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(54) **YARN WINDING DEVICE**

GARNWICKLUNGSVORRICHTUNG

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a yarn winding device, and a method of using such a device.

2. Description of the Related Art

[0002] A yarn catching section mounted on a yarn winding device that catches a yarn when a yarn breaks and the like is known in the art. For example, the yarn winding device equipped with a yarn-end blower that feeds a yarn end of a yarn supplying bobbin to a winding section side by the action of an air current, and a yarn catching section that catches the yarn end fed by the yarn-end blower is disclosed in EP 2 594 517 A1 and in Japanese Patent Application Laid-open No. 2012-20852.

[0003] In the above conventional yarn catching section, a suction force is constantly generated when the yarn winding device is operating. In other words, in the conventional yarn catching section, the suction force is generated even when yarn catching is not required. Because a negative pressure source that generates the suction force constantly consumes power, the conventional yarn winding devices are not efficient.

SUMMARY OF THE INVENTION

[0004] It is an object of the present invention to provide an efficient yarn winding device, and a method of using such a device.

[0005] According to one aspect of the present invention, a yarn winding device includes a yarn supplying section that supports a yarn supplying bobbin on which a yarn is wound; a winding section that winds the yarn pulled from the yarn supplying bobbin supported in the yarn supplying section; a yarn-end blower that blows off a yarn end from the yarn supplying bobbin to the winding section side by blowing an air current; and a yarn catching section that catches the yarn end blown off by the yarn-end blower. The yarn catching section includes a main body and a suction section that comprises a cylindrical member on which a suction port that sucks the yarn is formed. The suction section is arranged so as to be capable of performing a reciprocating linear movement in an axial direction of the cylindrical member in the main body, in which a suction force is generated in the suction port when the suction section is at a first position that is near a yarn path of the yarn that moves from the yarn supplying section to the winding section, and the suction force is not generated in the suction port when the suction section is at a second position that is retracted from the yarn path.

[0006] In the yarn winding device, when the suction section of the yarn catching section is at the first position

that is near the yarn path of the yarn that moves from the yarn supplying section to the winding section, the suction force is generated in the suction port, and when the suction section of the yarn catching section is at the second position that is retracted from the yarn path, the suction force is not generated in the suction port. In this configuration, when the yarn end is not getting sucked, the suction section is moved to the second position so that the suction force cannot be generated in the suction port. Consequently, power consumption by the negative pressure source when the yarn end is not getting caught can be reduced. As a result, an efficient operation can be achieved in the yarn winding device.

[0007] In the above yarn winding device, the yarn catching section includes a driving section that causes the suction section to perform the reciprocating movement, wherein the driving section causes the suction section to move to the first position and to the second position. In this configuration, the driving section causes the suction section to move to the second position when the yarn end is not getting sucked so that power consumption by the negative pressure source can be reduced more reliably.

[0008] In the above yarn winding device, the main body includes a hollow section that forms a space where the suction section is positioned in a partitioned manner, and in which a negative pressure acts by an action of a negative pressure source. In the suction section, the suction port is arranged on a first end thereof in an axial direction and a second end thereof is closed, and an opening that communicates with an inner section is arranged between the first end and the second end. The driving section causes the suction section to move to the first position that provides communication between the opening and the hollow section, and to the second position whereby the opening is closed by the main body. In this configuration, the suction section is moved to the second position so that the opening that communicates with the inner section of the suction section is closed. Therefore, in the second position, the suction force is not generated in the suction section. Consequently, the power consumption by the negative pressure source can be reliably reduced.

[0009] The above yarn winding device further includes a yarn joining device that joins the yarn of the yarn supplying bobbin caught by the yarn catching section and the yarn wound on the winding device. The driving section, in addition to the first position and the second position, moves the suction section to a third position at which a weaker suction force than that generated at the first position is generated in the suction port by providing communication between a part of the opening and the hollow section, and moves the suction section to the third position when the yarn joining device is joining the yarn. When the yarn is being joined by the yarn joining device, the suction of the yarn end in the suction section is maintained. In such a case, if the suction force applied by the suction section on the yarn end is significant, a yarn breakage may occur. Therefore, the suction force can be

weakened by moving the suction section to the third position that provides the communication between the part of the opening and the hollow section. Consequently, the yarn breakage during the yarn joining can be minimized.

[0010] The above yarn winding device further includes a cutter that cuts the yarn, and a yarn monitoring device that monitors a state of the yarn. The yarn joining device is arranged between the yarn supplying section and the winding section, and joins the yarn disconnected between the yarn supplying section and the winding section, and the yarn catching section, the cutter and the yarn monitoring device are arranged in this sequence order downstream of the yarn joining device. According to such a configuration, when the yarn is disconnected by the cutter upon detection of, for example, a yarn defect by the yarn monitoring device, the yarn catching section can reliably catch the disconnected yarn, and the caught yarn can be guided to the yarn joining device.

[0011] The above yarn winding device further includes a cutter that cuts the yarn, a yarn monitoring device that monitors a state of the yarn, and a yarn accumulating device that pulls and accumulates the yarn from the yarn supplying section. The yarn joining device is arranged between the yarn supplying section and the yarn accumulating device, and joins the yarn disconnected between the yarn supplying section and the yarn accumulating device, and the yarn catching section, the cutter, the yarn monitoring device, and the yarn accumulating device are arranged in this order downstream of the yarn joining device. According to such a configuration, when the yarn is disconnected by the cutter upon detection of, for example, a yarn defect by the yarn monitoring device, the yarn catching section can reliably catch the disconnected yarn, and the caught yarn can be guided to the yarn joining device.

[0012] In the above yarn winding device, the yarn catching section includes a detecting section that detects the yarn end sucked in the suction port. With this configuration, whether the yarn end is sucked into the suction section can be detected.

[0013] In the above yarn winding device, the yarn catching section includes a shutter that opens or closes the suction port in accordance with a movement of the suction section. In this configuration, the suction force changes depending on the position at which the suction section is positioned. Consequently, by moving the suction section to the position at which the suction port is closed by the shutter when the yarn is not getting sucked, the power consumption by the negative pressure source can be reduced more reliably.

[0014] In the above yarn winding device, the yarn catching section includes a driving section that causes the suction section to perform the reciprocating movement, and the driving section moves the suction section to the first position where the shutter opens to open the suction port, and to the second position where the suction port is closed by the shutter. In this configuration, when the suction section is moved to the second position, the

suction port is closed by the shutter. Therefore, at the second position, the suction force is not generated in the suction section. Consequently, the power consumption by the negative pressure source can be reliably reduced.

[0015] According to the present invention, an efficient operation can be achieved.

[0016] In the above explanation, the meaning of "a plurality of" also includes "a predetermined number of".

[0017] Although the invention has been explained with respect to specific embodiments for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art that fairly fall within the scope of the claims.

[0018] The above and other objects, features, advantages and technical and industrial significance of this invention will be better understood by reading the following detailed description of presently preferred embodiments of the invention, when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a schematic front view of an overall configuration of an automatic winder according to one embodiment of the present invention.

FIG. 2 is a schematic side view of a winder unit according to one embodiment of the present invention.

FIG. 3 is a perspective view of a first catching section according to the present invention.

FIG. 4 is another perspective view of the first catching section.

FIGS. 5A and 5B are views showing operation of the first catching section.

FIGS. 6A and 6B are views showing operation of the first catching section.

FIG. 7 is a perspective view of a first catching section according to another embodiment of the present invention.

FIG. 8 is another perspective view of the first catching section according to shown in FIG. 7.

DETAILED DESCRIPTION

[0020] Exemplary embodiments of the present invention are explained in detail below with reference to the accompanying drawings. Identical elements or corresponding elements are indicated by the same reference symbols in the drawings and redundant explanation thereof is omitted. The terms "upstream" and "downstream" refer to upstream and downstream in a traveling direction of a yarn during spinning, respectively.

[0021] As shown in FIG. 1, an automatic winder 1 includes a plurality of winder units (yarn winding devices) 2 that are arranged side by side, a machine-frame con-

trolling device 3, a yarn-supply bobbin feeder 4, a doffing device 5, and a not shown blower box.

[0022] The machine-frame controlling device 3 communicates with the winder units 2. The operator of the automatic winder 1 can centrally manage the winder units 2 by performing appropriate operations on the machine-frame controlling device 3. The machine-frame controlling device 3 controls operations of the yarn-supply bobbin feeder 4 and the doffing device 5.

[0023] The yarn-supply bobbin feeder 4 sets one yarn supplying bobbin 21 on each of conveying trays 26 by a not shown mechanism and feeds the yarn supplying bobbin 21 set on the conveying tray 26 to each of the winder units 2.

[0024] The doffing device 5 moves to the position of a winder unit 2 in which a package 30 has been fully wound (a state where a prescribed amount of a yarn 20 has been wound) in the winder unit 2, and removes the fully wound package 30. The doffing device 5 sets an empty (a state where no yarn is wound) winding bobbin 22 in the place of the package 30 that has been removed from the winder unit 2.

[0025] A configuration of the winder unit 2 is explained below. As shown in FIG. 2, the winder unit 2 includes a yarn supplying section 6, a yarn accumulating device 18, and a package forming section 8. In the winder unit 2, the yarn 20 from the yarn supplying bobbin 21 of the yarn supplying section 6 is unwound, the unwound yarn 20 is temporarily accumulated in the yarn accumulating device 18, and thereafter the accumulated yarn 20 is unwound and wound onto the winding bobbin 22 to form the package 30.

[0026] The yarn supplying section 6 supports the yarn supplying bobbin 21 set on the conveying tray 26 at a predetermined position, and unwinds the yarn 20 from the yarn supplying bobbin 21 to supply the yarn 20. The yarn supplying section 6 discharges the empty yarn supplying bobbin 21 from which all the yarn 20 has been unwound and receives another yarn supplying bobbin 21 from the yarn-supply bobbin feeder 4.

[0027] The yarn accumulating device 18 is arranged between the yarn supplying section 6 and the package forming section 8. The yarn accumulating device 18 is arranged at a position upstream of the package forming section 8 in a traveling direction of the yarn 20. The yarn accumulating device 18 temporarily accumulates the yarn 20 supplied from the yarn supplying section 6. The yarn accumulating device 18 is arranged such that the yarn 20 accumulated therein can be pulled by the package forming section 8. The yarn accumulating device 18 includes a yarn accumulating roller 32 on which the yarn 20 is wound, and a roller driving motor 33 that rotationally drives the yarn accumulating roller 32. The roller driving motor 33 causes the yarn accumulating roller 32 to rotate in a winding direction so that the yarn 20 from the yarn supplying section 6 is wound. Moreover, the roller driving motor 33 can also cause the yarn accumulating roller 32 to rotate in an opposite direction of the winding direction.

[0028] The package forming section 8 includes a cradle 23 on which the winding bobbin 22 can be mounted and a traversing drum 24 that drives the winding bobbin 22 while traversing the yarn 20. The package forming section 8 comprises a winding section. The cradle 23 rotatably supports the winding bobbin 22 (or the package 30). The cradle 23 is pivoted so that an outer peripheral surface of the package 30 mounted thereon is in contact with or separated from an outer peripheral surface of the traversing drum 24.

[0029] The traversing drum 24 is rotationally driven by a not shown driving source (an electric motor or the like). The rotation of the traversing drum 24 that is in contact with the outer peripheral surface of the winding bobbin 22 or the package 30 rotationally drives the winding bobbin 22. With this action, the yarn 20 accumulated in the yarn accumulating device 18 is unwound and pulled via a pulling guide 37, and wound on the winding bobbin 22. The traversing drum 24 has a not shown traversing groove formed on the outer peripheral surface thereof. The traversing groove enables the yarn 20 to be traversed by a predetermined width. With this configuration, the yarn 20 can be wound on the winding bobbin 22 while being traversed and the package 30 of a predetermined length and shape can be formed.

[0030] The winder unit 2 includes various devices on a yarn traveling path from the yarn supplying section 6 via the yarn accumulating device 18 to the package forming section 8. Specifically, an unwinding assisting device 10, a first blower (a yarn-end blower) 11, a second catching section 12, a yarn joining device 13, a first catching section (a yarn catching section) 14, a tension applying device 15, a cutter 16, a yarn monitoring device 17, and a second blower 48 are arranged sequentially on the yarn path of the yarn 20 in the direction from the yarn supplying section 6 arranged upstream to the yarn accumulating device 18 arranged downstream.

[0031] A balloon is formed above the yarn supplying bobbin 21 by the swaying yarn 20 that is being unwound from the yarn supplying bobbin 21. The unwinding assisting device 10 assists in the unwinding of the yarn 20 by appropriately controlling a size of the balloon by bringing a movable member 27 into contact with the balloon.

