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(54) **SPINNING MACHINE**

SPINNGERÄT

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Description

TECHNICAL FIELD

[0001] The present invention relates to a spinning machine including a draft process unit, a pneumatic spinning unit, a winding unit.

BACKGROUND ART

[0002] This type of spinning machine is known as disclosed in WO 2006/122605 A1 (see Fig. 1), for example. In the disclosed machine, a draft process unit, a pneumatic spinning unit, a delivery roller, a winding unit and the like are arranged linearly along a yarn path, which extends from bottom to top, above cans that house sliver (fiber bundle).

[0003] JP 59-043126 A1 describes a blow spinning comprising a plurality of nozzle-type spinning stations, each spinning station receiving a spinning can and having a drawing unit, a nozzle-type spinning unit, and a winding unit. The drawing unit and the spinning unit may be provided in a horizontal position, a vertical position or an intermediate position inclined upwards.

[0004] JP 2006-306588 A describes a yarn slack eliminating device in a textile machine which allows a yarn hooking member to offer a stable rotational resistance to a slack eliminating roller to enable the formation of packages of a stable quality.

SUMMARY OF INVENTION

[0005] An object of the present invention is to improve production of a package by realizing easy handling and maintenance of the units in the spinning machine.

[0006] This object is achieved by a spinning machine according to claim 1.

[0007] When the units are arranged along the yarn path extending linearly in the up and down direction, as disclosed in WO 2006/122605 A1, the size of the spinning machine in the up and down direction becomes so large that an operator cannot access the winding unit or the like disposed at the top part of the machine. In order to deal with this problem, it is necessary for the operator to bring a workbench from another place when handling or maintaining the units at the top part of the spinning machine. This results in a decrease in the efficiency of handling or maintenance of the spinning machine, and results in a decrease in efficiency of the spinning process.

[0008] In order to solve this problem, the easiest way is to reduce the size of the can in the up and down direction. However, in that case, the capacity of the can is reduced so that the sliver inside runs out faster. As a result, the cans need to be exchanged more frequently, and the efficiency of manufacturing a package is reduced. Therefore, it is not preferable to downsize the can for avoiding an increase in the size of the spinning machine in the up and down direction of the spinning machine.

[0009] A spinning machine according to the present invention includes a draft process unit, a pneumatic spinning unit, a yarn-accumulating device, and a winding unit. The draft process unit draws a sliver. The pneumatic spinning unit twists the sliver drawn by the draft process unit and delivers a spun yarn. A yarn-accumulating device temporarily accumulates the spun yarn delivered from the pneumatic spinning unit. The winding unit winds the spun yarn so as to form a package. A yarn path in a unit configuration section where the draft process unit, the pneumatic spinning unit, the yarn-accumulating unit, and the winding unit are disposed includes a first yarn path which is horizontal or inclined gently, and a second yarn path which continues from the first yarn path and is guided by the yarn-accumulating device to a different direction from that of the first yarn path. The draft process unit and the pneumatic spinning unit are disposed in the first yarn path, and the winding unit is disposed at a downstream end of the second yarn path.

[0010] As to the first yarn path, "inclined gently" means to be inclined upward or downward at an angle of 45 degrees or less. The shape of the yarn path, as a whole, may look like a "<" or "L", or may look like a mirrored image thereof.

[0011] In this spinning machine, an up and down distance between the lower end of the first yarn path and the upper end of the second yarn path can be reduced by nearly 50% compared with a conventional spinning machine. By reducing the size of the unit configuration section in the up and down direction, the total size of the spinning machine in the up and down direction can be reduced. Therefore, the operator can access a unit in the upper part of the spinning machine without having to use a workbench, so that handling and maintenance of the units can be performed easily and accurately. Thus, the efficiency of the spinning machine can be improved, and overall production of a package can be enhanced. Further, according to the present invention, the size of the spinning machine in the up and down direction is reduced compared with the conventional spinning machine, and the winding unit can be disposed at a position lower than that of the winding unit in a conventional spinning machine. As a result, a doffing unit of an automatic winder can be shared.

[0012] In this spinning machine, the yarn-accumulating device also serves as a direction-changing guide. Because it is not necessary to provide a dedicated direction-changing guide, the entire structure of the spinning machine can be simplified. In addition, the tension of the spun yarn temporarily accumulated in the yarn accumulating-device is not related to its bending angle, and it can be set to have a smaller value than that of the spun yarn before and after the yarn-accumulating device. Therefore, when the yarn-accumulating device serves as the direction-changing guide, the spun yarn can be bent considerably without imposing a large load on the spun yarn.

[0013] In addition, the draft process unit and the pneumatic spinning unit are disposed in the first yarn path, and the winding unit is disposed at the downstream end of the second yarn path. Therefore, the doffing of a package or exchange of a winding core in the winding unit can be easily and accurately accomplished at the downstream end of the second yarn path.

[0014] An angle formed between the second yarn path and the first yarn path is an acute angle. In this spinning machine, the size of the spinning machine in the up and down direction can be sufficiently reduced.

[0015] The spinning machine may further include a delivery roller disposed downstream of the first yarn path for delivering the spun yarn delivered from the pneumatic spinning unit. The delivery roller may be disposed at an inner side of a portion of the yarn path where the direction is changed from the first yarn path to the second yarn path.

