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(12) # EUROPEAN PATENT APPLICATION

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(54) **Producing textile fibre strand.**

(57) There is disclosed a method and apparatus for producing a textile fibre strand (11) by consolidating a sliver (12) from a carding operation (33) by passage through an air jet process (13) and optionally additionally through a rubbing apron process.

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This invention relates to the production of textile fibre strand, for example, a consolidated sliver or roving produced by a carding or a carding and speedframe operation.

Traditionally, in the production of staple fibre yarns, a card web is divided into slivers which are consolidated for ease of winding into firm packages and further handling and processing particularly by rubbing aprons which impart twist or false twist to the sliver.

The rubbing aprcns and associated equipment are bulky and cumbersome and relatively slow in operation. The present invention provides an efficiency-improving replacement or alteration.

The invention comprises a method for producing a textile fibre strand comprising the step of consolidating a sliver following a carding operation producing the sliver by passing the sliver through an air jet process.

The air jet process may comprise air jet twisting.

A card web may be divided into a plurality of slivers, each sliver being individually passed through an air jet process.

The air jet process may be accompanied by a rubbing apron process and may precede the same.

The sliver may be subjected to a fibre setting operation especially so whilst fibre twisted by the air jet. The air jet may false twist the sliver up to a twist stop located upstream of the air jet.

The invention also comprises apparatus for producing a consolidated textile fibre strand from a sliver produced by a carding operation comprising air jet means located adjacent a carding machine and arranged to receive and consolidate a sliver from the carding machine.

Apparatus according to the invention for producing consolidated textile fibre strands from sliver produced by a carding machine may comprise an array of air jet means each adapted to receive one of a plurality of slivers divided from the card web produced by the carding machine.

The machine may comprise rubbing apron means associated with the air jet means (or with the carding machine). The rubbing apron means may be arranged to receive consolidated sliver from the air jet means.

Thermoplastic web fibres may be shrunk before encountering the air jet means, especially in the case of acrylic fibres, by subjecting them to a heat treatment. Adjacent slivers may be differentially heat treated as by one being left untreated and one being heated so as e.g. to shrink the fibres, the two slivers being combined together in one air jet means. Fibres that respond to steam treatment may be so treated for example for shrinkage or to set them in twisted form.

The air jet means may be of the entangling rather than the twisted type, of course, although different results can clearly be anticipated from the two types.

Embodiments of apparatus and methods according to the invention will now be described with reference to the accompanying drawings, in which :-

Figure 1	is a diagrammatic sectional view of part of an apparatus according to the invention;
Figure 2	is a section on the line II-II of Figure 1;
Figure 3	is a diagrammatic plan view of a carding machine with an array of air jet means producing consolidated textile strands;
Figure 4	is a diagrammatic view of an arrangement with air jet means and rubbing apron means;
Figure 5	is a diagrammatic view of an arrangement with rubbing apron means, followed by air jet means;
Figure 6	is a diagrammatic view of a false twisting air jet means together with fibre setting heater means;
and Figure 7	is a diagrammatic view of false twisting air jet means supplied with two slivers, one being shrunk and one not.

The drawings illustrate methods and apparatus for producing a textile fibre strand 11. The methods comprise consolidating a sliver 12 following a carding operation producing the sliver, by passing the sliver 12 through an air jet means 13.

The jet means 13 illustrated in Figures 1 and 2 comprises a twisting jet 21 having a venturi section 21a and offset jets 22. The jet means 13 false twist the sliver back to twist stop means 24 adjacent the carding machine, the twist stop means comprising nip rollers 24a, 24b.

The resulting strand is better consolidated than a strand that has not been subject to an air jet process and can be wound up into a firmer package with less liability to break. The action is akin to the action of rubbing aprons but can be applied more easily and much faster.

As shown in Figures 4 and 5, a rubbing apron may be used as an auxiliary.

Figure 3 illustrates how an array 31 of air jet means 13 can be used to consolidate a plurality of slivers 32 from a carding machine 33 the slivers being divided from a single card web produced by the machine.

Figure 6 illustrates how a false twisting air jet means 61 can be used with a heater 62 for setting false twist in the sliver 63. False twist exists in the

zone between the false twist device and the carding machine and with thermoplastic yarns, heating may set in some of the false twist, the memory of the set twist remaining after untwisting as the strand passes through the false twisting air jet means 61.

Figure 7 illustrates false twisting air jet means 71 supplied with two slivers e.g. of acrylic yarn which shrinks on heating. One sliver 72 is from a heater 73, the other not. That from the heater 73 is shrunk, the other is not. When fabricated, the fibres have differential shrinkage.

Instead of twist by jet means, entangling jet means in which the fibres are entangled the better to cohere together as a textile entity.

The type of air jet means and the operating air pressures will be similar to those used in texturising continuous filaments by air jet false twisting or tangling.

Other arrangements falling within the general idea of the invention will no doubt suggest themselves.

Claims

1. A method for producing a textile fibre strand comprising the step of consolidating a sliver following a carding operation producing the sliver by passing the sliver through an air jet process.

