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(54) Device for multi-component yarn production in a rotor spinning machine and sensor for rotor spinning machines producing the multi-component yarn

(57) The device for multi-component yarn production (5) comprising a continuous component (4) and a component spun in the rotor (3) from singled-out fibres (21) on a rotor spinning machine whose operating unit contains means for preparation of singled-out fibres (21) from sliver (2) and for their transport to the spinning rotor (3), where they are processed into a spun component, whereas the operating unit further contains means for supplying continuous component (4) to the spinning rotor (3) and means to draw off the spun multi-component yarn (5) and winding it onto the bobbin (71), while in a path of the continuous component (5) a sensor (10) of the continuous component is inserted and in path of the multi-component yarn (5) a sensor (8) of the multi-component yarn is inserted. The path of the continuous component (4) in the area of the sensor (8) of the multi-component yarn (5) is situated close to the path of the multi-component yarn (5) and in the area where the continuous component (4) is situated near to the path of the multi-component yarn (5) the continuous component (4) has a sensor (10) of the continuous component.

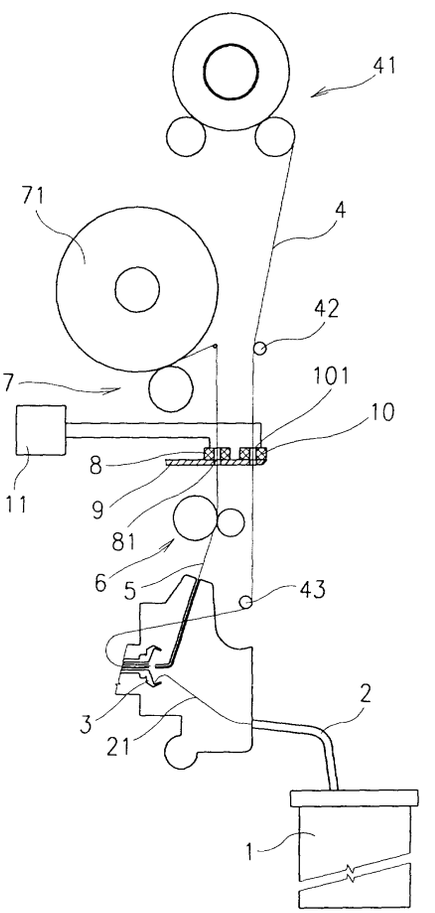

Fig. 1

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Description

Technical field

[0001] The invention relates to the device for multi-component yarn production comprising a continuous component and a component spun in the rotor of a rotor spinning machine from singled-out fibres, whose operating unit contains a device for feeding the sliver, its singling out into singled-out fibres and feeding the singled-out fibres into the spinning rotor where they are processed into a spun component which, having been produced, combines in the rotor with a continuous component supplied to the rotor with the device for supplying continuous component, to produce a multi-component fibre; in order to take it out of the rotor, the operating unit is fitted with a draw-off device of the multi-component yarn and winding device, while there is a sensor of the continuous component inserted in the path of the continuous component and at least one sensor inserted in the path of the multi-component yarn monitoring a presence, movement or quality of the multi-component yarn.

[0002] The invention further relates to the sensor for rotor spinning machines producing multi-component yarn, which contains a continuous component, supplied to the rotor and a component spun in the rotor from singled-out fibres on the rotor spinning machine.

Technical field

[0003] The known device for the multi-component yarn production comprising a continuous component and a component spun in the rotor of a rotor spinning machine from singled-out fibres, e.g. in accordance with CZ 281809, contains a sensor for presence of the multi-component yarn placed in between the spinning unit and the winding device of the multi-component yarn and a sensor for presence of the continuous component placed between the unwinding device of the continuous component and a spinning unit where the continuous component is supplied. Both the mentioned sensors are connected to the control unit which has still more sensors connected to it as well as control means of the relevant operating unit of the rotor spinning machine.

[0004] The drawbacks to this solution are mainly the difficult placing of the continuous component sensor on the operating unit of the rotor spinning machine and the high cost of separate sensors.

[0005] The aim of the invention is to produce a device for multi-component yarn production comprising a continuous component and a component spun in the rotor of a rotor spinning machine from singled-out fibres, which would allow for easier placing of the sensor of the continuous component on the operating unit of the machine, and make a sensor that would enable such placing, while this would also result in reducing the cost of production of such a sensor.

