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- **Poznik, Petr**
562 06 Usti nad Orlici (CZ)
- **Stancl, Jiri**
562 06 Usti nad Orlici (CZ)
- **Sloupensky, Jiri**
562 01 Usti nad Orlici (CZ)

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(71) Applicant: **Rieter CZ a.s.**
562 15 Usti nad Orlici (CZ)

(74) Representative: **Musil, Dobroslav, Dipl.-Ing.**
Cejl 38
602 00 Brno (CZ)

(72) Inventors:
 • **Kubes, Vitezslav**
561 01 Hnatnice 264 (CZ)

(54) **A device for unwinding a linear textile material in a component yarn production on a textile spinning machine**

(57) A device for unwinding a linear textile material (9) which forms a continuous component of a component yarn (12) on a rotor spinning machine for a component yarn production further comprising a spun-out

component from singled-out fibers. For each operating unit of the rotor spinning machine the device comprises one pair of unwinding pivoted rollers. A drive unwinding cylinder (3) from a pair of rollers is coupled with an independent motor (4) with adjustable speed.

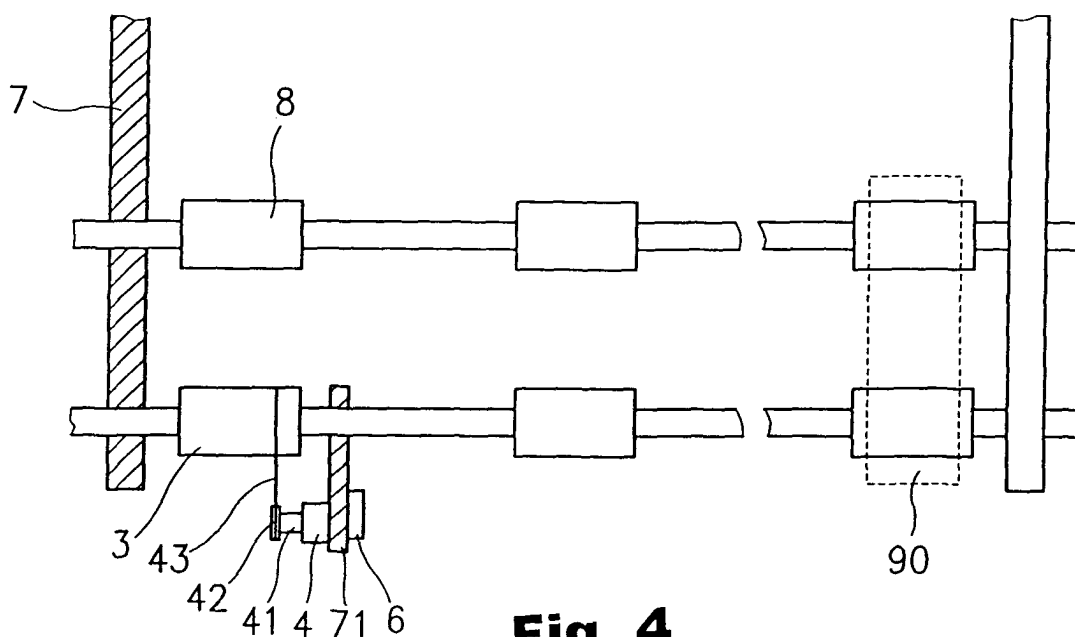


Fig. 4

Description

Technical field

[0001] The invention relates to a device for unwinding a linear textile material, in particular elastic, representing a continuous component of a component yarn in a textile spinning machine for a component yarn production, where for each operating unit of the spinning machine it consists of a pair of unwinding pivoted rollers composed of a drive and a driven unwinding roller for storage of an unreeled bobbin with a linear textile material.

Background art

[0002] Component yarns composed of spun-out component made of singled-out fibres and a continuous component composed of a linear non-elastic textile material or a linear textile material containing an elastic elastomer are produced on rotor spinning machines. Production of an elastic component yarn requires among others to keep a certain stress in a linear textile material in the entry into a spinning rotor, particularly in an elastic material. This can be reached by a method of unwinding it from its bobbin, where the delivery speed of an elastic linear material into the spinning rotor and accordingly a circumferential speed of unwinding cylinders or a cylinder is lower than draw-off speed of a component yarn out of the spinning rotor. For this reason it is necessary to control the rotation speed of the unwinding cylinders or the cylinder of unwinding mechanism of linear textile material according to the draw-off speed of the component yarn so that the stress in the linear textile material delivered into the spinning rotor complied with its properties and technical requirements given by required properties of the component yarn.