[0032] The first blower 11 is an air sucker device arranged at a position downstream of the unwinding assisting device 10 but near the unwinding assisting device 10. The first blower 11 blows compressed air to form an air current that blows off the yarn 20 up to the first catching section 14. Accordingly, in the event of a yarn breakage, for example, a yarn end on the yarn supplying bobbin 21 side can be blown off toward the yarn joining device 13 by the first blower 11.

[0033] Because the yarn 20 from the yarn supplying bobbin 21 that has just been fed to the yarn supplying section 6 is not drawn out adequately enough, the yarn end is difficult to be blown off by the first blower 11 toward the yarn joining device 13. To address this problem, an auxiliary blower 28 is arranged in the yarn supplying sec-

tion 6 of the winder unit 2.

[0034] The auxiliary blower 28 blows compressed air into the internally hollow conveying tray 26 and the yarn supplying bobbin 21 and generates an air current at an end portion of the yarn supplying bobbin 21 to blow off the yarn 20 from the yarn supplying bobbin 21 toward the first blower 11. The auxiliary blower 28 and the first blower 11 operate in conjunction with each other to reliably convey the yarn end from the yarn supplying bobbin 21 that has just been set in the yarn supplying section 6 toward the yarn joining device 13.

[0035] The second catching section 12 is arranged at a position upstream of the yarn joining device 13 but near the yarn joining device 13. The second catching section 12 is connected to a not shown suction air current generating source and generates a suction air current during yarn joining. The second catching section 12 sucks and catches the yarn 20 on the yarn accumulating device 18 side by the action of the suction air current.

[0036] The yarn joining device 13 joins the disconnected yarn 20. The yarn joining device 13 joins the yarn 20 from the yarn supplying bobbin 21 side and the yarn 20 from the yarn accumulating device 18 side when the yarn 20 is cut by the cutter 16 upon detection of a yarn defect by the yarn monitoring device 17, when the yarn 20 being unwound from the yarn supplying bobbin 21 breaks, or when the yarn 20 is disconnected between the yarn supplying bobbin 21 and the yarn accumulating device 18, such as during replacement of the yarn supplying bobbin 21 or the like. The yarn joining device 13 is arranged at a slightly retracted position from the yarn path. The yarn joining device 13 restores the continuity of the yarn 20 by joining the two yarn ends that are guided thereto. The yarn joining device 13 can be a device that employs a fluid medium, such as compressed air, or a device that has a mechanical structure.

[0037] The first catching section 14 is arranged at a position downstream of the yarn joining device 13 but near the yarn joining device 13. When the first catching section 14 is near the yarn path, it sucks and catches the yarn end from the yarn supplying bobbin 21 side that is blown off by the first blower 11 by generating the suction air current on the end portion side thereof. The detailed structure of the first catching section 14 is explained later.

[0038] The tension applying device 15 applies a predetermined tension on the traveling yarn 20. The tension applying device 15 is a gate-type structure with movable comb teeth arranged with respect to fixed comb teeth. The tension applying device 15 applies a predetermined resistance to the yarn 20 when the yarn 20 travels between the two sets of comb teeth. The movable comb teeth are moved by, for example, a solenoid, so that the movable comb teeth and the fixed comb teeth are either in an engaged state or in a released state. With this configuration, the tension applied by the tension applying device 15 on the yarn 20 can be adjusted. The configuration of the tension applying device 15 is not particularly limited to the above. Alternatively, for example, a disc-

type tension applying device can be used.

[0039] The yarn monitoring device 17 detects a yarn defect, such as slub, contaminant, or the like, by monitoring with an appropriate sensor a thickness and the like of the yarn 20. The cutter 16 is arranged at a position upstream of the yarn monitoring device 17 but near the yarn monitoring device 17. The cutter 16 immediately cuts the yarn 20 when the yarn monitoring device 17 detects a yarn defect.

[0040] The cutter 16 and the yarn monitoring device 17 are housed in one housing 19. The housing 19 is arranged at a position downstream of the tension applying device 15 but near the tension applying device 15. With this configuration, the yarn monitoring device 17 in the housing 19 can monitor the portion of the traveling yarn 20 near the position where the yarn 20 is held (guided) by the tension applying device 15. Accordingly, since practically no shaking of the yarn 20 occurs when the yarn 20 is monitored, a detection accuracy of a defect in the yarn 20 by the yarn monitoring device 17 can be further improved.

[0041] The second blower 48 is an air sucker device arranged at a position upstream of the yarn accumulating device 18 but near the yarn accumulating device 18. The second blower 48 blows compressed air to generate an air current that blows off and conveys a yarn end on the yarn accumulating device 18 side to the second catching section 12. Specifically, the second blower 48 includes a narrow cylindrical guide member through which the yarn 20 is passed. A blowout hole of the yarn 20 is formed on one end of the guide member.

[0042] A yarn guide member 60 is arranged near the blowout hole of the second blower 48. An opening is formed on either end of the yarn guide member 60 in a longitudinal direction thereof. The yarn guide member 60 is arranged such that the opening on one end side thereof is positioned facing the blowout hole of the second blower 48, and the opening on the other end side is positioned facing the second catching section 12. A guiding path is formed inside the yarn guide member 60. The guiding path joins the openings at the two ends of the yarn guide member 60. Accordingly, it is possible to detour the yarn monitoring device 17, the tension applying device 15, the yarn joining device 13, and the like. The second blower 48, the yarn guide member 60, and the second catching section 12 together constitute an accumulating side yarn-end catching device 50.

[0043] When the yarn 20 is disconnected between the yarn supplying bobbin 21 and the yarn accumulating device 18, the second blower 48 catches the yarn 20 on the yarn accumulating device 18 side and blows off the yarn 20 so that the yarn 20 enters the guiding path in the yarn guide member 60. Then, the yarn 20 is pulled out along the guiding path and caught by the second catching section 12. Furthermore, a not shown slit is formed over the entire length of the yarn guide member 60 thereby allowing the yarn 20 to be pulled out from inside the yarn guide member 60 in a state in which the yarn 20 has been

caught by the second catching section 12. In this manner, the yarn 20 on the yarn accumulating device 18 side is blown off by the second blower 48 and guided toward the yarn joining device 13.

[0044] Each of the winder units 2 has a controlling section 25. The controlling section 25 includes not shown hardware such as a CPU (Central Processing Unit), a ROM (Read-only Memory), a RAM (Random Access Memory), and the like. The RAM stores therein software, such as a control program, and the like. The controlling section 25 controls each of the structural components of the winder unit 2 by the cooperative functioning of the hardware and the software. The controlling section 25 communicates with the machine-frame controlling device 3. This feature enables the machine-frame controlling device 3 to centrally manage the operations of the winder units 2 of the automatic winder 1.

[0045] Next, the first catching section 14 is explained in detail. As shown in FIGS. 3 and 4, the first catching section 14 includes a base 70, a main body 72, a suction section 74, a driving section 76, and a yarn detecting section 78. In the following explanation, in FIGS. 5A, 5B, 6A, and 6B, the right side is defined as "front", and the left side is defined as "rear".

[0046] The base 70 is, for example, formed by a plate-shaped metal member. The base 70 is, for example, an L-shaped member. The base 70 includes a supporting part 70a and a fixing part 70b. The supporting part 70a supports the suction section 74, the driving section 76, and the yarn detecting section 78. The fixing part 70b is fixed to a frame of the winder unit 2.

[0047] The main body 72 is mounted on a bottom surface of the supporting part 70a of the base 70. The main body 72 reciprocatably (slidably) supports the suction section 74. As shown in FIGS. 5A, 5B, 6A, and 6B, insertion holes 72a and 72b are arranged on the main body 72 through which the suction section 74 is passed. The insertion holes 72a and 72b have a shape as same as that of the outer shape of the suction section 74 (circular). An inner diameter of the insertion holes 72a and 72b is substantially equal to the outer diameter of the suction section 74. The insertion hole 72a and the insertion hole 72b are arranged on the same axis.

[0048] The main body 72 includes a hollow section 72c. The hollow section 72c forms a space where a part of the suction section 74 is positioned. The hollow section 72c is arranged between the insertion hole 72a and the insertion hole 72b. Moreover, the main body 72 includes a connecting section 73 that is connected to a not shown negative pressure source. The connecting section 73 includes a flow path 73a that communicates with the hollow section 72c. This configuration enables the negative pressure source connected to the connecting section 73 to generate a negative pressure in the hollow section 72c of the main body 72. The hollow section 72c is an airtight section. Specifically, a not shown sealing member (for example, an O - ring) is arranged on the insertion holes 72a and 72b. Accordingly, air leakage between the

suction section 74 and the insertion holes 72a and 72b is reduced, thereby securing the airtightness of the hollow section 72c.

[0049] The suction section 74 is constituted by a cylindrical member. The suction section 74 reciprocates along an axial direction (longitudinal direction) thereof in the main body 72. A suction port 74a is arranged at one end (front end / tip end / first end) of the suction section 74 in the axial direction thereof. The suction port 74a brings the yarn 20 inside. The other end (rear end / second end) of the suction section 74 in the axial direction thereof is, for example, closed by a sealing section 74b. The suction section 74 is positioned in the insertion hole 72a, the hollow section 72c, and the insertion hole 72b in the main body 72.

[0050] The suction section 74 has an opening 75 between the one end and the other end thereof. The opening 75 is, for example, arranged in a substantially central portion of the suction section 74 in the axial direction thereof. The opening 75 is formed by boring through the side surface of the suction section 74 so as to communicate with the inner section (flow path) of the suction section 74. A suction force in the suction section 74 changes according to the position of the opening 75. Specifically, as shown in FIG. 5B, when the suction section 74 is positioned at a first position at which the opening 75 and the hollow section 72c communicate, a first suction force is generated. On the other hand, as shown in FIG. 5A, when the suction section 74 is positioned at a second position at which the opening 75 is closed by the insertion hole 72b of the main body 72, the suction force is not generated. As shown in FIG. 6A, when the suction section 74 is positioned at a third position at which a part of the opening 75 and the hollow section 72c communicate with each other, a second suction force that is weaker than the first suction force is generated. In detail, because the area of the opening 75 becomes smaller at the third position in comparison with the area of the opening 75 at the first position, the suction force inside the suction section 74 becomes weak.

[0051] A regulating member 74c is arranged in the suction section 74. The regulating member 74c regulates the movement of the suction section 74. The regulating member 74c is arranged on an outer circumference on the front side of the suction section 74. The regulating member 74c regulates the movement of the suction section 74 toward the rear side by coming in contact with the portion on the insertion hole 72a side of the main body 72.

[0052] The driving section 76 causes the suction section 74 to move reciprocally (advance / retract) in the longitudinal direction of the suction section 74. The driving section 76 includes a motor 80 and a driving force transmitting mechanism 81. In the present embodiment, the motor 80 is a stepping motor. The motor 80 is fixed on an upper surface of the supporting part 70a of the base 70. The motor 80 has a rotation axis. The operation of the motor 80 is controlled by the controlling section 25. Specifically, the motor 80 is driven in accordance with a

pulse signal output from the controlling section 25.

[0053] The driving force transmitting mechanism 81 transmits the driving force of the motor 80 to the suction section 74. The driving force transmitting mechanism 81 transforms the rotation of the rotation axis of the motor 80 into a linear movement that causes the suction section 74 to move reciprocally. The driving force transmitting mechanism 81 includes a first movable member 82 and a second movable member 83. One end of the first movable member 82 is connected to the rotation axis, and the other end thereof is connected to a connecting member 84 that is arranged at the other end of the suction section 74. One end of the second movable member 83 is integrally connected to the first movable member 82, and on the other end, a detecting section that causes a sensor section 85 that is arranged on the supporting part 70a of the base 70 to detect the position of the driving force transmitting mechanism 81. The driving section 76 drives the motor 80 and causes the suction section 74 to reciprocate, thereby causing the suction section 74 to reciprocate to the first position, the second position and the third position in a linear movement.

[0054] The yarn detecting section 78 detects the yarn 20. The yarn detecting section 78 is mounted on the main body 72. Specifically, the yarn detecting section 78 is mounted on the main body 72 by using a mounting member 79. The yarn detecting section 78 is arranged on the suction port 74a side of the suction section 74. Accordingly, the yarn detecting section 78 detects the yarn 20 that is sucked into the suction section 74.