Principle of the invention

[0006] The aim of the invention is achieved by providing a device for multi-component yarn production comprising a continuous component and a component spun in the rotor of a rotor spinning machine from singled-out fibres, whose principle consists in that the part of the path of the continuous component in the area of the sensor of the multi-component yarn is situated next to the path of the multi-component yarn. The close distance of the path of the continuous component in the area of the sensor of the multi-component yarn also allows for installation of the sensor of the continuous component in the same area, so that it is not needed to carry out complicated modifications to the operating unit that would enable situating of the sensor of the continuous component.

[0007] It is advantageous when part of the path of the continuous component, situated next to the path of the multi-component yarn, is parallel to the part of the path of the multi-component yarn in this area, which again significantly facilitates the placement of the continuous component sensor on the operating unit.

[0008] It is therefore advantageous to place the sensor of the continuous component as claimed in the Claim 3 in the area where the path of the continuous component is situated next to the path of the multi-component yarn in the area of the sensor of the multi-component yarn.

[0009] The sensor of the continuous component may also be placed next to the sensor of the multi-component yarn or the sensors may be placed one over the other, depending on the current need.

[0010] The saving of space is achieved by placing the both of sensors on one holder, or even better, by their integration to one case.

[0011] There is one path created in the integrated sensor case for passing of the multi-component yarn and of the continuous component depending on construction and/or operating conditions, or there is one separate path created for the multi-component yarn passing and another path for the continuous component passing.

[0012] The principle of the sensor for the rotor spinning machines producing multi-component yarn comprising a continuous component fed into the rotor and a component spun in the rotor from singled-out fibres, consists in that it contains means for monitoring of the multi-component yarn produced in the rotor, and means for monitoring of the continuous component supplied into the rotor, placed in a single common case. By placing the means for monitoring of the multi-component yarn and of the continuous component in a common case a sensor is created able to transmit information both about the multi-component yarn, e.g. about its presence at the monitoring area, its quality or presence of foreign particles in the multi-component yarn, as well as the information about the continuous component, namely about

its presence.

[0013] These sensors are connected to the evaluation circuits to evaluate the information that may be common for the sensors and may also be placed in the sensor case.

[0014] With respect to the assumed technical utilization of the sensor there is one path created in the sensor case for the multi-component yarn passing and another path for the continuous component passing.

[0015] The embodiment requiring less space for installation has one common path in the sensor case available for passing of the multi-component yarn and of the continuous component.

[0016] The means for monitoring of the multi-component yarn and the means for monitoring of the continuous component are placed along the path of the multi-component yarn or of the continuous component, or the means are placed in a common path one over the other, which further simplifies the construction and reduces the space required for their installation.

Description of drawings

[0017] Embodiments of the device and the sensor according to the invention are schematically shown in the enclosed drawings, where Fig. 1 shows the operating unit of the machine with two sensors placed next to each other, Fig. 2 shows two sensors placed one over the other and Fig. 3 shows the embodiment of sensor containing the means in one case for monitoring of the multi-component yarn produced in the rotor, and the means for monitoring of the continuous component fed into the rotor and the means for evaluating information at least about multi-component yarn and continuous component.

Examples of the embodiments

[0018] The rotor spinning machine for multi-component yarn production containing the continuous component, particularly the elastic component, has plurality of next to each other arranged operating units, each of them comprises a container **1** for the sliver **2**, from which is supplied the sliver **2** into the well-known not represented singling-out device , from which the singled-out fibres **21** are led into the spinning rotor **3**, where at the same time the continuous component **4** is supplied from the winding-off device **41** of the continuous component. In the rotor is produced multi-component yarn **5** comprising continuous component **4** and component spun in the rotor **3** from singled out fibres **21**. Multi-component yarn **5** is drawn off by draw-off device **6** a well-known manner from the rotor **3** and wound onto a bobbin **71** by a well-known winding device **7 .**

[0019] In the path of the multi-component yarn **5** between the draw-off device **6** and the winding device **7** a sensor **8** of the multi-component yarn is inserted, which is according of embodiment as shown in Fig. 1 mounted on the holder **9**. The holder **9** is mounted on the frame or another suitable part of the machine in well-known not represented manner. The path of the continuous component **4** is situated in the area of the sensor **8** of the multi-component yarn, next to the path of the multi-component yarn **5** and the sensor **10** of the continuous component is inserted in the path in this area, which in the shown embodiment is mounted on the common holder **9** along with the sensor **8** of the multi-component yarn.

