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(54) **Device to piece-up rovings of textile fibres.**

(57) Device to piece-up rovings of textile fibres for spinning machines for carded and combed yarns, the device being suitable for employment in cooperation with and on such spinning machines and comprising a perforated grill (10) having two cooperating surfaces (20–21) which undergo at least a temporary aspiration action (13), a nozzle (11–12) to emit fluid (19) under pressure being included.

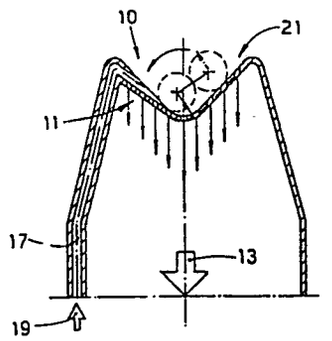

fig. 2a

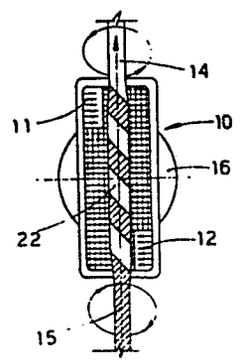

fig.3

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"DEVICE TO PIECE-UP ROVINGS OF TEXTILE FIBRES"

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This invention concerns a device suitable for the piecing-up of rovings of textile fibres. The device is satisfactorily employed in piecing-up roving on spinning machines and, in particular, on machines equipped with automatic devices to change rolls or packages of roving being fed. Such spinning machines can process roving of carded or combed yarns.

Methods and devices employed on spinning machines for piecing-up the roving are already known in the art.

According to one of these systems employed on spinning machines for carded yarns the heads or tails of the roving are positioned on an aspiration grill and the fibres of the two ends of the rovings are intermingled by the aspiration action, the bonding and piecing-up of the rovings being thus created.

This cited embodiment obtains a splice which often possesses not enough strength, thus leading to breakage of the roving and interruption of the spinning process.

DE-OS-3.247.687 is known and discloses the piecing-up of two superimposed rovings by means two concurrent jets of air which intermingle the fibres of the two rovings. This embodiment creates a weak bond between the rovings and a thickened zone, and this bond will be satisfactory only in cooperation with further processing by drawing and tearing machines but will not be satisfactory on spinning machines and even less satisfactory on spinning machines comprising an automatic change of the rolls of roving.

DE-OS-3.004.721 is also known and discloses a splicer device working by air for textile yarns. This device consists of two twin turbulence chambers cooperating with intermediate mechanical clamping means. The splicer device provides for mechanical gripping of the tail ends of the yarns and mechanical clamping together with drawing of the textile

yarns. This system is excellent when applied to textile yarns but cannot be used to splice rovings owing to the dimensions and weakness, namely lack of consistency, of the rovings.

The present invention eliminates these shortcomings and enables a stronger and more stable splice of the rovings in the feed of the roving to be obtained, at the same time improving the application of automatic systems to change the rolls and/or packages of roving being fed to the spinning machine. The invention therefore tends to make the operations of the spinning machine more reliable.

According to the invention a grill device subjected to an aspiration action undergoes also the action of a nozzle fed with fluid under pressure that acts substantially at a tangent to the roving.

Such tangential action together with the aspiration action sets the roving in rotation.

Where two rovings are positioned side by side, the combined action of aspiration and of tangential thrust causes rotation of the rovings and their rolling-up or knotting together.

In a variant of the invention two nozzles are provided and fed with fluid under pressure, the nozzles acting in a rotary manner.

The U-shaped conformation of the grill is advantageous for the invention in that the action of the ejector nozzles at a tangent to the grill is discharged onto the opposed surface.

The inclusion of two nozzles in positions offset in relation to each other has been found to be advantageous and to enhance the knotting effect at both ends of the rovings.

A variant of the invention has been embodied with more than two nozzles.

The invention therefore concerns a method to piece-up the rovings of textile fibres being fed to spinning machines when the ends of the rovings to be pieced-up have been positioned,

by hand or automatically, superimposed on each other or side by side on the aspiration grill of the device.

The rovings are pieced-up by twisting together the end of the roving being fed with the end of the roving coming from a replacement roll or full package; such twisting in conjunction with the intermingling of the fibres provides the action of piecing-up the roving.