[0055] When the yarn 20 is cut by the cutter 16, the first catching section 14 having the above configuration sucks and catches the yarn end of the yarn 20 on the yarn supplying bobbin 21 side. Furthermore, the first catching section 14 can suck and remove fly-waste and the like adhering to the traveling yarn 20 by generating the suction air current in the suction port 74a of the suction section 74.

[0056] The operation of the first catching section 14 is explained next. As shown in FIG. 5A, when the first catching section 14 is in standby state, the suction section 74 is positioned at the second position. At the second position, the suction section 74 is positioned on the rear side (the suction port 74a is positioned at a position away from the yarn path). At this position, the opening 75 is closed by the insertion hole 72b. Accordingly, at this position, because the opening 75 and the hollow section 72c do not communicate with each other, the negative pressure does not act inside the suction section 74 and the suction force is not generated.

[0057] For example, when a yarn defect is detected by the yarn monitoring device 17 and the yarn 20 is cut by the cutter 16, the first blower 11 blows off the yarn 20 on the yarn supplying section 6 side (the yarn supplying bobbin 21 side) in the upward direction. When the yarn 20 is cut, in the first catching section 14, as shown in FIG. 5B, the driving section 76 causes the suction section 74 to move to the first position. At the first position, the suc-

tion section 74 is positioned on the front side (the suction port 74a is positioned at a position near the yarn path). At this position, the opening 75 communicates with the hollow section 72c and the flow path 73a. Accordingly, in the suction section 74, the negative pressure acts therein, and the first suction force is generated. The first suction force is set to a suction force capable of sucking a yarn end. When a new yarn supplying bobbin 21 has been fed in the yarn supplying section 6, the auxiliary blower 28, too, operates at almost the same time to assist the first blower 11 to blow off the yarn end. The yarn 20 blown off by the first blower 11 is sucked and caught by the first catching section 14.

[0058] In the first catching section 14, when the suction section 74 catches the yarn end of the yarn 20 fed by the first blower 11, the driving section 76 causes the suction section 74 to move to the third position as shown in FIG. 6A. At the third position, the one end of the suction section 74 is near the yarn detecting section 78. Accordingly, the yarn 20 caught by the suction section 74 is detected by the yarn detecting section 78. However, when the yarn 20 is not detected by the yarn detecting section 78, the suction section 74 is moved to the first position once again, and the operation of catching the yarn 20 is performed again in the first catching section 14. When the suction section 74 is at the third position, a part of the opening 75 communicates with the hollow section 72c. Accordingly, in the suction section 74, the negative pressure acts therein and a second suction force that is weaker than the first suction force is generated. By operating the yarn joining device 13 in this state, the yarn 20 on the yarn supplying bobbin 21 side caught by the first catching section 14 and the yarn 20 on the yarn accumulating device 18 side caught by the second catching section 12 are joined.

[0059] When the yarn joining operation by the yarn joining device 13 is completed, the driving section 76 causes the suction section 74 to move to the second position in the first catching section 14, as shown in FIG. 6B. At this position, the opening 75 is closed by the insertion hole 72b. Accordingly, in the suction section 74, because the opening 75 and the hollow section 72c do not communicate with each other, the negative pressure does not act therein, and the generation of suction force for the suction section 74 stops, thereby terminating the catching of the yarn end.

[0060] As explained above, in the first catching section 14 of the winder unit 2 according to the present embodiment, when the suction section 74 is at the first position that is near the yarn path of the yarn 20, the suction force is generated in the suction port 74a, and when the suction section 74 is at the second position that is retracted from the yarn path, the suction force is not generated in the suction port 74a. In this configuration, when the yarn end is not getting sucked, by moving the suction section 74 to the second position, the suction force cannot be generated in the suction port 74a. The negative pressure source consumes power when generating the suction air

current in the suction port 74a of the suction section 74, and the power consumption is reduced when not generating the suction air current in the suction port 74a of the suction section 74. Consequently, the power consumption of the negative pressure source can be reduced in the first catching section 14 in which the suction air current is not generated when the yarn end is not getting caught. As a result, in the winder unit 2, an efficient operation can be achieved.

[0061] In the present embodiment, the first catching section 14 includes the driving section 76 that causes the suction section 74 to reciprocate. The driving section 76 causes the suction section 74 to move to the first position at which the suction force is generated in the suction port 74a, and to the second position at which the suction force is not generated in the suction port 74a. In this configuration, the driving section 76 causes the suction section 74 to move to the second position when the yarn end is not getting sucked, making it possible to reduce the power consumption of the negative pressure source more reliably.

[0062] In the present embodiment, the main body 72 includes the hollow section 72c that forms the space where apart of the suction section 74 is positioned and in which the negative pressure acts by the action of the negative pressure source. In the suction section 74, the suction port 74a is arranged at the one end in the axial direction thereof and the other end thereof is closed, and the suction section 74 includes the opening 75 that communicates with the inner section between the one end and the other end. The driving section 76 causes the suction section 74 to move to the first position at which the opening 75 and the hollow section 72c communicate with each other, and to the second position at which the opening 75 is closed by the main body 72. In this configuration, the opening 75 that communicates with the inner section of the suction section 74 is closed by moving the suction section 74 to the second position. Therefore, at the second position, the suction force is not generated in the suction section 74. Consequently, the power consumption of the negative pressure source can be reliably reduced.

[0063] In the present embodiment, in addition to the first position and the second position, the driving section 76 can move the suction section 74 to a third position at which a suction force that is weaker than that generated at the first position is generated in the suction port 74a by providing communication between a part of the opening 75 and the hollow section 72c. The driving section 76 causes the suction section 74 to move to the third position when the yarn joining device 13 joins the yarn 20. When the yarn 20 is being joined by the yarn joining device 13, the suction of the yarn end in the suction section 74 is maintained. In such a case, if the suction force applied by the suction section 74 on the yarn end is significant, a yarn breakage may occur. Therefore, the suction force can be reduced by moving the suction section 74 to the third position that provides the communication between

a part of the opening 75 and the hollow section 72c. Consequently, the yarn breakage during yarn joining can be minimized.

[0064] In the present embodiment, the winder unit 2 includes the cutter 16 that cuts the yarn 20, the yarn monitoring device 17 that monitors the state of the yarn 20, and the yarn accumulating device 18 that pulls the yarn 20 from the yarn supplying section 6 and accumulates the pulled yarn 20. The yarn joining device 13 is arranged between the yarn supplying section 6 and the yarn accumulating device 18, and joins the yarn 20 that is disconnected between the yarn supplying section 6 and the yarn accumulating device 18. The first catching section 14, the cutter 16, the yarn monitoring device 17, and the yarn accumulating device 18 are arranged in this order downstream of the yarn joining device 13. With such a configuration, when the yarn 20 is disconnected by the cutter 16 upon detection of a yarn defect by the yarn monitoring device 17, the first catching section 14 can reliably catch the disconnected yarn 20, and the caught yarn can be guided to the yarn joining device 13.

[0065] In the present embodiment, the first catching section 14 includes the yarn detecting section 78 that detects the yarn end sucked into the suction port 74a. With this configuration, whether or not the yarn end is sucked into the suction section 74 can be detected.

[0066] Exemplary embodiments of the present invention are explained above. The present invention, however, is not limited to the above embodiments.

[0067] As shown in FIG. 7, according to another embodiment of the present invention, a first catching section 90 includes a base 92, a main body 94, a suction section 96, a shutter 98, and a yarn detecting section 100. The first catching section 90 includes a not shown driving section. The driving section has the same configuration as that explained in the first embodiment, and causes the suction section 96 to reciprocate (advance / retract). An air type cylinder can be adopted as the driving section.

[0068] The main body 94 is mounted on a bottom surface of the base 92. The main body 94 reciprocatably (slidably) supports the suction section 96.

[0069] The suction section 96 is a cylindrical member. The suction section 96 reciprocates along an axial direction (longitudinal direction) thereof in the main body 94. A suction port 96a is arranged at one end of the suction section 96 in the axial direction thereof. The suction port 96a brings the yarn 20 inside. A negative pressure source is connected to the other end of the suction section 96 in the axial direction thereof.

[0070] The driving section moves, as shown in FIG. 7, the suction section 96 to a first position at which the suction port 96a is open when the shutter 98 opens, and as shown in FIG. 8, to a second position at which the suction port 96a is closed by the shutter 98. A suction force is generated when the suction section 96 is positioned at the first position. The suction force is not generated when the suction section 96 is positioned at the second position.

[0071] The shutter 98 opens or closes the suction port 96a in accordance with the movement of the suction section 96. The shutter 98 is arranged on the one end side of the suction section 96. The shutter 98 is fixed to the base 92 with a mounting member 99. The shutter 98 is arranged so as to be swingable on the mounting member 99. The shutter 98 swings in accordance with the reciprocating movement of the suction section 96. The shutter 98 is biased in a counter-clockwise direction by a not shown biasing member. Upon being pressed by the suction section 96, the shutter 98 swings in a clockwise direction. Moreover, by functioning in cooperation with the suction section 96, the shutter 98 clamps the yarn 20.

[0072] The yarn detecting section 100 detects the yarn 20. The yarn detecting section 100 is mounted on the main body 94. Specifically, the yarn detecting section 100 is mounted on the main body 94 with the mounting member 99. The yarn detecting section 100 is arranged on the suction port 96a side of the suction section 96. Accordingly, the yarn detecting section 100 detects the yarn 20 sucked in the suction section 96.

[0073] The operation of the first catching section 90 is explained next. As shown in FIG. 8, when the first catching section 90 is in standby state, the suction section 96 is positioned at the second position. At the second position, the suction section 96 is positioned on the rear side (the suction port 96a is positioned at a position away from the yarn path). At this position, the suction port 96a of the suction section 96 is closed by the shutter 98. Accordingly, the suction force is not generated in the suction port 96a of the suction section 96.

[0074] For example, when a yarn defect is detected by the yarn monitoring device 17 and the yarn 20 is cut by the cutter 16, the first blower 11 blows off the yarn 20 on the yarn supplying section 6 side (the yarn supplying bobbin 21 side) in the upward direction. When the yarn 20 is cut, the suction section 96 is moved by the driving section to the first position in the first catching section 14, as shown in FIG. 7. At the first position, the suction section 96 is positioned on the front side (the suction port 96a is positioned at a position near the yarn path). At this position, the shutter 98 is open upon being pressed away by the suction section 96. Accordingly, in the suction section 96, the negative pressure acts therein and the suction force is generated.

[0075] In the first catching section 90, the suction section 96 catches the yarn end of the yarn 20 fed by the first blower 11, the driving section causes the suction section 96 to move to the second position. At the second position, the one end of the suction section 96 is positioned near the yarn detecting section 100. Accordingly, the yarn 20 caught by the suction section 96 is detected by the yarn detecting section 100. However, when the yarn 20 is not detected by the yarn detecting section 100, the suction section 96 is again moved to the first position, and the operation of catching the yarn 20 is performed again in the first catching section 90. At the second position, the shutter 98 closes the suction port 96a of the

suction section 96. Accordingly, by the cooperative functioning of the suction section 96 and the shutter 98, the yarn 20 caught by the suction section 96 is clamped. By operating the yarn joining device 13 in the yarn clamped state, the yarn 20 on the yarn supplying bobbin 21 side caught by the first catching section 90 and the yarn 20 on the yarn accumulating device 18 side caught by the second catching section 12 are joined.

[0076] When the yarn joining operation by the yarn joining device 13 is completed, the driving section causes the suction section 96 to move to the front in the first catching section 90. Accordingly, the clamping of the yarn 20 (catching of the yarn 20) by the suction section 96 and the shutter 98 is released.

[0077] In the first catching section 90, when the suction section 96 is at the first position that is near the yarn path of the yarn 20, the suction force is generated in the suction port 96a, and when the suction section 96 is at the second position that is retracted from the yarn path, the suction force is not generated in the suction port 96a. In this configuration, when the yarn end is not getting sucked, by moving the suction section 96 to the second position, the suction force cannot be generated in the suction port 96a. The negative pressure source consumes power when generating the suction air current in the suction port 96a of the suction section 96, and reduces the power consumption when not generating the suction air current in the suction port 96a of the suction section 96. Consequently, the power consumption of the negative pressure source can be reduced in the first catching section 90 in which the suction air current is not generated when the yarn end is not getting caught. As a result, in the winder unit 2, an efficient operation can be achieved.

[0078] In the above embodiments, a configuration in which the driving section 76 includes the motor 80 and the driving force transmitting mechanism 81 is cited as an example. The driving section, however, can have any configuration as long as it reciprocally moves the suction section 74 or 96. For example, a cylinder and the like can be used as the driving section.