[0020] The sensor **8** of the multi-component yarn comprises an aperture **81** for passing of the multi-component yarn **5**, around which there are elements appropriately positioned for monitoring presence and/or movement and/or quality of the multi-component yarn **5** and/or presence of foreign fibres in the multi-component yarn **5**. The sensor **10** of the continuous component comprises an aperture **101** for passing of the continuous component **4**, around which there are elements appropriately positioned for monitoring presence and/or movement of the continuous component **4**. The sensor **8** of the multi-component yarn and the sensor **10** of the continuous component may, if needed, contain other means for monitoring further properties of the multi-component yarn **5** or of the continuous component **4**, while in the shown embodiment the part of the path of the continuous component **4** passes through the sensor **10** of the continuous component parallel with the path of the multi-component yarn **5** near the sensor **8** of the multi-component yarn.

[0021] The path of the continuous component **4** is deviated from its normal course by means of the known yarn guides **42**, **43** thus being situated next to the path of the multi-component yarn **5**. Yarn guides **42**, **43** may be fixed or rotation type as needed.

[0022] The sensors **8** of the multi-component yarn and sensor **10** of the continuous component are in the known way connected with the evaluation circuits 11, which are advantageously common to the both sensors, usually placed on the corresponding operating unit of the machine.

[0023] In embodiment according to Fig. 2 is the sensor **10** of the continuous component placed over the sensor **8** of the multi-component yarn on a common holder **9**, while each of the sensors **8**, **10** is fitted with a separate aperture **81**, **101** for the passing of the continuous component **4** or of the multi-component yarn **5**.

[0024] The sensors **8** of the multi-component yarn and the sensor **10** of the continuous component in embodiment according to Fig. 3 are integrated in a common case **12**, where also their evaluation circuits are placed **11** including the processors needed for their evaluation, which may however be placed outside of the case **12** if needed, e.g. inside the evaluation unit of the operating unit or in the evaluation unit of a machine section. Each of the sensors **8**, **10** is fitted with its own opening **81**, **101** for the passing of the continuous component **4** or of the multi-component yarn **5**.

[0025] If the arrangement of the operating unit allows, then in the embodiment with the sensor **8** of the multi-component yarn and the sensor **10** of the continuous component integrated in one common case **12**, only one aperture **120** is created for the passing of the multi-component yarn **5** and of the continuous component **4**, around which the monitoring means of the sensor **8** of the multi-component yarn and of the sensor **10** of the continuous component are arranged. The path of the continuous component **4** is very close to the path of the multi-component yarn **5** in this embodiment.

[0026] In the Fig. 4 and 5 is shown the integrated sensor **13** for rotor spinning machines producing the multi-component yarn **5** containing the continuous component **4** supplied to the rotor **3** and the component spun in rotor **3** from singled-out fibres. The integrated sensor **13** contains in one case **12** the means for monitoring of the multi-component yarn **5** and of the continuous component **4**.

[0027] In the embodiment according to Fig. 4 is in the integrated sensor **13** created an aperture **131** for passing of the multi-component yarn **5**, which has a sensor **132** of the multi-component yarn **5** assigned, and an aperture **133** for passing of the continuous component **4**, which has a sensor **134** of the continuous component **4** assigned. Inside the sensors **13** caseare common with the sensor **132** of the multi-component yarn and the sensor **134** of continuous component placed evaluation circuits **135** including at least one microprocessor. The sensor **132** of the multi-component yarn and the sensor **134** of the continuous component are made to one of the known well-suited principle of monitoring the properties and/or movement and/or presence of yarn and therefore may be of capacity or optical kind. For the optical monitoring it is possible to use optical sensors with a row optical element, e.g. CCD or CMOS.

[0028] Use of the row optical element in the optical sensor allows for creating an integrated sensor **130**, shown in Fig. 5, where there is one aperture **1301** created for passing of the multi-component yarn **5** and continuous component **4**, which has a row optical sensor **1302** using for monitoring of the multi-component yarn **5** and the continuous component **4**.

