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(54) **Method and device for cleaning the space between the guide tube for additional material and the inner surface of the hollow rotor shaft, in a multicomponent rotor-spinning device**

Verfahren und Vorrichtung zum Reinigen des Raumes zwischen dem Mehrkomponenten Zufuhrkanal und dem Inneren des hohlen Rotorschafts, in einer Mehrkomponenten-Rotorspinnvorrichtung

Procédé et dispositif pour nettoyer l'espace compris entre le tube d'ammenée du composant additionel, et l'intérieur de l'axe creux du rotor, dans un dispositif de filature multicomposants à rotor

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Description

Technical field

[0001] The invention concerns the method of cleaning the space between the guide tube of the continuous component of the multi-component yarn, and the inner surface of the rotor's hollow shaft when leading the continuous component into the spinning rotor of the rotor spinning machine for the multi-component yarn production which contains the continuous component and the component spun within the rotor from the singled-out fibres, while the guide tube of the linear material is placed concentrically inside the hollow shaft of the rotor.

[0002] The invention further concerns the device for cleaning the space between the guide tube of the continuous component of the multi-component yarn and the inner surface of the rotor's hollow shaft when leading the continuous component into the spinning rotor of the rotor spinning machine for the multi-component yarn production, which contains the continuous component and the component spun out within the rotor from the singled-out fibres, where the rotor is mounted on the hollow shaft in whose cavity the guide tube for the linear material is placed basically concentrically, fixed inside the body where the rotor is placed.

State of the art

[0003] During the production of the multi-component yarn, linear material, e.g. elastic yarn or elastic fibre, is guided by the fixed guide tube into the cavity of the spinning rotor along its rotation axis. The linear material forms the continuous component of the multi-component yarn which is combined in the spinning rotor with the component spun from the singled-out fibres in the rotor.

[0004] In the models used so far, e.g. according to CZ 230 478 or CZ 237 078, the guide tube of the continuous component is placed inside the hollow shaft on which the rotor is mounted, the guide tube being fixed inside the rotor body after the loose end of the hollow shaft. Between the inner surface of the hollow shaft and the outside surface of the guide tube is a space created, preventing contact of the rotating hollow shaft and the static guiding tube. Inside the rotor or in other places of the rotor spinning machine particles of dust come loose during the spinning and settle in the space between the hollow shaft and the guide tube, gradually filling up the space.

[0005] The purpose of the invention is to prevent the settling of dust in the space between the hollow shaft and the guide tube to a maximum possible degree.

Principle of the invention

[0006] The aim of the invention is achieved through the method of cleaning the space between the guide tube of the continuous component of the multi-component yarn and the inner surface of the rotor's hollow shaft, based on the forced airflow generated additionally inside the space between the guide tube of the continuous component and the inner surface of the spinning rotor's hollow shaft. Said forced airflow is generated either by a source of overpressure or underpressure on which said space is connected or by a spiral projection or groove on the inner wall of the hollow shaft and/or on the outer wall of the guide tube. The forced airflow prevents the settling of dust and other particles of dirt between the guide tube and the inside surface of the spinning rotor's hollow shaft. This will extend the maintenance intervals of the work areas of the spinning machine and consequently increase the machine's productivity. The forced airflow within the space between the guide tube and the hollow shaft's inner surface may be directed either towards the spinning rotor or away from the spinning rotor towards the end of the hollow shaft.

[0007] The air flowing into the rotor prevents the dust from entering the space between the guide tube and the inner surface of the hollow shaft, the dust thus being kept within the rotor, spun into the spun-out component of the yarn and taken out of the rotor in the spun-out multi-component yarn.

[0008] The airflow from the rotor towards the end of the hollow shaft carries the dust across the space between the guide tube and the inner surface of the hollow shaft to the hollow shaft's end, whereby it also prevents its settling within this space. At the same time the underpressure in the spinning rotor increases, thus compensating for the loss of underpressure needed for spinning, caused by the hollow shaft.

[0009] The principle of the device performing the method of cleaning consists in that the space between the guide tube of the continuous component and the hollow shaft is connected to the source of the air overpressure or underpressure on the other side from the rotor. The device created in this way does not require any mechanical adaptations to the hollow shaft and /or the guide tube - what it does need, though, is an additional source of power.