[0079] In the above embodiments, the configuration in which the yarn accumulating device 18 is omitted and the yarn 20 from the yarn supplying section 6 is directly wound by the package forming section 8, and when the yarn 20 is disconnected, the yarn 20 is caught from the package forming section 8 and guided to the yarn joining device 13 can be applied.

[0080] In the above embodiments, the yarn supplying section 6 is not limited to the one that transports the yarn supplying bobbin 21 by mounting on the tray. That is, the yarn supplying section 6 can be a magazine-type bobbin feeder. In this configuration, when the bobbin feeder feeds a new yarn supplying bobbin 21 into the yarn supplying section 6, the bobbin feeder can pull the yarn end from the yarn supplying bobbin 21 and convey the yarn end to the first blower 11. The auxiliary blower 28 can be omitted in this case.

[0081] In the above embodiments, traversing of the

yarn 20 is performed by the traversing drum 24 in the package forming section 8. The package forming section 8 is not limited to such a configuration. An arm-type or a belt-type traverse mechanism can be used for traversing the yarn 20. In the above embodiments, even though a torsion coil spring (not shown) is used, a variety of elastic members can be used. Moreover, in the above embodiments, the yarn 20 can be wound into a cheese-shaped package 30 or a cone-shaped package 30. The material and shape of various components explained above are not limited to those mentioned above, and it is possible to adopt various materials and shapes.

Claims

1. A yarn winding device (2) comprising:

a yarn supplying section (6) adapted to support a yarn supplying bobbin (21) on which a yarn is wound;

a winding section (8) adapted wind the yarn pulled from the yarn supplying bobbin (21) supported in the yarn supplying section (6);

a yarn-end blower (11) adapted to blow off a yarn end from the yarn supplying bobbin (21) to the winding section (8) side by blowing an air current; and

a yarn catching section (14; 90) adapted to catch the yarn end blown off by the yarn-end blower (11), wherein the yarn catching section (14; 90) includes

a main body (72; 94); and

a suction section (74; 96) that is constituted by a cylindrical member on which a suction port (74a; 96a) adapted to suck the yarn is formed, wherein

the suction section (74; 96) is arranged so as to be capable of performing a reciprocating linear movement in an axial direction of the cylindrical member in the main body (72; 94), in which a suction force is generated in the suction port (74a; 96a) when the suction section (74; 96) is at a first position that is near a yarn path of the yarn that moves from the yarn supplying section (6) to the winding section (8), **characterized in that**

the suction force is not generated in the suction port (74a; 96a) when the suction section (74; 96) is at a second position that is retracted from the yarn path, and the yarn catching section (90) includes a shutter (98) adapted to open or close the suction port (96a) in accordance with a movement of the suction section (96).

2. A yarn winding device (2) comprising:

a yarn supplying section (6) adapted to support

a yarn supplying bobbin (21) on which a yarn is wound;

a winding section (8) adapted wind the yarn pulled from the yarn supplying bobbin (21) supported in the yarn supplying section (6);

a yarn-end blower (11) adapted to blow off a yarn end from the yarn supplying bobbin (21) to the winding section (8) side by blowing an air current; and

a yarn catching section (14; 90) adapted to catch the yarn end blown off by the yarn-end blower (11), wherein the yarn catching section (14; 90) includes

a main body (72; 94); and

a suction section (74; 96) that is constituted by a cylindrical member on which a suction port (74a; 96a) adapted to suck the yarn is formed, wherein

the suction section (74; 96) is arranged so as to be capable of performing a reciprocating linear movement in an axial direction of the cylindrical member in the main body (72; 94), in which a suction force is generated in the suction port (74a; 96a) when the suction section (74; 96) is at a first position that is near a yarn path of the yarn that moves from the yarn supplying section (6) to the winding section (8), **characterized in that**

the suction force is not generated in the suction port (74a; 96a) when the suction section (74; 96) is at a second position that is retracted from the yarn path, and the yarn catching section (14; 90) includes a driving section (76) adapted to cause the suction section (74; 96) to perform the reciprocating movement, wherein the driving section (76) is adapted to cause the suction section (74; 96) to move to the first position and to the second position, and

the main body (72) includes a hollow section (72c) that forms a space where a part of the suction section (74) is positioned, and in which a negative pressure exists by an action of a negative pressure source,

in the suction section (74), the suction port (74a) is arranged on a first end thereof in an axial direction and a second end thereof is closed, and an opening (75) that communicates with an inner section is arranged between the first end and the second end, and

the driving section (76) is adapted to cause the suction section (74) to move to the first position that provides communication between the opening (75) and the hollow section (72c), and to the second position whereby the opening (75) is closed by the main body (72).

3. The yarn winding device (2) as claimed in Claim 2, further comprising a yarn joining device (13) adapted

- to join the yarn of the yarn supplying bobbin (21) caught by the yarn catching section (14; 90) and the yarn wound on the winding section (8), **characterized in that** the driving section (76),
in addition to the first position and the second position, is adapted to move the suction section (74) to a third position at which a weaker suction force than that generated at the first position is generated in the suction port (74a) by providing communication between a part of the opening (75) and the hollow section (72c), and
is adapted to move the suction section (74) to the third position when the yarn joining device (13) is joining the yarn.
4. The yarn winding device (2) as claimed in Claim 3, further comprising a cutter (16) adapted to cut the yarn, and a yarn monitoring device adapted to monitor a state of the yarn, **characterized in that** the yarn joining device (13) is arranged between the yarn supplying section (6) and the winding section (8), and is adapted to join the yarn disconnected between the yarn supplying section (6) and the winding section (8), and
the yarn catching section (14; 90), the cutter (16) and the yarn monitoring device (17) are arranged in this order downstream of the yarn joining device (13).
5. The yarn winding device (2) as claimed in Claim 3, further comprising a cutter (16) adapted to cut the yarn, a yarn monitoring device (17) adapted to monitor a state of the yarn, and a yarn accumulating device (18) adapted to pull and accumulates the yarn from the yarn supplying section (6), **characterized in that** the yarn joining device (13) is arranged between the yarn supplying section (6) and the yarn accumulating device (18), is adapted to join the yarn disconnected between the yarn supplying section (6) and the yarn accumulating device (18), and
the yarn catching section (14; 90), the cutter (16), the yarn monitoring device (17), and the yarn accumulating device (18) are arranged in this order downstream of the yarn joining device (13).
6. The yarn winding device (2) as claimed in any one of Claims 2 to 5, **characterized in that** the yarn catching section (14; 90) includes a detecting section (78; 100) adapted to detect the yarn end sucked in the suction port (74a; 96a).
7. Method of using a yarn winding device (2) comprising:
a yarn supplying section (6) supporting a yarn supplying bobbin (21) on which a yarn is wound;
a winding section (8) winding the yarn pulled from the yarn supplying bobbin (21) supported in the yarn supplying section (6);
a yarn-end blower (11) blowing off a yarn end from the yarn supplying bobbin (21) to the winding section (8) side by blowing an air current; and
a yarn catching section (14; 90) catching the yarn end blown off by the yarn-end blower (11), wherein the yarn catching section (14; 90) includes
a main body (72; 94); and
a suction section (74; 96) that is constituted by a cylindrical member on which a suction port (74a; 96a) adapted to suck the yarn is formed, wherein
the suction section (74; 96) performs a reciprocating linear movement in an axial direction of the cylindrical member in the main body (72; 94), in which a suction force is generated in the suction port (74a; 96a) when the suction section (74; 96) is at a first position that is near a yarn path of the yarn that moves from the yarn supplying section (6) to the winding section (8), **characterized in that**
the suction force is not generated in the suction port (74a; 96a) when the suction section (74; 96) is at a second position that is retracted from the yarn path.
8. The method as claimed in Claim 7, **characterized in that** the yarn catching section (14; 90) includes a driving section (76) that causes the suction section (74; 96) to perform the reciprocating movement, wherein the driving section (76) causes the suction section (74; 96) to move to the first position and to the second position.
9. The method as claimed in Claim 8, **characterized in that** the main body (72) includes a hollow section (72c) that forms a space where a part of the suction section (74) is positioned, and in which a negative pressure exists by an action of a negative pressure source, in the suction section (74), the suction port (74a) is arranged on a first end thereof in an axial direction and a second end thereof is closed, and an opening (75) that communicates with an inner section is arranged between the first end and the second end, and
the driving section (76) causes the suction section (74) to move to the first position that provides communication between the opening (75) and the hollow section (72c), and to the second position whereby the opening (75) is closed by the main body (72).
10. The method as claimed in Claim 9, further comprising a yarn joining device (13) that joins the yarn of the yarn supplying bobbin (21) caught by the yarn catching section (14; 90) and the yarn wound on the

winding section (8), **characterized in that** the driving section (76), in addition to the first position and the second position, moves the suction section (74) to a third position at which a weaker suction force than that generated at the first position is generated in the suction port (74a) by providing communication between a part of the opening (75) and the hollow section (72c), and moves the suction section (74) to the third position when the yarn joining device (13) is joining the yarn.

11. The method as claimed in Claim 10, further comprising a cutter (16) that cuts the yarn, and a yarn monitoring device that monitors a state of the yarn, **characterized in that** the yarn joining device (13) is arranged between the yarn supplying section (6) and the winding section (8), and joins the yarn disconnected between the yarn supplying section (6) and the winding section (8), and the yarn catching section (14; 90), the cutter (16) and the yarn monitoring device (17) are arranged in this order downstream of the yarn joining device (13).
12. The method as claimed in Claim 10, further comprising a cutter (16) that cuts the yarn, a yarn monitoring device (17) that monitors a state of the yarn, and a yarn accumulating device (18) that pulls and accumulates the yarn from the yarn supplying section (6), **characterized in that** the yarn joining device (13) is arranged between the yarn supplying section (6) and the yarn accumulating device (18), and joins the yarn disconnected between the yarn supplying section (6) and the yarn accumulating device (18), and the yarn catching section (14; 90), the cutter (16), the yarn monitoring device (17), and the yarn accumulating device (18) are arranged in this order downstream of the yarn joining device (13).
13. The method as claimed in any one of Claims 7 to 12, **characterized in that** the yarn catching section (14; 90) includes a detecting section (78; 100) that detects the yarn end sucked in the suction port (74a; 96a).
14. The method as claimed in Claim 7, **characterized in that** the yarn catching section (90) includes a shutter (98) that opens or closes the suction port (96a) in accordance with a movement of the suction section (96).
15. The yarn winding device (2) as claimed in Claim 1, **characterized in that** the yarn catching section (14; 90) includes a driving section (76) that causes the suction section (74; 96) to perform the reciprocating movement, and the driving section (76) moves the suction section

(96) to the first position where the shutter opens to open the suction port (96a), and to the second position where the suction port (96a) is closed by the shutter (98).

Patentansprüche

1. Garnwickelvorrichtung (2), welche aufweist:

einen Garnzuführabschnitt (6), der dazu ausgelegt ist, eine Garnzuführspule (21) zu tragen, auf die ein Garn gewickelt ist;
einen Wickelabschnitt (8), der dazu ausgelegt ist, das Garn aufzuwickeln, das von der im Garnzuführabschnitt (6) getragenen Garnzuführspule (21) abgezogen wird;
ein Garnende-Gebläse (11), das dazu ausgelegt ist, durch Blasen eines Luftstroms ein Garnende von der Garnzuführspule (21) weg zu der Wickelabschnitt (8)-Seite zu blasen; und
einen Garnfangabschnitt (14; 90), der dazu ausgelegt ist, das mit dem Garnende-Gebläse (11) weggeblasene Garn aufzufangen, wobei der Garnfangabschnitt (14; 90) enthält:

einen Hauptkörper (72; 94); und
einen Saugabschnitt (74; 96), der durch ein zylindrisches Element aufgebaut ist, an dem eine zum Ansaugen des Garns ausgebildete Saugöffnung (74a, 96a) ausgebildet ist, wobei

der Saugabschnitt (74; 96) angeordnet ist, um in der Lage zu sein, eine lineare Hin- und Herbewegung in axialer Richtung des zylindrischen Elements in dem Hauptkörper (72; 94) durchzuführen, in dem eine Saugkraft in der Saugöffnung (74a, 96a) erzeugt wird, wenn sich der Saugabschnitt (74; 96) an einer ersten Position befindet, die einem Garnweg des Garns benachbart ist, das sich von dem Garnzuführabschnitt (6) zu dem Wickelabschnitt (8) bewegt, **dadurch gekennzeichnet, dass** die Saugkraft in der Saugöffnung (74a, 96a) nicht erzeugt wird, wenn sich der Saugabschnitt (74; 96) an einer zweiten Position befindet, die von dem Garnweg zurückgezogen ist, und der Garnfangabschnitt (90) einen Verschluss (98) enthält, der dazu ausgelegt ist, die Saugöffnung (96a) gemäß einer Bewegung des Saugabschnitts (96) zu öffnen oder zu schließen.

