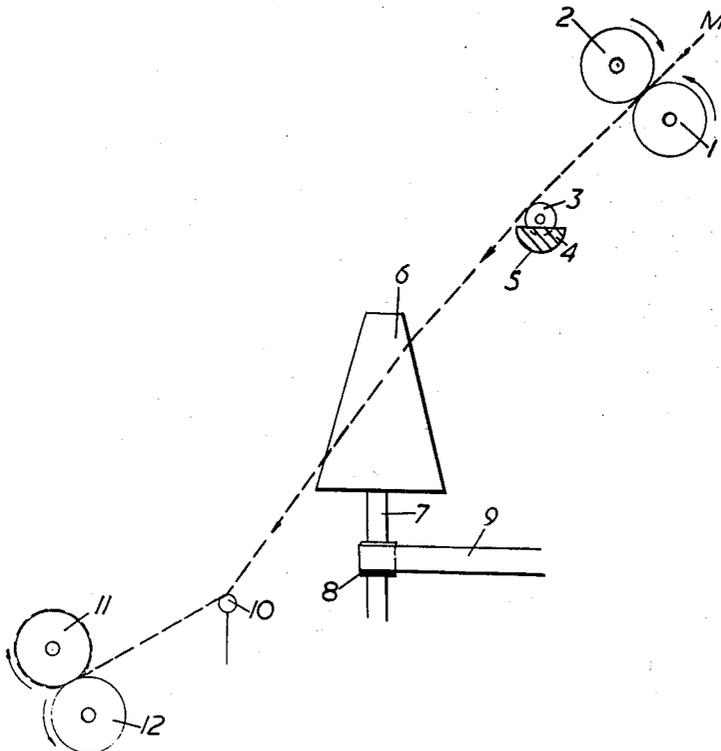


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G. TISSOT ET AL
PRODUCTION OF TWISTLESS STAPLE FIBER YARNS
BY SIZING UNTWISTED BUNDLES, FALSE
TWISTING AND WINDING
Filed Dec. 23, 1958

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Inventors
GERMAIN TISSOT
EMMANUEL TEISSIER

By *[Signature]*
Attorney

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**PRODUCTION OF TWISTLESS STAPLE FIBER
YARNS BY SIZING UNTWISTED BUNDLES,
FALSE TWISTING AND WINDING**

Germain Tissot and Emmanuel Teissier, Paris, France,
assignors to Societe de Constructions Mecaniques de
Stains, Stains (Seine), France, a corporation of France

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3 Claims. (Cl. 57-156)

This invention relates to a method and apparatus for producing untwisted yarns.

It is known to produce untwisted yarns by incorporating binders in tops of parallel fibers. It is also known to impart a false twist in the winding of the yarns onto ring spindles. This false twist permits the production of finer yarns, reducing the number of breakages, and increasing the spinning speed.

According to the present invention, untwisted yarns can be produced incorporating in tops of parallel fibers a water-soluble binder in aqueous solution and by applying immediately thereafter a false twist which feeds along the yarn and effects a momentary twist to the filaments while impregnated with the binder, thus imparting to the yarn a substantially circular cross-section which is thereafter retained despite the disappearance of the twist. The impregnation with the binder is effected under conditions such that a limited quantity of water is incorporated in the top, for example by contact with a half-immersed wetting roller, the greater part of the absorbed water rapidly evaporating, so that the impregnated yarn dries sufficiently to permit direct winding.

The impregnated yarns may be woven or knitted without further treatment, and the readily soluble binder will disappear on rinsing of the woven, knitted or other articles in water to provide textile articles containing untwisted yarns having a particularly pleasant appearance and hand, and good draping properties. The adhesion between the filaments, notably in the case of long fibers of 50 mm. or more, is sufficiently great to ensure adequate tensile strength of the textile articles.

In the patent application Serial No. 782,565 filed December 23, 1958, there has been described the special application of the present method to tows of fibers emanating from the direct spinning of groups of continuous filaments, while the present invention relates to the application to all yarns of discontinuous fibers.