[0010] The solution requiring no additional power source to perform the method described, can be achieved as set out within Claim 3, that is by providing at least one shape providing for the airflow generation on at least one of the walls forming the space between the hollow shaft and the guide tube.

[0011] The device for airflow generation between the hollow shaft and the guide tube consists of at least one projection and/or groove in the shape of a spiral.

Description of the drawings

[0012] The drawings enclosed present sketches of the devices designed to perform the method of cleaning on the principle of the invention, where figures 1 - 3 represent the cross-section of the spinning unit with the guide tube placed within the rotor's hollow shaft - this design pro-

vides the source for airflow generation both on the inner wall of the hollow shaft and on the outer side of the guide tube, with the following differences: the model in Fig. 1 represents grooves both on the hollow shaft's inner wall and on the outer side of the guide tube, the model in Fig. 2 has projections on both the walls whereas the model in Fig. 3 has grooves on the hollow shaft's inner wall and projections on the outer wall of the guide tube. Fig. 4 represents the cross-section of the spinning unit whose hollow shaft's end on the far side from the rotor is connected to the source of air over- or underpressure.

Specific description

[0013] The invention will be demonstrated example of the embodiment of the spinning unit of the rotor spinning machine for the multi-component yarn production, while the explanation will focus on those components relating to the solution based on the invention; the other elements of the spinning unit and spinning machine will only be described in the degree necessary for explaining the principle of the invention.

[0014] The spinning unit of the rotor spinning machine contains the spinning rotor **1**, which is fixed onto the hollow shaft **2**, pivoted by means of bearing **3** inside the body **4**. The hollow shaft **2** is coupled to a tangential belt **A**, which drives the spinning rotor **1**. The spinning unit also includes the feed device **5** of the sliver **51** and the singling-out device **6**, from which the singled-out fibres 61 are fed into the spinning rotor in the familiar way **1** to be spun into a spun-out component **81** of the multi-component yarn **8**. Inside the hollow shaft **2** concentrically with it is placed the guide tube **7** of the continuous component **82** of the multi-component yarn **8**, which loosely passes through the cavity of the hollow shaft **2** without touching its inner wall **21** and which is, by its end far from the rotor, **1** fastened inside the body **4** covering the rotor. The continuous component **82** is combined inside the rotor **1** with the spun-out component **81** from the singled-out fibres to produce the multi-component yarn **8**, which is taken out of the rotor in the familiar way **1** by means of the guide tube 9 and spooled in the familiar way not represented here.

[0015] In the model device in Fig. 1, the inner wall **21** of the hollow shaft has a spiral groove **210**, which, while the hollow shaft revolves, **2** generates - between the outer wall **71** of the guide tube and the inner wall **21** of the hollow shaft - the airflow whose direction depends on the direction in which the spiral groove rises **210** and on the direction of revolution of the hollow shaft **2** and of the spinning rotor mounted on it **1**. In order to raise the speed of airflow in the space between the outer wall **71** of the guide tube and the inner wall **21** of the hollow shaft, the model in Fig. 1 has a spiral groove created **711** on the outer wall **71** of the guide tube - it is advantageous with regard to this spiral groove **711** to select the same direction of rise as that of the spiral groove **210** inside the inner wall of the **21** guide tube **2**.

[0016] In the model represented the spiral groove **711** is created on part of the outer wall **71** of the guide tube mounted **7**, and this part has a constant outer diameter. In another model not represented in the drawings, the spiral groove **711** may be made along the whole length of the guide tube **7** passing through the hollow shaft **2**, that is along all diameter sizes of the guide tube mounting **7**. In order to provide for the airflow in the space between the outer wall of the 71 guide tube and the inner wall of the **21** hollow shaft, it is necessary to make, based on this design, a spiral groove on at least one of the walls delimiting this space, which, resulting of the hollow shaft's revolutions, **2** causes the air flowing in the space between the outer wall **71** of the guide tube and the inner wall of the **21** hollow shaft.

[0017] The model in Fig. 2 uses the guide tube **7** of a constant diameter without a shoulder, on whose outer side **71** a spiral projection is made **712**, complemented by the spiral projection **212** on the inner wall **21** of the hollow shaft **2**. Also spiral projections **212** and **712** can be made along the whole length of the relevant walls **21**, **71** forming the space between the outer wall **71** of the guide tube and the inner wall of the **21** hollow shaft, or the spiral projections may be made along part of their length or at least along part of the length of only one of them.

