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J. STARY ETAL

3,336,742

YARN TWIST CONTROLLING DEVICE

Filed Dec. 7, 1966

2 Sheets-Sheet 1

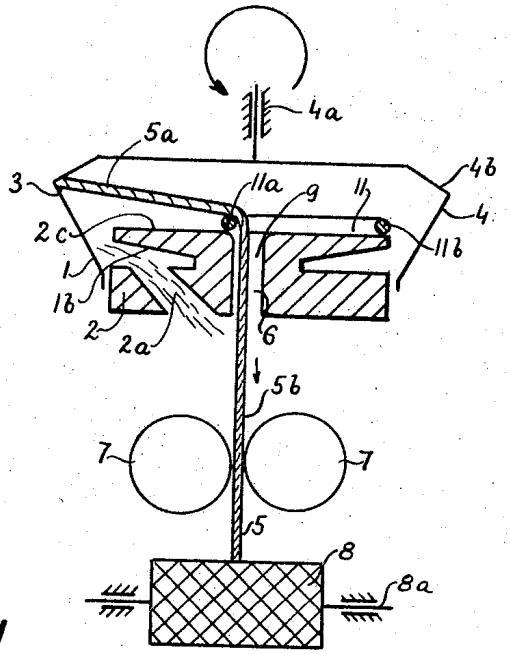

Fig. 1

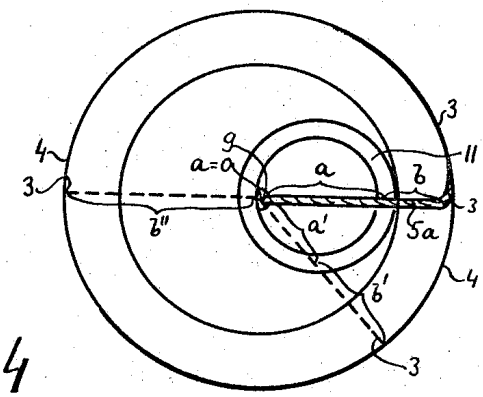

Fig. 4

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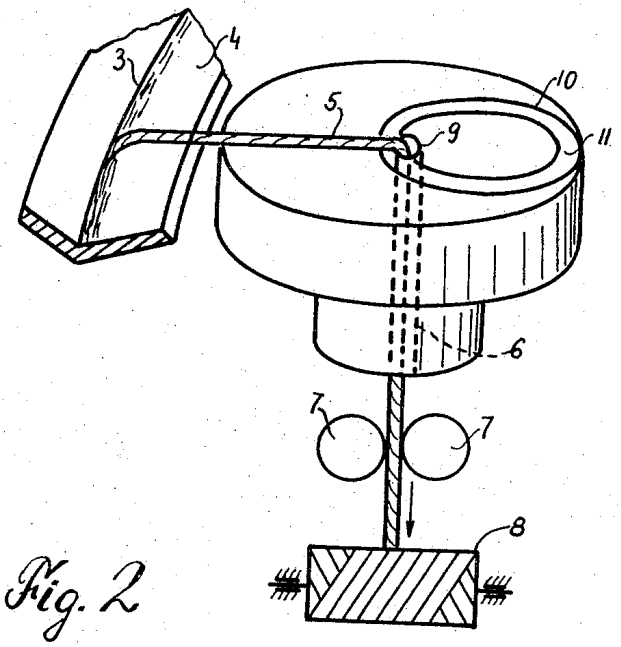

Fig. 2

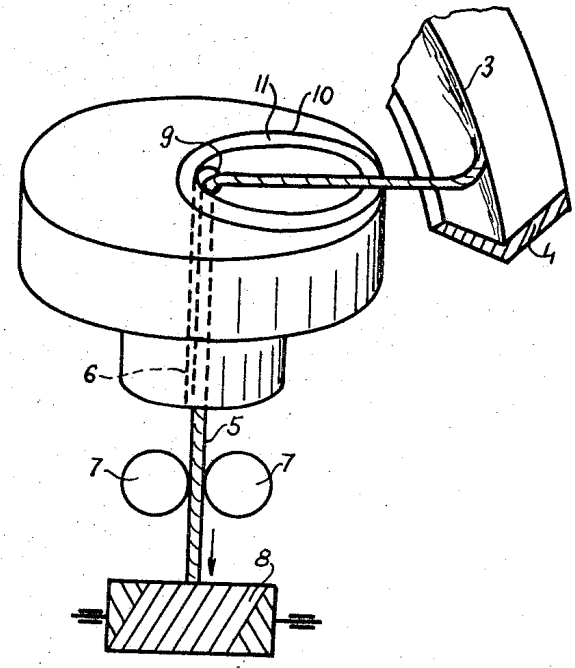

Fig. 3

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YARN TWIST CONTROLLING DEVICE

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ABSTRACT OF THE DISCLOSURE

A guide ring eccentric to the inlet of the delivery channel of a rotary spinning chamber slidingly guides the spun yarn so that not only the yarn portion in the delivery channel, but also the revolving yarn portion in the spinning chamber is twisted.

