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(54) PREPARATION OF FIBRES FOR SPINNING.

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Description

This invention relates to the preparation of fibres for spinning.

In the preparation of fibres for spinning it is necessary to straighten and align the fibres to a certain extent. In the production of woollen yarn it is conventional to card the fibres to disentangle them. This produces a thin web of fibres which is split into strips. The strips are fed to rubbing aprons which consolidate the strips into slubbings. The consolidation process is slower than the carding one and is a bottleneck in the process. A large investment in rubbing aprons is needed to maximise the use of a card. The slubbings are often too thick for a required yarn fibre count so they have to be divided again, particularly for ring spinning which is a preferred system for spinning the longer fibres of woollen yarns.

US-A-3 358 432 proposes a technique for spinning yarn from sliver with a ring spinner in which drafting problems are reduced by supporting fibre being drafted on card-clothing covered rollers.

It is an object of the invention to improve the process of spinning yarns, particularly long fibre woollen yarns, by removing or reducing the need for rubbing aprons in the preparation of the fibres for the spinning stage.

According to the invention there is provided a fibre preparation apparatus including means to receive sliver from a card, means to both open the sliver in to fibres and direct the fibres on to a moving elongate surface, means to exert suction to collect the opened fibres on said elongate surface, control means urged against the surface to hold collected fibres to the surface, means to withdraw collected fibres from between the control means and the surface as a continuous strand and supply the strand to a ring spinning arrangement.

The means to withdraw collected fibres may include means to draft the strand to a required count. The means to withdraw collected fibres may include means to apply a false twist to the strand.

Suction may be applied to hold the collected fibres on the surface. The surface may be the peripheral curved surface of a hollow disc. The surface may have a groove to receive the fibres.

According to the invention there is also provided a method of preparing a sliver of fibres for spinning including:

opening fibres from the sliver on to a surface,
collecting opened fibres on said surface by suction,

moving collected fibres on the surface past a control means urged against the surface,

withdrawing collected fibres from between the surface and the control means as a continuous strand and supplying the strand to a ring spinning

arrangement.

According to the invention there is further provided a method of preparing fibres for spinning including

- 5 carding fibres to a state to be suitable for rubbing into slubbings,
- presenting the carded fibres as slivers,
- opening fibres from the sliver,
- directing fibres by said opening action on to a
- 10 collecting surface,
- holding fibres on the collecting surface,
- moving collected fibres held on the surface past a control means urged against the surface,
- withdrawing collected fibres from between the
- 15 surface and the control means as a continuous strand and supplying the strand to a spinning arrangement.

The method may include the introduction of a core yarn and wrap spinning the fibres onto the core yarn.

Embodiments of the invention will now be described with reference to the accompanying drawing which shows in schematic form a fibre preparation apparatus according to an aspect of the invention.

In the drawing a generally conventional opening wheel is indicated at OW. A collecting device CD is conveniently of hollow disc form with the peripheral curved collecting surface CS perforated to permit suction to be exerted through the surface by means not shown but indicated by arrow SU. Over part of the periphery suction is obstructed by a suitable plate or like device OB inside the disc. The disc is arranged to rotate in the direction indicated. The opening wheel OW is arranged to direct fibres F opened from a sliver S from a supply SC, in conventional manner, onto the collecting surface CS. The opening wheel rotates past the surface CS in the direction shown by the arrow. Other relative rotations are possible. A control means, such as a rubber control roller CR, is urged against the collecting surface e.g. by spring SP, to provide a "nip" and revolves with the rotation of the disc CD. Over the greater part of the surface CS, between opening wheel OW and control roller CR, the collected fibres are held by the suction SU. Suction is obstructed elsewhere, as mentioned above.

In operation of the apparatus, as described so far, the individual fibres F opened from the sliver S by the opening wheel OW are moved directly onto the collecting surface CS, partly by the action of the wheel and partly by the suction through the perforated surface. The fibres can be held to the surface by the suction as the disc rotates although in any cases suction only at the initial approach to the surface is enough to ensure that the fibres stay in place on the disc surface. The pressure pro-

duced by suction can of course be produced in other ways if preferred, as stated below, the present embodiment being only an example. The opened fibres are not allowed to "float" or form a cloud, being under control throughout the movement between the opening device and the collecting surface. On the surface the fibres have the general appearance of the fibres in a card web. As the disc CD rotates the fibres are carried into the "nip" between the control roller CR and the disc.

