METHOD AND APPARATUS FOR SPINNING SLIVER

Inventors: Hans Landwehrkamp; Franz Schreyer, both of Ingolstadt, Germany; Adolf Schiltknecht, Winterthur, Switzerland

Assignee: Schubert Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Germany

Filed: Mar. 9, 1970
Appl. No.: 17,496

Foreign Application Priority Data
Mar. 20, 1969 Germany 1914115
Apr. 30, 1969 Germany 1922078

U.S. Cl. 57/58.89, 57/58.95, 57/56, 57/156
Int. Cl. D01h 7/02, D01g 15/00, D01g 23/00
Field of Search 57/58.89–58.95, 56, 156

ABSTRACT
On its way to a spinning chamber a sliver is opened out to divide it up into individual fibers and is then caused to pass along a path with two parts placed at an angle to each other. Owing to the sudden change in direction as the fibers pass from one part to the other dirt particles, which are denser than the fibers, are thrown out by centrifugal force and leave the fibers through a separating opening.

30 Claims, 13 Drawing Figures
METHOD AND APPARATUS FOR SPINNING SLIVER

The present invention relates to the spinning of sliver using a spinning chamber and more particularly to a method in which the sliver to be spun is fed to the spinning chamber through a feeding and opening device so that it arrives in the chamber as individual fibers for removal of dirt particles. The invention also relates to various forms of apparatus for carrying out this method. The term sliver is intended to mean a strand of loosely connected fibers which are capable of being opened out for feeding to the spinning chamber.

For the so-called open end spinning method it is necessary to open out the sliver and supply its fibers to the spinning chamber in a condition in which they are as nearly as possible separate from one another so that the yarn can be formed in the spinning chamber. For this purpose use can be made of rotating rollers with needles or other fiber engaging projections (see German Pat. specification No. 1,111,549 and Swiss Pat. specification No. 453,976) or a drafting device (see German Pat. specification No. 1,170,841). It has been found that the open end spinning process is extremely sensitive to the degree of cleanliness of the supplied fiber material. Dust such as husks or neps of fiber not only leads to deposits in the spinning apparatus being formed but cause substantial interference with the spinning process owing to yarn breakages. It is therefore necessary to arrange for the preparation process for the production of sliver to be spun in the open end spinning process to bring about a particularly thorough cleaning. If a particular degree of cleanliness of the sliver is not achieved, problems of the above-mentioned type occur which make the open end spinning process economically unsuitable for such materials (Geissler, Deutsche Textiltechnik 1967/12, pages 751 to 755). On the other hand there are economic and technical limitations regarding more intensive cleaning of the fiber material during preparation for spinning.

One object of the invention is to provide an open end spinning apparatus which is capable of processing fiber material to a certain degree of cleanliness economically.

A further object of the invention is to provide a cleaning process in which the fibers of the sliver to be used for spinning are separated from each other.

The present invention consists in a method for spinning a sliver in a spinning chamber, comprising opening the sliver and feeding it in the form of individual fibers to the spinning chamber, the fibers of the sliver passing to the spinning chamber along a path having two parts which are set at an angle to each other so as to produce a change in direction of the movement of the fibers and to throw out dirt particles through a separating opening adjacent to the adjacent ends of the two parts of the path.

In this manner the fact that the fibers are substantially separated so as to be divided up individually is exploited to bring about a successful separation of the dirt particles from the fibers, which in prior operations have not been removed.

In accordance with a preferred feature of the invention an air current is introduced into the fibers opposite to the direction of movement of the dirt particles out of the fibers to stop fibers from passing out through the separating opening and occasioning loss of fibers.

In accordance with a still further preferred feature of the invention the transport roller with fiber-engaging projections which serve for separating the sliver into individual fibers is arranged to rotate after spinning in the spinning chamber to be discontinued, and the spinning chamber slows down, and fibers are removed through the openings instead of being fed into the spinning chamber.

