

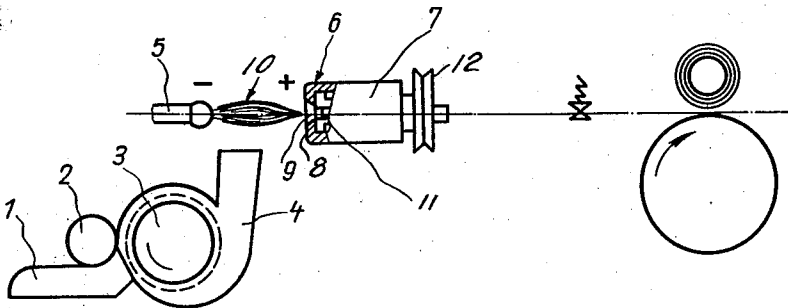
Oct. 22, 1963

S. I. ARSHINOV ETAL

3,107,478

METHOD AND APPARATUS FOR YARN PRODUCTION FROM FIBRES

Filed Jan. 12, 1962



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3,107,478

METHOD AND APPARATUS FOR YARN PRODUCTION FROM FIBRES

Serguei Ivanovich Arshinov, Mytishchinsky rayon, platforma Cheluskinskaja, lia Novaja ulitsa 56; Nicolay Iljich Zolotariov, 2⁰¹ Donskoi proiezdz 6, Apt. 42; Serguei Savellievich Ivanov, 2⁰¹ Donskoi proiezdz 6, Apt. 39; Anatoly Grigorievich Lifshits, Malaia Bronnaia ulitsa 42/14, Apt. 31; Alexey Gavrilovich Moskalov, Leninsky prospect 62/1, Apt. 344; and Vladimir Petrovich Radovitsky, 2⁰¹ Donskoi proiezdz 6, Apt. 45, all of Moscow, U.S.S.R.

Filed Jan. 12, 1962, Ser. No. 166,986

3 Claims. (Cl. 57—58.95)

The present invention relates to a method of yarn production from fibres and a device for carrying out the same. The present invention relates to the textile industry and more precisely to methods used in staple yarn production from elemental fibres.

It is common knowledge that the available methods of yarn production are intricate, time consuming, labour consuming and expensive, and require the use of a variety of textile machines, for instance slivering and roving machines, as well as others.

Methods of yarn production directly at the card by the use of web division on dividing belts followed by false twisting of the slivers obtained and their drawing in draw rolls and thereafter by final twisting at the torsional spindles installed in the cards were formerly proposed.

Attempts were made to obtain the yarn directly from the hackling sliver by an air stream guiding the flow of suspended and oriented fibres to the opening of the rotating false twist tube.

These attempts, however, have not yielded positive results, since the yarn obtained was neither solid nor sufficiently uniform.

It has been proved that the method embodying the principle of the present method and carried out by means of the present device provides a good-quality yarn without requiring additional intermediate processing steps inevitable in the execution of prior known methods of the yarn production.

As a consequence, the present invention provides an improved, simplified and more economical method of yarn production.

The invention is designed primarily for the production of yarn directly from the hackling sliver.

An object of the present invention is to preclude the necessity of utilizing, roving and other machines heretofore necessary for the production of yarn.

Another object of the invention is simplification of the spinning machine design by eliminating such complicated assemblies at manufacturing and in service as, for instance, the drawing apparatus, the spindle having a ring and traveler, the winding mechanism, etc.

In connection with the aforesaid objects the invention is based on a new method of yarn production in which the loose separately divided fibres are uniformly conveyed, for example by air flow, to the high tension of an electrostatic field formed by two different electrodes while orientating the fibres along a common axis. One of these electrodes is provided with an opening extending axially therethrough and forms a twisting mechanism. The fibres supplied to the electrostatic field collect in a bundle with the fibers oriented in one direction and the ends of such fibers are joined to the end of the continuously forming yarn projecting from the axial opening of the twisting mechanism. These fibers are thereby twisted to form yarn which is thereafter wound on a bobbin in any suitable manner.