In this spinning machine, both the delivery roller and the yarn-accumulating device serve as direction-changing guides. Therefore, even if the bending angle from the first yarn path to the second yarn path is small, the spun yarn can be smoothly guided to the second yarn path. In other words, because two members are used for changing the direction of the spun yarn, when compared with the case in which a single member is used, the bending angle of the spun yarn at each member can be set larger. Therefore, the tension applied to the spun yarn at each direction-changing guide can be reduced substantially. Thus, the load imposed on the spun yarn can be reduced, and malfunctions such as a break of the spun yarn can be reliably prevented.

[0016] A contact angle of the spun yarn with respect to the delivery roller may be 90 degrees or less.

In this spinning machine, there is little probability that the spun yarn tangles around the delivery roller. Therefore, productivity of the spinning machine is less likely to decrease.

[0017] The delivery roller may be made of a material having a high abrasive resistance.

In this spinning machine, the roller does not need to be exchanged as frequently, so that operation efficiency of the spinning machine is less likely to decrease.

[0018] An upstream side of the draft process unit and the winding unit may be disposed on the side closer to a passageway from where an operator operates the spinning machine. The yarn-accumulating device may be disposed behind the draft process unit and the winding unit when viewed from the passageway. Note that the position of the direction-changing guide, when viewed from the passageway, may be on the straight line connecting the draft process unit and the winding unit, or at a position laterally shifted from the straight line.

In this spinning machine, because the upstream side of the draft process unit is disposed on the side closer to the passageway for the operator, the operator can easily introduce the sliver to the upstream side. Similarly, because the winding unit is disposed on the passageway side, it is possible for the operator to doff a package and exchange a winding core easily and accurately. In other words, the total size of the spinning machine in the up and down direction can be reduced while an arrangement of units desired for the operator is realized. In addition, the width of the spinning machine, when viewed from the passageway, is smaller when compared with the case in which the entire first yarn path and second yarn path is disposed on the passageway side. Therefore, more spinning machines can be installed along the passageway.

[0019] The entire first yarn path and second yarn path may also be disposed on the side closer to the passageway for the operator.

In this spinning machine, because the entire first yarn path and second yarn path is disposed on the side closer to the passageway for the operator, the operator can easily access all the units disposed along both yarn paths. Therefore, the operator can easily handle and maintain the units. In other words, the total size of the spinning machine in the up and down direction can be reduced while an arrangement of the units desired for the operator is realized.

ADVANTAGEOUS EFFECTS OF INVENTION

[0020] In the spinning machine according to the present invention, each unit can be handled and maintained easily, so that production of a package can be improved.

BRIEF DESCRIPTION OF DRAWINGS

[0021]

Fig. 1 is a side view of a spinning machine according to an embodiment of the present invention.

Fig. 2 is a front view of the spinning machine.

Fig. 3 is a side view illustrating a structure of a yarn path in the spinning machine and an arrangement of units therein.

DESCRIPTION OF EMBODIMENTS

1. Fundamental structure of a spinning machine

[0022] Figs. 1 to 3 illustrate an embodiment of a spinning machine according to the present invention. In this embodiment, as illustrated in Fig. 2, a group of spinning machines 4 is arranged linearly with respect to a base frame 1. In this embodiment, for the sake of easy description, the arrangement direction of the group of spinning machines 4 is defined as the left and right direction, and the direction perpendicular to the left and right direction in the horizontal plane is defined as the front and rear direction. In addition, the direction perpendicular to a floor surface on which the base frame 1 is installed is defined as the up and down direction. The orientation of the left, front, upper, and the orientation of the right, rear,

lower are illustrated in Figs. 1 and 2 with crossing arrows.

[0023] At the left end of the base frame 1, a motor box 2 is disposed. At the right end of the base frame 1, a blower box 3 is disposed. In a lower part of the front of the base frame 1, a housing portion 7 is disposed for housing cans 10, which store slivers S. In an upper part of the front of the base frame 1, a unit configuration section 8 is disposed in which units constituting the spinning machine 4 are arranged. On the front side of the base frame 1, there is a passageway for the operator, which extends in the left and right direction. The spinning machine 4 is used for manufacturing a package P by winding a spun yarn Y from the sliver S as raw material, and one can 10 is disposed for each of the spinning machines 4. The can 10 has a cylindrical shape with a closed bottom surface and an upper opening, and has the same size as the can used in the conventional spinning machine. The can 10 may also be formed in a rectangular tubular shape.

2. Description of fundamental shape of yarn path

[0024] A yarn path of the spinning machine 4 in the unit configuration section 8 has substantially a shape like "<" constituted of a first yarn path R1 and a second yarn path R2 as illustrated in Figs. 1 and 3. The first yarn path R1 is constituted of a horizontal yarn path extending from the front side to the rear side of the lower part of the unit configuration section 8. The second yarn path R2 is constituted of a yarn path continuing from the first yarn path R1, and is guided so as to change the direction of the yarn from going towards the rear side to the direction towards the front side of the upper part of the unit configuration section 8 in an obliquely upward manner. Note that the first yarn path R1 is constituted not of a strictly straight line in the front and rear direction, but a bent line that is substantially a straight line with parts bending in the up and down direction or in the left and right direction. The direction of the second yarn path R2 may change in the left and right direction within a traverse width of a traverse drum 28 of a winding unit 17, and the center of the traverse width can be regarded as a representative of the yarn path.

3. Description of individual units

[0025] The spinning machine 4 is constituted of individual units, including a sliver guide 11, a draft process unit 12, a pneumatic spinning unit 13, a delivery roller 14, a yarn-accumulating device 15, a yarn clearer 16, the winding unit 17, and the like. Among these units 11 to 17, the sliver guide 11, the draft process unit 12, the pneumatic spinning unit 13, and the delivery roller 14 are arranged in this order along the first yarn path R1. In addition, the yarn-accumulating device 15, the yarn clearer 16, and the winding unit 17 are arranged in this order along the second yarn path R2.