[0018] The model in Fig. 3 generates airflow in the space between the outer wall of the **71** guide tube and the inner wall of the **21** hollow shaft using the combination of the spiral groove **211** in the inner wall **21** of the guide tube and of the spiral projection **712** along part of the length of the outer wall of the **71** guide tube.

[0019] In the model represented in Fig. 4 the end of the hollow shaft **2** opposite the spinning rotor **1** has an air box **200** connected, which is - in the model represented - coupled in a familiar way by means of air supply **201** to the source **202** of the air underpressure or overpressure. The air underpressure or overpressure inside the air box **200** forces the airflow in the relevant direction between the outside wall **71** of the guide tube and the inner wall of the **21** hollow shaft.

Claims

1. The method of cleaning the space between the guide tube (7) of the continuous component of the multi-component yarn and the inner surface of the hollow shaft (2) of the rotor while feeding the continuous component (82) to the spinning rotor (1) of the rotor spinning machine for the multi-component yarn production (8) containing the continuous component (82) and the component (81) spun out in the rotor (1) from singled-out fibres, while the guide tube (7) is placed basically concentrically in the hollow shaft of the (2) rotor, whereas through the space between the guide tube of the continuous component and inner surface of the hollow shaft of the spinning rotor

is sucked airflow into the inner space of rotor, **characterized by that** the forced airflow generated additionally inside the space between the guide tube (7) of the continuous component and the inner surface of the hollow shaft (2) of the spinning rotor said forced airflow is generated either by a source of overpressure or underpressure on which said space is connected or by a spiral projection or groove on the inner wall of the hollow shaft and/or on the outer wall of the guide tube., which prevents settlement of dust and other particles of dirt in the space between the guide tube (7) and the inner surface of the hollow shaft (2) of the spinning rotor.

2. The device for feeding the continuous component (82) into the spinning rotor (1) of the rotor spinning machine for the multi-component yarn production (8) including the continuous component (82) and the component (81) spun out in the rotor (1) from singled-out fibres (61), which has the rotor (1) mounted on the hollow shaft (2) in whose cavity the guide tube is placed in a basically concentrical position, (7) of the continuous component which is fastened inside the body (4) in which the rotor is installed (1), **characterized by that** the space between the guide tube (7) of the continuous component and the hollow shaft (2) is connected on the other side from the spinning rotor (1) to the source (202) of the air overpressure or underpressure.

3. The device for feeding the continuous component (82) into the spinning rotor (1) of the rotor spinning machine for the multi-component yarn production (8) including the continuous component (82) and the component (81) spun out in the rotor (1) from singled-out fibres (61), which has the rotor (1) mounted on the hollow shaft (2) in whose cavity the guide tube is placed in a basically concentrical position, (7) of the continuous component which is fastened inside the body (4) in which the rotor is installed (1), **characterized by that** the inner wall (21) of the hollow shaft and/or the outer wall (71) of the guide tube are modified to provide for the airflow generation.

4. The devices as claimed in claim 3, **characterized by that** the means for generating the airflow is at least one spiral projection (212, 712) and/or spiral groove (211, 711).

Patentansprüche

1. Das Verfahren zur Reinigung des Raumes zwischen dem Führungsrohr (7) der kontinuierlichen Komponente des Komponentengarns und der inneren Oberfläche der Hohlwelle (2) des Rotors bei der Zuführung der kontinuierlichen Komponente (82) zum Spinnrotor (1) einer Rotorspinnmaschine zur Erzeugung eines Komponentengarns (8), das eine kontinuierliche Komponente (82) und die von den aufgelösten Fasern im Rotor (1) ersponnene Komponente (81) aufweist, wobei das Führungsrohr (7) im Grunde genommen koaxial in der Hohlwelle (2) des Rotors gelagert ist, wobei in dem Raum zwischen dem Führungsrohr der kontinuierlichen Komponente und der inneren Oberfläche der Hohlwelle des Spinnrotors die Luftströmung in den Innenraum des Rotors hineingesaugt wird, **dadurch gekennzeichnet, dass** in dem Raum zwischen dem Führungsrohr (7) der kontinuierlichen Komponente und der inneren Oberfläche der Hohlwelle (2) des Spinnrotors eine zusätzliche Luftströmung entweder mit Hilfe einer Überdruckquelle oder einer Unterdruckquelle, an der der bereits erwähnte Raum angeschlossen ist, oder mit Hilfe eines spiralförmigen Vorsprungs oder einer Nut auf der inneren Seite der Hohlwelle und/oder auf der äußeren Seite des Führungsrohres zwangsläufig erzeugt wird, wodurch man die Ablagerung von dem Staub und anderem Schmutz in dem Raum zwischen dem Führungsrohr (7) und der inneren Oberfläche der Hohlwelle (2) des Spinnrotors verhindert wird.