Claims

1. The device for multi-component yarn production comprising a continuous component and a component spun in the rotor of a rotor spinning machine from singled-out fibres, whose operating unit contains means for preparation of singled-out fibres from sliver and their transport to the spinning rotor where they are processed into a spun component whereas the operating unit further contains means for supplying a continuous component into the spinning rotor and means to draw off the spun a multi-component yarn and winding it onto the bobbin, while a sensor of the continuous component is inserted in a path of the continuous component and a sensor of the multi-component yarn is inserted in a path of the multi-component yarn, **characterized by** that the part of the path of the continuous component (4) in the area of the sensor (8) of the multi-component yarn (5) is situated next to the path of the multi-component yarn (5).

2. The device as claimed in Claim 1 **characterized by that the** part of the path of the continuous component (4) situated next to the path of the multi-component yarn (5) is parallel with part of the path of the multi-component yarn (5) in this section.

3. The device as claimed in Claims 1 or 2 **characterized by** that in the place where is the path of the continuous component (4) situated next to the path of the multi-component yarn (5) the continuous component (4) has assigned a sensor (10) of the continuous component.

4. The device as claimed in Claim 3 **characterized by** that the sensor (10) of the continuous component is situated in the operating unit next to the sensor (8) of the multi-component yarn.

5. The device as claimed in Claim 3 **characterized by** that the sensor (10) of the continuous component and the sensor (8) of the multi-component yarn are situated one over the other.

6. The device as claimed in any of Claims 3 to 5, **characterized by** that the sensor (10) of the continuous component is mounted on a single common holder (9) along with the sensor (8) of the multi-component yarn.

7. The device as claimed in any of Claims 3 to 5, **characterized by** that the sensor (10) of the continuous component fed into the spinning rotor (3) and the sensor (8) of the multi-component yarn are integrated in a common case (12).

8. The device as claimed in Claim 7, **characterized by** that in the case (12) of the integrated sensor is created an aperture (120) for passing of the multi-component yarn (5) and of the continuous component (4).

9. The device as claimed in Claim 7, **characterized by** that in the case (12) of the integrated sensor is created one aperture (81) made for multi-component yarn (5) to pass and another aperture (101) for continuous component (4) to pass through.

10. The sensor for the rotor spinning machines producing multi-component yarn comprising continuous

component supplied to the rotor and the component spun in the rotor from the singled-out fibres, **characterized by** that it contains means for monitoring of the multi-component yarn (5) produced in the rotor (3) and means for monitoring of the continuous component (4) supplied to the rotor (3) placed in a single common case (12).

11. The sensor as claimed in Claim 10, **characterized by** that the means for monitoring the properties of the multi-component yarn (5) produced in the rotor (3) and the means for monitoring of the continuous component (4) supplied to the rotor (3) are interconnected with evaluation circuits (11), that at least in part are arranged in the case (12) of the sensor.

12. The sensor as claimed in Claim 11, **characterized by** that the evaluation circuits (11) are shared by the means for monitoring the properties of the multi-component yarn (5) produced in the rotor (3) and by the means for monitoring of the continuous component (4) supplied to the rotor (3).

13. The sensor as claimed in Claims 11 or 12, **characterized by** that evaluation circuits (11) for the means for monitoring the properties of the multi-component yarn (5) produced in the rotor (3) and for the means for monitoring of the continuous component (4) supplied to the rotor (3) are placed in the case (12) of the sensor.

14. The sensor as claimed in any of Claims 10 to 13, **characterized by** that one aperture (131) is created in the case (12) of the sensor for passing of the multi-component yarn (5) to, and another aperture (133) for passing of the continuous component (4).

15. The sensor as claimed in any of Claims 10 to 13, **characterized by** that one common aperture (1301) made in the sensor case (12) for passing of the multi-component yarn (5) and for passing of the continuous component (4).

16. The sensor as claimed in Claim 15, **characterized by** that the means for monitoring the properties of the multi-component yarn (5) produced in the rotor (3) and the means for monitoring of the continuous component (4) supplied to the rotor (3) being placed around the aperture (1301) made for passing of the multi-component yarn (5) and of the continuous component (4).

