ABSTRACT

A fiber separating roller device for spinning units of pneumatic-mechanical machines for manufacturing yarn, particularly by means of an under-pressure (reduced pressure) spinning chamber mounted with its front surfaces in the recess of and substantially sealed to the body of the fiber separating mechanism. The body of the fiber separating roller is provided with at least two continuous passages therethrough. The axes of the passages may be parallel to the axis of rotation of the fiber separating roller, skewed in one direction relative to the axis of rotation of the fiber separating roller, or alternating skewed in several directions relative to the axis of the fiber separating roller.
FIBER SEPARATING ROLLER DEVICE FOR SPINNING UNITS OF PNEUMATIC-MECHANICAL YARN MANUFACTURING MACHINES

The present invention relates to an improved fiber separating roller device for spinning units of machines for manufacturing yarn pneumatically-mechanically, the spinning chamber of such spinning unit being mounted with its front surfaces in the recesses of the body of the fiber separating mechanism.

Embodiments are known in which the fiber separating roller mounted inside the body of the fiber separator mechanism is provided with smooth front surfaces engaging the recesses of said body. A feeding roller is usually attached to the fiber separating roller, said feeding roller feeding a sliver of fibrous material to the working surface of the fiber separating roller. The separate, combed-out fibers are withdrawn through the withdrawing opening, which is represented by an exit channel, which opens onto the collecting surface of the rotary spinning chamber, where yarn is formed from the fibers in a known manner.

It sometimes happens, during combing, that certain fibers are not brought into the exit channel by the combing roller but get into the space between the body of the fiber separating mechanism and the two front surfaces of the fiber separating roller. An accumulation of fibers in this space unfavorably effects the function of the combing roller causing the production of lower quality yarn, particularly as to the increased frequency of its breakage, as well as in the reduced lifetime of the combing mechanism. In certain cases, complete choking of the mechanism by fibers occurs, and thereupon also mechanical deformation of the driving part of the combing roller, which is removable by dismounting the fiber separating mechanism.

For the purpose of preventing such phenomena, a modification of the fiber separating roller has been proposed consisting in that the circumferences of the front surfaces of the fiber separating roller are provided with projections in the form of teeth, rounded off grooves, or knurling. This modification only generally prevents the penetration of fibers between the walls of the body and the front surfaces of the fiber separating roller without excluding the possibility of choking, particularly during extended operation.

According to a further proposal, the walls of the body of the fiber separating body are provided with openings enabling air to enter the inner space, said air being thus introduced into the path about which the fibers are conveyed during processing.

The disadvantage of the latter modification consists particularly in that the close zone of the yarn forming point is contaminated to a great extent by dust and fluff, the said impurities being sucked in by the openings into the front space of the fiber separating mechanism in which also the fiber separating roller is mounted. At least a part of these impurities is stuck in such front space, and also causes choking after extended operation.

The present invention has among its objects the overcoming and limiting of said fiber flue dust to a minimum, thus enhancing the reliability of operation of the spinning mechanism, as well as the quality of the yarn produced by it.

In accordance with the present invention the body of the fiber separating roller is provided with at least two continuous openings therethrough.

Further features are obvious from the following specification, describing preferred, non-limiting embodiments of the invention, and the accompanying drawings which form a part of the application and in which:

FIG. 1 is a view in vertical section through a first embodiment of the fiber separating mechanism of the invention;

FIG. 2 is a side view in vertical section through the fiber separating mechanism and the spinning chamber;

FIG. 3 is a view in side elevation of a first embodiment of the fiber separating roller;

FIG. 4 is a view in chordal section through the fiber separating roller along the line IV—IV in FIG. 3;

FIG. 5 is a view in side elevation of a further embodiment of the fiber separating roller; and

FIG. 6 is a view in diametral section through the further embodiment of the fiber separating roller along line VI—VI in FIG. 5.

It will be seen from the above that FIGS. 1-4, inclusive, show a first embodiment of fiber separating mechanism, and that FIGS. 5 and 6 show a modification of the fiber separating roller therefor. In the fiber separating mechanism of FIGS. 1-4, inclusive, a feeding roller is rotatably mounted in the body of the mechanism, and in its immediate proximity there is rotatably mounted a fiber separating roller provided with a suitable roughened operative surface, e.g. a sawtooth wire, needles, rippled rings or similar elements. The actual body of the fiber separating roller is provided with continuous openings or passages therethrough, the axes of which are skewed with respect to the axis of rotation of the fiber separating roller, either only in one direction as shown, or alternatingly in several directions.