2. Die Vorrichtung zum Zuführen einer kontinuierlichen Komponente (82) in den Spinnrotor (1) einer Rotorspinnmaschine zur Erzeugung des Komponentengarns (8), das eine kontinuierliche Komponente (82) und eine von den aufgelösten Fasern (61) im Rotor (1) ersponnene Komponente (81) aufweist, bei der der Rotor (1) auf der Hohlwelle (2) fest gelagert ist, in deren Hohlraum ein Führungsrohr (7) der kontinuierlichen Komponente im Grunde genommen koaxial gelagert ist, das in dem Körper (4) befestigt ist, in dem der Rotor (1) gelagert ist, **dadurch gekennzeichnet, dass** der Raum zwischen dem Führungsrohr (7) der kontinuierlichen Komponente und der Hohlwelle (2) auf der von dem Spinnrotor (1) abgewandten Seite mit der Überdruck- oder Unterdruckquelle (202) gekoppelt ist.

3. Die Vorrichtung zum Zuführen einer kontinuierlichen Komponente (82) in den Spinnrotor (1) einer Rotorspinnmaschine zur Erzeugung des Komponentengarns (8), das eine kontinuierliche Komponente (82) und eine von den aufgelösten Fasern (61) im Rotor (1) ersponnene Komponente (81) aufweist, bei der der Rotor (1) auf der Hohlwelle (2) fest gelagert ist, in deren Hohlraum ein Führungsrohr (7) der kontinuierlichen Komponente im Grunde genommen koaxial gelagert ist, das in dem Körper (4) befestigt ist, in dem der Rotor (1) gelagert ist, **dadurch gekennzeichnet, dass** die innere Wand (21) der Hohlwelle und/oder die äußere Wand (71) des Führungsrohres mit den Mitteln zur Erzeugung der Luftströmung versehen sind.

4. Die Vorrichtung nach dem Anspruch 3, **dadurch gekennzeichnet, dass** die Mittel zur Erzeugung der Luftströmung mit mindestens einem spiralförmigen Vorsprung (212, 712) und/oder einer spiralförmigen Nut (211, 711) gebildet werden.

Revendications

1. Le mode de nettoyage de l'espace entre le tuyau de guidage (7) de la composante continue de fil composit, et de la surface interne de l'arbre creux (2) du rotor pendant l'amènement de la composante continue (82) dans le rotor à filer (1) de métier à filer de rotor pour la production de fil composit (8), comprenant la composante continue (82) et la composante (81) filetée dans le rotor (1) des fibres individualisées, et le tuyau de guidage (7) est déposé dans son essentiel de coaxialité dans l'arbre creux (2) de rotor, et l'air est aspirée dans l'espace interne de rotor (1) par l'espace entre le tuyau de guidage (7) de la composante continue et la surface interne de l'arbre creux (2) de rotor à filer , **caractérisé en ce que** dans l'espace entre le tuyau de guidage (7) de la composante continue et la surface interne de l'arbre creux (2) de rotor à filer (1) se forme forcément la circulation aérienne additive, soît à l'aide de la source de surpression ou de dépression, à laquelle est accouplé l'espace déja mentionné, soît à l'aide de l'avancée en forme de spirale ou la rainure sur le côté interne de l'arbre creux (2) et/ou sur le côté externe du tuyau de guidage (7), ce qui empêche le logement de la poussière et d'autres impuretés dans l'espace entre le tuyau de guidage (7) et la surface interne de l'arbre creux (2) du rotor à filer (1).