The present invention also resides in an apparatus for processing textile fibers comprising means for conveying and opening up the individual fibers, a spinning chamber arranged to receive the opened up fibers from the conveying means, the conveying means being arranged to pass the fibers along a path with two portions at an angle to each other for causing the fibers to undergo a change in direction on passing through one part of the path to the next part, a dirt-discharge opening being provided at adjacent ends of the two parts of the path for discharge of dirt from the fibers, and means defining a separating edge which defines one side of the dirt-discharge opening. Therefore centrifugal forces and the resistance of the air are used to bring about an effective removal of dirt. The intensity of cleaning is influenced by the angle which a radius of the roller drum, running so as to touch the edge, makes with a radially outer face of the means defining the edge. This angle should be at least 30°. In order to adjust the apparatus to suit different types of material to be spun the distance of the separating edge from the roller can be made adjustable.

However, separation of dirt can be brought about also in the case of a feeding and opening up conveying means without a rotating needle idler or like roller. If the opening up of the fiber sliver is carried out by means of a drafting device, duct means can be provided defining the two parts of the path which leads from the drafting device to the chamber, the upstream and the downstream path parts having the separating edge arranged adjacent to their adjacent ends. The opening can be arranged in an extension of the upstream part of the supply duct.

In accordance with a further feature of the invention a connecting duct is arranged to form an extension of the upstream path part.

Means can be provided defining an additional air supply duct which opens into the path upstream from the dirt discharge opening. A supplemental air supply duct can be formed by an extension of the downstream duct.

Each of the two air supply ducts is connected with the atmosphere or can be connected with an air supply source such as a blower. For regulating and adapting the separation procedure to meet requirements the air supply duct is preferably arranged so that it can be partially or completely closed.

In order to bring about a still better adaptation of the separation process in order to suit fibrous material to be spun and be able to transport the dirt removed without interfering with spinning, a movable closing part can be provided to block the opening. The closing part can be moved into a position so as to uncover or to block the opening. Thus as required the action of the separating arrangement can be interrupted. Preferably the closing part is arranged so that it can be moved into at least one intermediate position between the open and closed position of the opening so that the intensity of dirt removal can be set in order to be agreement
with the requirements of the fibrous material which is to be spun. In order to prevent any influence of the separating means when it is not required in the case of an apparatus operating with the high-speed roller provided with needles or other fiber-engaging projections, the closing part has a side facing the roller which forms a continuation of the inner profile of the housing of the roller.

A particularly convenient form of the invention is arrived at when the closing part is arranged at the end of a two-armed lever which pivots about an intermediate fulcrum point and whose free end is connected with a control cam for producing the pivoting movement. In accordance with a further embodiment of the invention, in which the separating means of several spinning units are connected with a common collecting duct, the wall of the collecting duct supports the closing parts arranged in individual openings in it and the ducts can be displaced, for instance, slid or swung, for actuating the closing part.

In accordance with a still further feature of the invention in order to avoid interference with the spinning process by the removal of dirt, the dirt is removed from the collecting duct after the separating openings have been closed and the openings are only uncovered after dirt removal has been completed.

Further details of the invention are now described with reference to the accompanying drawings.

FIG. 1 is a section through a sliver spinning device according to the invention in section.

FIG. 2 is a detail section showing a particular construction of the separating edge.

FIG. 3 is a detail section showing a further construction of the separating edge.

FIG. 4 is a section through a particular form of separating device.

FIG. 5 is a section through a further embodiment of the separating device in accordance with the invention for fiber supply and opening without a needle roller or a spiked roller.

FIG. 6 is a section through a modification of the device shown in FIG. 5.

FIG. 7 is a section through a further embodiment of a device in accordance with the invention with an adjustable closing part for the separating opening.

FIG. 8 is a section through a further embodiment of the invention with a closing part which can be swung by means of a lever.

FIGS. 9 to 11 are sections through further embodiments of the invention with tilting and sliding collecting ducts, in section.

FIGS. 12 and 13 are sections through the device in accordance with the invention in the case of a spinning device with a cleaning device adjacent to the supply duct leading to the spinning chamber.

Referring now to the drawings, and more particularly to FIG. 1, it will be seen that a sliver S is fed by means of a feed cylinder 20, which cooperates with a feed groove 21 in gripping the sliver, and the sliver is passed to an opening roller 22 which opens it up into individual fibers. Such opening rollers are provided with needles or another form of fiber-gripping surface, for instance spikes. From the supply position Z the fibers F are transported by the roller 2 as far as a fiber-removing position A, from which they pass through a supply duct 71 to the spinning chamber 7. In the collecting groove of the spinning chamber 7 the fibers F are deposited in a fiber ring and withdrawn from the spinning chamber 7 by means of a draw-off device 72 as a spun yarn G.

