

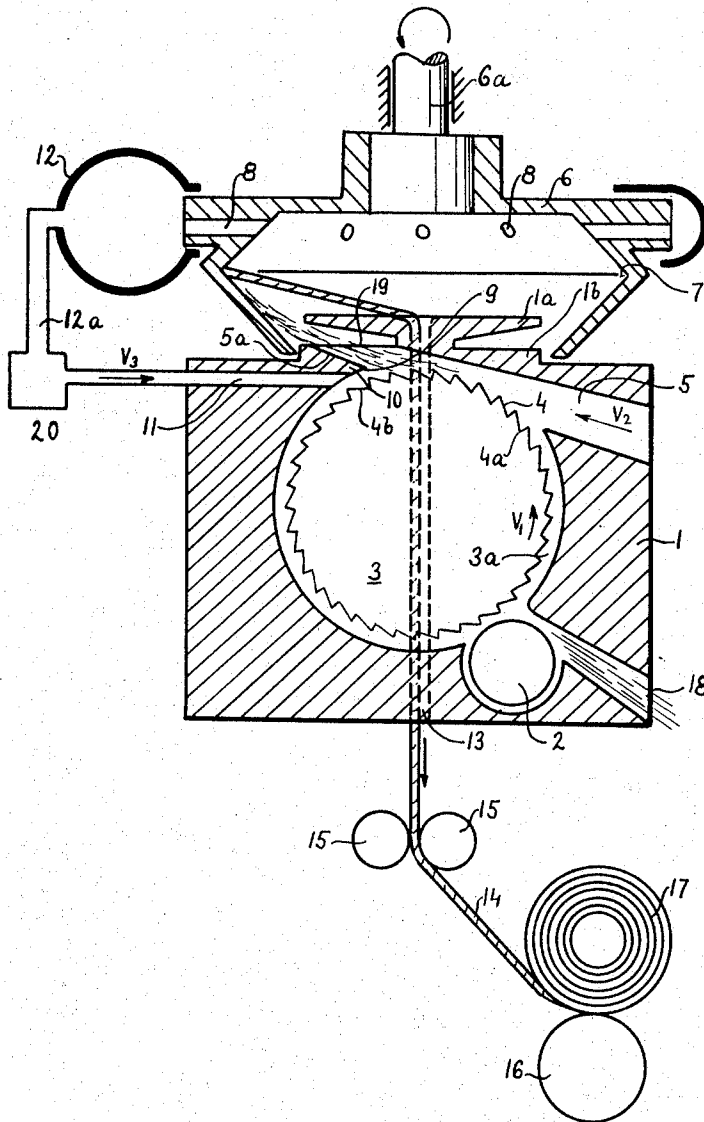
Jan. 2, 1968

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3,360,917

FIBER FEEDING DEVICE FOR A ROTARY SPINNING CHAMBER

Filed Dec. 7, 1966



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FIBER FEEDING DEVICE FOR A ROTARY SPINNING CHAMBER

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Filed Dec. 7, 1966, Ser. No. 599,943

Claims priority, application Czechoslovakia, Dec. 7, 1965, 7,334/65

10 Claims. (Cl. 57—58.95)

ABSTRACT OF THE DISCLOSURE

At the periphery of a combing roller, which carries fibers into a suction channel leading to a rotary spinning chamber, pressure air is blown for preventing accumulations of fibers.

Background of the invention

The present invention relates to an improvement of a fiber combing and feeding device for a rotary spinning chamber into which fibers are sucked and deposited on an annular collecting surface where a yarn is formed.

In constructions according to the prior art, a rotary combing roller combs fibers out of a sliver, and the fibers are carried by the combining roller into a suction channel communicating with the inlet of the rotary spinning chamber. The combing roller is located in a cylindrical cavity of a body, and forms a gap with the same, except where a peripheral portion of the combing roller is located in the suction channel. Between the outlet portion of the suction channel and one end of the gap, a sharp edge is provided for guiding the fibers into the gap. However, accumulations of fibers frequently form on the sharp edge at the respective end of the gap which are finally drawn into the outlet portion of the suction channel and enter simultaneously the spinning chamber so that a slub is formed in the yarn since the portion spun of the accumulated fibers is thicker than the remaining yarn which is spun of separated fibers. It is not possible to impart any twist to such a slub of the spun yarn, and consequently the yarn frequently breaks. In any event, the quality of the yarn is impaired since the thickness and twist of the yarn are not uniform. This is also due to the fact that the accumulated fibers are in a bent and curled condition, whereas combed fibers directly fed through the suction channel into the spinning chamber are straight.