2. Le dispositif pour amener la composante continue (82) dans le rotor à filer (1) (1) de métier à filer de rotor pour la production du fil composit (8) comprenant la composante continue (82) et la composante (81) filetée dans le rotor (1) des fibres individualisées (61), où le rotor (1) est rigidement déposé sur l'arbre creux (2), dans la cavité duquel est déposé dans son essentiel de coaxialité le tuyau de guidage (7) de la composante continue, qui est fixée dans le corps (4), où est déposé le rotor (1), **caractérisé en ce que** l'espace entre le tuyau de guidage (7) de la composante continue et l'arbre creux (2) est sur le côté détourné du rotor à filer (1) relié avec la source (202) de la surpression ou de la depression de l'air.

3. Le dispositif pour amener la composante continue (82) dans le rotor à filer (1) du métier à filer de rotor pour la production de filé composant (8), comprenant la composante continue (82) et la composante (81) filetée dans le rotor (1) des fibres individualisées (61), où le rotor (1) est rigidement déposé sur l'arbre creux (2), dans la cavité duquel est déposé dans son essentiel de coaxialité le tuyau de guidage (7) de la composante continue, qui est fixée dans le corps (4), où est déposé le rotor (1), **caractérisé en ce que** le paroi interne (21) de l'arbre creux et/ou le paroi externe (71) du tuyau de guidage (7) sont munis des moyens pour former le courant aérien.

4. Le dispositif selon la revendication 3, **caractérisé en ce que** les moyens pour former le courant aérien sont crées au moins par une des avancées spirales (212, 712) et/ou par la rainure spirale (211, 711).