[0026] The draft process unit 12 is a device which draws the sliver S to form the fiber bundle and delivers the fiber bundle to the pneumatic spinning unit 13. The draft process unit 12 is constituted of four pairs of draft rollers nipping and drawing the sliver S. The pairs of draft rollers are driven by a motor (not shown) and rotate in response thereto. As a specific arrangement, a back roller pair 21, a third roller pair 22, a second roller pair 23 around which an apron belt is wound, and a front roller pair 24, each of which being constituted of a pair of top and bottom rollers, are arranged in the front and rear direction from the upstream side in the first yarn path R1. The rotation speed of the draft roller pairs 21 to 24 increases towards the downstream side. Thus, while the sliver S passes through the draft process unit 12, the sliver S is sent to the downstream side and is drawn to be a predetermined thinness based on a ratio between the rotation speeds of neighboring draft roller pairs. In this embodiment, the back roller pair 21 on the upstream side is disposed at the front side of the base frame 1, i. e. the side closer to the passageway for the operator. Thus, the operator can easily introduce the sliver S to the back roller pair 21.

[0027] The pneumatic spinning unit 13 is a device which applies a whirling air current to the fiber bundle so as to spin truly-twisted spun yarn Y The pneumatic spinning unit 13 includes a pneumatic spinning nozzle, which forms the whirling air current, and a hollow guide shaft. The pneumatic spinning nozzle and the hollow guide shaft work together so that the whirling air current blows to the sliver S and twists the sliver S. As a result, the spun yarn Y is formed.

[0028] The delivery roller 14 and a nip roller 26 are devices disposed on the downstream side of the pneumatic spinning unit 13 for delivering the yarn. The delivery roller 14 is disposed above the nip roller 26, and more specifically, right above the nip roller 26. The delivery roller 14 is driven by a motor (not shown) and rotates in response thereto. The nip roller 26 is a roller that, when working together with the delivery roller 14, nips the spun yarn Y. In general, the delivery roller 14 is formed of a metallic material having high abrasive resistance, such as iron or aluminum, and the surface of the nip roller 26 is formed of an elastic material, such as rubber. Thus, the spun yarn Y delivered from the draft process unit 12 and the pneumatic spinning unit 13 can be reliably nipped and delivered to the downstream side along the yarn traveling direction.

[0029] The yarn-accumulating device 15 has a cylindrical shape with a tapered flange on its downstream side in the second yarn path R2. The shape of the yarn-accumulating device 15 is not limited to the illustrated one. As long as the spun yarn Y delivered from the pneumatic spinning unit 13 can be temporarily stored, the shape may also be a cylindrical shape with a tapered flange on the upstream side in the second yarn path R2. The yarn-accumulating device 15 is disposed above the delivery roller 14, and more specifically, slightly shifted towards the rear above the delivery roller 14. In addition, the ro-

tation axis of the yarn-accumulating device 15 extends obliquely upward when viewed from the rear to the front of the device.

[0030] The spun yarn Y is guided into the yarn-accumulating device 15 in the direction perpendicular to the rotation axis of the yarn-accumulating device 15 and is wound spirally around the outer circumferential surface thereof so as to be accumulated. The accumulated spun yarn Y is drawn out in the direction of the rotation axis of the yarn-accumulating device 15, and after the yarn clearer 16 checks the spun yarn Y for any yarn defect, the spun yarn Y is wound by the winding unit 17.

[0031] The winding unit 17, which is located at the downstream end of the second yarn path R2 and at the uppermost part of the spinning machine 4, includes the traverse drum 28 which traverses the spun yarn Y along the center axis direction of the package P, a cradle arm 29 which supports a winding core of the package P, and the like. The cradle arm 29 is urged by swinging urging means (not shown) in such a direction that the package P is in contact with the traverse drum 28. The traverse drum 28 rotates while being in contact with the package P so as to apply a torque to the package P. The winding unit 17 is disposed at the front side of the base frame 1, i.e. the side closer to the passageway for the operator. Thus, the operator can doff the package P and exchange the winding core easily and accurately.

4. Detailed description of yarn path

[0032] In this embodiment, both the delivery roller 14 and the yarn-accumulating device 15 serve as a direction-changing guide. Specifically, the spun yarn Y delivered from the pneumatic spinning unit 13 is guided by the delivery roller 14 and the yarn-accumulating device 15 such that its direction changes to an obliquely frontward and upward direction, and is delivered to the second yarn path R2. In other words, the spun yarn Y is bent at an obtuse angle by the delivery roller 14 and is bent at a right angle by the yarn-accumulating device 15.

[0033] In this way, a bending angle θ between the first yarn path R1 and the second yarn path R2 is an acute angle. This bending angle θ is preferably 90 degrees or less, so that the size of the unit configuration section 8 in the up and down direction is small. When the bending angles of the spun yarn Y at the delivery roller 14 and the yarn-accumulating device 15 are respectively denoted by α and β, the bending angle 0 is expressed as $\theta=\alpha+\beta-180$ (degrees).