Summary of the invention

It is one object of the invention to overcome this disadvantage of known fiber feeding devices for rotary spinning chambers and to prevent accumulations of fibers in the feeding device.

Another object of the invention is to blow air into the region of the feeding device where accumulations of fibers usually take place so that gathering fibers are blown into the suction channel before a substantial number can accumulate.

Another object of the invention is to use the air pressure produced by the rotary spinning chamber for producing pressure air used for preventing accumulations of fibers in the feeding device of the spinning chamber.

With these objects in view, the present invention relates to a fiber feeding device for a rotary spinning chamber. A body has a suction channel with an outlet portion for guiding air in one direction into the spinning chamber, and a rotary combing means for combining fibers out

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of a sliver and being disposed so that a peripheral portion thereof is located upstream of the outlet portion in the region of the suction channel so that fibers are drawn by suction from the peripheral portion into the spinning chamber. In accordance with the invention, clearing means are provided for blowing pressure air at the peripheral portion so that accumulations of fibers are blown into the suction channel and are sucked through the outlet portion of the same into the spinning chamber.

In the preferred embodiment of the invention, a diffuser casing surrounding the spinning chamber and receiving pressure air from the same, is connected by a conduit with a pressure channel opening at the end of the peripheral portion leading in the direction of rotation of the same, and extending in substantially tangential direction. A sharp edge is disposed between the pressure channel and the outlet portion of the suction channel and forms the end of the part-circular gap surrounding a combing roller. It is at this point where accumulation of fibers frequently takes place in constructions according to the prior art, and due to the provision of the pressure channel, fibers tending to accumulate at the end of the gap and on the sharp edge, are blown into the suction channel and transported into the spinning chamber before a substantial accumulation can take place.

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 a specific embodiment when read in connection with the accompanying drawing.

Brief description of the drawing

The single figure of the drawing is a schematic sectional view illustrating a preferred embodiment of the invention.

Description of a preferred embodiment

A rotary spinning chamber 6 of known construction has a shaft 6a mounted in a bearing and driven to rotate the spinning chamber about its axis. The spinning chamber has a pair of frusto-conical walls forming a circular collecting surface 7 in the region of the greatest diameter of the spinning chamber. Air escape openings 8 are provided through which air is outwardly discharged due to the action of the centrifugal force. The air is under pressure in the diffuser casing 12 which surrounds the portion of the spinning chamber having escape openings 8.

The other axial end of the spinning chamber has a wide opening into which a portion 1a, and a boss 1b of a body 1 project. Body 1 has a cylindrical cavity in which a rotary combing roller 3 is located which forms a gap 3a in the cavity. A feeding roller 2 is located in an adjacent communicating cylindrical cavity and transports a sliver 18 toward the gap 3a where the sliver is engaged by the teeth or needles on the periphery of the combing roller, and divided into fibers which are oriented in circumferential direction of combing roller 3 which transports the fibers in the direction of the arrow at a speed V_1 .

Combing roller 3 is disposed so that a peripheral portion 4 thereof projects slightly into a suction channel 5 which extends substantially in tangential direction of the trailing end 4a of the peripheral portion 4 whose leading end 4b is located in the region of a sharp straight edge 9 provided at the end of the part-circular gap 3a. A pressure channel 11 passes through body 1 and opens adja-

cent edge 9 into gap 3a. A conduit means 12a connects diffuser casing 12 through a throttling valve 20 with pressure channel 11 so that pressure air is blown at a speed V_3 in the direction of the arrow into the end of gap 3 between edge 9 and the leading end 4b of the peripheral portion 4 of combing roller 3. Pressure channel 11 extends in substantially tangential direction to the leading end 4b of the peripheral portion 4.

Outside of the cavity in which combing roller 3 is located, a withdrawing channel 13 extends coaxially with the axis of rotation of spinning chamber 6 through body 1. The yarn 14 spun of the fibers collected on collecting surface 7 is guided through withdrawing channel 13 to a pair of transporting rollers 15 which transport the spun yarn to winding means 16 by which a bobbin 17 is formed.

Operation

During rotation of the spinning chamber, air is drawn at a speed V_2 through suction channel 5 into the interior of the spinning chamber, and discharged through escape openings 8 so that air under pressure moves at the speed V_3 through pressure channel 11 and is blown in direction substantially opposite to the direction of movement of the air in the suction channel past the edge 9 into the suction channel. The rotating combing roller 3 forms fibers of sliver 18 which are transported by the needles of combing roller 3 in a known and conventional manner into the suction channel 5 where the air stream removes the fibers from the peripheral portion 4 of the combing roller and transports the fibers into the spinning chamber where a yarn is formed on collecting surface 7, twisted by the rotation of the spinning chamber, and withdrawn by transporting rollers 15 through channel 13.