2. Garnwickelvorrichtung (2), welche aufweist:

einen Garnzuführabschnitt (6), der dazu ausgelegt ist, eine Garnzuführspule (21) zu tragen, auf die ein Garn gewickelt ist;

einen Wickelabschnitt (8), der dazu ausgelegt ist, das Garn aufzuwickeln, das von der im Garnzuführabschnitt (6) getragenen Garnzuführspule (21) abgezogen wird;

ein Garnende-Gebläse (11), das dazu ausgelegt ist, durch Blasen eines Luftstroms ein Garnende von der Garnzuführspule (21) weg zu der Wickelabschnitt (8)-Seite zu blasen; und einen Garnfangabschnitt (14; 90), der dazu ausgelegt ist, das von dem Garnende-Gebläse (11) weggeblasene Garn aufzufangen, wobei der Garnfangabschnitt (14; 90) enthält:

einen Hauptkörper (72; 94); und einen Saugabschnitt (74; 96), der durch ein zylindrisches Element aufgebaut ist, an dem eine zum Ansaugen des Garns ausgebildete Saugöffnung (74a, 96a) ausgebildet ist, wobei

der Saugabschnitt (74; 96) angeordnet ist, um in der Lage zu sein, eine lineare Hin- und Herbewegung in axialer Richtung des zylindrischen Elements in dem Hauptkörper (72; 94) durchzuführen, in dem eine Saugkraft in der Saugöffnung (74a, 96a) erzeugt wird, wenn sich der Saugabschnitt (74; 96) an einer ersten Position befindet, die einem Garnweg des Garns benachbart ist, das sich von dem Garnzuführabschnitt (6) zu dem Wickelabschnitt (8) bewegt, **dadurch gekennzeichnet, dass**

die Saugkraft in der Saugöffnung (74a, 96a) nicht erzeugt wird, wenn sich der Saugabschnitt (74; 96) an einer zweiten Position befindet, die von dem Garnweg zurückgezogen ist, und der Garnfangabschnitt (14; 90) einen Antriebsabschnitt (76) enthält, der dazu ausgelegt ist, zu veranlassen, dass der Saugabschnitt (74; 96) die Hin- und Herbewegung durchführt, wobei der Antriebsabschnitt (76) dazu ausgelegt ist, zu veranlassen, dass sich der Saugabschnitt (74; 96) zu der ersten Position und zu der zweiten Position bewegt, und

der Hauptkörper (72) einen hohlen Abschnitt (72c) enthält, der einen Raum bildet, wo ein Teil des Saugabschnitts (74) positioniert ist, und in dem durch Wirkung einer Unterdruckquelle ein Unterdruck herrscht,

in dem Saugabschnitt (74) die Saugöffnung (74a) an dessen in axialer Richtung erstem Ende angeordnet ist und dessen zweites Ende geschlossen ist, und eine Öffnung (75), die mit einem inneren Abschnitt in Verbindung steht, zwischen dem ersten Ende und dem zweiten Ende angeordnet ist, und

der Antriebsabschnitt (76) ausgelegt ist, um zu veranlassen, dass sich der Saugabschnitt (74) zu der ersten Position bewegt, die eine Verbin-

dung zwischen der Öffnung (75) und dem hohlen Abschnitt (72c) herstellt, und zu der zweiten Position, wodurch die Öffnung (75) durch den Hauptkörper (72) verschlossen wird.

3. Die Garnwickelvorrichtung (2) nach Anspruch 2, die ferner eine Garnverbindungs Vorrichtung (13) aufweist, die dazu ausgelegt ist, das von dem Garnfangabschnitt (14; 90) gefangene Garn der Garnzuführspule (21) mit dem auf den Wickelabschnitt (8) gewickelten Garn zu verbinden, **dadurch gekennzeichnet, dass**

der Antriebsabschnitt (76), zusätzlich zur ersten Position und zweiten Position, dazu ausgelegt ist, den Saugabschnitt (74) zu einer dritten Position zu bewegen, an der eine schwächere Saugkraft als jene, die an der ersten Position erzeugt wird, in der Saugöffnung (74a) erzeugt wird, indem eine Verbindung zwischen einem Teil der Öffnung (75) und dem hohlen Abschnitt (72c) hergestellt wird, und dazu ausgelegt ist, den Saugabschnitt (74) zu der dritten Position zu bewegen, wenn die Garnverbindungs Vorrichtung (13) das Garn verbindet.

4. Die Garnwickelvorrichtung (2) nach Anspruch 3, die ferner ein Messer (16) aufweist, das dazu ausgelegt ist, das Garn zu schneiden, und eine Garnüberwachungs Vorrichtung (17), die dazu ausgelegt ist, einen Zustand des Garns zu überwachen, **dadurch gekennzeichnet, dass**

die Garnverbindungs Vorrichtung (13) zwischen dem Garnzuführabschnitt (6) und dem Wickelabschnitt (8) angeordnet ist, und dazu ausgelegt ist, das zwischen dem Garnzuführabschnitt (6) und dem Wickelabschnitt (8) durchtrennte Garn zu verbinden, und der Garnfangabschnitt (14; 90), das Messer (16) und die Garnüberwachungs Vorrichtung (17) in dieser Reihenfolge stromab der Garnverbindungs Vorrichtung (13) angeordnet sind.

5. Die Garnwickelvorrichtung (2) nach Anspruch 3, die ferner ein Messer (16) aufweist, das dazu ausgelegt ist, das Garn zu durchschneiden, eine Garnüberwachungs Vorrichtung (17), die dazu ausgelegt ist, einen Zustand des Garns zu überwachen, sowie eine Garnsammel Vorrichtung (18), die dazu ausgelegt ist, das Garn von dem Garnzuführabschnitt (6) abzu ziehen und zu akkumulieren, **dadurch gekennzeichnet, dass**

die Garnverbindungs Vorrichtung (13) zwischen dem Garnzuführabschnitt (6) und dem Garnsammelabschnitt (18) angeordnet ist, und dazu ausgelegt ist, das zwischen dem Garnzuführabschnitt (6) und der Garnsammel Vorrichtung (18) durchtrennte Garn zu verbinden, und

der Garnfangabschnitt (14; 90), das Messer (16), die Garnüberwachungs Vorrichtung (17) und die Garn-

sammelvorrichtung (18) in dieser Reihenfolge stromab der Garnverbindungs Vorrichtung (13) angeordnet sind.

6. Die Garnwickelvorrichtung (2) nach einem der Ansprüche 2 bis 5, **dadurch gekennzeichnet, dass** der Garnfangabschnitt (14; 90) einen Detektionsabschnitt (78; 100) enthält, der dazu ausgelegt ist, das in die Saugöffnung (74a, 96a) gesaugte Garnende zu detektieren.
7. Verfahren zur Verwendung einer Garnwickelvorrichtung (2), welche aufweist:

einen Garnzuführabschnitt (6), der dazu ausgelegt ist, eine Garnzuführspule (21) zu tragen, auf die ein Garn gewickelt ist;
einen Wickelabschnitt (8), der dazu ausgelegt ist, das Garn aufzuwickeln, das von der in dem Garnzuführabschnitt (6) getragenen Garnzuführspule (21) abgezogen wird;
ein Garnende-Gebläse (11), das dazu ausgelegt ist, durch Blasen eines Luftstroms ein Garnende von der Garnzuführspule (21) weg zu der Wickelabschnitt (8)-Seite zu blasen; und
einen Garnfangabschnitt (14; 90), der dazu ausgelegt ist, das mit dem Garnende-Gebläse (11) weggeblasene Garn aufzufangen, wobei der Garnfangabschnitt (14; 90) enthält:

einen Hauptkörper (72; 94); und
einen Saugabschnitt (74; 96), der durch ein zylindrisches Element aufgebaut ist, an dem eine zum Ansaugen des Garns ausgebildete Saugöffnung (74a, 96a) ausgebildet ist, wobei

der Saugabschnitt (74; 96) eine lineare Hin- und Herbewegung in axialer Richtung des zylindrischen Elements in dem Hauptkörper (72; 94) durchführt, in dem eine Saugkraft in der Saugöffnung (74a, 96a) erzeugt wird, wenn sich der Saugabschnitt (74; 96) an einer ersten Position befindet, die einem Garnweg des Garns benachbart ist, das sich von dem Garnzuführabschnitt (6) zu dem Wickelabschnitt (8) bewegt, **dadurch gekennzeichnet, dass** die Saugkraft in der Saugöffnung (74, 96a) nicht erzeugt wird, wenn sich der Saugabschnitt (74; 96) an einer zweiten Position befindet, die von dem Garnweg zurückgezogen ist.

8. Das Verfahren nach Anspruch 7, **dadurch gekennzeichnet, dass** der Garnfangabschnitt (14; 90) einen Antriebsabschnitt (76), der veranlasst, dass der Saugabschnitt (74; 96) die Hin- und Herbewegung durchführt, wobei der Antriebsabschnitt (76) veranlasst, dass sich der Saugabschnitt (74; 96) zu der

ersten Position und zu der zweiten Position bewegt.

9. Das Verfahren nach Anspruch 8, **dadurch gekennzeichnet, dass** der Hauptkörper (72) einen hohlen Abschnitt (72c) enthält, der einen Raum bildet, wo ein Teil des Saugabschnitts (74) positioniert ist, und in dem durch Wirkung einer Unterdruckquelle ein Unterdruck herrscht, in dem Saugabschnitt (74) die Saugöffnung (74a) an dessen in axialer Richtung erstem Ende angeordnet ist, und dessen zweites Ende geschlossen ist, und eine Öffnung (75), die mit einem inneren Abschnitt in Verbindung steht, zwischen dem ersten Ende und dem zweiten Ende angeordnet ist, und der Antriebsabschnitt (76) veranlasst, dass sich der Saugabschnitt (74) zu der ersten Position bewegt, die eine Verbindung zwischen der Öffnung (75) und dem hohlen Abschnitt (72c) herstellt, und zu der zweiten Position, wodurch die Öffnung (75) durch den Hauptkörper (72) verschlossen wird.

10. Das Verfahren nach Anspruch 9, das ferner eine Garnverbindungs Vorrichtung (13) aufweist, die das von dem Garnfangabschnitt (14; 90) gefangene Garn der Garnzuführspule (21) mit dem auf den Wickelabschnitt (8) gewickelten Garn verbindet, **dadurch gekennzeichnet, dass** der Antriebsabschnitt (76), zusätzlich zur ersten Position und zweiten Position, den Saugabschnitt (74) zu einer dritten Position bewegt, an der eine schwächere Saugkraft als jene, die an der ersten Position erzeugt wird, in der Saugöffnung (74a) erzeugt wird, indem eine Verbindung zwischen einem Teil der Öffnung (75) und dem hohlen Abschnitt (72c) hergestellt wird, und den Saugabschnitt (74) zu der dritten Position bewegt, wenn die Garnverbindungs Vorrichtung (13) das Garn verbindet.

11. Das Verfahren nach Anspruch 10, das ferner ein Messer (16) aufweist, das das Garn schneidet, und eine Garnüberwachungs Vorrichtung (17), die einen Zustand des Garns überwacht, **dadurch gekennzeichnet, dass** die Garnverbindungs Vorrichtung (13) zwischen dem Garnzuführabschnitt (6) und dem Wickelabschnitt (8) angeordnet ist, und das zwischen dem Garnzuführabschnitt (6) und dem Wickelabschnitt (8) durchtrennte Garn verbindet, und der Garnfangabschnitt (14; 90), das Messer (16) und die Garnüberwachungs Vorrichtung (17) in dieser Reihenfolge stromab der Garnverbindungs Vorrichtung (13) angeordnet sind.

12. Das Verfahren nach Anspruch 10, das ferner ein Messer (16) aufweist, das Garn durchschneidet, eine Garnüberwachungs Vorrichtung (17), die einen Zustand des Garns überwacht, sowie eine Garn-

sammelvorrichtung (18), die das Garn von dem Garnzuführabschnitt (6) abzieht und akkumuliert, **dadurch gekennzeichnet, dass** die Garnverbindungs-
vorrichtung (13) zwischen dem Garnzuführabschnitt (6) und dem Garnsammelabschnitt (18) angeordnet ist und das zwischen dem Garnzuführabschnitt (6) und der Garnsammelvorrichtung (18) durchtrennte Garn verbindet, und der Garnfangabschnitt (14; 90), das Messer (16), die Garnüberwachungs-
vorrichtung (17) und die Garnsammelvorrichtung (18) in dieser Reihenfolge stromab der Garnverbindungs-
vorrichtung (13) angeordnet sind.