[0034] In this embodiment, as described above, the yarn path is bent at an obtuse angle by the delivery roller 14. In other words, the delivery roller 14 is disposed at an inner side of a portion of the yarn path where the direction is changed from the first yarn path R1 to the second yarn path R2, and the nip roller 26 is disposed at an outer side of the portion of the yarn path where the direction is changed from the first yarn path R1 to the second yarn path R2. This is because if the nip roller 26, which is made of rubber, is used for bending the yarn path, the surface of the nip roller 26 would wear out soon due to the spun yarn Y running at high speed. In that case, the nip roller 26 must then be exchanged frequently, which deteriorates the utilization rate of the spinning machine 4. In addition, production of the package P is also deteriorated. Therefore, in this embodiment, the spinning machine 4 has a structure in which the delivery roller 14, which is made of a metal having high abrasive resistance, is used for bending the yarn path. Thus, the yarn path is bent while good utilization rate of the spinning machine 4 is maintained, so that a spinning machine 4 having a reduced base frame height can be realized.

[0035] Further, as illustrated in Fig. 3, a contact angle γ of the spun yarn Y around the delivery roller 14 is 90 degrees or less. If the contact angle y is 90 degrees or more, i.e. the spun yarn Y is in contact with the delivery roller 14 for a larger area, the running spun yarn Y may fail to be delivered to the yarn-accumulating device 15 and tangles around the delivery roller 14. If the spun yarn Y tangles around the delivery roller 14, the running of the spun yarn Y is stopped by the delivery roller 14 and the spun yarn Y cannot be wound around the package P. As a result, productivity of the spinning machine 4 is deteriorated. Further, if the spun yarn Y is supplied to the downstream side in the yarn traveling direction in spite of the tangling around the delivery roller 14, and is wound to form the package P, the following malfunction occurs. The spun yarn Y that has been damaged by being tangled around the delivery roller 14 is wound to form the package P, which causes the quality of the package P to deteriorate. In addition, it is desirable in view of yarn quality that the spun yarn Y does not substantively contact the individual units before being wound to form the package P. Therefore, in this embodiment, the contact angle γ is set to 90 degrees or less.

5. Effect of the embodiment

[0036] As described above, in this embodiment, the yarn path of the spinning machine 4 in the unit configuration section 8 is formed to have a shape like "<", and includes the first yarn path R1 arranged laterally from the front side to the rear side in the lower part of the unit configuration section 8, and the second yarn path R2 that continues from the first yarn path R1 and is guided to a different direction from that of the first yarn path R1 and extends to the upper part of the unit configuration section 8. Thus, a distance in the up and down direction between the lower end of the first yarn path R1 and the upper end of the second yarn path R2 is reduced by almost 50%, compared with the conventional arrangement, to be approximately 600 mm. Further, a distance in the up and down direction between the floor and the winding unit 17 can be approximately 1800 mm, which is just a little higher than the height of a typical operator. Therefore, the operator can access the winding unit 17 without using a workbench. Thus, the operator can handle and carry out

maintenance work on the winding unit 17 easily and accurately. Further, the operator can doff the package P and exchange the winding core thereof easily and accurately. In this way, the efficiency of the spinning machine can be improved, and overall production of the package P can be improved.

6. Other embodiments

[0037] Although one embodiment of the present invention has been described above, the present invention is not limited to the embodiment and can be modified variously without deviating from the scope and the spirit of the present invention.

(1) In the embodiment described above, the first yarn path R1 extends from the front side to the rear side in the lower part of the unit configuration section 8, and the second yarn path R2 extends from the rear side of the lower part of the unit configuration section 8 to the front side of the upper part of the unit configuration section 8. However, the present invention is not limited to this structure. For example, the entire first yarn path R1 and second yarn path R2 may be disposed at the front side of the unit configuration section 8. In this case, the first yarn path R1 and the second yarn path R2 extend not in the front and rear direction but in the left and right direction. If the entire yarn path is disposed at the front side, i.e. the side closer to the passageway for the operator, as is in this modified example, the operator can easily access all the units 11 to 17 in the unit configuration section 8. Therefore, the operator can easily handle and carry out maintenance work on the units 11 to 17.
(2) In the embodiment described above, both the delivery roller 14 and the yarn-accumulating device 15 also serve as the direction-changing guide. However, it is acceptable that only the yarn-accumulating device 15 is used as the direction-changing guide.
If only the yarn-accumulating device 15 serves as the direction-changing guide, the delivery roller 14 and the nip roller 26 can be removed from the spinning machine 4. In this case, the number of units which the spun yarn Y contacts before being wound to form the package P can be reduced. Therefore, the quality of the spun yarn Y wound to form the package P can be further improved. Since the number of units in the spinning machine 4 is reduced, the structure can be simplified while the height of the base frame is reduced.
(3) In the embodiment described above, the bending angle of the spun yarn Y at the yarn-accumulating device 15 is the right angle. However, the present invention is not limited to the described embodiment. As long as the total bending angle 0 is an acute angle, the bending angle β at the yarn-accumulating device 15 may also be an acute angle. If the yarn path is arranged as described, the height of the base frame of the spinning machine 4 can be further reduced.
(4) In addition to the delivery roller 14 and the yarn-accumulating device 15, a special-purpose member may be provided as a part of the direction-changing guide.
Specifically, either a single or multiple special-purpose members may be used as the direction-changing guide. Alternatively, one or both of the delivery roller 14 and the yarn accumulating device 15 may be combined with a special-purpose member to be used as the direction-changing guide. As a specific example of the special-purpose member, a rotatable roller or a fixed and supported guide rod like a round shaft may be used. The delivery roller 14 may also be omitted.
(5) The yarn path in the unit configuration section 8 does not strictly have to have a shape like "<" as illustrated in Figs. 1 and 3. For example, the yarn path may have a shape like "L" or a similar shape. Further, the shape may be a mirrored shape of "<" or "L".
(6) The first yarn path R1 does not have to be horizontal, but may be inclined downward or upward.
(7) The draft process unit 12 does not have to be constituted of four draft roller pairs, but may be constituted of three draft roller pairs.
(8) Instead of the traverse drum 28, a traverse guide, which traverses the spun yarn Y, and a friction roller which contacts the package P so as to apply the torque to the package P may be provided.

