

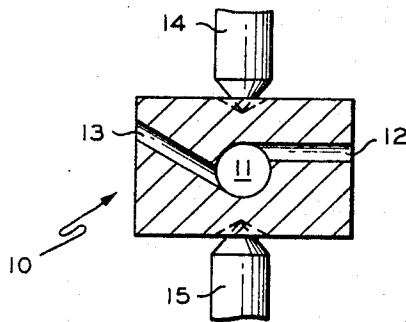
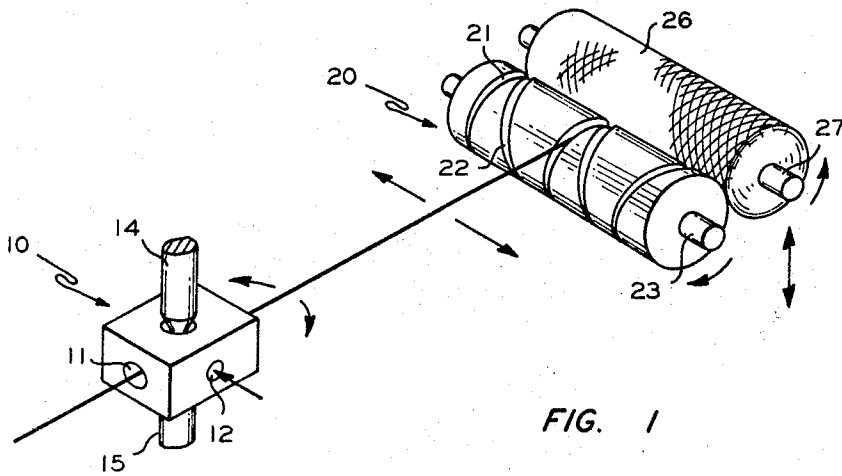
June 10, 1969

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3,448,570

METHOD AND APPARATUS FOR TAKING-UP YARN

Filed Jan. 2, 1968



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3,448,570

METHOD AND APPARATUS FOR TAKING-UP YARN

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Filed Jan. 2, 1968, Ser. No. 694,970

Int. Cl. D01h 13/26, 7/92, 7/46

U.S. Cl. 57-34

5 Claims

ABSTRACT OF THE DISCLOSURE

An apparatus for taking-up yarn comprising in combination a grooved windup roller and a package on to which the yarn is wound there is provided the improvement comprising a fluid vortex twisting device positioned in the path of yarn being passed to the grooved windup roller. As the yarn passes through the fluid jet, sufficient false twist is imparted to the yarn bundle to reduce individual filament excursions and present a coherent yarn for entry into the groove of the windup roller.

This invention relates to taking-up yarn onto a package. In one aspect the invention relates to an improved integral combination of yarn winding apparatus. In another aspect the invention relates to an improved method of taking-up yarn.

When taking up yarn onto a package, the yarn is usually traversed along the length of the package so that the yarn is distributed evenly over the cylindrical surface of the package. One method of traversing the yarn utilizes an open face cam or grooved roller, containing double reversed intersecting helical grooves which guide the yarn in a traverse path as the cam is rotated. This method has proved satisfactory for taking up twisted yarns but when utilized to wind untwisted yarns, several problems occur. The twist free filament bundle tends to assume a ribbon form when it comes into contact with the grooved surface, increasing the yarn with to the extent that entry into the guide groove is difficult. The absence of twist allows the excursion of individual filament which results in splitting of the yarn with part of the yarn entering the groove and traversing while the other portion remains on the surface of the roller.

By the practice of the invention wherein a false twist is imparted to the yarn before it is passed to the grooved roller, these difficulties are eliminated.

Accordingly it is an object of the invention to provide an integral combination of apparatus for efficiently taking up yarn.

Another object of the invention is to provide an improved method of winding yarn onto a package.

Another object of the invention is to treat untwisted yarn so that it can be wound onto a package by utilizing a grooved winding roller.

These and other objects of the invention will be apparent to one skilled in the art upon consideration of the following disclosure, the drawings and appended claims.

FIGURE 1 is a perspective view of the apparatus of the invention.

FIGURE 2 is a cross-sectional view of a twisting jet.