The construction of the spinning chamber can be in various forms, whose selection is not critical for the present invention. The chamber can, for instance, be a rotating spinning chamber as described in the Swiss Patent specification No. 457,216, as a rotating funnel as described in the German Patent specification 1,142,535, as a spinning tube as described in the German Patent specification No. 1,062,153 or as any other form of collecting surface as described, for instance, in the German Patent specification No. 1,130,741 or the British Patent specification No. 979,962.

The needle roller 2 is surrounded by a housing 10 whose wall 11 conforms to the periphery of the roller 2 and surrounds it with a narrow gap. Downstream from the supply position Z, that is to say in the direction of rotation of the roller 2, and upstream from the fiber-removal position A there is a separating edge 3 on the housing wall 11. This edge defines a dirt-discharge opening 6 between the edge and the roller which serves for the removal of husks and other dirt removed by the separating edge 3 and is connected with a duct 12 which opens into a collecting space 5. The collecting space 5 is preferably arranged below the roller 2 so that the separated out material can fall away under the action of gravity. For removal of the separated matter the collecting space 5 is, for example, in the form of a drawer which can be pulled out horizontally.

Instead of the collecting space 5 it is also possible to provide a common collecting duct 50, 51, 53, and 57 common to a number of spinning devices.

For production of an air current which moves in the opposite direction to that in which the separated material moves out of the dirt-discharge opening 6, such opening is connected via the connection duct 12 with an air supply duct 4, which can, for example, open above the collecting space 5 into the connecting duct 12. Air from the atmosphere can be sucked by the spinning chamber 7 via the air supply duct 4 so that there is an air current produced whose direction of flow is opposite to that of the direction of movement of the separated materials. Such an air current holds back fibers which might otherwise emerge through the opening 6 and pushes them back behind the separating edge 3 so that no fiber losses occur. It naturally follows that this air current must flow at a certain well-defined rate so that the dirt particles, which would otherwise interfere with the spinning operation, are separated while the fibers remain on the roller 2. Generally for this purpose a suitable dimensioning of the air supply duct 4 is sufficient. However, this air current can also be made adjustable for particular fiber materials or it can be supplied with an air supply device such as a blower.

The separating edge 3 limits the opening 6 in the housing wall 11 in the direction of rotation of the roller 2. If the radius r of the roller 2, passing through the separating edge 3, is extended, the extended radius r and the wall 36 of the opening which merges with the duct 12 form between them an angle α. This angle should have a value of at least 30° or preferably more than 30°. The size of this angle α has a very important influence on the separation of dirt. If the angle α is decreased so as to be below the value mentioned, the cleaning effect is very considerably reduced.
The sliver S is drawn by the feed cylinder 20 and the feed groove 21 and first passes to the supply position Z where the sliver S is engaged by the roller 2 and individual fibers are combed out of the sliver and removed from it by the fiber-engaging means of the roller. Owing to the rotation of the roller 2 fibers and the dirt particles between the fibers pass to the opening 6. At this position the dirt particles, which are generally denser than the fibers, and therefore tend to be thrown outward more by centrifugal force towards the surface of the fiber-engaging means of the roller 2, are thrown through the opening 6 in the housing wall 11 so that they are given the possibility of becoming separated from the roller. They are thrown out or stripped off by the stripping edge 3, which defines the downstream end or margin of the opening 6. The fibers are, however, owing to the action of the air current introduced in a direction opposite to the direction of movement of the dirt particles, entrained further by the roller 2 as far as the fiber removal position A, where they enter the supply duct 71 owing to the degree of vacuum existing in the spinning chamber 7.

It is important that the opening 6 and the separating edge 3 are not immediately adjacent to the supply position Z or the removal position A, but are separated from them by a part of the housing wall 11, since otherwise the removal of dirt or the yarn quality would be unfavourably influenced. Both for the subject of the dirt to a centrifugal action and also for the transfer of the fibers after the removal of dirt it is necessary to provide a certain path along the housing wall 11. It has been found extremely convenient to arrange the opening 6 approximately at the beginning of the second half of the path between the supply position Z and the removal position A.

