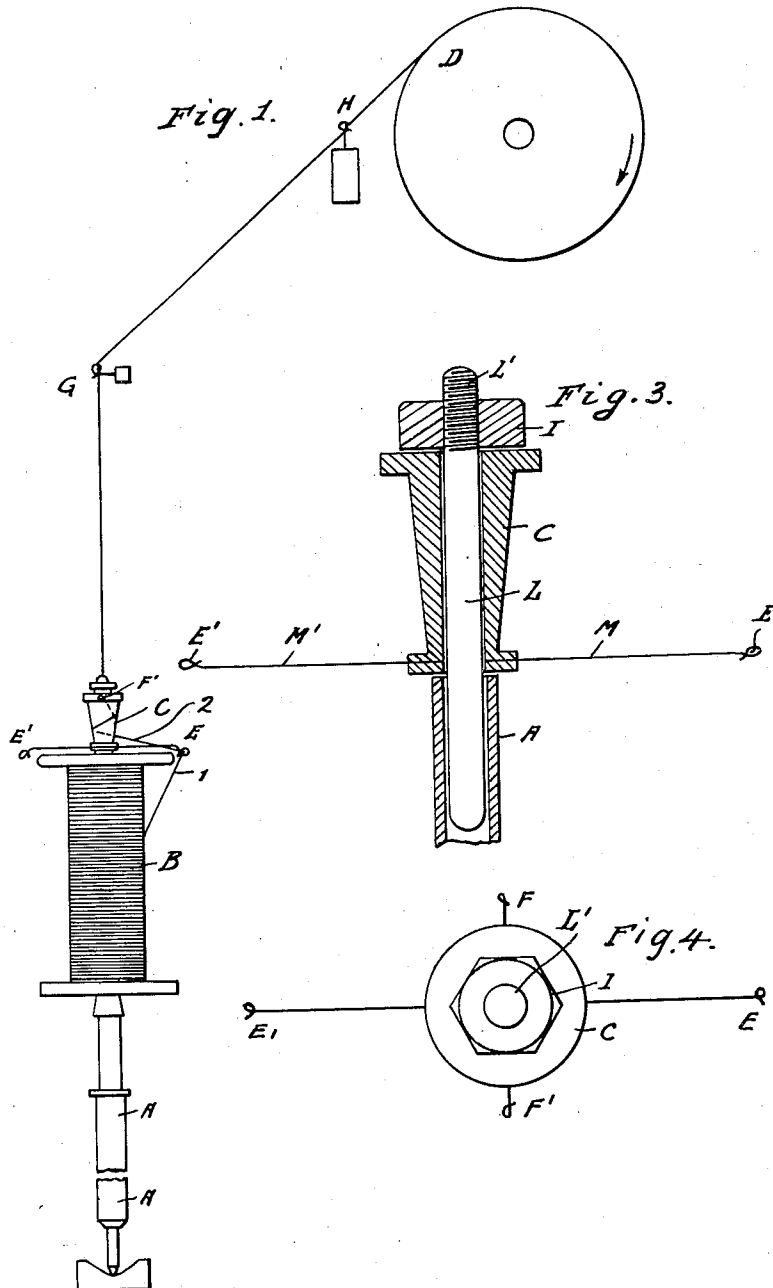


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YARN TWISTING DEVICE
Filed April 13, 1933

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2 Sheets-Sheet 1



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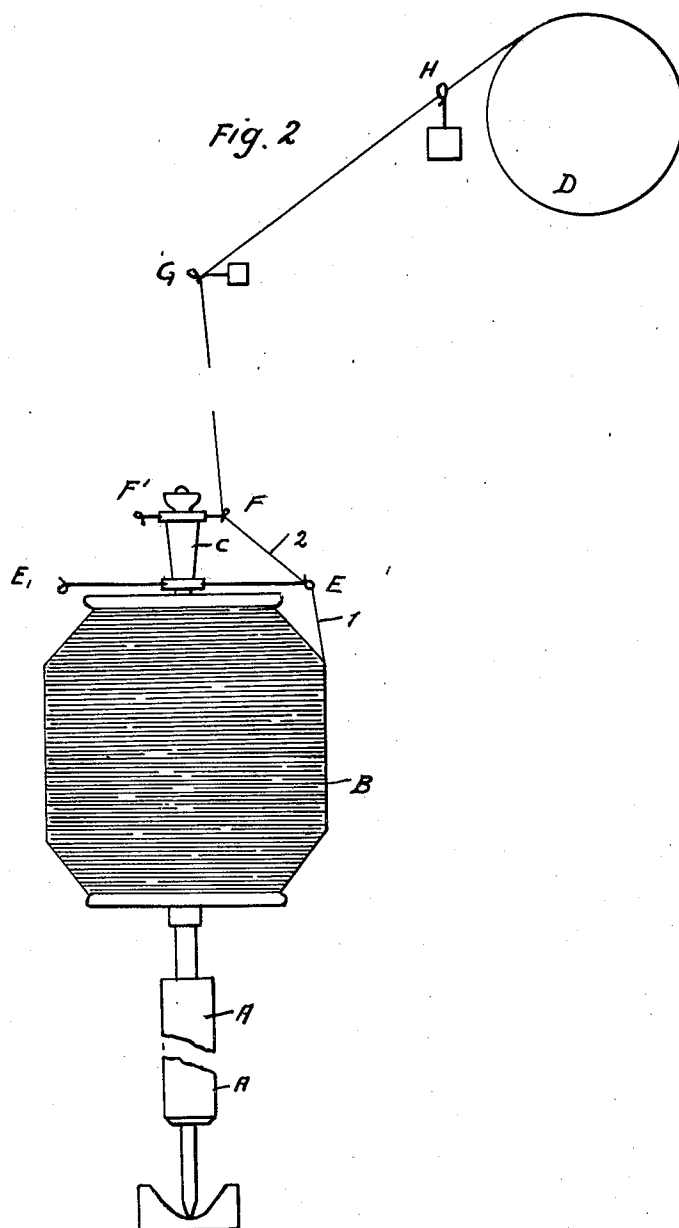
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2,009,249