13. Das Verfahren nach einem der Ansprüche 7 bis 12, **dadurch gekennzeichnet, dass** der Garnfangabschnitt (14; 90) einen Detektionsabschnitt (78; 100) enthält, der das in die Saugöffnung (74a, 96a) gesaugte Garnende detektiert.
14. Das Verfahren nach Anspruch 7, **dadurch gekennzeichnet, dass** der Garnfangabschnitt (90) einen Verschluss (98) enthält, der die Saugöffnung (96a) gemäß einer Bewegung des Saugabschnitts (96) öffnet oder schließt.
15. Die Garnwickelvorrichtung (2) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Garnfangabschnitt (14; 90) einen Antriebsabschnitt (76) enthält, der veranlasst, dass der Saugabschnitt (74; 96) die Hin- und Herbewegung durchführt, und der Antriebsabschnitt (76) den Saugabschnitt (96) zu der ersten Position, wo der Verschluss die Saugöffnung (96a) öffnet, und zu der zweiten Position, wo die Saugöffnung (96a) durch den Verschluss (98) verschlossen wird, bewegt.

Revendications

1. Un dispositif de bobinage de fil (2) comprenant :

une section d'alimentation en fil (6) adaptée pour supporter une bobine d'alimentation en fil (21) sur laquelle un fil est enroulé ;
une section de bobinage (8) adaptée pour enrouler le fil tiré de la bobine d'alimentation en fil (21) supportée dans la section d'alimentation en fil (6) ;
un ventilateur d'extrémité de fil (11) adapté pour souffler une extrémité de fil de la bobine d'alimentation en fil (21) vers le côté de la section de bobinage (8) en soufflant un courant d'air ; et
une section d'attrapage de fil (14 ; 90) adaptée pour attraper l'extrémité de fil soufflée par le ventilateur d'extrémité de fil (11), dans laquelle la section d'attrapage de fil (14 ; 90) comprend un corps principal (72 ; 94) ; et

une section d'aspiration (74 ; 96) qui est constituée par un élément cylindrique sur lequel un orifice d'aspiration (74a ; 96a) adapté pour aspirer le fil est formé, dans laquelle

la section d'aspiration (74 ; 96) est agencée de manière à pouvoir effectuer un mouvement linéaire de va-et-vient dans une direction axiale de l'élément cylindrique dans le corps principal (72 ; 94), dans lequel une force d'aspiration est générée dans l'orifice d'aspiration (74a ; 96a) lorsque la section d'aspiration (74 ; 96) se trouve dans une première position qui est proche d'un trajet de fil du fil qui se déplace de la section d'alimentation en fil (6) à la section de bobinage (8),

caractérisé en ce que

la force d'aspiration n'est pas générée dans l'orifice d'aspiration (74a ; 96a) lorsque la section d'aspiration (74 ; 96) est à une deuxième position qui est rétractée du trajet de fil, et la section d'attrapage de fil (90) comprend un obturateur (98) adapté pour ouvrir ou fermer l'orifice d'aspiration (96a) en fonction d'un mouvement de la section d'aspiration (96)

2. Un dispositif de bobinage de fil (2) comprenant :

une section d'alimentation en fil (6) adaptée pour supporter une bobine d'alimentation en fil (21) sur laquelle un fil est enroulé ;
une section de bobinage (8) adaptée pour enrouler le fil tiré de la bobine d'alimentation en fil (21) supportée dans la section d'alimentation en fil (6) ;
un ventilateur d'extrémité de fil (11) adaptée pour souffler une extrémité de fil depuis la bobine d'alimentation en fil (21) vers le côté de la section de bobinage (8) en soufflant un courant d'air ; et
une section d'attrapage de fil (14 ; 90) adaptée pour attraper l'extrémité de fil soufflée par le ventilateur d'extrémité de fil (11), dans laquelle la section d'attrapage de fil (14 ; 90) comprend un corps principal (72 ; 94) ; et
une section d'aspiration (74 ; 96) qui est constituée par un élément cylindrique sur lequel un orifice d'aspiration (74a ; 96a) adapté pour aspirer le fil est formé, dans lequel
la section d'aspiration (74 ; 96) est agencée de manière à être capable d'effectuer un mouvement linéaire de va-et-vient dans une direction axiale de l'élément cylindrique dans le corps principal (72 ; 94), dans lequel une force d'aspiration est générée dans l'orifice d'aspiration (74a ; 96a) lorsque la section d'aspiration (74 ; 96) est à une première position qui est proche d'un trajet de fil du fil qui se déplace de la section d'alimentation en fil (6) à la section de bobinage

(8),

caractérisé en ce que

la force d'aspiration n'est pas générée dans l'orifice d'aspiration (74a ; 96a) lorsque la section d'aspiration (74 ; 96) est à une deuxième position qui est rétractée du trajet de fil, et la section d'attrapage de fil (14 ; 90) comprend une section d'entraînement (76) adaptée pour amener la section d'aspiration (74 ; 96) à effectuer le mouvement de va-et-vient, dans laquelle la section d'entraînement (76) est adaptée pour amener la section d'aspiration (74 ; 96) à se déplacer vers la première position et vers la deuxième position, et

le corps principal (72) comprend une section creuse (72c) qui forme un espace où une partie de la section d'aspiration (74) est positionnée, et dans laquelle une pression négative existe par une action d'une source de pression négative, où, dans la section d'aspiration (74), l'orifice d'aspiration (74a) est agencé sur une première extrémité de celle-ci dans une direction axiale et une deuxième extrémité de celle-ci est fermée, et une ouverture (75) qui communique avec une section intérieure est agencée entre la première extrémité et la deuxième extrémité, et

la section d'entraînement (76) est adaptée pour amener la section d'aspiration (74) à se déplacer vers la première position qui assure la communication entre l'ouverture (75) et la section creuse (72c), et vers la deuxième position dans laquelle l'ouverture (75) est fermée par le corps principal (72).

3. Le dispositif de bobinage de fil (2) selon la revendication 2, comprenant en outre un dispositif de jonction de fil (13) adapté pour joindre le fil de la bobine d'alimentation en fil (21) attrapé par la section d'attrapage de fil (14 ; 90) et le fil enroulé sur la section de bobinage (8),

caractérisé en ce que

la section d'entraînement (76),

en plus de la première position et de la deuxième position, est adaptée pour déplacer la section d'aspiration (74) vers une troisième position dans laquelle une force d'aspiration plus faible que celle générée à la première position est générée dans l'orifice d'aspiration (74a) en assurant une communication entre une partie de l'ouverture (75) et la section creuse (72c), et

est adaptée pour déplacer la section d'aspiration (74) vers la troisième position lorsque le dispositif de jonction de fil (13) joint le fil.

4. Dispositif de bobinage de fil (2) selon la revendication 3, comprenant en outre un couteau (16) adapté pour couper le fil, et un dispositif de surveillance de

fil adapté pour surveiller un état du fil,

caractérisé en ce que

le dispositif de jonction de fil (13) est agencé entre la section d'alimentation en fil (6) et la section de bobinage (8), et est adapté pour joindre le fil déconnecté entre la section d'alimentation en fil (6) et la section de bobinage (8), et

la section d'attrapage de fil (14 ; 90), le couteau (16) et le dispositif de surveillance du fil (17) sont agencés dans cet ordre en aval du dispositif de jonction de fil (13).

5. Le dispositif de bobinage de fil (2) selon la revendication 3, comprenant en outre un couteau (16) adapté pour couper le fil, un dispositif de surveillance de fil (17) adapté pour surveiller un état du fil, et un dispositif d'accumulation de fil (18) adapté pour tirer et accumuler le fil à partir de la section d'alimentation en fil (6),

caractérisé en ce que

le dispositif de jonction de fil (13) est agencé entre la section d'alimentation en fil (6) et le dispositif d'accumulation de fil (18), est adapté pour joindre le fil déconnecté entre la section d'alimentation en fil (6) et le dispositif d'accumulation de fil (18), et la section d'attrapage de fil (14 ; 90), le couteau (16), le dispositif de surveillance de fil (17) et le dispositif d'accumulation de fil (18) sont agencés dans cet ordre en aval du dispositif de jonction de fil (13).

6. Dispositif de bobinage de fil (2) selon l'une quelconque des revendications 2 à 5,

caractérisé en ce que la section d'attrapage de fil (14 ; 90) comprend une section de détection (78 ; 100) adaptée pour détecter l'extrémité de fil aspirée dans l'orifice d'aspiration (74a ; 96a).

7. Procédé d'utilisation d'un dispositif de bobinage de fil (2) comprenant : une section d'alimentation en fil (6) supportant une bobine d'alimentation en fil (21) sur laquelle un fil est enroulé ;

une section de bobinage (8) enroulant le fil tiré de la section de bobine d'alimentation en fil (21) ; supporté dans la section d'alimentation en fil (6), un ventilateur d'extrémité de fil (11) soufflant une extrémité de fil de la bobine d'alimentation en fil (21) vers le côté de section de bobinage (8) en soufflant un courant d'air ; et

une section d'attrapage de fil (14 ; 90) capturant l'extrémité de fil soufflée par le souffleur d'extrémité de fil (11), dans laquelle la section d'attrapage de fil (14 ; 90) comprend

un corps principal (72 ; 94) ; et

une section d'aspiration (74 ; 96) qui est constituée par un élément cylindrique sur lequel un orifice d'aspiration (74a ; 96a) adapté pour aspirer le fil est formé, dans lequel

la section d'aspiration (74 ; 96) effectue un mouve-

ment linéaire de va-et-vient dans une direction axiale de l'élément cylindrique dans le corps principal (72 ; 94), dans lequel une force d'aspiration est générée dans l'orifice d'aspiration (74a ; 96a) lorsque la section d'aspiration (74 ; 96) est à une première position qui est proche d'un trajet de fil du fil qui se déplace de la section d'alimentation en fil (6) à la section de bobinage (8), **caractérisé en ce que** la force d'aspiration n'est pas générée dans l'orifice d'aspiration (74a ; 96a) lorsque la section d'aspiration (74 ; 96) est à une deuxième position qui est rétractée du trajet de fil.

8. Procédé selon la revendication 7, **caractérisé en ce que** la section d'attrapage de fil (14 ; 90) comprend une section d'entraînement (76) qui amène la section d'aspiration (74 ; 96) à effectuer le mouvement de va-et-vient, dans lequel la section d'entraînement (76) amène la section d'aspiration (74 ; 96) à se déplacer vers la première position et vers la deuxième position.
9. Procédé selon la revendication 8, **caractérisé en ce que** le corps principal (72) comprend une section creuse (72c) qui forme un espace où une partie de la section d'aspiration (74) est positionnée, et dans lequel une pression négative existe par une action d'une source de pression négative, dans la section d'aspiration (74), l'orifice d'aspiration (74a) est agencé sur une première extrémité de celle-ci dans une direction axiale et une deuxième extrémité de celle-ci est fermée, et une ouverture (75) qui communique avec une section intérieure est agencée entre la première extrémité et la deuxième extrémité, et la section d'entraînement (76) amène la section d'aspiration (74) à se déplacer vers la première position qui assure la communication entre l'ouverture (75) et la section creuse (72c), et vers la deuxième position dans laquelle l'ouverture (75) est fermée par le corps principal (72).
10. Le procédé selon la revendication 9, comprenant en outre un dispositif de jonction de fil (13) qui joint le fil de la bobine d'alimentation en fil (21) attrapé par la section d'attrapage de fil (14 ; 90) et le fil enroulé sur la section de bobinage (8), **caractérisé en ce que** la section d'entraînement (76), en plus de la première position et de la deuxième position, déplace la section d'aspiration (74) vers une troisième position dans laquelle une force d'aspiration plus faible que celle générée dans la première position est générée dans l'orifice d'aspiration (74a) en assurant la communication entre une partie de l'ouverture (75) et de la section creuse (72c), et déplace la section d'aspiration (74) vers la troisième position lorsque le dispositif de jonction de fil (13)

joint le fil.