2. A method according to claim 1, wherein the air jet process comprises air jet twisting.

3. A method according to claim 1, wherein the air jet process comprises causes entangling rather than twisting.

4. A method according to any one of claims 1 to 3, wherein a card web is divided into a plurality of slivers, each sliver being individually passed through the air jet process.

5. A method according to any one of claims 1 to 4, wherein the air jet process is accompanied by a rubbing apron process.

6. A method according to claim 5, wherein the rubbing apron process precedes the air jet process.

7. A method according to any preceding claim, wherein the sliver is subjected to a fibre setting operation.

8. A method according to claim 6, wherein the air jet process false twists the sliver up to a twist stop located upstream of the air jet.

9. A method according to any preceding claim, wherein the web of fibres are thermoplastic and wherein a sliver thereof is subjected to heat or steam treatment before encountering the air jet process.

10. A method according to claim 9, wherein said sliver is combined with another which has not been heat treated for treatment by the air jet process.

11. Apparatus for producing a consolidated textile fibre strand from a sliver produced by a carding operation comprising air jet means located adjacent the carding machine and arranged to receive and consolidate a sliver from the carding machine.

12. Apparatus according to claim 11, comprising an array of air jet means each adapted to receive one of a plurality of slivers divided from the card web produced by the carding machine.

13. Apparatus according to either claim 11 or claim 12, further comprising rubbing apron means associated with the air jet means.

14. Apparatus according to claim 13, wherein the rubbing apron means precedes the air jet means.

15. Apparatus according to claim 13, wherein the rubbing apron means receives consolidated sliver from the air jet means.