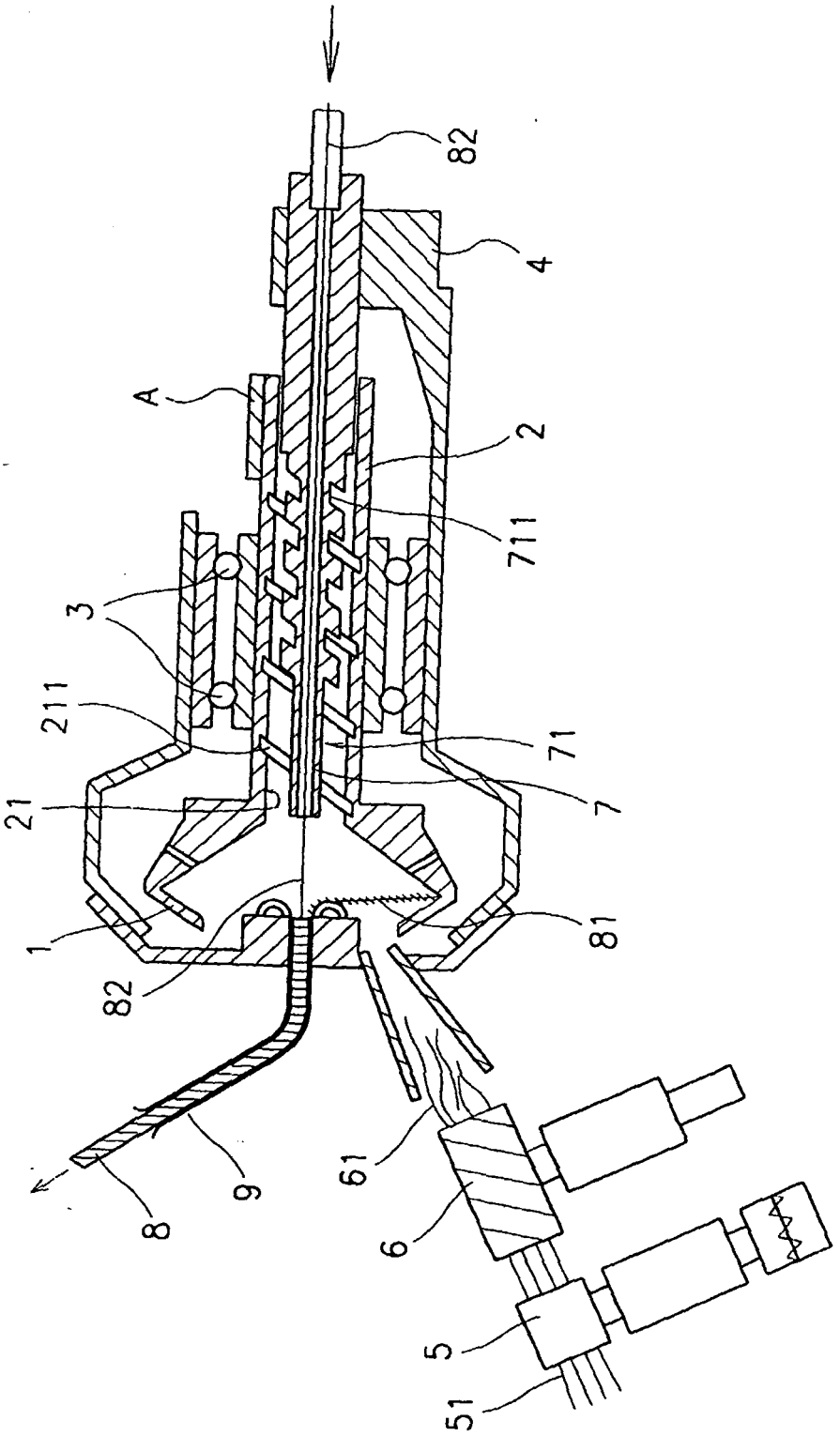

Fig. 1