11. Procédé selon la revendication 10, comprenant en outre un couteau (16) qui coupe le fil, et un dispositif de surveillance de fil qui surveille un état du fil, **caractérisé en ce que** le dispositif de jonction de fil (13) est agencé entre la section d'alimentation en fil (6) et la section de bobinage (8), et joint le fil déconnecté entre la section d'alimentation en fil (6) et la section de bobinage (8), et la section d'attrapage de fil (14 ; 90), le couteau (16) et le dispositif de surveillance de fil (17) sont agencés dans cet ordre en aval du dispositif de jonction de fil (13).
12. Procédé selon la revendication 10, comprenant en outre un couteau (16) qui coupe le fil, un dispositif de surveillance de fil (17) qui surveille un état du fil, et un dispositif d'accumulation de fil (18) qui tire et accumule le fil depuis la section d'alimentation en fil (6), **caractérisé en ce que** le dispositif de jonction de fil (13) est agencé entre la section d'alimentation en fil (6) et le dispositif d'accumulation de fil (18), et joint le fil déconnecté entre la section d'alimentation en fil (6) et le dispositif d'accumulation de fil (18), et la section d'attrapage de fil (14 ; 90), le dispositif de coupe (16), le dispositif de surveillance de fil (17) et le dispositif d'accumulation de fil (18) sont agencés dans cet ordre en aval du dispositif de jonction du fil (13).
13. Procédé selon l'une quelconque des revendications 7 à 12, **caractérisé en ce que** la section d'attrapage de fil (14 ; 90) comprend une section de détection (78 ; 100) qui détecte l'extrémité de fil aspirée dans l'orifice d'aspiration (74a ; 96a).
14. Procédé selon la revendication 7, **caractérisé en ce que** la section d'attrapage de fil (90) comprend un obturateur (98) qui ouvre ou qui ferme l'orifice d'aspiration (96a) selon le déplacement de la section d'aspiration (96).
15. Le dispositif de bobinage de fil (2) selon la revendication 1, **caractérisé en ce que** la section d'attrapage de fil (14 ; 90) comprend une section d'entraînement (76) qui amène la section d'aspiration (74 ; 96) à effectuer le mouvement de va-et-vient, et la section d'entraînement (76) déplace la section d'aspiration (96) vers la première position où l'obturateur s'ouvre pour ouvrir l'orifice d'aspiration (96a), et vers la deuxième position où l'orifice d'aspiration (96a) est fermé par l'obturateur (98).