FIG. 4 shows an embodiment of the subject matter of the invention in which in the direction of fiber movement immediately upstream from the separating opening 6 an additional or auxiliary air supply duct 43 opens. The air supply duct 43 is separated from the opening 6 by a wall 44 and supplies air which assists the air current introduced through the air supply duct 4.

In order to adapt the device to suit different types of fiber material to be spun the distance between the separating edge 3 and the roller 2 can be adjusted. As appears from FIG. 1, the opening wall 36 is in the form of a slide 31 whose edge adjacent to the roller 2 constitutes the separating edge 3. The setting of the slide 31 in relation to the roller can be carried out, for example, by means of a setting screw 32 or anoderm suitable manually adjustable device.

It is also possible to provide a remote or ganged control of separating edges of a number of spinning devices, for example, using eccentrics or cams, which are arranged on a single shaft.

Various modifications are possible in the invention described. Thus the separating edge 3 can also be accurate or curved if the opening 6 should be rounded instead of being rectangular. Another form of the separating edge is shown in FIG. 2 in which the wall 360 of the opening is curved and the opening 6 makes an angle a with the separating edge 36. Owing to the curvature of the wall 360 of the opening this angle changes in relation to the connecting duct 43. In this manner the desired deflection of the dirt particles into the collecting space 5 is achieved. In accordance with FIG. 3 (300) the separating edge can be flattened or as shown in FIG. 2 (30) it can be rounded in order to avoid fibers being caught and retained on it.

If several rollers with needles or other fiber engaging surfaces are provided for opening the sliver, dirt-removing arrangements can be provided on each roller or on only one of them.

If for the fiber supply and opening use is not made of rollers provided with needles or other fiber-gripping surfaces, removal of dirt can be brought about by placing the separation arrangement in the supply duct opening into the spinning chamber 7. In this manner the dirt particles shown in FIGS. 8 and 6 the supply and opening up of the sliver S is carried out by a drafting device, in which the roller 2 first passes to the supply position Z between the pair of draw-in rollers 22 and the drafting or opening rollers 23. In accordance with the construction of the drafting device it is also possible to use a greater number of drafting or opening rollers. From the opening rollers 23 the separated fibers-F at the fiber removal position A are passed into the supply duct 73', 73' and so supplied to the spinning chamber 7 in an opened condition.

The supply duct 73', 73 is divided by a separating opening 61 into first part 73' and a second part 73. The separating opening 61 is connected with a collecting space 5 and is defined on its side adjacent to the second part 73 of the supply duct by a separating edge 33. As shown in FIG. 6 the supply duct 73', 73 is curved and preferably has at a position adjacent to the separating opening 61 a flattened cross-section, the separating edge 33 being arranged on the outer flat side of the supply duct 73', 73. The degree of efficiency of the separating device is increased since the dirt particles have a shorter path to travel before they reach the separating opening 61.

Preferably the opening 61 is joined by a connecting duct 13, forming an extension of the duct part 73' lying upstream from the separating edge 33. The connecting duct 13 opens into the collecting space 5.

In order to introduce in this case as well an air current flowing in the opposite direction to the direction of dirt removal, an air supply duct 42 is arranged above the collecting space 5. Additionally it is possible to provide in the rear extension of the supply duct 73 opening into the spinning chamber an air supply duct 42 which assists in deflecting the air current necessary for fiber removal. Instead of the air supply duct 42 it is also possible to provide such an additional air supply duct 43 in accordance with FIG. 6 leading in the direction of fiber transport and placed immediately upstream from the separating opening 61 from which it is separated by a wall 44. Air supply can be adjusted by a slide 40 or 41 and the air can simply be drawn from the atmosphere or can be supplied by an air source such as a blower. In this manner the above-described separation operation can be controlled and undesired removal of fibers can be checked.