INDUSTRIAL APPLICABILITY

[0038] The present invention can be widely applied to spinning machine that includes units such as a draft process unit, a pneumatic spinning unit, and a winding unit.

REFERENCE SIGNS LIST

[0039]

4 spinning machine
8 unit configuration section
10 can
12 draft process unit
13 pneumatic spinning unit
14 delivery roller
15 yarn-accumulating device
17 winding unit
S sliver
Y spun yarn
P package
R1 first yarn path
R2 second yarn path

Claims

1. A spinning machine comprising:

   a draft process unit (12) configured to draw a sliver (S);
   a pneumatic spinning unit (13) arranged to twist the sliver (S) drawn by the draft process unit (12) and deliver a spun yarn (Y); and
   a winding unit (17) arranged to wind the spun yarn (Y) so as to form a package, wherein
   a yarn path in a unit configuration section (8) where the draft process unit (12), the pneumatic spinning unit (13), and the winding unit (17) are disposed includes a first yarn path (R1) arranged to be horizontal or inclined gently upward or downward at an angle of 45 degrees or less, and a second yarn path (R2) arranged to continue from the first yarn path (R1) to a different direction from that of the first yarn path (R1), and
   the draft process unit (12) and the pneumatic spinning unit (13) are disposed in the first yarn path (R1),
   characterized in that
   the unit configuration section (8) further comprises a yarn-accumulating device (15) arranged to temporarily accumulate the spun yarn (Y) delivered from the pneumatic spinning unit (13);
   the second yarn path (R2) is guided by the yarn-accumulating device (15) to the different direction;
   the second yarn path (R2) extends in an obliquely upward manner to an upper part of the unit configuration section (8);
   the winding unit (17) is disposed at a downstream end of the second yarn path (R2), and
   an angle between the second yarn path (R2) and the first yarn path (R1) is an acute angle.

2. The spinning machine according to claim 1, further comprising a delivery roller (14) disposed downstream of the first yarn path (R1) and arranged to deliver the spun yarn (Y) delivered from the pneumatic spinning unit (13), wherein

   the delivery roller (14) is disposed at an inner side of a portion of the yarn path where the direction is changed from the first yarn path (R1) to the second yarn path (R2).

3. The spinning machine according to claim 2, wherein a contact angle of the spun yarn (Y) with respect to the delivery roller (14) is 90 degrees or less.

4. The spinning machine according to claim 2 or 3, wherein the delivery roller (14) is made of a material having a high abrasive resistance.

5. The spinning machine according to any one of claims 1 to 4, wherein

   an upstream side of the draft process unit (12) and the winding unit (17) are disposed on a side closer to a passageway from where an operator operates the spinning machine, and
   the yarn-accumulating device (15) is disposed behind the draft process unit (12) and the winding unit (17) when viewed from the passageway.

6. The spinning machine according to any one of claims 1 to 4, wherein the entire first yarn path (R1) and second yarn path (R2) are disposed on a side closer to a passageway for an operator operating the spinning machine.

Patentansprüche

1. Eine Spinnmaschine mit folgenden Merkmalen:

   einer Zugverarbeitungseinheit (12), die ausgebildet ist, um ein Faserband (S) zu ziehen;
   einer pneumatischen Spinneinheit (13), die angeordnet ist, um das Faserband (S), das durch die Zugverarbeitungseinheit (12) gezogen wird, zu verdrillen und ein gesponnenes Garn (Y) zu liefern; und
   einer Wickeleinheit (12), die angeordnet ist, um das gesponnene Garn (Y) so zu wickeln, dass ein Garnkörper entsteht, wobei
   ein Garnweg in einem Einheitsausbildungsabschnitt (8), in dem die Zugverarbeitungseinheit (12), die pneumatische Spinneinheit (13) und die Wickeleinheit (17) angeordnet sind, einen ersten Garnweg (R1), der horizontal oder in einem Winkel von 45 Grad oder weniger leicht nach oben oder unten geneigt angeordnet ist, und einen zweiten Garnweg (R2) umfasst, der angeordnet ist, um von dem ersten Garnweg (R1) in einer Richtung als derjenigen des ersten Garnwegs (R1) weiter zu laufen, und
   die Zugverarbeitungseinheit (12) und die pneumatische Spinneinheit (13) in dem ersten Garnweg (R1) angeordnet sind,
   dadurch gekennzeichnet, dass
   der Einheitsausbildungsabschnitt (8) ferner eine Garnsammelvorrichtung (15) aufweist, die angeordnet ist, um das gesponnene Garn (Y), das von der pneumatischen Spinneinheit (13) geliefert wird, zeitweilig zu sammeln;
   der zweite Garnweg (R2) durch die Garnsammelvorrichtung (15) in die unterschiedliche Richtung geführt wird;
   sich der zweite Garnweg (R2) schräg nach oben bis zu einem oberen Teil des Einheitsausbildungsabschnitts (8) erstreckt;

die Wickeleinheit (17) an einem in Verarbeitungsrichtung nachgeordneten Ende des zweiten Garnwegs (R2) angeordnet ist, und
ein Winkel zwischen dem zweiten Garnweg (R2) und dem ersten Garnweg (R1) ein spitzer Winkel ist.