The device for the production of yarn from fibres orientated into a bundle in the high tension electrostatic

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field consists of a feed roll; facilities for loosening and dividing the fibres; facilities for conveying the fibres into the electrostatic field; electrodes to create the aforesaid electrostatic field; and a twisting mechanism provided by one of the electrodes of the electrostatic field.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing wherein:

The single FIGURE of the drawing is a diagrammatic view showing an apparatus constructed in accordance with the invention and for performing the method of the invention.

The fibre is supplied by feed roll 2 from feeding table 1 to needle drum 3 which rotates at a speed ensuring the complete removal of the needles of the drum 3 from the fibres. Drum 3 is mounted in a housing 4 the outlet of which is pointing upwards.

Due to rapid rotation of drum 3 the fibre mass is separated into individual fibres and is conveyed in suspended state in the air stream from within housing 4 to the high-tension electrostatic field created by different opposed electrodes 5 and 6.

The electrode 6 is in the form of an elongated hollow shell 7 having an end wall 8 facing the electrode 5. The end wall 8 is provided with a central axially extending aperture 9 through which fibres 10 may pass into and through the shell 7. Disposed within the shell 7 in axial alignment with the aperture 9 and mounted for axial movement toward and away from the end wall 8 is a ball 11, and spring means or other suitable resilient means, not shown, is provided within the shell 7 for urging the ball 11 toward the end wall 8. The shell 7 is mounted for rotation and a pulley 12 is fixed thereto which may be driven from any suitable power source.

In operation, the fibres 10 disposed in the electrostatic field between the electrodes 5 and 6 are straightened and disposed in parallelism and their ends collected into a bundle which enter the shell 7 through the aperture 9 in the end wall 8. The trailing and leading ends of fibres join together as they pass into the shell 7, and such fibres pass over the ball 11 and due to the frictional engagement between the ball 11, the fibres and the end wall 8 surrounding the aperture 9 and due to the rotation of the shell 7, the fibres are twisted to provide yarn which moves axially out of the shell 7 and is thereafter wound on a conventional bobbin.

As a result of the above described structure and by reason of the fact that the electrode 6 also provides the twisting mechanism, the fibres are twisted together immediately adjacent the electro-static field thereby providing a yarn which is superior to one which is twisted by mechanism spaced an appreciable distance from the electro-static field and in which the fibres pass through guides or other mechanism between the electro-static field and the twisting mechanism.

It should be mentioned that the instant invention provides for a rapid and simple processing of staple yarn. Moreover, the invention precludes the necessity for re-winding the yarn on cross-winding machines, since the yarn is wound directly on a conventional bobbin.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawing and described in the specification, but only as indicated in the appended claims.

What we claim is:

1. A method of producing yarn from a fibrous mass, said method comprising the steps of separating said mass into individual fibres suspended in an air stream, feeding said fibres by means of said air stream into an electro-

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static field to straighten and dispose said fibres in parallelism, feeding said fibres through a rotating electrode, and gripping said fibres within said electrode to twist the same to provide yarn.

2. An apparatus for producing yarn from a fibrous mass, said apparatus comprising means for feeding said mass, means for providing an air stream, means for separating said mass into individual fibres in suspension in said air stream, a pair of spaced electrodes for providing an electro-static field therebetween, said air stream serving to feed said fibres into said field, one of said electrodes being hollow for passage of said fibres there- through, means for rotating said one electrode, and means within said one electrode for engaging said fibres, rotation of said one electrode serving to twist said fibres to provide yarn.

3. An apparatus as defined in claim 2, in which said one electrode comprises a hollow shell having an end wall

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facing the other electrode, said one end wall having an aperture for passage of said fibres therethrough and through said shell, a ball within said shell in alignment with said apertures and mounted for axial movement toward and away from said end wall, resilient means urging said ball toward said end wall, and means to rotate said shell, whereby said ball will frictionally engage fibres passing through said aperture into said shell to twist said fibres upon rotation of said shell.

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