From the "nip" the fibres, which now are a loosely-formed fibre strand FS, are drawn through a pair of parallel friction-twisting belts TB and a pair of drafting rollers DR. The belts apply a false twist and the rollers draft, i.e. draw out, the strand to a required count. The strand is then supplied to a conventional ring-spinning arrangement RS. The false twisting operation can be omitted. The drafting operation can be omitted. The degree of false-twisting and/or drafting, if any, is adjusted as required. Preferably the strand prepared as described produces the same surface structure in the spun yarn as does the slubbing which has been treated by the rubbing aprons of the conventional technique. When long fibres are used, for which condenser technique is appropriate in the present art, the yarn surface structure preferably emulates that of condenser produced yarn.

Typically the opening wheel is about 100 millimetres in diameter. The collecting device disc is conveniently about 160 millimetres in diameter with a curved surface about 30 millimetres wide. The perforated area is about 10 to 20 millimetres wide along the middle of the surface. Lips are provided at each side of the surface and the "nip" control roller fits between the lips to hold the fibres against the surface. The surface may be flat or shaped but the control roller must be shaped to fit. The surface can have a V-groove about 10 millimetres wide, provided with perforations, to receive the fibres. The control roller is arranged to exert a "nip" similar to that in conventional processes.

As distinct from the conventional preparation of wool fibres for ring spinning, which requires extensive carding, splitting of the web and slubbing using rubbing aprons before spinning a sliver produced by less-extensive carding and without the need for slubbing can be readily and economically prepared and supplied to a ring spinner using the apparatus embodying the invention.

The techniques described are particularly suitable for the longer fibres, about one hundred millimetres or more, of wool for which ring spinning is preferred but the techniques are suitable for shorter fibres. Wool fibres range from twenty to four hundred millimetres in length. A further gain in efficiency is possible as the capacity of a slubbing bobbin is generally much less than that of a sliver

can, so when fed from slivers a ring frame can run with much less down-time. Also the transport of sliver in cans is simpler than that of slubbing bobbins.

The dimensions, speeds and pressures given by way of example are those for a typical arrangement embodying the invention and suitable ranges for these will be readily apparent to those skilled in the art, having regard to the nature and length of the fibres to be handled and the yarn required. For example a core yarn could be wrapped with the fibres by introducing the core yarn into the arrangement.

Claims

1. A fibre preparation apparatus to form fibre sliver into spun yarn including means to receive sliver from a card, process the received sliver fibres and supply them to a ring spinning arrangement, characterised by means [OW] to both open the sliver in to fibres and direct the fibres on to a moving elongate surface [CS], means [SU] to exert suction to collect the opened fibres on said elongate surface, fibre control means [CR] urged [SP] against the surface to hold collected fibres to the surface, means [DR] to withdraw collected fibres from between the control means and the surface as a continuous strand [CS] and supply the strand to a ring spinning arrangement [RS].
2. A fibre preparation apparatus according to Claim 1 in which the means to withdraw collected fibres includes means [DR] to draft the strand to a required count.
3. A fibre preparation apparatus according to Claim 1 in which the means to withdraw collected fibres includes means [TB] to apply a false twist to the strand.
4. An apparatus according to Claim 1 in which suction is applied to collected fibres up to the control means.
5. An apparatus according to Claim 1 in which the control means is a roller urged against the surface to form a "nip".
6. An apparatus according to Claim 1 in which the surface is the peripheral curved surface of a hollow disc [CD] and the disc is revolved.
7. An apparatus according to Claim 6 in which the surface has a groove to receive the fibres.