[0003] CZ PV 2001-33 solves mentioned problems using a through unwinding shaft or shafts positioned along the rotor spinning machine.

[0004] Drive unwinding shaft is pivoted and it is coupled with a central control drive with adjustable ratio between revolutions of unwinding shaft of the unwinding mechanism of a linear textile material and revolutions of draw-off device shaft of a component yarn from the spinning rotor. There is mounted a drive unwinding cylinder for each operating unit on the drive unwinding shaft, where the cylinder is capable of coupling the drive unwinding shaft using a clutch. The drive unwinding shaft is either stationary, while there is a driven unwinding cylinder freely pivoted on it mating with the first unwinding cylinder, or it is pivoted, while it is coupled with the central control drive or with a drive unwinding shaft.

[0005] The device enables a continual unwinding of a linear textile material of a component yarn in desired speed in a component yarn production on a rotor spinning machine.

[0006] This basic requirement is completely met only

provided that all operating units of the rotor spinning machine require the same speed of delivery of a linear textile material into the spinning rotor. This requirement cannot be realized with demand on simultaneous production of various component yarns on one rotor spinning machine, or with differences in properties of delivered linear textile materials resulting for example from their different production batch.

[0007] Similar problems can be found in ring spinning machines for component yarn production and in jet spinning machines, in which the linear textile material is stored on bobbins and it is being unwound basically identically with rotor spinning machines, while the same are disadvantages resulting from mounting the drive cylinder of each operating unit on a through shaft, i.e. the same unwinding speed of a linear textile material on all operating units.

[0008] The next common disadvantage of well known linear textile material unwinding devices is the impossibility to stop an operating unit while component yarn production interruption, which is usually solved by putting off of the unrolled bobbin from the drive cylinder of the particular operating unit. The free end of a linear textile material is a big problem in case of interruption of linear textile material, for danger of winding this free end on some of the rotating parts of the machine and consequent breakdown or other problems.

[0009] The goal of the invention intends to eliminate or at least to significantly minimize the drawbacks of the art.

Principle of the invention

[0010] The goal of the invention is reached by a device for unwinding a linear textile material, in particular elastic, representing a continuous component of a component yarn in a textile spinning machine for a component yarn production, whose principle consists in that a drive unwinding cylinder from a pair of rollers of each operating unit of the textile machine is coupled with a separate motor with adjustable speed.

[0011] The device according to the invention allows in each operating unit of the textile spinning machine unwinding of a linear textile material, in particular elastic linear textile material, in a speed demanded by properties of produced component yarn and/or processed linear textile material. Important is in particular the possibility to reach optimal ratio of unrolled linear textile material speed and the speed of component yarn drawn-off from the spinning rotor. The unwinding device according to the invention enables its stopping in particular operating unit while component yarn production interruption in this operating unit.

[0012] Thus the textile machine is according to Claims 2 to 4 a rotor spinning machine or a jet spinning machine or a ring spinning machine.

[0013] The forced rotation of driven unwinding cylinder from the pair of unwinding cylinders of each operat-

ing unit is reached according to Claims 5 and 6 by its coupling with a motor of the drive unwinding cylinder, which improves uniform and gentle unwinding, in particular in high unwinding speeds.

[0014] The goal of the invention is also reached by that the drive unwinding cylinder motor is powered by a frequency converter with an adjustable ratio between circumferential speed of the drive unwinding cylinder of the unwinding mechanism of a linear textile material and the circumferential speed of the draw-off roller of a component yarn.

[0015] The control of separate drive of unwinding mechanism in each operating unit enables to produce in one textile spinning machine more types of component yarns in one time, or to adjust precisely to diverse properties of various production batches of feed materials. To control the delivery speed of linear textile material is the motor connected to electronic control unit according to Claim 8, which enables to control its speed in accordance to adjusted desired delivery speed of linear textile material.

[0016] The reverse run of the motor, unwinding cylinders and the bobbin being unwinded positioned on the cylinders is enabled by the solution according to Claim 9, which provides winding the free end of linear textile material back onto the bobbin from which it was wound out and prevents winding of this free end onto some rotating part of the machine and like.

Description of the drawing

[0017] Example embodiment of a device for unwinding a linear textile material according to the invention is represented in enclosed drawings, where Fig. 1 shows a layout of an operating unit of a rotor spinning machine with a device for unwinding a linear textile material, Fig. 2 is an axial layout of drive unwinding cylinders with a drive specific for each operating unit, Fig. 3 is an arrangement of the device with positioning of unwinding cylinders and drives for each operating unit on a separate arm, Fig. 4 is another alternative for embodiment of the unwinding device according to the invention with the unwinding cylinders pivoted on stationary through shafts, while to a drive cylinder of each operating unit is attached a separate drive, Fig. 5 is an embodiment of the unwinding device with the unwinding cylinders pivoted on stationary through shafts, while the drive cylinders are composed of motors with rotary outer jacket and Fig. 6 is a layout of an operating unit of a jet spinning machine with a device for unwinding linear textile material.