The fibers F supplied from the drafting device to the fiber draw off position A first run through the duct 73' and owing to the curvature of the supply duct 73 (in the case of the embodiment of FIG. 6) upstream from the separating edge 33 undergo a change in direction before they pass into the spinning chamber. In the case of these embodiments of the invention the fibers F are transported by the air current produced by the degree of vacuum in the spinning chamber. The dirt particles
between the fibers F cannot properly participate in the change of the direction in the air current owing to their higher density and inertia and are therefore thrown into the opening 61. Observations have shown that a part of the fibers arriving are thrown a few millimeters into the opening 61 but are then drawn back again owing to the action of the air current arriving through air supply duct 4, above the separating edge and into the supply duct 73. In this manner a separation of the fibers from the dirt particles occurs.

In accordance with a preferred embodiment the supply duct 73', 73 is not bent (see FIG. 5) but has a sharp bend or angle at the separating opening 61. Owing to this sudden change in direction a very satisfactory separation of the fibers from the dirt components is obtained.

If instead of the collecting space 5 a common collecting duct 50, 51, 53, 57 is provided the supply of air can be made through it.

As has been shown such a separating device constitutes an unnecessary interference in fiber transport to the way from the feed or opening device to the spinning chamber in the case of the processing of clean fiber materials, for example, combed cotton or synthetics, where dirt separation is not necessary and in this case such processing cannot improve the yarn quality. This interference leads to a reduction in quality in certain respects; it may, for example, lead to a reduction in tensile strength and in the evenness of the yarn. Generally such an interference with the spinning process is caused when the collected dirt particles are removed pneumatically in the separating operation. Such interference may lead, for example, to thick and thin irregularities which may be a cause of yarn breakage.

Therefore in accordance with a further feature of the invention a closing part which can be moved as desired is provided for covering the opening 6 or 61 of the separating device. The closing part 8 (FIG. 7) is in the simplest embodiment constructed so as to be shifted by hand. The side 82 of the closing part 8 is made to agree in shape with the housing wall 11 so that in the closed position 8' the wall 11 of the housing is not interrupted in any way. If fiber material with a high shell content is to be processed, the closing part 8 is moved into the open position so that the separating device is fully operative.

In the case of the spinning of combed cotton, rayon staple fibers or synthetics the fiber transport is unnecessarily interfered with if the separating device is in the operational setting. This may lead, for example, to a reduction in the strength of the yarn produced and in some cases to a reduction in the evenness of the yarn. In order to prevent such an unfavourable effect on yarn quality, the closing part 8 is moved into its closing position 8'. The fibers F removed from the fiber sliver 5 are therefore transported by the roller 2 from the supply position 2 to the removal position A without the separating edge 3 being able to have any effect on the fibers.

Intensive removal of dirt entails a considerable effect on fiber transport to the spinning chamber 7. In consequence a separation should only be undertaken on such a scale that there is a favourable influence on yarn quality, as determined by the dirt content of the fiber material to be spun. For low dirt contents or very coarse particles an attenuated separating action brought about by the separating device is sufficient so that there is less influence on the fiber transport. Consequently the separating opening 6 is only opened sufficiently far as is required for a satisfactory spinning result. The closing part can for this purpose be brought steplessly or non-steplessly into intermediate positions between the opened and closed positions, in accordance with the dirt content of the fiber material.

In order to achieve the desired control of the closing part, particularly in the case of a number of spinning stations, it is possible to adopt one or a number of different forms of the invention.

In the case of the form of the invention shown in FIG. 8 the closing part 83 is arranged on the end of a two-armed lever 84 which can pivot about a pin 85. A spring 840, which presses against the free end of the double-armed lever 84 holds the closing part 83 in the closed position. If the opening 6 is to be uncovered and to be connected with the collecting duct 51, a cam 842, operated by turning the shaft 841, presses against the free end of the two-armed lever 84, so that there is a movement of the closing part 83 against the pressure of the spring 840 and the opening is uncovered. The closing part 83 is so constructed that there is a correspondence in the shape in the closed position both as regards the dirt-discharge opening 6 and as regards the collecting duct 51. This construction has been found particularly convenient and is free from trouble through the deposit of dirt and fibers. The cam shaft 841 can be used to operate any desired number of closing parts 83.