Background of the invention

The present invention relates to an improvement of spinning apparatus of the type in which a rotary spinning chamber receives fibers on a rotary collecting surface and spins the same into a yarn which is withdrawn by transporting means through a delivery channel.

In prior art constructions, the spun yarn has a revolving yarn portion extending from the collecting surface to the inlet of the delivery channel, and a twisted yarn portion moving outward in the delivery channel.

Since the revolving yarn portion is not twisted, yarn breakage occurs mainly in the revolving yarn portion which does not have the tensile strength of the twisted yarn portion. Of course, the yarn breakage may also be caused by poor quality of the sliver from which fibers are combed and supplied to the spinning chamber. However, since the quality and condition of the sliver cannot be changed, a reduction of the number of yarn breakages can only be obtained by providing also the revolving yarn portion with a twist.

Summary of the invention

It is an object of the invention to reduce the number of yarn breakages occurring in a yarn spun by a rotary spinning chamber, and to effect twisting of the entire yarn between the collecting surface of the spinning chamber and transporting rollers which transport the yarn through the delivery channel.

Another object of the invention is to spread the twist of the yarn portion in the delivery channel, to the revolving yarn portion in the spinning chamber.

With these objects in view, the present invention relates to a yarn twist controlling device for a rotary spinning chamber having an annular fiber collecting surface, and which comprises supporting means formed with a delivery channel having an inlet for the spun yarn. In accordance with the invention, a guiding means is provided on the supporting means for slidingly guiding the revolving yarn portion intermediate the collecting surface and the inlet of the delivery channel of the rotary spinning chamber. The guiding means is at least partly located between the inlet and the collecting surface. More particularly, the guide means is curved so that during the rotation of the spinning chamber, the distances from the inlet to points of the guiding means engaged by the yarn vary, whereby also the distances from the respective points to the collecting surface of the spinning chamber vary.

In the preferred embodiment of the invention, the guide means is a stationary annular member, preferably a circular ring, secured to the supporting means in a position located in the spinning chamber eccentric to the axis of rotation of the same, and the inlet of the delivery channel is located within the annular member. It is advantageous if a portion of the circular ring is located adjacent and radially outward of the inlet, and a diametrical portion of the ring is located in the proximity of the collecting surface.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

Brief description of the drawing

FIG. 1 is a schematic axial sectional view illustrating an embodiment of a yarn twist controlling device according to the invention;

FIG. 2 is a fragmentary schematic partly perspective view illustrating the device in the operational position of FIG. 1;

FIG. 3 is a fragmentary schematic, partly perspective view illustrating the device in another operational position; and

FIG. 4 is a fragmentary schematic plan view illustrating the device with the spinning chamber omitted in the operational position of FIG. 3.

Description of the preferred embodiments

Referring to the drawing, a substantially cylindrical body **2** projects into an opening in a rotary spinning chamber **4** which is rotated about an axis by a drive shaft **4***a*. Spinning chamber **4** has two frusto-conical walls forming a circular collecting surface **4***b* to which fibers **1** are supplied through an inlet channel terminating in an annular recess **2***b*. The fibers are spun on the rotating collecting surface **4***b* into a yarn **5** which is transported by a pair of transporting rollers **7** in the direction of the arrow through the delivery channel **6** which has an inlet **9** located in the spinning chamber. A rotary take-up means **8***a* provided with winding means, not shown, forms a bobbin **8** of the yarn **5**.

Delivery channel **6** and inlet **9** are disposed coinciding with the axis of rotation of spinning chamber **4** so that the yarn portion **5***a* between collecting surface **4***b* and inlet **9** revolves with the spinning chamber and implies a twist to the yarn portion **5***b* extending through the delivery channel **6** to the transporting rollers **7**.

In accordance with the invention, a guide means in the form of a circular ring **11** is secured to the planar circular face **2***c* of the supporting body **2**. Guide ring **11** has such a diameter that a portion **11***a* thereof is located radially outward of the inlet **9**, while the corresponding diametrically located portion **11***b* is located adjacent the circular periphery of face **2***c* of supporting body **2**, and in the proximity of the collecting surface **4***b*.

During rotation of the spinning chamber relative to the stationary supporting body **2**, the yarn assumes the operational position shown in FIGS. 1 and 2 in which the yarn does not engage the annular edge of inlet **9**, as in prior art constructions, but slidingly engages portions **11***a* of guide ring **11**. When the rotary spinning chamber turns 180 degrees to the position shown in FIGS. 3 and 4, the revolving yarn portion slides on the diametrically located ring portion **11***b*. In intermediate positions, the revolving yarn portion **5***a* slides on guide ring **11**.