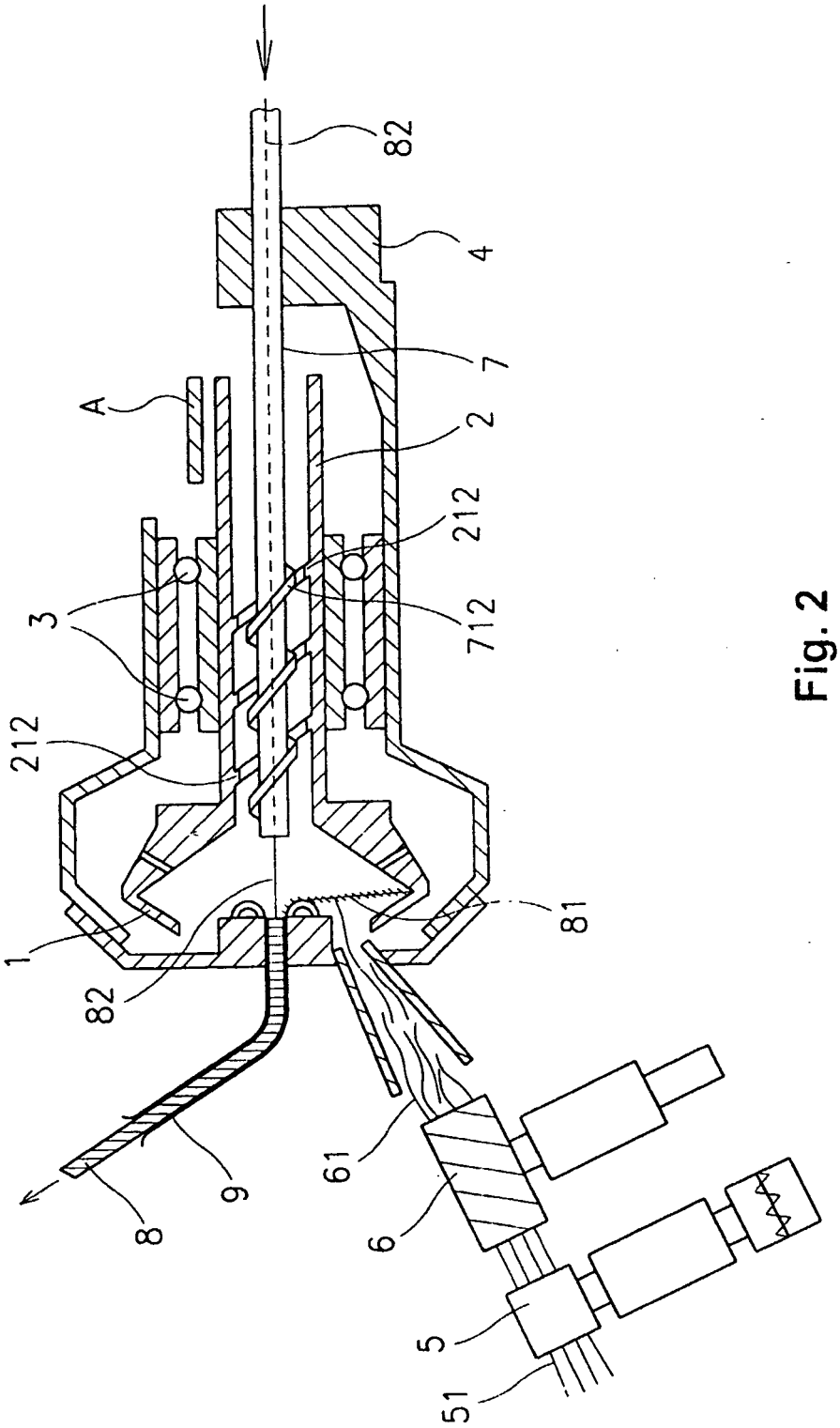

Fig. 2

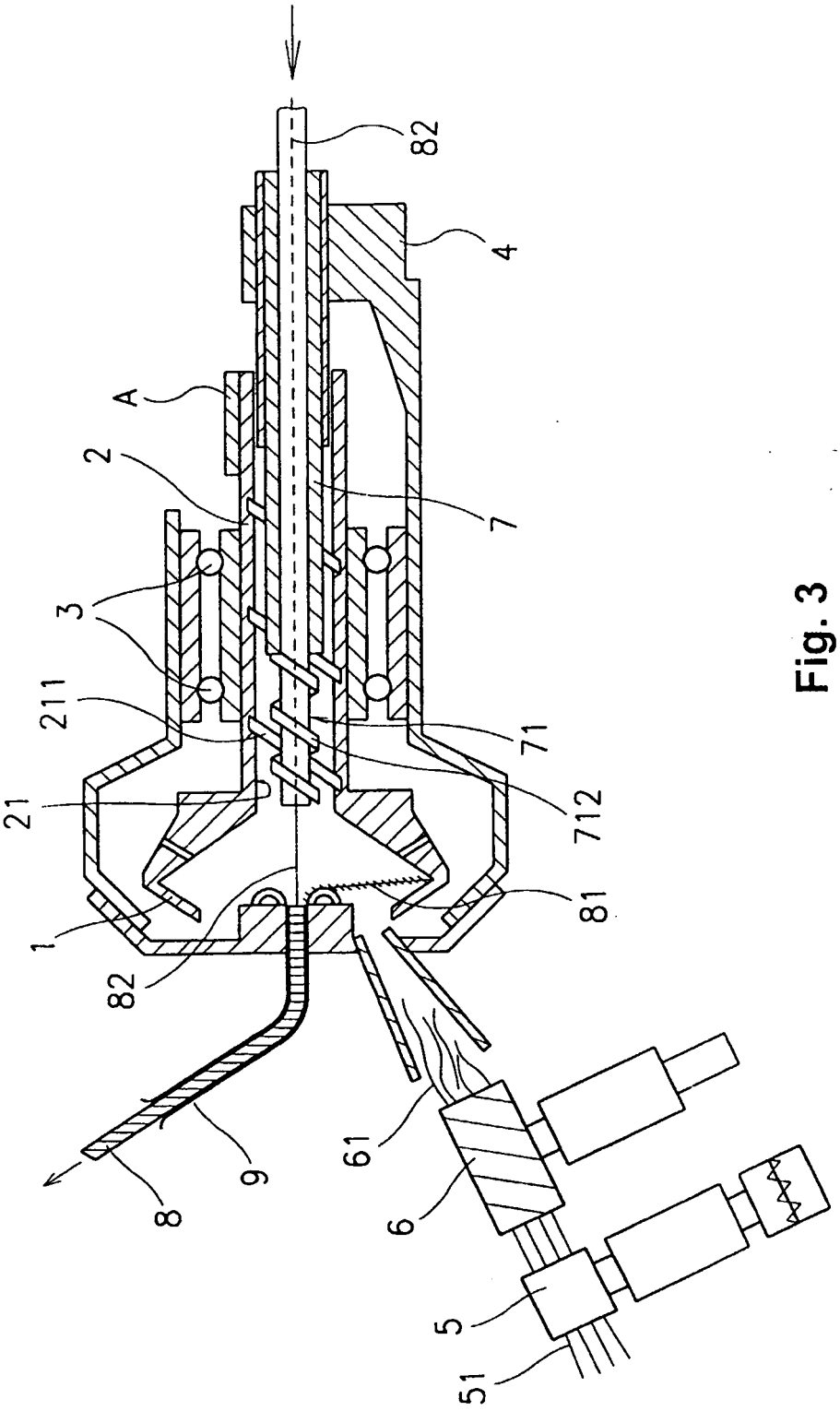