Specific description

[0018] A device for a component yarn production consisting of a linear textile material representing a continuous component and a spun-out component from singled-out fibers on a rotor spinning machine according to

the invention as described in Fig. 1 and 2, where for each operating unit it consists of independently driven unwinding device 1. The unwinding device 1 consists of a drive unwinding shaft 2, drive unwinding cylinder 3, motor 4, frequency converter 5, control device 6, and a not represented driven unwinding cylinder with a fixed neck. The drive unwinding cylinder 3 is stationary connected to the drive unwinding shaft 2, the driven unwinding cylinder is mounted full-floating pivoted on the fixed neck of the driven unwinding cylinder. The drive unwinding shaft 2 is pivoted and on one of his ends it is coupled with the motor 4. The axes of the drive unwinding shaft 2 and the fixed neck of the driven unwinding cylinder are parallel. The drive unwinding shaft 2 is advantageously composed of the motor 4 shaft.

[0019] Within space of each operating unit of the rotor spinning machine is from the unwinding device 1 unrolled a linear textile material 9, which is led into the guide tube of a spinning unit 10 and into a spinning rotor 11. By a well known manner is in the spinning rotor 11 a component yarn 12 spun consisting of a linear textile material 9 and a spun-out component made of a sliver 14. The component yarn 12 is drawn-off from a delivery tube from the spinning rotor 11 through a draw-off device 15.

[0020] According to the rotation speed of draw-off rollers of the draw-off device 15, or as the case may be to speed of the drawn-off component yarn 12, it is possible using the control device 6 of the unwinding mechanism 1 of a linear textile material 9 to adjust such output speed of the motor 4 of the unwinding device 1, which in a linear textile material 9 delivered into the guide tube of a spinning unit 10 develop desired tension.

[0021] With the device according to the invention there are related possibilities of arrangement of supply bobbins with a winding of linear textile material 9, methods of achieving desired pressure of supply bobbins onto unwinding cylinders, or desired fiber friction between linear textile material 9 and the surface of unwinding cylinders. This topic is described in detail in CZ PV 2001-3383.

[0022] The solution according to the invention, which comprises separated independent drives of unwinding device 1 of particular operating units, enables to adjust the unwinding speed of the textile material 9 to the draw-off speed of the component yarn 12, which provides the possibility to produce various types of component yarns with difference in elasticity of processed linear textile material 9 or for production of the component yarn 12 to use linear textile materials 9 of unequal mechanical properties, for example due to production batch of processed linear materials.

[0023] In the Fig. 3 to 5 is described a device for unwinding a linear textile material, in particular elastic, representing the continuous component of the component yarn for positioning in a textile spinning machine for component yarn production, for example in a rotor spinning machine, a jet spinning machine or a ring spinning

machine.

[0024] The device shown in Fig. 3 in each operating unit of the textile spinning machine consists of an arm 7 mounted by a well known not represented manner on which there is pivoted a drive unwinding shaft 2, on which one end is a drive unwinding cylinder 3 positioned and its second end is connected to the shaft of the motor 4, which is positioned on a particular arm 7 together with a frequency converter 5 coupled with the motor 4 for motor 4 speed control. The frequency converter 5 can be replaced as needed with another device for motor 4 speed control, or respectively also for control of direction of rotation of this motor 4. On the arm 7 is parallel to the drive unwinding cylinder 3 pivoted a driven unwinding cylinder 8. On the drive unwinding cylinder 3 and on the driven unwinding cylinder 8 there is by its circumference mounted a bobbin 90 with a winding of linear textile material 9.

[0025] In the embodiment shown in Fig. 4 are in each section of textile spinning machine by a well known not represented manner positioned two arms 7, inside of which are two stationary shafts mounted in parallel, on which are for each operating unit of the machine positioned two unwinding cylinders, the drive unwinding cylinder 3 and the driven unwinding cylinder 8, on which is by its circumference positioned a bobbin 90 with a winding of a linear textile material 9. On the stationary shaft of the drive unwinding cylinders 3 is stationary connected an auxiliary arm 71, on which is stationary fixed the motor 4, where on its shaft 41 is positioned a belt pulley 42, which is together with particular drive unwinding cylinder 3 belted by a belt 43, transferring rotary motion from the motor 4 to the particular drive unwinding cylinder 3. On the auxiliary arm 71 there is mounted the motor 4 control device 6, which is with this motor connected and consists of means for motor 4 speed control and for control of direction of rotation of this motor 4.