The invention concerns also a device which enables the above method to be obtained in practice.

The invention is therefore embodied with a device to piece-up rovings of textile fibres for spinning machines for carded and combed yarns, the device being suitable for employment in cooperation with and on such spinning machines and being characterized in that it comprises a perforated grill having two cooperating surfaces which undergo at least a temporary aspiration action, a nozzle to emit fluid under pressure being included.

The attached figures show, as a non-restrictive example, a preferred practical embodiment of the method, but technical and constructional variants can be applied without departing thereby from the scope of the invention.

The figures show the following:-

Figs.1a and 1b give a plan view and a cross section along A-A respectively of a preferred embodiment;

Figs.2a and 2b show cross sections along B-B and C-C respectively of the embodiment of Fig.1a;

Figs.3 to 7 show the procedure;

Figs.8 and 9 show two splices made with different counts of yarn.

A perforated grill 10 of suitable dimensions is provided in cooperation with a conduit 16 subject to an aspiration action 13. The diameter of the holes in the grill may range from 0.4 to 1.5 mm., but the present applicant has found that a

diameter of 0.6-0.7 mm. of the holes is best.

The grill will advantageously have an elongated U-shaped conformation. The angle "alpha" of the "U" may vary between 160° and 60° and the present applicant has found that an angle between 75° and 120° is the best.

In a preferred embodiment two nozzles 11 and 12 respectively will cooperate with the grill 10 and are fed by fluid under pressure 19 through conduits 17 and 18 respectively. The fluid under pressure 19 may be fed at a temperature deemed most suitable and may contain treatment substances.

As can be seen clearly in Figs.2a-2b the nozzles 11-12 deliver the fluid under pressure 19 to the grill 10 near the upper surface of the grill and in cooperation with the corresponding sloped, perforated surfaces 20-21.

The fluid 19 runs along the corresponding sloped surface and ascends, if the pressure is sufficient, the opposite surface, its action and rate of flow diminishing progressively owing to the presence of aspiration action 13.

Owing to the position of the nozzles 11-12 the action of the fluid 19 creates a twisting effect on the rovings, and this effect causes the rovings to wind round each other, as is indicated hereinafter.

One single nozzle 11 or 12 may be provided instead of the two nozzles 11-12. A plurality of nozzles may alternatively be included and be arranged in a systematic manner on the grill 10; all of the nozzles may have the same capacity, or else the nozzles may have differentiated capacities.

The action of the nozzles may be simultaneous or partially overlapping or may take place at different times.

The pressure of the fluid 19 may be constant, pulsating or variable during the piecing-up operation on the grill 10.

The aspirating action 13 too may be constant or variable or pulsating or may be lacking for a part or the whole of the

piecing-up operation on the grill 10.

Moreover, the aspirating action 13 may be restricted to a very precise area of the grill 10, whereas the remaining area may undergo either a different aspirating action or no aspirating action at all.

The tail of the roving 14 being currently fed is stationary on the perforated grill 10 in relation to the grill and is kept adhering thereto by aerodynamic actions created by the aspiration.

The head 15 of the new roving to be pieced-up is positioned by hand or automatically on the same grill 10 and, being drawn by the aspiration action, is superimposed on or positioned at the side of the previous roving 14.

The jets of fluid 19 created in the example shown by the nozzles 11-12 create the required actions, which in conjunction with the actions generated by the aspiration 13 acting on the perforated grill 10 determine the field of the forces which set in rotation the ends 14-15 of the rovings, thus causing the twisting of the ends 14-15 of the rovings and the intermingling of their fibres.

The feed of the nozzle or nozzles comes from an outside source of which the pressure may be regulated as required, as we said earlier.

Feed rollers located downstream of the grill 10 may be actuated or not during the action of the fluid so as to draw onto the grill 10 the tail of the roving being fed and therewith the splice which is being produced. The feed rollers are not shown in the figures.

During spinning the roving already being fed and the splice are gripped by the feed rollers and, on departing therefrom, obtain a false twist, provided by known devices, or obtain their definitive twist by means of the rotating spindle.

In any event, the final piecing-up takes place at the

moment when the spindle applies the twist to the fibres, for the piecing-up carried out on the grill 10 is only a provisional splice, which however is enough to provide the roving with continuity.