Fig. 3

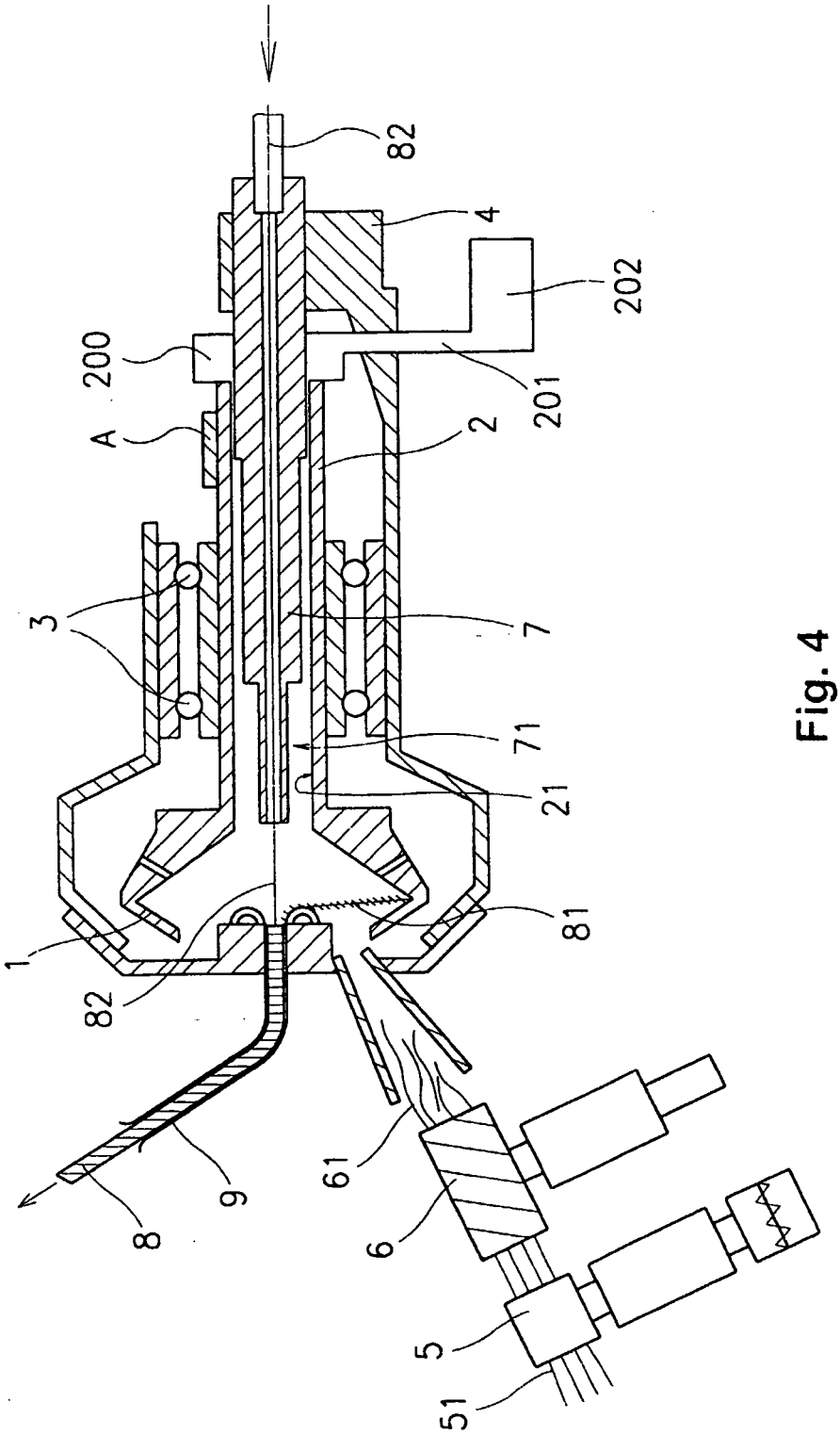

Fig. 4