In the case of the embodiment in accordance with FIG. 9 a tubular collecting duct 50 is provided which can rotate about its axis. On the outer periphery of the collecting duct 50 a closing part 86 is arranged which by a rotation of the collecting duct 50 is brought into an open position or into the closed position 86'. Instead of a collecting duct in the form of a rotating tube, the collecting duct can also be arranged to be moved along its axis or perpendicularly in relation to its axis so that an unblocking or blocking of the opening 6 is brought about. In FIG. 10 the upper wall of the collecting duct 53 is for this purpose constructed as the closing part 54 and moreover has an opening corresponding to the opening 6. In the pushed-in position the closing part 54 closes the opening. If the collecting duct 53 is brought into the opened or unblocked position by lateral displacement using a linkage 55, the opening 6 is no longer blocked by the closing part 54 and beneath dirt-discharge opening 6 there is the opening of the collecting duct 53 for receiving the separated dirt particles. In this embodiment of the invention as well it is possible to move the closing part into various intermediate positions.

In accordance with the embodiment shown in FIG. 11 the collecting duct 57 can be shifted axially. In the position shown in the drawing the dirt-discharge opening 6 is unblocked so that separation of dirt particles occurs. If, however, the collecting duct 57 is moved to the left in terms of FIG. 11, a wall of the collecting duct 57 constructed in the form of the closing part 54 is moved into the opening 6 and blocks it.

In the case of a high speed needle roller 2 or a roller equipped with other projections or the like for engaging fibers, of the spinning device, the separating device can also be used successfully when feed is interrupted. In order to avoid the needle or the like roller 2 continuing feeding fiber material into the spinning chamber 7,
after the feed is supposed to have been stopped owing to the inertia of the roller 2, after interruption of the feed superfluous fibers F are drawn off through the separating opening 6 while the roller 2 slows down. Thus the fibers cannot pass into the spinning chamber 7. In this respect the suction effect can be controlled by an air supply duct 4 which can be connected with a suction device, and/or by suitable opening or closing of the closing parts 8, 83, 86 or 54. The sucked-off fibers can thus be drawn off either through the air supply duct 4 or through the collecting duct 50, 51, 53, 57 or the collecting space 5.

If the supply and opening of the sliver S is carried out by a drafting device, then in accordance with FIG. 12 the opening 61 can be closed by a closing part 88 partially or completely. This closing part 88 is constructed in a simple manner, for example as a hand-operated slide.

In the case of the embodiment of FIG. 13 the closing part consists of a rotary slide 89, which has an opening 890. In the shown position the latter connects the supply duct 73' with the duct 73. Opposite the opening 890 there is an opening 891 which is connected with the opening 61. In the extension of the supply duct 73, which opens into the spinning chamber 7, a tube connector 75 is provided which extends the closing part 89.

This tube connector is provided with a recess or slot 892 along which a lever 893, connected with the slide or closing part 89, can be moved. In accordance with the position of the rotary slide 89, which is actuated by the handle or lever 892, or, if required, by a central operating means (not shown), the opening 61 is completely or partially opened or closed as is required for the removal of dirt by the openings 890 and 891 provided in the rotary slide 89.

The tube connector can also serve as an air supply duct, an opening 77 connected with the atmosphere being shut or opened in accordance with the position of the rotary slide.

The removal of dirt collected in the collecting duct 50, 51, 53, 57 or the collecting space 5 is carried out preferably using compressed air or vacuum. It is also possible to operate with a mechanical device, for example a conveyer belt moving in the duct which continuously removes the dirt. Such a device is, however, complicated in construction.

In the case of dirt removal by an air current it is to be noted that the spinning process may not be influenced by it though the collecting duct is connected via the dirt-discharge opening 6 or 61 with the spinning device. For this reason the removal of dirt is not continuous and is undertaken from time to time in such a manner that the dirt-discharge opening 6 or 61 as the case may be, which connected with the collecting duct, closed when the removal of deposited dirt is to take place. It is only after the removal of the dirt has been carried out that the dirt-discharge opening is unblocked again. In this manner the compressed air supply or vacuum induced air flow cannot have any effect on the spinning device. Since the pneumatic removal only requires a very short time, lasting a few seconds, the spinning procedure can proceed during this time without any difficulties occurring, even in those cases in which during removal of dirt no separation of dirt from the fibers occurs.