As binding agents, there may be employed solutions of gelatin and more especially an aqueous solution containing from 10 to 20 grams per liter of gelatin, which gells sufficiently rapidly to permit direct winding of the yarn.

The false twist may be applied by any known means, but preferably there is employed a device permitting of imparting a false twist by external contact with a rotating member or a member actuated with circular or linear oscillations since this type of device permits of omitting the threading of the yarn which is necessary in the case of the well known false twist tubes.

The nature of the invention will be better understood by referring to the following description taken in connection with the accompanying drawing in which a specific embodiment has been set forth for purposes of illustration.

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In the drawing, the figure is a diagrammatic illustration of an apparatus embodying the present invention.

Referring to the drawing more in detail, a yarn M substantially free from twist, obtained by any known method is fed at constant speed by a pair of feed rollers 1, 2, as indicated by the arrows. The yarn passes over a sizing roller 3 actuated at a relatively low speed, for example at 7 to 10 revolutions per minute. The said roller is partially immersed in a sizing bath 4 composed, for example of a water solution of gelatin in a concentration of 12 to 15 grams per liter, treated at 45° C. to 50° C. The bath is contained in a trough 5. In the course of its contact with the roller 3, the yarn M becomes impregnated with a quantity of liquid, which quantity depends upon the speed of rotation of the roller 3 and of the bath 4. The yarn M thereafter passes over a frusto conical element 6 having a resilient surface and consisting, for example, of rubber. This movement of the yarn may be along an arc of a circle or of a helix. The frusto conical member 6 is mounted on a spindle 7 on which there is also mounted a pulley 8 driven by a belt 9. In the course of the travel of the yarn M over the element 6, it undergoes a more or less considerable rotation on its own axis ("rolling"), which results in the insertion of a false twist which is immediately fed in both directions, but notably towards the inlet end, as far as the point at which the yarn M is gripped between the feed rollers 1, 2. The yarn M will thus be in the twisted state during the sizing.

On the outlet side of the element 6, the yarn M is guided through an eye 10 and wound on a spool 11, which is driven by a driving roller 12, with the usual reciprocating movement being imparted to eye 10 by means not shown. The water contained in the size evaporates for the greater part during the passage of the yarn towards the outlet and the yarn is almost dry on reaching the spool, and in any case is sufficiently dry to be wound and to produce wound packages which can be unwound without difficulty for subsequent processing. The false twist applied disappears on the outlet side of the element G.

The degree of this false twist depends upon the exact shape of the element 6, upon the nature of its surface, and upon the travel of the yarn M in contact with the surface of the element 6. In the great majority of cases, sufficient flexibility of adaptation is obtained by adjusting the position of the eye 10, the speed of the spindle 7 remaining constant. The latter may be, for example, of the order of 1000 to 5000 revolutions per minute for spinning speeds between 40 and 100 meters per minute.

The false twist imparted by the element 6 may be somewhat less uniform than that produced by tube type devices, but this is of little importance in the present case, where it is essential that a high false twist can be applied.

Although a specific embodiment of the invention has been shown and described, it is to be understood that various changes and modifications may be made therein as will be readily apparent to a person skilled in the art.

What is claimed is:

1. The method of making twistless threadlike products of twistless fibers, which comprises feeding a top of substantially untwisted staple fibers through an impregnating zone, impregnating said top in said zone with a solution of a water-soluble binder, advancing the impregnated top through a false-twisting zone whereby false twist is imparted in one direction only, whereby the false

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twist induced feeds back to said impregnating zone and advancing thereafter the false-twisted impregnated top through a drying and untwisting zone, thereby producing a substantially twistless threadlike product and winding said product onto a package.

2. The method as set forth in claim 1 wherein said impregnation consist of a water solution of a water-soluble gelatin.

3. The method set forth in claim 2 in which the gelatin has a concentration of from 12 to 15 grams per liter 10

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and the impregnation takes place at a temperature of from 45° C. to 50° C.

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