17. The sensor as claimed in Claim 15, **characterized by** that the means for monitoring the properties of the multi-component yarn (5) produced in the rotor (3) and the means for monitoring of the continuous component (4) supplied to the rotor (3) being placed one over the other.

18. The sensor as claimed in Claim 15, **characterized by** that the means for monitoring the properties of the multi-component yarn (5) and the means for monitoring of the continuous component (4) are common.

19. The sensor as claimed in Claim 18, **characterized by** that at least one element for monitoring the properties of the multi-component yarn (5) is row optical sensor.

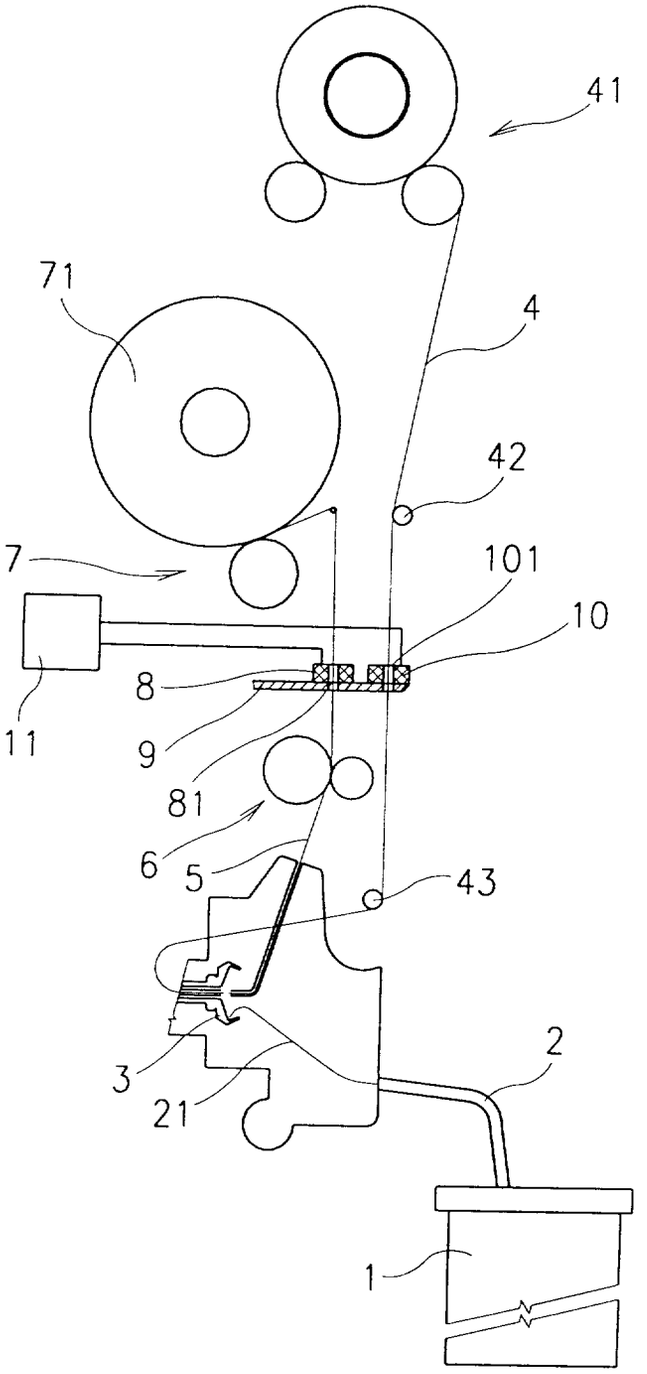

Fig. 1

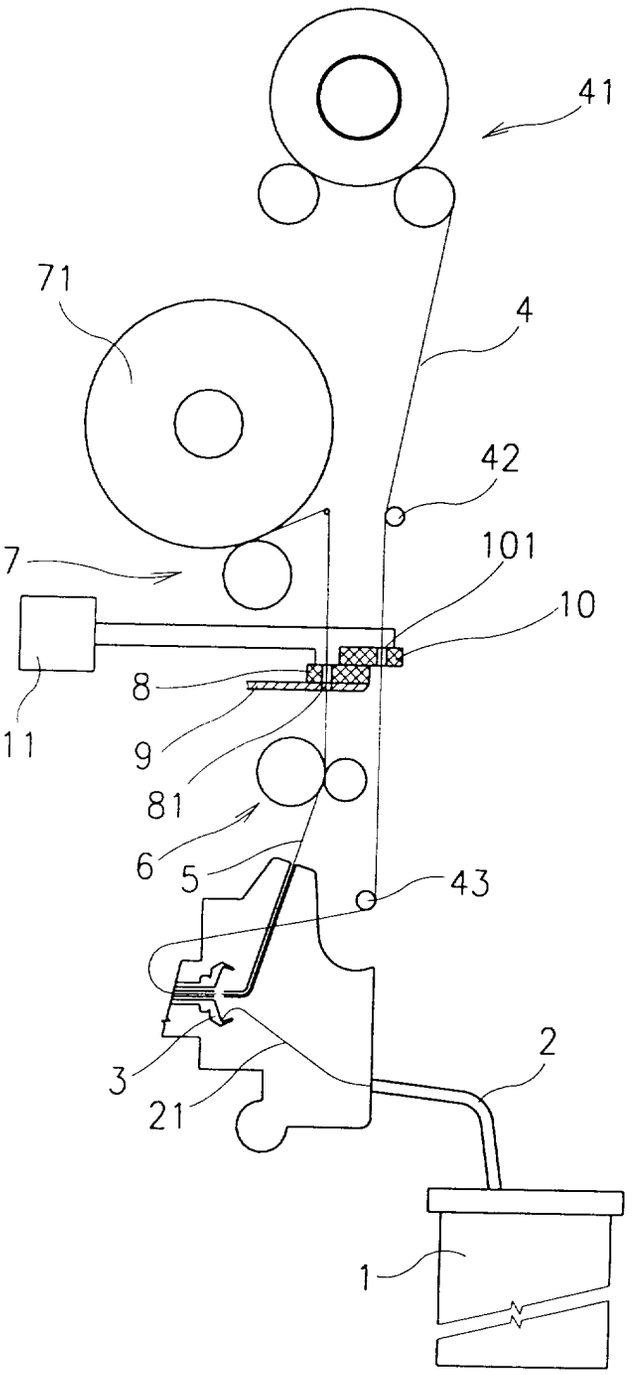

Fig. 2

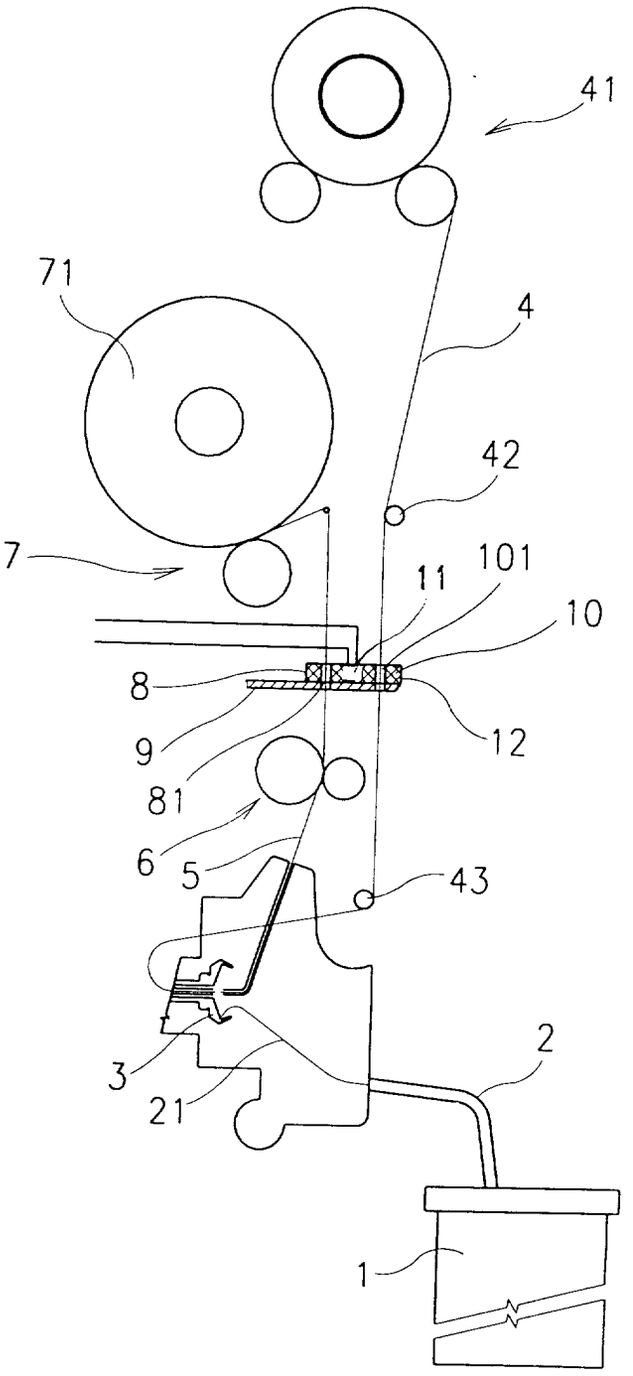

Fig. 3

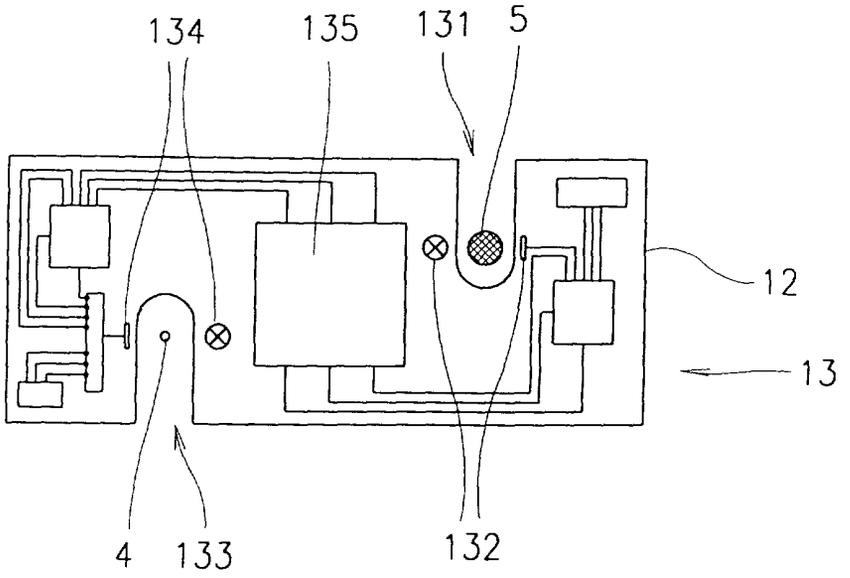

Fig. 4

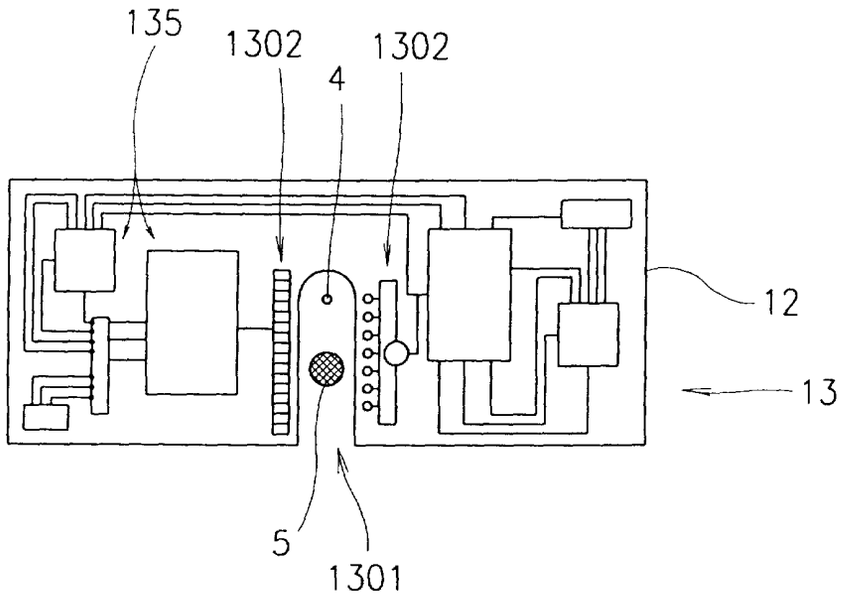

Fig. 5