8. An apparatus according to Claim 1 in which the surface is perforated.
9. A method of preparing fibres for spinning from a sliver characterised by:
 - opening fibres from the sliver [S] on to a surface [CS],
 - collecting such opened fibres on said surface by suction [SU],
 - moving such collected fibres on the surface past a fibre control means [CR] urged against the surface,
 - withdrawing such collected fibres from between the surface and the fibre control means urged [SP] against the surface as a continuous strand [CS] and supplying the strand to a ring spinning arrangement [RS].
10. A method according to Claim 9 including carding fibres from a supply and collected carded fibres to form said sliver directly therefrom.
11. A method as claimed in Claim 9 including the introduction of a core yarn and wrap spinning the withdrawn collected fibres onto the core yarn.
12. A method according to Claim 9 including preparing fibres by carding fibres to a state to be suitable for rubbing into slubbings and presenting the carded fibres as slivers [S].
13. A method according to Claim 12 including drafting the continuous strand and supplying the drafted strand to a ring spinning arrangement, with a false twist [TB] if required.

Patentansprüche

1. Vorrichtung zum Bearbeiten von Fasern, um ein Faserband in gesponnenes Garn umzuformen, mit einer Einrichtung zum Empfangen des Bandes von einer Karde, Verarbeiten der empfangenen Fasern des Bandes und zum Zuführen derselben zu einer Ring-Spinnanordnung, gekennzeichnet durch eine Einrichtung (OW) sowohl zum Öffnen des Bandes in Fasern als auch zum Richten der Fasern auf eine sich bewegende langgestreckte Oberfläche (CS), eine Einrichtung (SU), um eine Saugkraft auszuüben zum Sammeln der geöffneten Fasern auf der genannten langgestreckten Oberfläche, eine Fasersteuereinrichtung (CR), die gegen die Oberfläche gedrückt (SP) ist, um gesammelte Fasern auf der Oberfläche zu halten, eine Einrichtung (DR) zum Abziehen gesammelter Fasern aus einem Bereich zwischen der

Steuereinrichtung und der Oberfläche in Form eines kontinuierlichen Stranges (CS) und zum Zuführen des Stranges zu einer Ring-Spinnanordnung (RS).

2. Vorrichtung zum Bearbeiten von Fasern gemäß Anspruch 1, wobei die Einrichtung zum Abziehen gesammelter Fasern eine Einrichtung (DR) aufweist, um den Strang auf die gewünschte Feinheitsnummer zu bringen.
3. Vorrichtung zum Bearbeiten von Fasern gemäß Anspruch 1, wobei die Einrichtung zum Abziehen gesammelter Fasern eine Einrichtung (TB) aufweist, um dem Strang eine falsche Drehung zu versetzen.
4. Vorrichtung nach Anspruch 1, wobei gesammelte Fasern bis zu der Steuereinrichtung gesaugt werden.
5. Vorrichtung nach Anspruch 1, wobei die Steuereinrichtung eine Rolle aufweist, die gegen die Fläche gedrückt wird, um eine "Knickstelle" zu bilden.
6. Vorrichtung nach Anspruch 1, wobei die Oberfläche die gekrümmte Umfangsfläche einer hohlen Scheibe (CD) ist und die Scheibe gedreht wird.
7. Vorrichtung nach Anspruch 6, wobei die Oberfläche eine Vertiefung aufweist, um die Fasern aufzunehmen.
8. Vorrichtung nach Anspruch 1, wobei die Oberfläche durchlöchert ist.
9. Verfahren zum Vorbereiten von Fasern zum Spinnen aus einem Band, gekennzeichnet durch:
 - Öffnen der Fasern aus dem Band (S) auf eine Oberfläche (CS),
 - Sammeln der auf diese Weise geöffneten Fasern auf der Oberfläche durch Ansaugen (SU),
 - Bewegen der so gesammelten Fasern auf der Oberfläche an einer Fasersteuereinrichtung (CR) vorbei, die gegen die Oberfläche gedrückt wird,
 - Abziehen der so gesammelten Fasern von einer Stelle zwischen der Oberfläche und der Fasersteuereinrichtung, die gegen die Oberfläche gedrückt (SP) wird, als ein kontinuierlicher Strang (CS) und Zuführen des Stranges zu einer Ring-Spinneinrichtung (RS).