[0026] The embodiment shown in Fig. 5 consists similarly as embodiment according to Fig. 4 of two parallel stationary shafts, on which are for each operating unit positioned two unwinding cylinders, the drive unwinding cylinder 3 and the driven unwinding cylinder 8, on which is by its circumference positioned a bobbin 90 with a winding of a linear textile material 9. The stationary shaft for mounting the drive unwinding cylinders 3 is composed of a hollow stationary shaft 31 and the drive unwinding cylinders are formed of motors 4 with rotating jackets, where their stators 41 are stationary mounted on the hollow stationary shaft 31. Each of the motors 4 consists of control device 6, consisting of means for motor speed control and for control of direction of rotation of the motor. The motors 4 with the rotating jacket are produced for example according to the Patent Application EP 4.466.006 (CZ PV 2003-702).

[0027] The embodiment of device shown in Fig. 3, 4 or 5 can be used in any textile spinning machine for component yarn production, for example a rotor spinning machine, a jet spinning machine or a ring spinning ma-

chine, while the device is usually positioned in the upper part of the machine using some of well known manners.

[0028] In the Fig. 6 is described the arrangement of the operating unit of the jet spinning machine for component yarn production, in which a roving 100 of fibers is delivered into a drafting mechanism, where it is refined and paralleled and made ready for spinning in a jet chamber 102, into which it is delivered from the last pair of cylinders 1011 of the drafting mechanism 101. Into the space in front of the last pair of cylinders of the draw-off device is delivered a linear textile material 9, which is in the device 1 for unwinding a linear textile material forced to unwind from the supply bobbin 90 of a linear textile material 9. The device 1 for unwinding a linear textile material in each operating unit of a jet spinning machine consists of the drive unwinding cylinder 3 and the driven unwinding cylinder 8. The drive unwinding cylinder 3 is in the not represented embodiment composed of the motor 4 with a rotating jacket. The component yarn 12 produced in the jet chamber 102 is drawn off through the pair of draw-off rollers 15. The device 1 for unwinding a linear textile material according to the invention enables a continuous unwinding of a linear textile material in the desired speed on the jet spinning machine and provides sufficient delivery of this linear textile material into the jet chamber for component yarn production. The device according to the invention also allows stopping the motor of an operating unit, where spinning interruption occurred. The arrangement of unwinding device according to the invention in each operating unit provides also reverse motion of the unwinding cylinder 3 in case of end down or another interruption of the unwinded linear textile material 9 and in consequence of it also winding the free end of linear textile material back to the supply bobbin 90, which prevents capture of the free end of the linear textile material by some of rotating parts of the device and its winding onto this rotating part.

[0029] The reverse run of the unwinding cylinders 3, 8, for winding the free end of the linear textile material 9 back on the bobbin 90 can be used in all spinning textile machines for component yarn production and prevents the risk of capture of the free end of the linear textile material by some of rotating parts of the device or by some part of serving mechanism traversing along operating units of the machine.

Claims

1. A device for unwinding a linear textile material, in particular elastic, representing a continuous component of a component yarn in a textile machine for a component yarn production, where for each operating unit of a rotor spinning machine the textile machine consists of a pair of unwinding pivoted rollers composed of a drive and a driven unwinding roller for storage of an unwinded bobbin with a linear

textile material, **characterized by** that the drive unwinding cylinder (3) from the pair of rollers of each operating unit of the textile machine is coupled with an independent motor (4) with adjustable speed.

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2. A device as claimed in Claim 1, **characterized by** that the textile machine is a rotor spinning machine.

3. A device as claimed in Claim 1, **characterized by** that the textile machine is a jet spinning machine.

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4. A device as claimed in Claim 1, **characterized by** that the textile machine is a ring spinning machine.

5. A device as claimed in any of Claims 1 to 4, **characterized by** that the drive unwinding cylinder from the pair of rollers is coupled with a motor (4) of the drive unwinding cylinder (3).

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6. A device as claimed in any of Claims 1 to 4, **characterized by** that the driven unwinding cylinder from the pair of rollers is capable of coupling with the drive motor (4) of the drive unwinding cylinder (3) using a clutch.

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7. A device as claimed in any of Claims 1 to 6, **characterized by** that the motor (4) is powered by a frequency converter (5) with an adjustable ratio between circumferential speed of the drive unwinding cylinder (3) and the circumferential speed of a roller of a component yarn (12) draw-off device (15).