Some fibers have the tendency to get caught on the sharp edge 9 which in constructions, according to the prior art, cause fiber accumulations in this region. Due to the blowing of pressure air by pressure channel 11 into the end of gap 3a and past edge 9 into the outlet portion 5a of suction channel 5, fibers carried beyond edge 9 are immediately blown back into the suction channel and sucked out of the same through outlet portion 19.

In this manner, it is prevented that fiber accumulations in the form of small balls of curled fibers are suddenly sucked into the spinning chamber and cause the formation of a slub in the spun yarn.

The best operational conditions are obtained when the speed V_1 at the periphery of combing roller 3 is higher than the speed V_2 of the air in the suction channel 5, and when the speed V_2 is higher than the speed V_3 of the air in the pressure channel 11, which may be expressed as follows:

$$V_1 > V_2 > V_3$$

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

While the invention has been illustrated and described as embodied in a fiber feeding device having a channel for pressure air by which accumulations of fibers are prevented, 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 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:

1. A fiber feeding device for a rotary spinning chamber, and having a suction channel with an outlet portion for guiding air in one direction into said spinning chamber, and a rotary combing means for combing fibers out of a sliver and being disposed so that a peripheral portion thereof is located upstream of said outlet portion in the region of said suction channel so that fibers are drawn by suction from said peripheral portion through said outlet portion into said spinning chamber, in combination with an improvement comprising clearing means for blowing pressure air at said peripheral portion so that fibers escaping from said suction channel are blown into said suction channel and are sucked through said outlet portion into said spinning chamber whereby fiber accumulations are prevented.

2. The improvement defined in claim 1 wherein said clearing means include a pressure channel opening at said peripheral portion, and air supply means for supplying pressure air to said pressure channel.

3. The improvement defined in claim 2 wherein said pressure channel extends in substantially tangential direction of said peripheral portion; and wherein said combing means is a roller.

4. The improvement defined in claim 2 and comprising means having an edge located between said pressure channel and said outlet portion of said suction channel opposite said peripheral portion and forming a gap with the same so that pressure air discharged from said pressure channel flows through said gap and moves accumulations of fibers on said edge into said suction channel.

5. The improvement defined in claim 2 and comprising means having an edge located between said pressure channel and said outlet portion of said suction channel opposite said peripheral portion and forming a gap with the same so that pressure air discharged from said pressure channel flows through said gap and moves accumulations of fibers on said edge into said suction channel; wherein said combing means is a combing roller; wherein said peripheral portion has ends leading and trailing, respectively, in the direction of rotation of said combing roller; wherein said suction channel extends in substantially tangential direction of said trailing end; and wherein said pressure channel extends in substantially tangential direction of said leading end.

6. The improvement as defined in claim 5 wherein said air supply means comprises a diffuser casing receiving pressure air from said spinning chamber, and conduit means connecting said diffuser casing with said pressure channel.

7. The improvement defined in claim 6 comprising a throttle valve in said conduit means for regulating and controlling the flow of pressure air into said pressure channel.

8. The improvement defined in claim 1 wherein said combing means is a combing roller; wherein said peripheral portion has ends leading and trailing, respectively, in the direction of rotation of said combing roller; wherein said suction channel extends in substantially tangential direction of said trailing end; and wherein said pressure channel extends in substantially tangential direction of said leading end.

9. The improvement defined in claim 1 wherein said clearing means comprise a diffuser casing receiving pressure air from said spinning chamber, a pressure channel opening at said peripheral portion, and conduit means connecting said diffuser casing with said pressure channel.

10. A fiber feeding device as defined in claim 1 and comprising a body having said suction channel, and a cavity; wherein said combing means is a combing roller located in said cavity and having said peripheral portion; wherein said clearing means include a pressure channel in said body opening at said peripheral portion, and air supply means for supplying pressure air to said pressure channel; wherein said body has an edge located between said pressure channel and said outlet portion of said suction channel opposite said peripheral portion of

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said combing roller and forming a gap with the same so that pressure air discharged from said pressure channel flows through said gap and moves accumulations of fibers into said suction channel; and wherein said pressure channel extends in substantially tangential direction of the leading end of said peripheral portion, and said suction channel extends substantially in tangential direction of the trailing end of said peripheral portion.

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