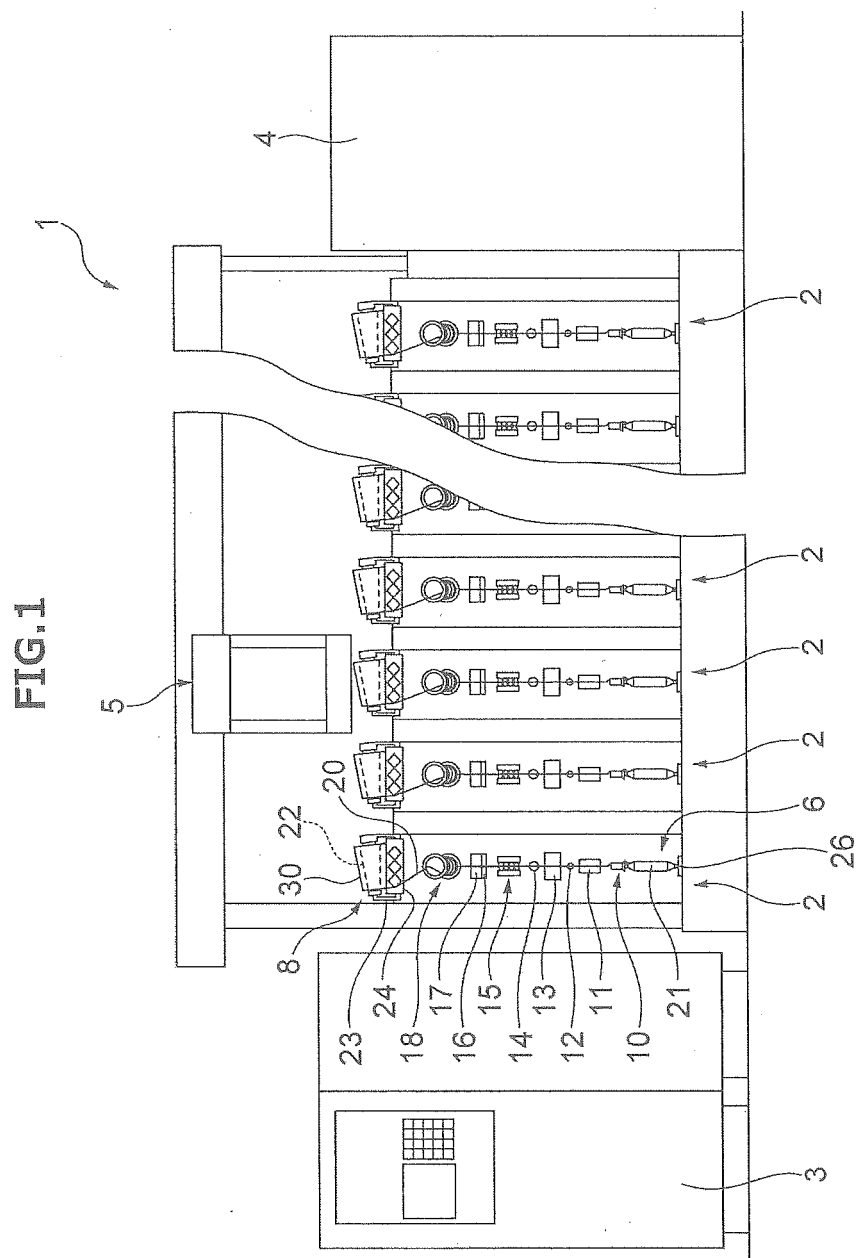


FIG. 2

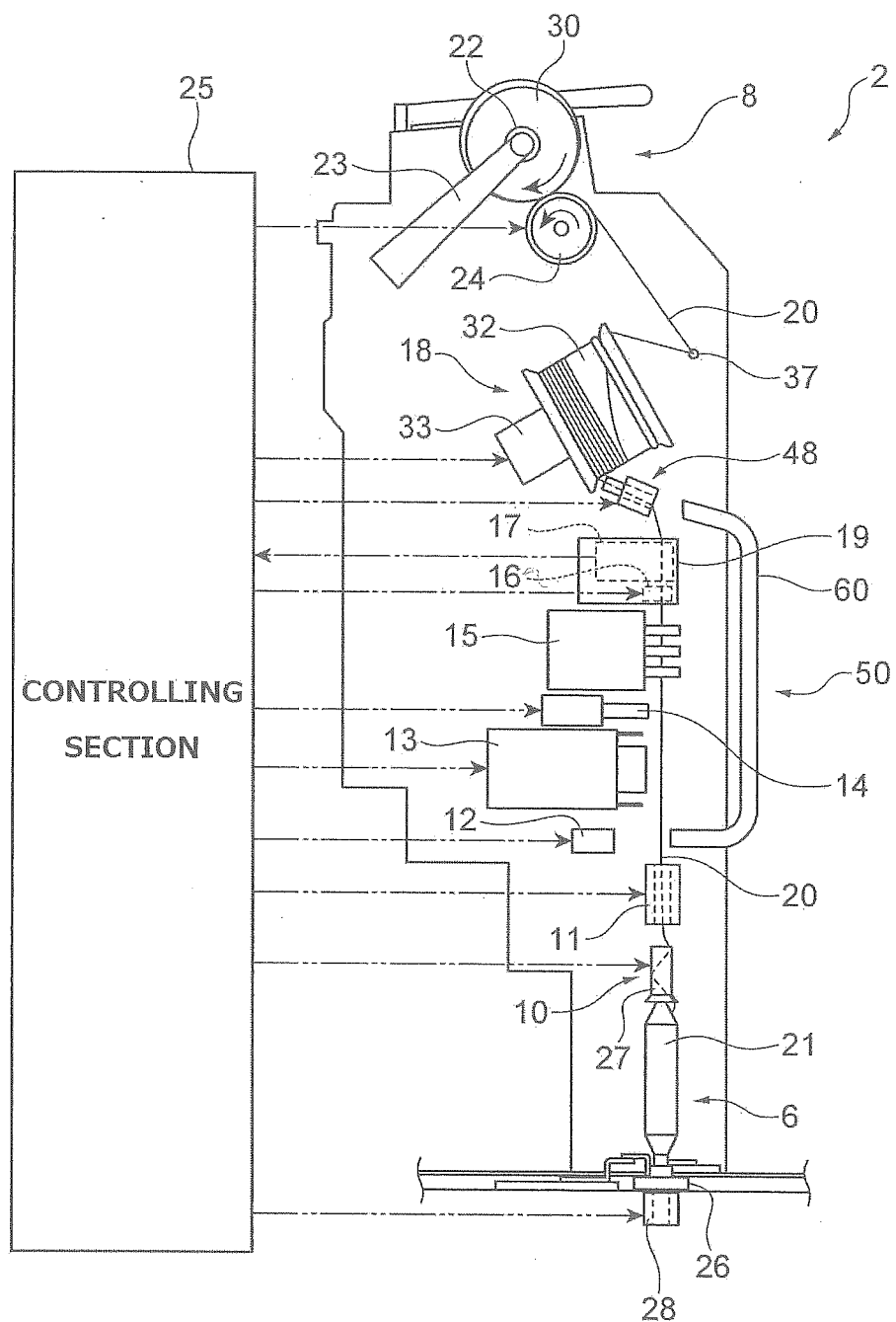


FIG.3

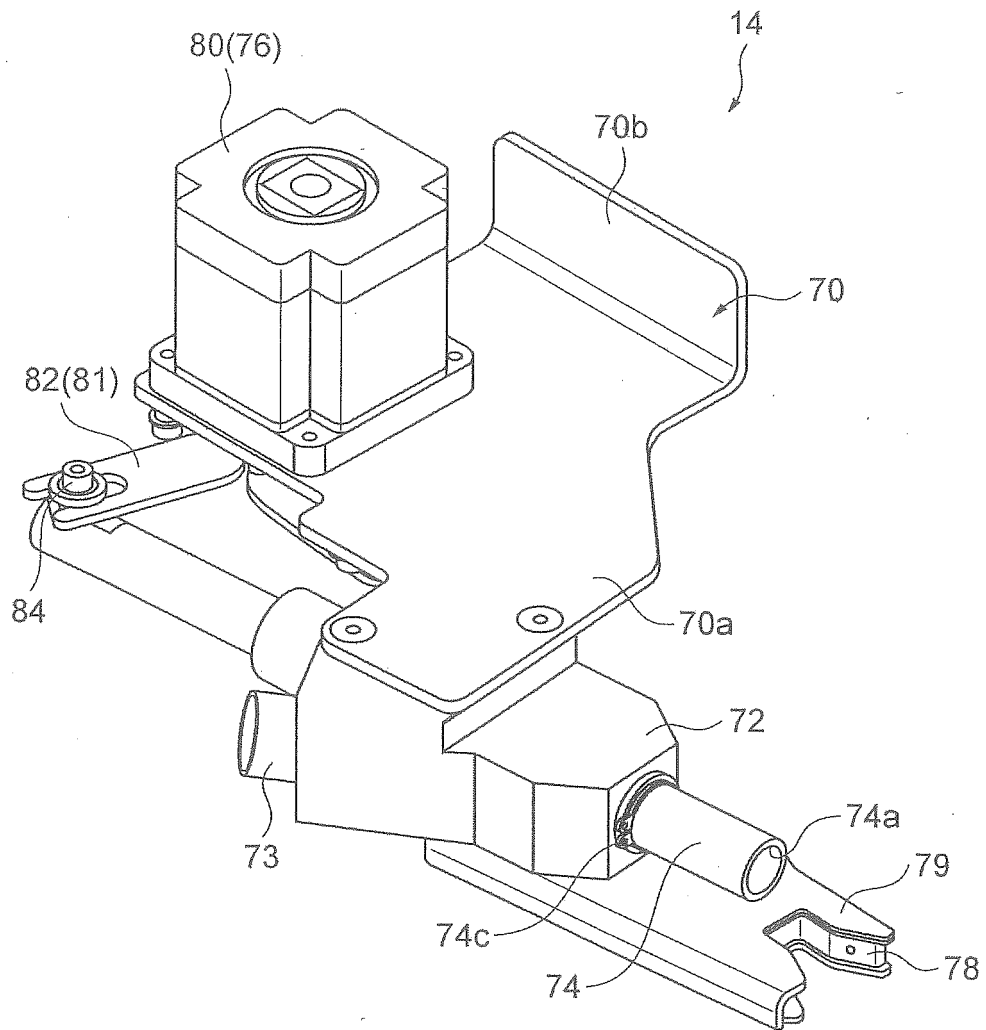


FIG.4

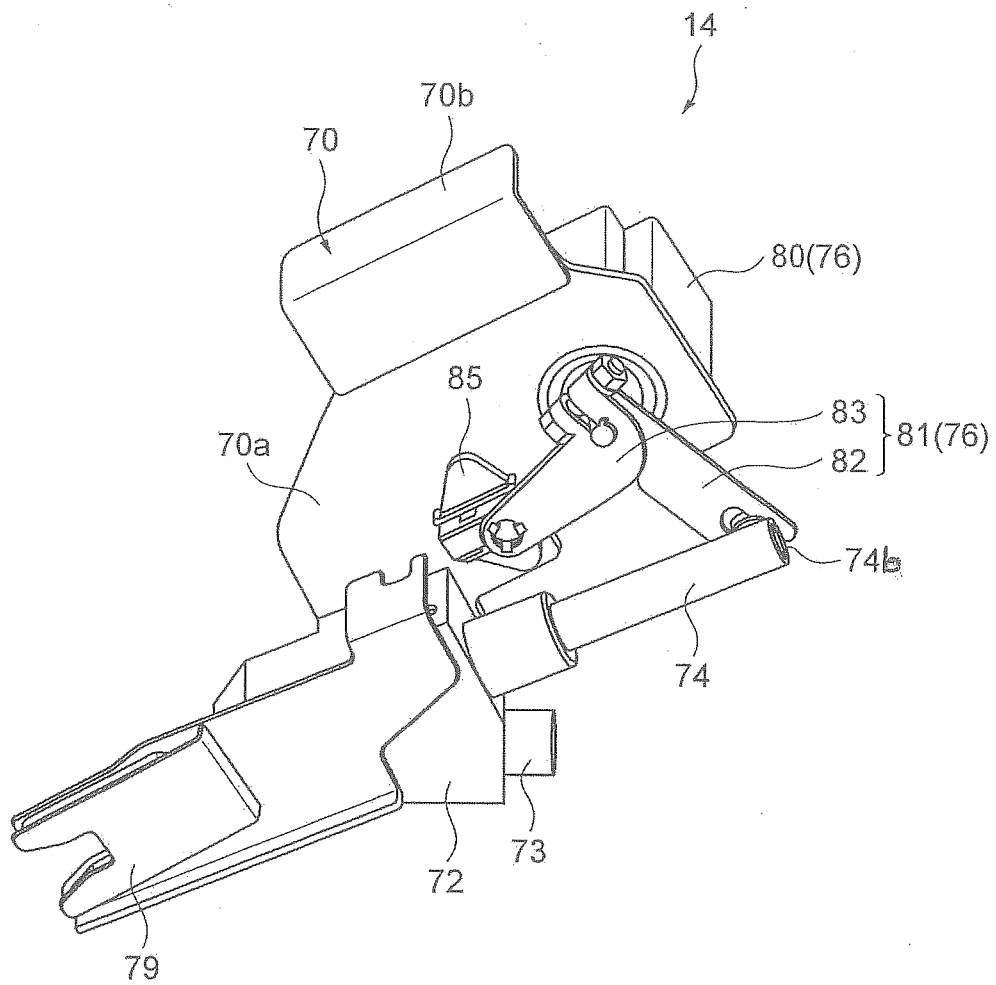


FIG.5A

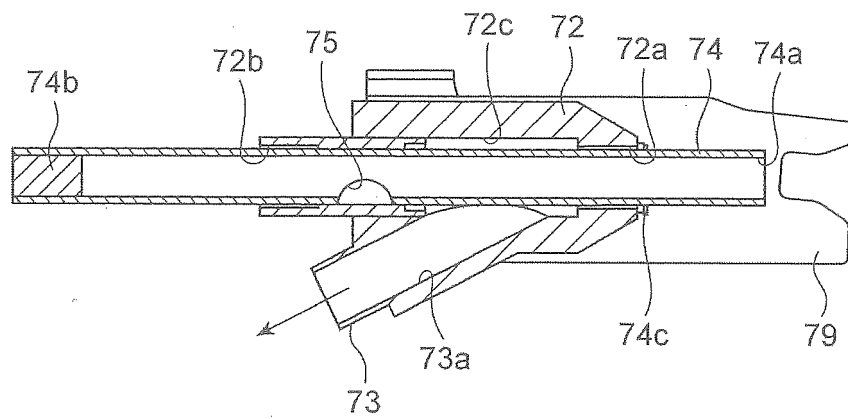


FIG.5B

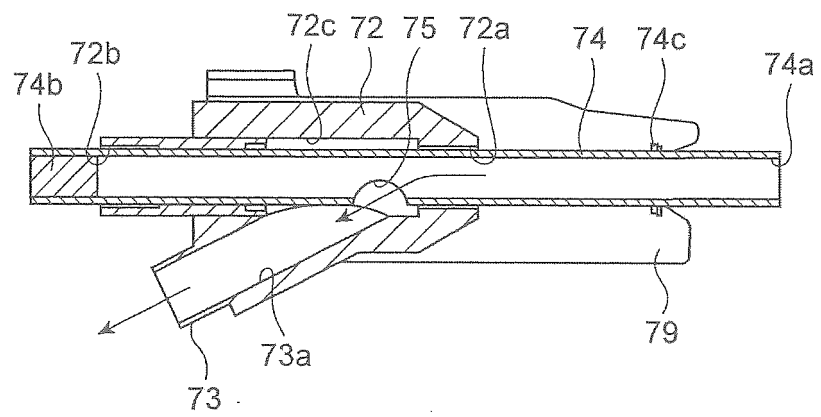


FIG.6A

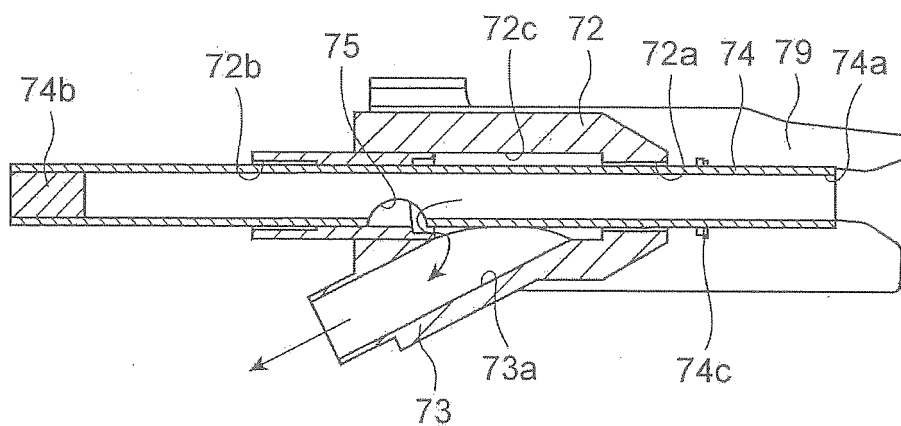


FIG.6B

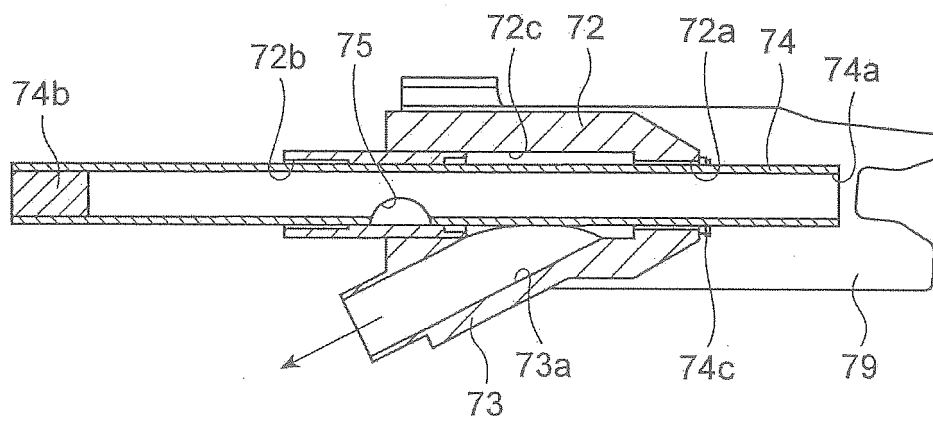


FIG.7

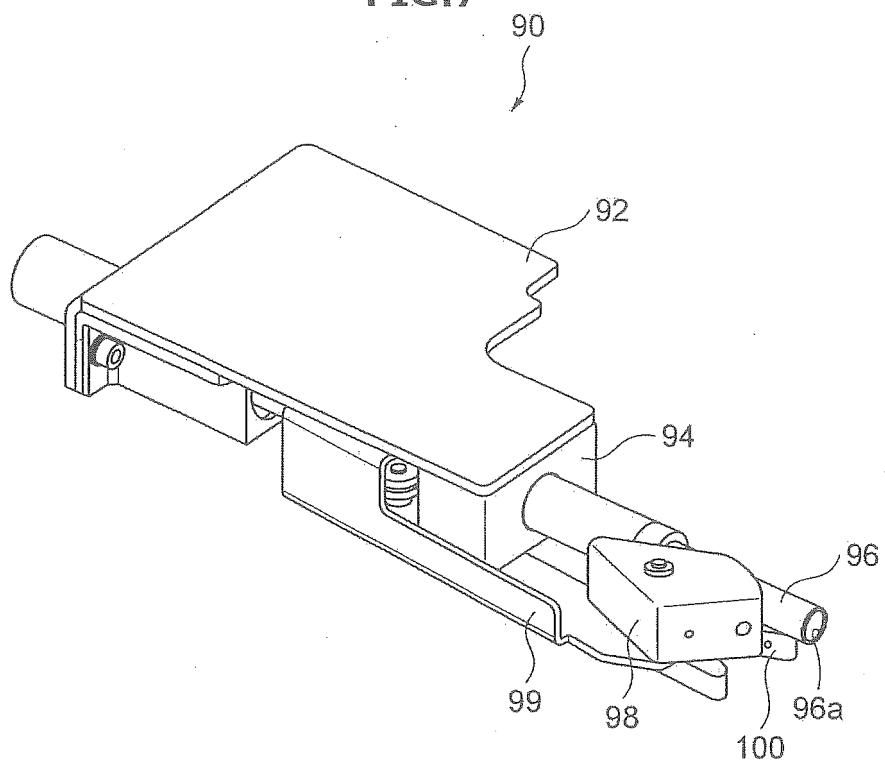
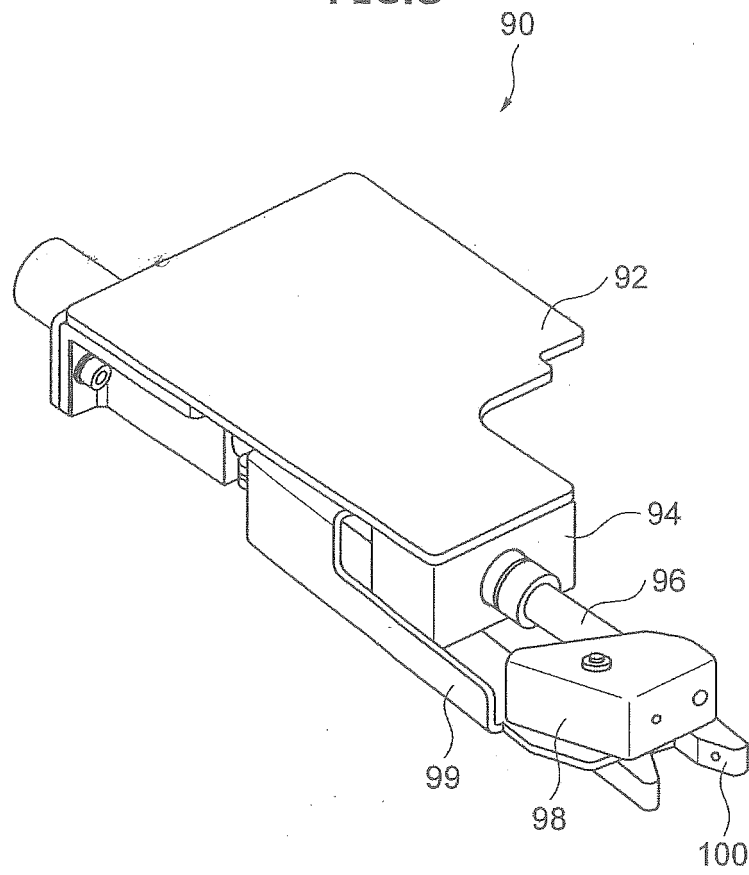


FIG.8



REFERENCES CITED IN THE DESCRIPTION

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