2. Die Spinnmaschine gemäß Anspruch 1, die ferner eine Zuführrolle (14) aufweist, die in Verarbeitungsrichtung nach dem ersten Garnweg (R1) angeordnet ist und angeordnet ist, um das gesponnene Garn (Y), das von der pneumatischen Spinneinheit (13) geliefert wird, zuzuführen, wobei
die Zuführrolle (14) an einer Innenseite eines Abschnitts des Garnwegs angeordnet ist, wo die Richtung von dem ersten Garnweg (R1) zu dem zweiten Garnweg (R2) verändert wird.

3. Die Spinnmaschine gemäß Anspruch 2, bei der ein Kontaktwinkel des gesponnenen Garns (Y) in Bezug auf die Zuführrolle (14) 90 Grad oder weniger beträgt.

4. Die Spinnmaschine gemäß Anspruch 2 oder 3, bei der die Zuführrolle (14) aus einem Material mit großer Abriebbeständigkeit hergestellt ist.

5. Die Spinnmaschine gemäß einem der Ansprüche 1 bis 4, bei der
eine in Verarbeitungsrichtung vorgelagerte Seite der Zugverarbeitungseinheit (12) und die Wicklungseinheit (17) an einer Seite angeordnet sind, die näher an einem Durchgang ist, von wo ein Bediener die Spinnmaschine bedient, und
die Garnsammelvorrichtung (15) bei Betrachtung von dem Durchgang aus hinter der Zugverarbeitungseinheit (12) und der Wickeleinheit (17) angeordnet ist.

6. Die Spinnmaschine gemäß einem der Ansprüche 1 bis 4, bei der der gesamte erste Garnweg (R1) und zweite Garnweg (E2) an einer Seite angeordnet sind, die näher an einem Durchgang für einen Bediener ist, der die Spinnmaschine bedient.

Revendications

1. Machine de filature, comprenant:

une unité de traitement d'étirage (12) configurée pour étirer un ruban (S);
une unité de filature pneumatique (13) aménagée pour tordre le ruban (S) étiré par l'unité de traitement d'étirage (12) et délivrer un fil filé (Y); et
une unité d'enroulement (17) aménagée pour enrouler le fil filé (Y) de manière à former un paquet,
dans laquelle
un trajet de fil dans un segment de configuration d'unité (8), où sont disposées l'unité de traitement d'étirage (12), l'unité de filature pneumatique (13) et l'unité d'enroulement (17), comporte un premier trajet de fil (R1) aménagé de manière à être horizontal ou légèrement incliné vers le haut ou vers le bas à un angle de 45 degrés ou moins, et un deuxième trajet de fil (R2) aménagé de manière à continuer depuis le premier trajet de fil (R1) dans une direction différente de celle du premier trajet de fil (R1), et
l'unité de traitement d'étirage (12) et l'unité de filature pneumatique (13) sont disposées dans le premier trajet de fil (R1),
caractérisée par le fait que
le segment de configuration d'unité (8) comprend par ailleurs un dispositif d'accumulation de fil (15) aménagé de manière à accumuler temporairement le fil filé (Y) délivré par l'unité de filature pneumatique (13);
le deuxième trajet de fil (R2) est guidé par le dispositif d'accumulation de fil (15) vers la direction différente ;
le deuxième trajet de fil (R2) s'étend vers le haut de manière oblique jusqu'à une partie supérieure du segment de configuration d'unité (8) ;
l'unité d'enroulement (17) est disposée à une extrémité aval du deuxième trajet de fil (R2), et un angle entre le deuxième trajet de fil (R2) et le premier trajet de fil (R1) est un angle aigu.

2. Machine de filature selon la revendication 1, comprenant par ailleurs un rouleau de délivrance (14) disposé en aval du premier trajet de fil (R1) et aménagé de manière à délivrer le fil filé (Y) délivré par l'unité de filature pneumatique (13), dans laquelle
le rouleau de délivrance (14) est disposé d'un côté intérieur d'une partie du trajet de fil où la direction est changée du premier trajet de fil (R1) au deuxième trajet de fil (R2).

3. Machine de filature selon la revendication 2, dans laquelle un angle de contact du fil filé (Y) par rapport au rouleau de délivrance (14) est de 90 degrés ou moins.

4. Machine de filature selon la revendication 2 ou 3, dans laquelle le rouleau de délivrance (14) est réalisé en un matériau présentant une haute résistance à l'abrasion.

5. Machine de filature selon l'une quelconque des revendications 1 à 4, dans laquelle
un côté amont de l'unité de traitement d'étirage (12) et l'unité d'enroulement (17) sont disposés d'un côté plus près d'un passage d'où un opérateur fait fonc-

tionner la machine de filature, et
le dispositif d'accumulation de fil (15) est disposé derrière l'unité de traitement d'étirage (12) et l'unité d'enroulement (17), lorsque vu depuis le passage.

6. Machine de filature selon l'une quelconque des revendications 1 à 4, dans laquelle l'ensemble du premier trajet de fil (R1) et du deuxième trajet de fil (R2) est disposé d'un côté plus près d'un passage pour un opérateur faisant fonctionner la machine de filature.