YARN TWISTING DEVICE

Emilio Castelli, Como, Italy

Application April 13, 1933, Serial No. 665,856
In Italy May 7, 1932

7 Claims. (Cl. 117—26)

The present invention relates to apparatus for twisting yarn at high torsion, in a single operation, upon twisting frames wherein torsion is imparted by the unwinding spindle revolving about its own axis.

It is well known that in order to impart high torsion to yarns on twisting frames of the aforesaid kind, it is necessary to apply the desired torsion in at least two stages or even in three stages when the yarn concerned is thick, or loose because if the whole desired torsion were applied in a single stage, the work would be rendered very bad and with the most downy type of yarn becomes impossible due to frequent breakages of the yarn subjected to the said high torsion.

Investigation shows that the reason of these difficulties is that, while the unwinding spindle revolving about its axis imparts the desired high torsion to the yarn, the yarn takes up the torsion over the entire free portion of the length thereof, which extends from the point where the yarn unwinds from the supply bobbin or yarn package up to the point where the twisted yarn is wound onto a receiving bobbin; this torsion begins as soon as the yarn leaves the supply bobbin package and even before that, because, due to the rigidity acquired by the twisted yarn, the fibres as they are being drawn together during the twisting operation nip the fibres of the still untwisted yarn lying on the package, thus causing jerks and ruptures that make the unwinding practically impossible.

The invention aims at obviating this serious inconvenience by eliminating the possibility of the torsion applied to the yarn reaching back up to the layers of untwisted yarn unwinding from the package.

Accordingly an object of the present invention is to prevent the twisting operation from commencing on the supply bobbin.

Heretofore in the first crape torsion, and also in the second torsion when yarn titres were concerned, a spindle cap was used which, owing to its shape, kept the various yarns united at the beginning of the twisting and also served to impart the desired tension to the yarn during the twisting process, the said tension being adjusted by varying the weight of the spindle cap or of its armature.

The device according to the present invention, however, comprises a novel type of spindle cap which, in addition to the functions just stated, also transfers the commencement of the torsion to the spindle cap itself thus preventing the torsion from reaching back to the package.

The accompanying drawings illustrate, merely by way of example, a practical embodiment of the spindle cap of the present invention.

Fig. 1 is a diagrammatic view of the invention.

Fig. 2 is a diagrammatic view of the invention as applied to rayon twisting frames, the supply package being a bobbin such as is delivered by the spinning frame.

Fig. 3 is an axial section through the device interposed between the supply bobbin or package and the receiving bobbin on which the twisted yarn is wound.

Fig. 4 is a plan view of the device according to Fig. 3.

In the twisting frames known heretofore, the spindle A spins about its own axis and imparts the desired torsion to the yarn that unwinds from the bobbin or package B supported by means of the said spindle. The yarn leaves the package B and, after receiving the desired torsion, is wound on bobbin D.

The yarn length between B and D is twisted in a permanent manner and the torsion, by effect of the rigidity acquired by the yarn subjected to torsion, extends downwardly till it reaches and nips between its twisted fibres, the loose and still untwisted fibres disposed in layers on the package B.

According to the present invention, this disadvantage is overcome by eliminating the possibility of the twisted yarn coming into contact with the untwisted layers on the package B, or at least by causing it to come into contact therewith at a torsion that is not prejudicial to the unwinding of the yarn from said package.

To this effect, on the upper end of the spindle A supporting the supply package B, a novel type of spindle cap C is provided. The yarn may bear against this cap (Fig. 2) but preferably surrounds the body of the cap with one or more turns (Fig. 1) according to the yarn thickness and composition. Subsequently the yarn may proceed smoothly without further interruption while guided by eyelet or pig tail thread-guides E—F—G—H, till it is wound onto receiving bobbin D.