When the rolls or packages of roving being fed are changed by automatic devices, suitable known means arrange for replacement of the exhausted roll with a full roll and for the shearing of the previous roving 14 at a position immediately upstream of the grill 10 of the device so as to leave only a few millimetres of roving upstream of the first nozzle 11; in the same way the head of the new roving 15 has to extend by a few millimetres beyond the second nozzle 12. In this way the ends of the rovings 14-15 are twisted about each other in an adequate manner.

The perforated grill 10 may have a variable radius of its rounded union at its centre, the radius depending on the specific application. In a variant the geometry of the union may be circular or curved.

The grill may be perforated with holes having various diameters; the distribution of the holes in the grill may be differentiated.

As we said earlier, the nozzles to feed compressed air may be one, two or more in number and may be located in diverse positions; they may also lie at a tangent to the surfaces of the grill or at any angle thereto.

The dimensions of the grill may be varied to obtain the best piecing-up results for the count of the roving in question and for the type of material of which the fibres consist.

CLAIMS

1 - Device to piece-up rovings of textile fibres for spinning machines for carded and combed yarns, the device being suitable for employment in cooperation with and on such spinning machines and being characterized in that it comprises a perforated grill (10) having two cooperating surfaces (20-21) which undergo at least a temporary aspiration action (13), a nozzle (11-12) to emit fluid (19) under pressure being included.

2 - Device as claimed in Claim 1, in which the grill (10) comprises two surfaces (20-21) positioned at an angle of between 60° and 160° to each other.

3 - Device as claimed in Claim 2, in which the two surfaces (20-21) are positioned at an angle of between 75° and 120° to each other.

4 - Device as claimed in Claim 1, in which at least two nozzles (11-12) to emit fluid (19) under pressure are included.

5 - Device as claimed in any claim hereinbefore, in which a union of a required amplitude is comprised at the vertex of the angle between the two surfaces (20-21) of the grill.

6 - Device as claimed in any claim hereinbefore, in which the diameters of the holes in the grill (10) range from 0.4 to 1.5 mm.

7 - Device as claimed in Claim 6, in which the diameters of the holes in the grill (10) range from 0.6 to 0.7 mm.

8 - Device as claimed in any claim hereinbefore, in which the density of the holes in the grill (10) is constant.

9 - Device as claimed in any of Claims 1 to 7 inclusive, in which the density of the holes in the grill (10) is variable.

10 - Device as claimed in any claim hereinbefore, in which the dimension of the holes in the grill (10) is constant.

11 - Device as claimed in any of Claims 1 to 9 inclusive, in

which the dimension of the holes in the grill (10) is variable.

12 - Device as claimed in any claim hereinbefore, in which the surfaces (20-21) of the grill (10) have a straight development.

13 - Device as claimed in any of Claims 1 to 11 inclusive, in which the surfaces (20-21) of the grill (10) have a curved development.

14 - Device as claimed in any claim hereinbefore, in which the emitting nozzles (11-12) are positioned at a tangent to their respective surface (20-21) of the grill.

15 - Device as claimed in any of Claims 1 to 13 inclusive, in which the emitting nozzles (11-12) are positioned at an angle to their respective surface (20-21) of the grill.

16 - Device as claimed in any claim hereinbefore, in which the aspiration (13) is exerted over all of the surfaces (20-21) of the grill without any substantial discontinuity of values at one and the same moment.

17 - Device as claimed in any of Claims 1 to 15 inclusive, in which the aspiration (13) is exerted with variable values over specialized areas of the surfaces (20-21) of the grill.

European Patent Office

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Application number

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EUROPEAN SEARCH REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 4)
A,D	DE-A-3 247 687 (SPINNEREIMASCHINENFABRIK SEYDEL & CO. GmbH) * Page 12, lines 5-31; figure 3 *	1	B 65 H 69/06 D 01 H 15/00
A,D	DE-A-3 004 721 (MURATA KIKAI K.K.) * Page 5, lines 12-27 *	4,14, 15	

TECHNICAL FIELDS SEARCHED (Int Cl 4)

B 65 H
D 01 H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22-05-1987	HOEFER W.D.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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