FIG. 1

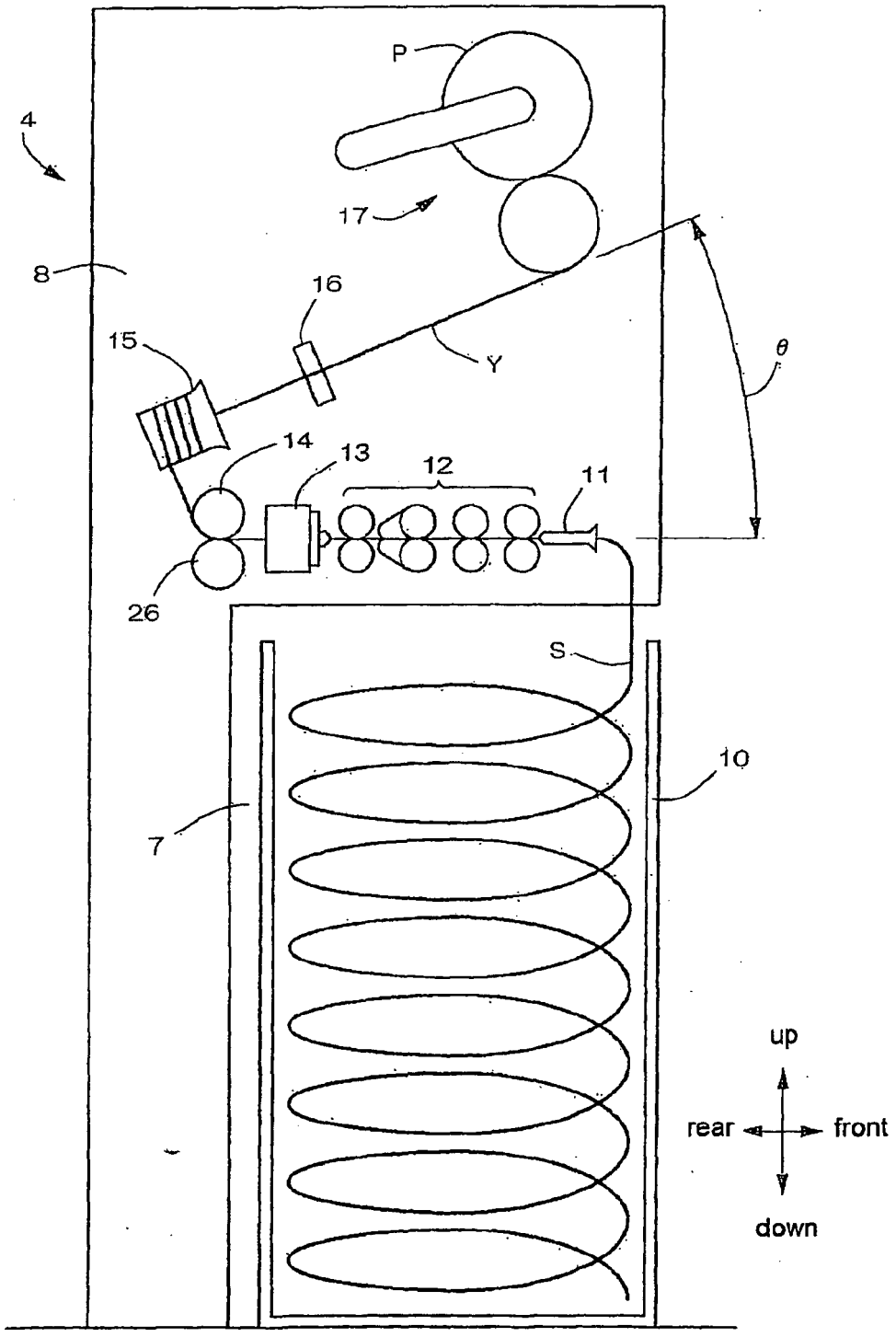


FIG. 2

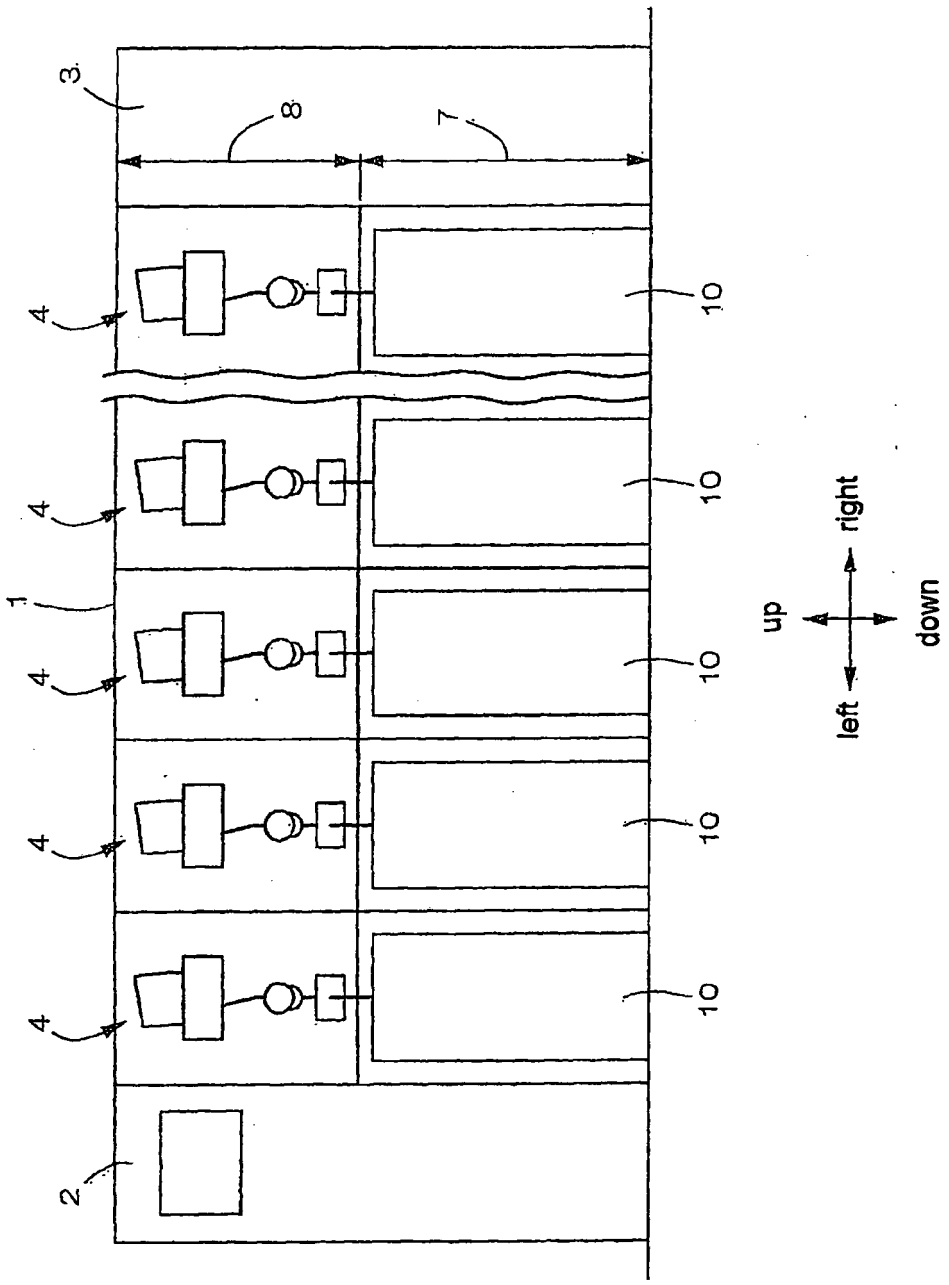
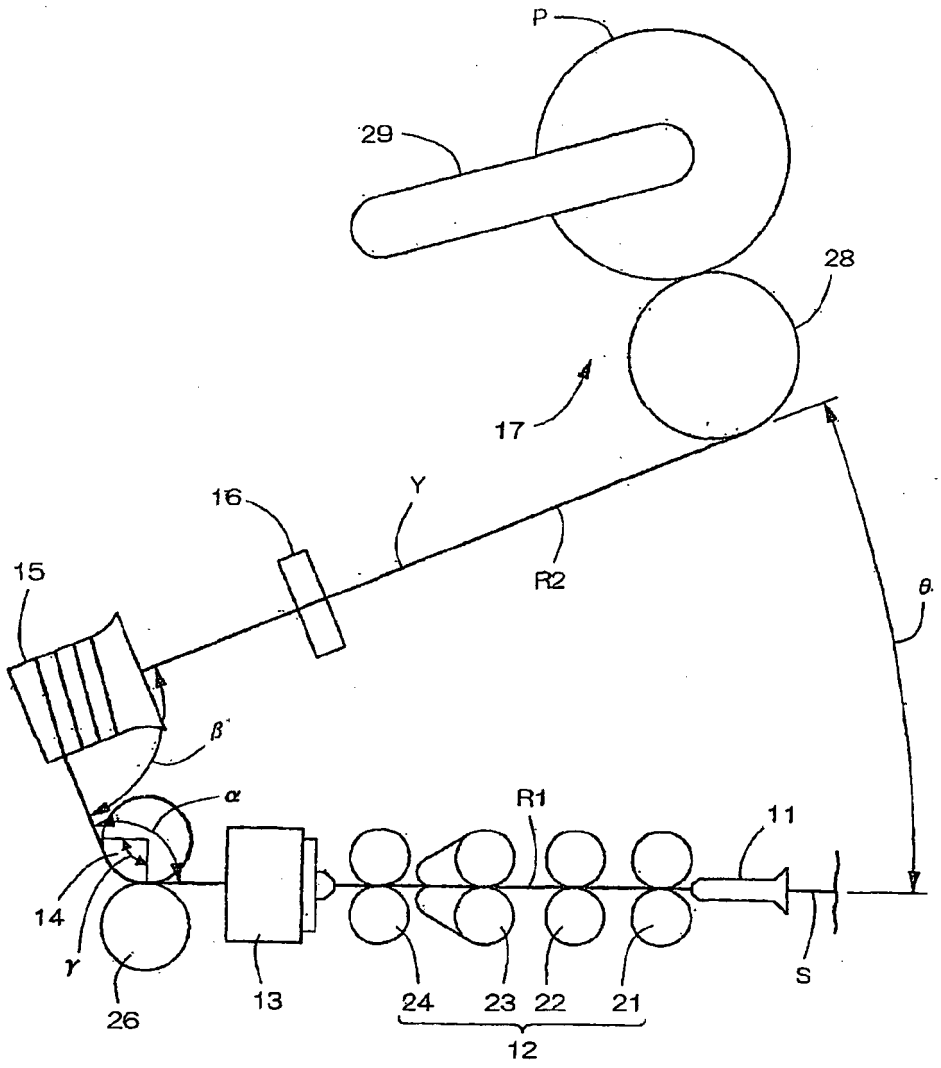


FIG. 3



REFERENCES CITED IN THE DESCRIPTION

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- JP 2006306588 A **[0004]**