As shown in FIG. 4, the distance *a* between inlet **9** and the point of guide ring **11** slidingly engaged by yarn portion **5***a*, varies during rotation, and in the position shown in broken lines, the distance *a'* is shorter than the distance *a*. The distance *b* between the engaged point of

guide ring **11** and collecting surface **3** also varies, and increases as distance *a* decreases, so that the distance *b'* is greater than the distance *a'*, although the distance *b* is smaller than the distance *a*. In the position of FIG. 1 and FIG. 2, the distance *b* is a maximum *b''*, while the distance *a* is zero.

During rotation of the spinning chamber, yarn portion **5***a* revolves from the position shown in FIGS. 1 and 2 to the positions shown in FIG. 3, and back to the position shown in FIGS. 1 and 2. Twist is produced between the nip of the transporting rollers **7** and the points of guide ring **11** slidingly engaged by yarn portion **5***a* so that the guide ring **11** performs in the device of the present invention the function of the annular edge of the inlet **9** in constructions of the prior art. However, while in prior art constructions, only yarn portion **5***b* was twisted, guide ring **11** of the present invention permits the spreading of the twist almost to the collecting surface. During movement from the position of FIG. 2 to the position of FIG. 3, the yarn is twisted between rollers **7** and ring **11**. In the position of FIG. 3, the twist also extends over the distance *a* which is equal to the diameter of the circular guide ring **11**. After turning movement for 180 degrees to the position of FIG. 2, the twist spreads from portion *a* to portion *b''* and the twist in the yarn reaches the collecting surface **3**.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of spinning arrangements differing from the types described above.

While the invention has been illustrated and described as embodied in a yarn twist controlling device for extending the twist to the revolving portion of a yarn spun in a rotary spinning chamber, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

We claim:

1. Yarn twist controlling device for a rotary spinning chamber having an annular fiber collecting surface, comprising supporting means formed with a delivery channel having an inlet for the spun yarn so that the yarn has a first revolving yarn portion extending from said collecting surface to said inlet, and a second twisted yarn portion moving outward in said delivery channel; wherein the improvement comprises guiding means on said supporting means for slidingly guiding said first yarn portion and being at least partly located between said inlet and said collecting surface so that the twist of said second yarn portion spreads to said first yarn portion.

2. The improvement defined in claim **1** wherein said guide means is curved so that the distances from the points thereof engaged by said yarn to said inlet, and the distances from said points to said collecting surface vary.

3. The improvement defined in claim **1** wherein said supporting means is a body having said inlet disposed coinciding with the axis of rotation of said spinning chamber; and wherein said guide means is mounted on said body and has a portion located adjacent said inlet of said delivery channel radially outwardly of the same and another portion located spaced from said inlet and in the proximity of said collecting surface.

4. The improvement defined in claim **1** wherein said guide means is a circular ring, and wherein said inlet is located within said circular ring in an eccentric position in relation to the center of said circular ring.

5. The improvement defined in claim **1** wherein said supporting means is a body having said inlet disposed coinciding with the axis of rotation of said spinning chamber; and wherein said guide means is a circular ring secured to said body in a position in which said inlet is located within said circular ring in an eccentric position in relation to the center of said circular ring.

6. The improvement defined in claim **5** wherein said body has a planar face perpendicular to said axis and located in said spinning chamber; and wherein said circular ring is secured to said planar face and projects from the same into said spinning chamber.

7. The improvement defined in claim **6** wherein said planar surface has a circular periphery concentric with and spaced a short distance from said collecting surface; and wherein said circular ring has a diameter corresponding to the radius of said periphery and is disposed in a position in which a portion of said ring is located adjacent and outwardly of said inlet, and a diametrical portion of said ring is located adjacent said circular periphery within the same so that the distances from said inlet to the points of said ring engaged by said yarn vary, and the distances from said points to said collecting surface vary.

8. The improvement defined in claim **7** wherein said ring has a circular cross section, abuts said planar face of said body, and projects from the same into the spinning chamber for slidingly guiding said first yarn portion.

9. Yarn twist controlling device as defined in claim **1** and comprising a pair of transporting means gripping said yarn outwardly of said delivery channel for transporting the yarn from said collecting surface to said inlet and through said delivery channel.

10. The improvement defined in claim **1** wherein said guide means is a stationary annular member secured to said supporting means in a position located in said spinning chamber; and wherein said inlet is located within said annular member in such a position that the distances from the points of said member engaged by said first yarn portion to said inlet vary during each revolution of said spinning chamber.

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