The blocking and unblocking of the dirt-discharge opening is carried out with the above-described means. The control can be automatic or manual so that in accordance with the quantity of dirt removed longer or shorter periods for the blocking of the opening and removal of dirt can be allowed.

The apparatus in accordance with the invention makes it possible to reduce the number of fiber breakages to a factor of ten % at least and also to process fiber material which has been pre-cleaned to a lesser extent. The degree of cleanliness of the yarn is substantially increased.

What we claim is:
1. A method for spinning a sliver in a spinning chamber, comprising opening the sliver and feeding it in the form of individual fibers to the spinning chamber, the fibers of the sliver passing to the spinning chamber along a path having two parts which are set at an angle to each other so as to produce a change in direction of the movement of the fibers and to throw out dirt particles through a dirt-discharge opening adjacent to the adjacent ends of the two parts of the path.
2. A method in accordance with claim 1, in which an air current is introduced into the fibers in a direction opposite to the direction of movement of the dirt particles out of the fibers.
3. A method in accordance with claim 1, in which a transport roller with fiber engaging projections and which serves for separating the sliver into individual fibers continues to rotate after spinning in the spinning chamber is discontinued, and as the spinning chamber slows down fibers are removed through the dirt-discharge opening instead of being fed to the spinning chamber.
4. An apparatus for processing textile fibers comprising means for conveying textile fiber material and opening up the fibers thereof, a spinning chamber arranged to receive the opened up fibers from said means, said means being arranged to pass the fibers along a path with two portions at an angle to each other for causing the fibers to undergo a change in direction on passing through one part of the path to the next part, a dirt-discharge opening being provided at adjacent ends of the two parts of the path for discharge of dirt from the fibers, and means defining a separating edge which defines one side of the dirt-discharge opening.
5. An apparatus in accordance with claim 4, in which the conveying said opening means induces a high speed rotary roller provided with fiber-engaging projections on its surfaces, a casing surrounding the roller, the two parts of the path being defined by the casing surrounding the roller and by the roller, and the separating edge being placed on the downstream side of the dirt-discharge opening in terms of the direction of rotation of the roller.
6. An apparatus in accordance with claim 5, in which a radius of the roller drawn so as to touch the separating edge, makes an angle of at least 30° with a radially outer face of the means defining the separating edge, and adjacent to the separating edge.
7. An apparatus in accordance with claim 5, comprising means for adjusting the distance of the separating edge from the roller.
8. An apparatus in accordance with claim 4, the conveying and opening means including a drafting device for opening up the sliver into individual fibers, and duct means defining the two parts of the path which leads
from the drafting device to including spinning chamber, the upstream and downstream path portions having the separating edge arranged adjacent to their adjacent ends.

9. An apparatus in accordance with claim 8, in which the dirt-discharge opening is arranged in an extension of the upstream part of the supply duct.

10. An apparatus in accordance with claim 9, comprising a connecting duct arranged so as to form a continuation of the upstream path.

11. An apparatus in accordance with claim 4, and means defining an air supply duct adjacent to the dirt-discharge opening.

12. An apparatus in accordance with claim 11, comprising an additional air supply duct opening into the path upstream from the dirt-discharge opening.

13. An apparatus in accordance with claim 4, in which the two path portions include an upstream portion and a downstream portion, and a supplemental air supply duct formed by an extension of the downstream path portion in the direction opposite to the direction of fiber flow through said downstream path portion.

14. An apparatus in accordance with claim 13, in which the air supply duct is connected with the atmosphere.

15. An apparatus in accordance with claim 4, an air supply duct for supplying air to the fiber path, and means for closing the air supply duct to varying degrees.

16. An apparatus in accordance with claim 4, comprising a closing part for blocking the dirt-discharge opening.

17. An apparatus in accordance with claim 15, in which the closing part can be brought into at least one intermediate position between positions in which it blocks the dirt-discharge opening and in which it uncovers the dirt-discharge opening.

18. An apparatus in accordance with claim 16, in which the conveying means is a roller and the closing part is adjacent to it, the portion of the closing part nearest the roller conforming to the shape of a housing surrounding the roller.

19. An apparatus in accordance with claim 18, comprising a pivoted two-armed lever, the closing part being carried by one arm of said lever, and a control cam for engaging the other arm of said lever for turning said lever.