The spindle cap C, entrained in the rotating movement of the yarn at the velocity of the spindle A, is therefore relatively stationary with respect to the spindle A and bobbin B, so that the yarn stretches 1 and 2 are not subjected to any torsion. The result is that the spindle cap C steps into the place of package A as starting point for the twist, the twist beginning only at the upper thread-guide F of the spindle cap C since the

stretch 1 (from the supply package B to the thread-guide E) and the stretch 2 (extending from the thread-guide E to the thread-guide F and eventually encircling the body of the spindle cap C) are theoretically without any torsion.

Referring now to Figures 3 and 4 of the drawings the spindle cap comprises a tubular C, having a cylindrical axial bore and preferably an inverted frustoconical outer surface, which body is loosely mounted on a pin L the bottom end of which is centred in an axial recess in the top portion of the spindle A supporting the supply package B. The top end L' of the pin L is screw-threaded for reception of a nut I intended to prevent the cap C from flying off the pin L. From the bottom portion of the cap C, at two diametrically opposite points, two small resilient rods M and M' extend outwardly, each being fitted with a thread-guide E and E' at its outer end. One of these thread-guides engages the yarn leading from the supply package B. From two diametrically opposite points of the top portion of the spindle cap C, two thread-guides F—F' project outwardly, one of which engages the upper end of the yarn stretch 2, which may or may not have previously been wound round the frustoconical surface of the spindle cap C in one or more turns. In Figs. 1 and 4, the pair of thread-guides E—E' is arranged at right angles relatively to thread-guide pair F—F'. However, both pairs of thread-guides may also be aligned with each other as shown in Fig. 2, especially when the thread has not to be wound round the body of the spindle cap C.

The yarn, guided by other suitable thread-guides G—H etc., after having been twisted in the desired manner is wound onto the receiving bobbin D.

It will be appreciated that the spindle cap construction that has been described and illustrated should be considered only as one of several possible embodiments of the present invention. A similar result might be achieved either by varying the form of the interposed device, or by inserting the device into the cycle in a different manner, since the nature and titre of the yarn as well as the desired twist and the twisting frames employed may permit or even require special adaptations to be made to the device, the principle remaining unaltered that the device whatever may be its form and its application in the cycle—is but a necessary means for the embodiment of the present invention.

In practice the rigidity of the yarn overcomes the friction between the yarn and the thread guides on the cap so that a certain number of twists will appear in yarn stretches 1 and 2; these twists, far from being harmful, are advantageous in imparting a certain compactness to the yarn while unwinding from the package B, and in fact advisable not to remove completely the twists in these stretches, which are useful rather than harmful when using certain kinds of yarn. This more or less slight, up reaching twist may be increased by simply causing the yarn to bear against an upper thread-guide of the spindle cap, or it may even be completely removed by increasing the number of turns wound round the cap body.

By increasing the number of turns, the yarn friction is increased and the back-reaching twist reduced or eliminated, while by reducing the turns, the twist reaches back to the supply bobbin

or package as much as is deemed convenient and not harmful.

The constructional details and the details relating to the form may be varied in practice without departing from the scope of the invention and obviously parts may be used without others.

Having now fully described my invention, I claim:

1. Apparatus for the production of high twist yarns in a single operation having in combination a yarn package support, winding means for drawing the yarn from the package, and means for preventing torsion applied to the yarn from reaching back to the package, comprising a member having a frusto-conical portion and means tending to guide the yarn in the form of a loop into continuous contact with the conical surface of said frusto-conical portion.

2. Apparatus for the production of high twisting yarns in a single operation having in combination a yarn package support, winding means for drawing the yarn from the package, and means for preventing torsion applied to the yarn from reaching back to the package, comprising a member having an inverted frusto-conical portion, and means tending to guide the yarn in the form of a loop into continuous contact with the surface of said inverted frusto-conical portion.

3. Apparatus for the production of high twist yarns in a single operation having in combination a yarn package support, winding means for drawing the yarn from the package and means for preventing torsion applied to the yarn from reaching back to the package, which last said means includes a member having a frusto-conical portion surmounting the package.

4. Apparatus for the production of high twist yarns in a single operation having in combination a yarn package support, winding means for drawing the yarn from the package and means for preventing torsion applied to the yarn from reaching back to the package, which last said means includes a member having a frusto-conical portion surmounting the package and rotatable relatively thereto.

5. Apparatus for the production of high twist yarns in a single operation having in combination a yarn package support, winding means for drawing the yarn from the package, a member supported by the package support and having a frusto-conical portion and thread guides supported by said member.

6. In an apparatus for the production of high twist yarns in a single operation having a yarn package support and winding means for drawing the yarn from the package, a member having a frusto-conical portion, flanges serving as upper and lower limits of said portion and thread guides secured to each of the flanges.

7. Apparatus for the production of high twist yarns in a single operation, having in combination a spindle rotatable about its axis having a recess in one end thereof and serving to support a yarn package, a second spindle loosely engaging the first spindle and extending axially beyond the package, a nut engaging a threaded end of said second spindle, a tubular member mounted for rotation on the second spindle and thread guides supported by the member at different planes, there being winding means for drawing the yarn from the package.

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