16. Apparatus according to any one of claims 11 to 15, wherein the air jet means is of the twisting kind.

17. Apparatus according to any one of claims 11 to 15, wherein the air jet means is of the entangling kind.

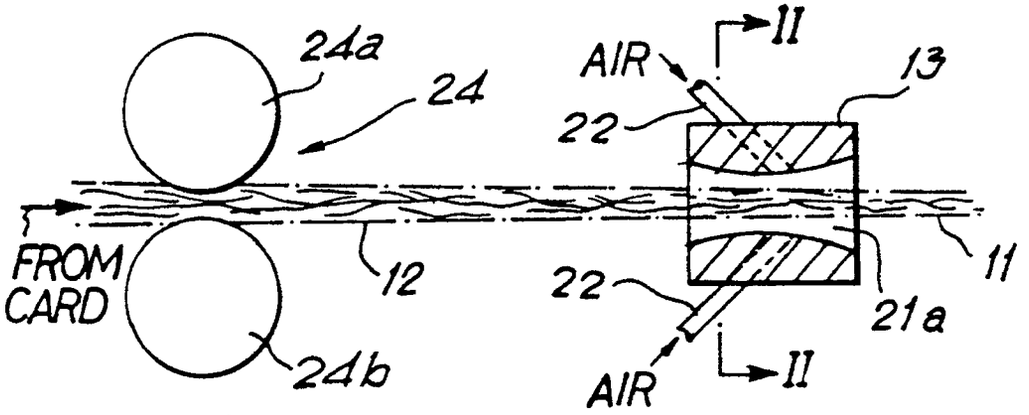

FIG.1

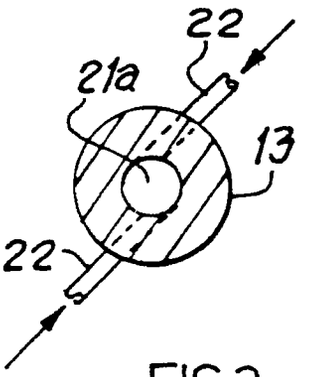

FIG.2

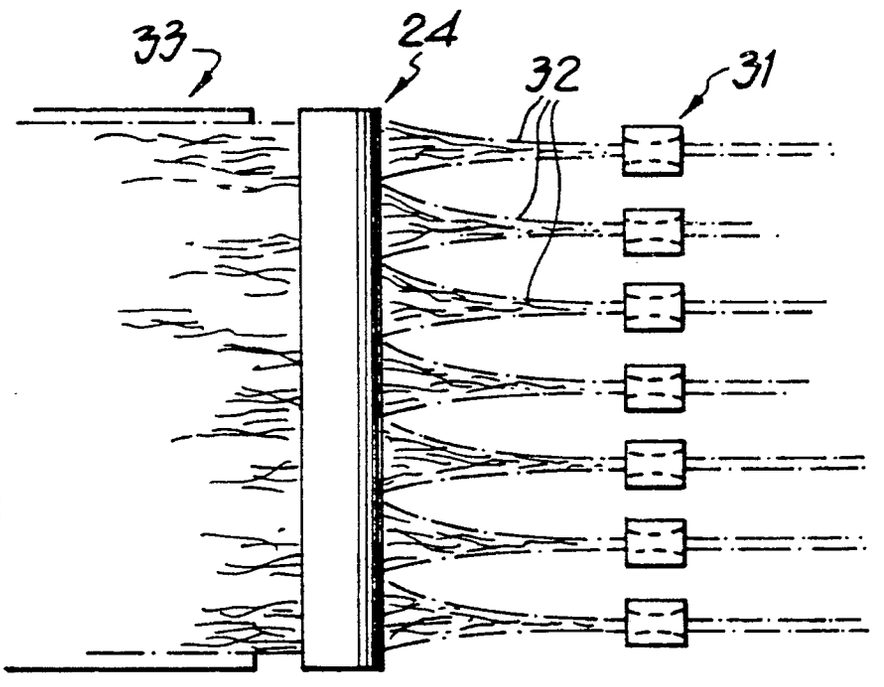

FIG.3

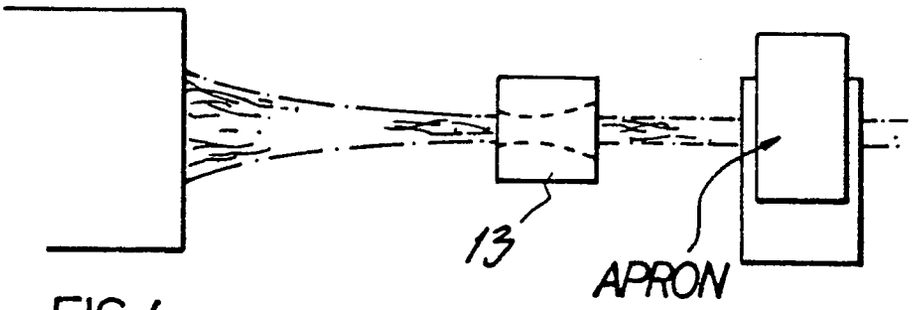

FIG.4

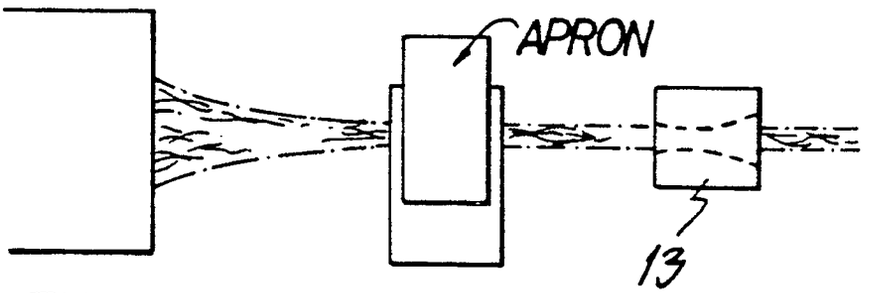

FIG.5

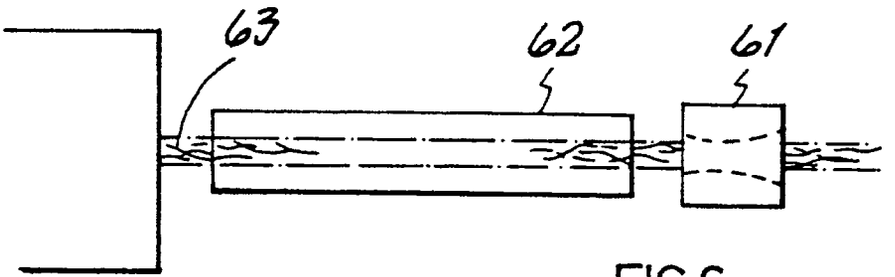

FIG.6

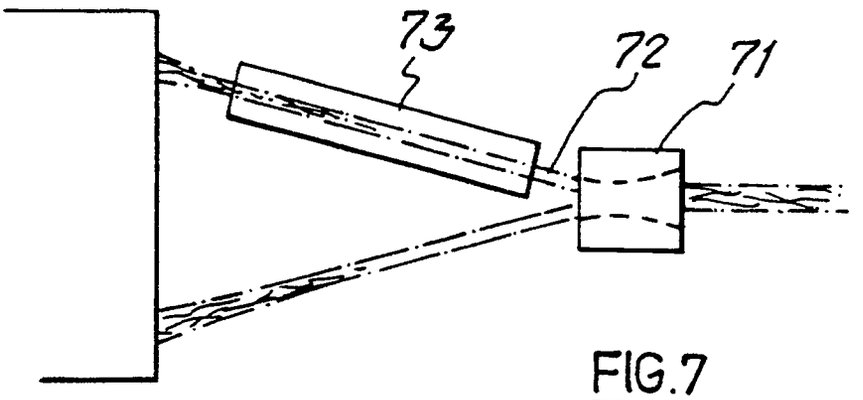

FIG.7

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EUROPEAN SEARCH REPORT

Application Number

EP 90 30 2632

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.5)
E	GB-A-2 222 836 (HAIGH-CHADWICK LTD) * the whole document *	1-17	D 01 G 15/66
X,A	EP-A-0 174 112 (CARDING SPECIALISTS (CANADA) * the whole document *	1,2,3,11, 16,17	
A	EP-A-0 065 756 (GEHRS,H.)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D 01 G
D 01 H

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	27 November 90	MUNZER E.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
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