20. An assembly comprising several spinning apparatuses in accordance with claim 4, and means for adjusting conjointly the size of the individual dirt-discharge openings of the several spinning apparatuses.

21. An apparatus for processing textile fibers comprising means for conveying textile fiber material and opening up the fibers thereof, and a spinning chamber arranged to receive the opened fibers from said means, said means defining a path along which the textile fiber material passes, said path having an opening therein through which impurities from said material are discharged.

22. A method in accordance with claim 1, including closing the dirt-discharge opening, removing pneumatically dirt particles separated from the sliver and again opening the dirt-discharge opening after the removal of the dirt particles has been completed.

23. An apparatus for processing textile fibers comprising fiber opening roller means for opening up the individual fibers, conveying means for conveying fibers along an arcuate path adjacent to the periphery of said fiber opening roller means, a spinning chamber arranged to receive the opened up fibers from the discharge end of said conveying means path, and a dirt-discharge opening in said conveying means adjacent to said fiber opening roller at a location in advance of the discharge end of said conveying means path for discharge of dirt separated from the fibers moving along said path.

24. A method for removing impurities and similar material from staple fibers for ringless spinning in spinning units including a fiber opening roller and a rotary underpressure spinning chamber, characterized in that the impurities are ejected from the fibers through a discharge opening after having been contacted by the fiber opening roller by the effect of the acceleration imparted to the impurities by their contact with the fiber opening roller.

25. An apparatus for removing impurities from staple fibers for ringless spinning in spinning units, comprising a hollow body, a fiber opening roller rotatable in said hollow body, said hollow body having a supply passage through which unopened fibers are supplied to said opening roller, and a spinning chamber, said hollow body having an opened fiber discharge passage through which opened fibers pass from said opening roller to said spinning chamber, and said hollow body having an impurities discharge passage between said fiber supply passage and said opened fiber discharge passage for discharge therethrough of impurities from fiber being opened by said opening roller.

26. The apparatus defined in claim 25, in which the impurities discharge passage extends through the hollow body generally tangentially to the periphery of the fiber opening roller.

27. The apparatus defined in claim 26, in which the hollow body includes a wall extending substantially tangentially to the periphery of the fiber opening roller, located so that the adjacent portion of the fiber opening roller periphery moves toward said wall and constituting a wall of the impurities discharge passage.

28. The apparatus defined in claim 25, in which the width of the impurities discharge opening in a direction parallel to the axis of rotation of the fiber opening roller is at least equal to the axial width of the periphery of the fiber opening roller.

29. The apparatus defined in claim 25, including an impurities collecting chamber for receiving impurities from the impurities discharge passage, from which collecting chamber the impurities are removed by suction.

30. An apparatus for processing textile fibers comprising fiber opening roller means for opening up the individual fibers, conveying means for conveying fibers along an arcuate path adjacent to the periphery of said fiber opening roller means, a spinning chamber arranged to receive the opened up fibers from the discharge end of said conveying means path, and a dirt-discharge opening in said conveying means adjacent to said fiber opening roller at a location in advance of the discharge end of said conveying means path for discharge of dirt separated from the fibers moving along said path, and an impurities collecting chamber for receiving impurities from said impurities discharge passage, from which collecting chamber the impurities are removed by suction.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,797,218 Dated March 19, 1974

Inventor(s) Hans Landwehrkamp, Franz Schreyer and Adolf Schiltknecht

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Title page, column 1, name of assignee should read --Schubert & Salzer Maschinenfabrik Aktiengesellschaft--.

Column 10, line 48, cancel "said opening means induces" and insert --and opening means includes--; line 57, insert a comma after the word "roller".

Column 11, line 1, cancel "including" and insert --the--; line 2, cancel "the" and insert --including--; line 7, cancel "part of the supply duct" and insert --path portion of the duct means--; line 10, after "path" insert --portion of the duct means--; line 17, cancel "calim" and insert --claim--; line 28, cancel "the" and insert --said--; line 33, cancel "15" and insert --16--.

Column 12, line 22, cancel "said" and insert --said--.

Signed and sealed this 22nd day of October 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR. C. MARSHALL DANN
Attesting Officer Commissioner of Patents