According to the invention, in yarn take-up apparatus including a roller having grooves to guide the yarn in a traversing path, drive means for rotating the grooved roller and a yarn package rotatably mounted onto which the yarn is wound, there is provided the improvement comprising a fluid jet mounted in the path of the yarn being passed to the roller; the jet having a yarn passageway and a fluid conduit intersecting the passageway tangentially to impart false twist to the yarn as it moves through the passageway.

In one embodiment of the apparatus the fluid jet is pivotally mounted so that the yarn passageway moves in an arc following the traversing motion of the yarn thread line as it is being wound onto the package.

Further in accordance with the invention, there is provided in a method of taking up untwisted yarn including passing yarn to a grooved windup roller and onto a yarn package the improvement comprising subjecting said yarn to the action of a fluid vortex to impart sufficient false twist so that a coherent yarn bundle is presented to the grooved portion of the windup roller. The fluid vortex is created in the yarn passageway of a fluid jet by introducing a pressurized fluid tangentially to the axis of the yarn path. The fluid is introduced at a pressure sufficient to cause the yarn bundle to rotate as it moves through the passageway, twisting in opposite directions downstream and upstream from the fluid jet. Snubbing of the yarn against the roller grooves causes removal of the false twist. The method results in avoiding the splitting and ribboning of yarn as it enters the groove of the windup roller.

FIGURE 1 illustrates the apparatus of the invention, including a fluid twisting jet 10 and a grooved windup roller 20. The twisting means comprises a yarn passageway 11 and a fluid conduit 12 as will be described in detail with reference to FIGURE 2. The yarn 30 passes through jet 10, receiving false twist, and is passed to the guide grooves of windup roller 20. The surface of roller 20 contains a right hand helical groove 21 and intersecting left hand helical groove 22. The roller is mounted on shaft 23 and rotated by drive means not shown. A yarn package 26 such as a bobbin or pirn is mounted on freely rotating shaft 27. Shaft 27 is carried upon a tension arm (not shown) which maintains package 26 in frictional contact with roller 20. As roller 20 rotates and drives package 26, the yarn 30 follows the grooves and traverses as it is wound onto the package.

FIGURE 2 is a cross-sectional view of jet 10 illustrating the yarn passageway 11 and tangential fluid conduit 12. "Tangential" is used in a broad sense to describe the intersection of the yarn passageway by the fluid conduit at an angle such that the yarn bundle is rotated about its axial center lines by fluid introduced through the conduit. A stringup slot 13 is cut through the length of jet 10 to facilitate insertion of the yarn into the jet. The jet is pivotally mounted as shown at 14 and 15 to allow the jet to rotate and traverse with the yarn. In operation, pressurized fluid, such as air is introduced through conduit 12, screening the stringup slot and creating the fluid vortex. The fluid acts upon the periphery of the yarn bundle moving through passageway 11 causing it to rotate twisting in one direction downstream and the opposite direction upstream. False twist of 1/2 t.p.i. is sufficient to provide a coherent yarn bundle if the fluid jet is mounted in close proximity to the winding roller. It is generally necessary to avoid snubbing the yarn against any surfaces as it is passed from the jet. This can be accomplished by suitable design of the yarn exhaust port of a passageway 11 or by pivotally mounting the jet as illustrated.

It is readily apparent that by false twisting the yarn a coherent yarn bundle is passed to the groove of the windup roller and that the splaying and splitting problem encountered in winding zero twist yarn is avoided.

That which is claimed is:

1. In yarn take-up apparatus including in combination a roller, grooved to guide yarn in a traversing path; drive means to rotate the grooved roller; and a yarn package rotatably mounted onto which the yarn is wound the improvement comprising a fluid twisting jet mounted in the path of yarn being passed to said grooved roller, said

jet having a yarn passageway and a fluid conduit intersecting said passageway tangentially.

2. The apparatus of claim 1 wherein said fluid twisting jet is pivotally mounted to allow the yarn passageway to move in an arc and follow the traversing motion of said yarn.

3. The apparatus of claim 1 including means to introduce pressurized fluid into the fluid conduit of said jet.

4. In a method of taking-up untwisted yarn including passing said yarn to the grooved portion of an open cam winder and onto a yarn package the improvement comprising subjecting said yarn to the action of a fluid vortex twister to impart false twist sufficient to present a coherent yarn bundle to the groove of said roller of said winder.

5. The method of claim 4 wherein false twist of at least 1/2 turn per inch is imparted to said yarn.

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U.S. Cl. X.R.

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