The front surfaces of the body of the fiber separating mechanism are substantially sealed to the spinning chamber 7, so that the vacuum in the spinning chamber sucks air through the body or housing of the fiber separating mechanism.

The shape of the openings can be either circular, or square-shaped, rectangular, triangular, hexagonal, rhombic, slot-shaped with rounded-off ends or any other shape. The space within the fiber separating mechanism body, in which the fiber separating roller is mounted, opens tangentially into the collecting surface of a spinning chamber 7. The side walls of body 1 of the fiber separating mechanism are connected with the ambient atmosphere by means of ventilation openings 8, 9 which have the maximum possible dimensions. The ventilation recess at the free side of body 1 of the fiber separating mechanism is at least equal or bigger than two-thirds of the diameter of fiber separating roller 3 in any case, however, its rim is situated below the operative surface of fiber separating roller 3. Also, the ventilation recess 8 on the other side of body 1 of the fiber separating mechanism has an area of a dimension maximally possible, its shape being, however, influenced and limited by the mounting 12 of fiber separating roller 3.

The fiber separating roller according to the present invention works as follows:
During rotation of the fiber separating roller 3 during operation, separate fibers are separated from a sliver 10 (FIG. 2), which is fed by feeding the sliver between rollers 2 and 3 into body 1 of the fiber separating mechanism, said separated fibers then being conveyed by a common action of fiber separating roller 3 affixed to a shaft journaled at 12 in fixed frame structure and underpressure (held at a pressure less than atmospheric in a known manner) spinning chamber 7 through the channel 6 into spinning chamber 7, in which they are processed in a known manner to form yarn 11. Due to high velocity of rotation of the fiber separating roller 3, which, as we have seen, is provided with continuous openings 5, an increased air flow arises at its two sides between its front surfaces and the walls of body 1 of the fiber separating mechanism. Said air flow increases the pressure at the immediate proximity of the two front surfaces of the fiber separating roller 3, thus creating an air pressure diaphragm which avoids the penetration of fibers between the front surfaces of the fiber separating roller 3 and the walls of body 1 of the fiber separating mechanism, and thus directing said fibers into the required direction. Thus the fouling of the said space by impurities or its choking, respectively, is avoided.

In FIGS. 5 and 6 there is illustrated a modified fiber separating roller, here designated 3'. Roller 3' has a plurality of passages 5' therethrough, such passages having their axes parallel to the axis of roller 3'.

The advantages of the fiber separating roller according to the present invention, lie in its simple modification and its consequent high efficiency, which raises the quality of the yarn and prolongs the lifetime of the components of the fiber separating mechanism.

Although the invention is illustrated and described with reference to a plurality of embodiments thereof, it is to be expressly understood that it is in no way limited to the disclosure of such a plurality of embodiments, but is capable of numerous modifications within the scope of the appended claims.

What is claimed is:

1. In the combination of a spinning unit of a machine for manufacturing yarn by combined pneumatic and mechanical manipulation, said spinning unit operating under sub-atmospheric pressure, and a fiber separating device disposed in advance of the spinning unit to feed separated fibers thereinto, the improvement which comprises a housing for the fiber separating device, said housing being disposed close to and substantially sealed to the spinning chamber, and a fiber separating roller rotatably mounted in the housing of the fiber separating mechanism, said roller being provided with passages therethrough.

2. Apparatus according to claim 1, comprising a rotatably driven spinning member in the spinning chamber, and wherein the roller is mounted for rotation on an axis disposed normal to the axis of rotation of the spinning member.

3. Apparatus according to claim 2, wherein the parts are so constructed and arranged that the separating roller delivers separated fibers tangentially thereof directly into the spinning chamber.

4. Apparatus according to claim 2, wherein the fiber separating roller has a roughened operative peripheral surface, and comprising a fiber feeding roll disposed to function with the separating roller to feed fibers into the fiber separating mechanism.

5. Apparatus according to claim 1, wherein the axes of the passages through the fiber separating roller are parallel to the axis of such roller.

6. Apparatus according to claim 1, wherein the axes of the passages through the fiber separating roller are parallel to each other and are skewed in one direction relative to the axis of the fiber separating roller.

7. Apparatus according to claim 1, wherein the axes of the passages through the fiber separating roller are alternatingly skewed in several directions relative to the axis of the fiber separating roller.