross-section having at least one side double-tapered, whereby said groove has two portions which become wider at differing rates from the lower section of the groove to the circumference of said core.

2. The textile yarn core of claim 1 wherein said groove is located centrally of the longitudinal dimension of said core.

3. The textile yarn core of claim 1 wherein both sides of said groove are of a double-tapered configuration.

4. The textile yarn core of claim 3 wherein the taper of each side of the lower portion is in approximately the range of 1° to 5° from the circumferential centerline of said groove; and each side of the upper portion is in the approximate range of 30° to 50° to said groove centerline.

5. The textile yarn core of claim 1 wherein the taper of the lower portion is in approximately the range of 1° to 5° from the circumferential centerline of said groove; and the upper portion is in the approximate range of 30° to 50° to said groove centerline.