10. Verfahren nach Anspruch 9, wobei die Fasern aus einer Zuführeinrichtung kardiert werden und kardierte Fasern gesammelt werden, um daraus direkt das Band zu bilden.
11. Verfahren nach Anspruch 9, wobei ein Kerngarn hinzugefügt wird und spinnend die abgezogenen gesammelten Faser um das Kerngarn gewunden werden.
12. Verfahren nach Anspruch 9, wobei die Bearbeitung der Fasern durch Kardierung in einem Zustand erfolgt, in dem sie geeignet sind, zu Vordergespinsten gestrichen zu werden und wobei die kardierte Fasern als Bänder (S) vorliegen.
13. Verfahren nach Anspruch 12, wobei der kontinuierliche Strang gezogen wird und der gezogene Strang einer Ring-Spinnrichtung zugeführt wird, falls erforderlich mit einer falschen Drehung (TB).

Revendications

1. Dispositif de préparation de fibres pour former un ruban de fibres en un filé, comprenant des moyens pour recevoir le ruban d'une carte, traiter les fibres du ruban reçu et les envoyer à un continu de filage à anneau, caractérisé par des moyens (OW) à la fois pour ouvrir le ruban en des fibres et diriger les fibres sur une surface allongée mobile (CS), des moyens (SU) pour appliquer une aspiration et rassembler les fibres libérées sur ladite surface allongée, des moyens de commande de fibres (CR) sollicités (SP) contre la surface pour maintenir les fibres rassemblées sur la surface, des moyens (DR) pour retirer les fibres rassemblées d'entre les moyens de commande et la surface sous forme d'un filé continu (CS) et envoyer le filé à un continu de filage à anneau (RS).
2. Dispositif de préparation de fibres selon la revendication 1, dans lequel les moyens pour retirer les fibres rassemblées comprennent des moyens (DR) pour étirer le filé jusqu'à un titre désiré.
3. Dispositif de préparation de fibres selon la revendication 1, dans lequel les moyens pour retirer les fibres rassemblées comprennent des moyens (TB) pour appliquer une fausse torsion au filé.

4. Dispositif selon la revendication 1, dans lequel une aspiration est appliquée sur les fibres rassemblées jusqu'aux moyens de commande.
5. Dispositif selon la revendication 1, dans lequel les moyens de commande sont constitués par un rouleau sollicité contre la surface pour former une "zone de pincement".
6. Dispositif selon la revendication 1, dans lequel la surface est la surface périphérique courbe d'un disque creux (CD), et le disque est entraîné en rotation.
7. Dispositif selon la revendication 6, dans lequel la surface comprend une gorge pour recevoir les fibres.
8. Dispositif selon la revendication 1, dans lequel la surface est perforée.
9. Procédé de préparation de fibres en vue du filage à partir d'un ruban, caractérisé par:
la libération des fibres à partir du ruban (S) pour les amener sur une surface (CS),
le rassemblement de ces fibres libérées sur ladite surface par aspiration (SU),
le transfert de ces fibres rassemblées sur la surface au-delà de moyens de commande de fibres (CR) sollicités contre la surface,
le retrait de ces fibres rassemblées d'entre la surface et les moyens de commande de fibres sollicités (SP) contre la surface sous forme d'un filé continu (CS) et l'envoi du filé à un continu de filage à anneau (RS).
10. Procédé selon la revendication 9, comprenant le cardage de fibres à partir d'une source d'alimentation et le rassemblement des fibres cardées pour former ledit ruban directement à partir de celles-ci.
11. Procédé selon la revendication 9, comprenant l'introduction d'un fil de coeur et le filage par enveloppement des fibres rassemblées et retirées sur le fil de coeur.
12. Procédé selon la revendication 9, comprenant la préparation de fibres par le cardage de fibres jusqu'à un état apte au frottement en des mèches et la présentation des fibres cardées sous forme de rubans (S).
13. Procédé selon la revendication 12, comprenant l'étirage du filé continu et l'envoi du filé étiré vers le continu de filage à anneau, avec une fausse torsion (TB) si cela est nécessaire.