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8. A device as claimed in any of Claims 1 to 6, **characterized by** that the motor (4) is connected with a control device (6) for the speed control in dependence on adjusted required speed of feeding the elastic component.

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9. A device as claimed in any of Claims 1 to 8, **characterized by** that the separate motor (4) with adjustable speed is coupled with means for reversing its movement for winding the free end of linear textile material (9) back on a bobbin (90) positioned on the unwinding cylinders (3, 8).

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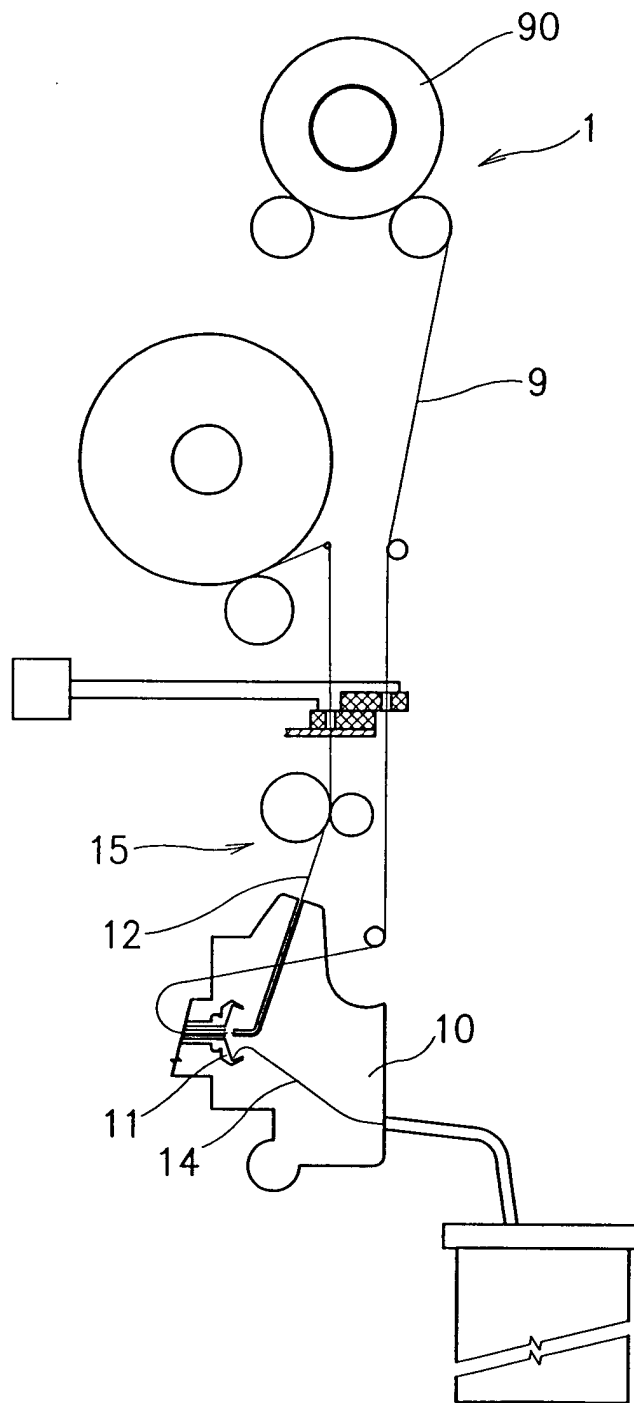


Fig. 1

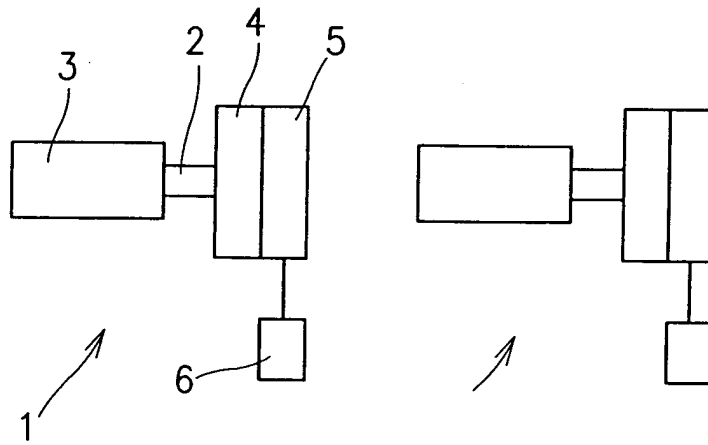


Fig. 2

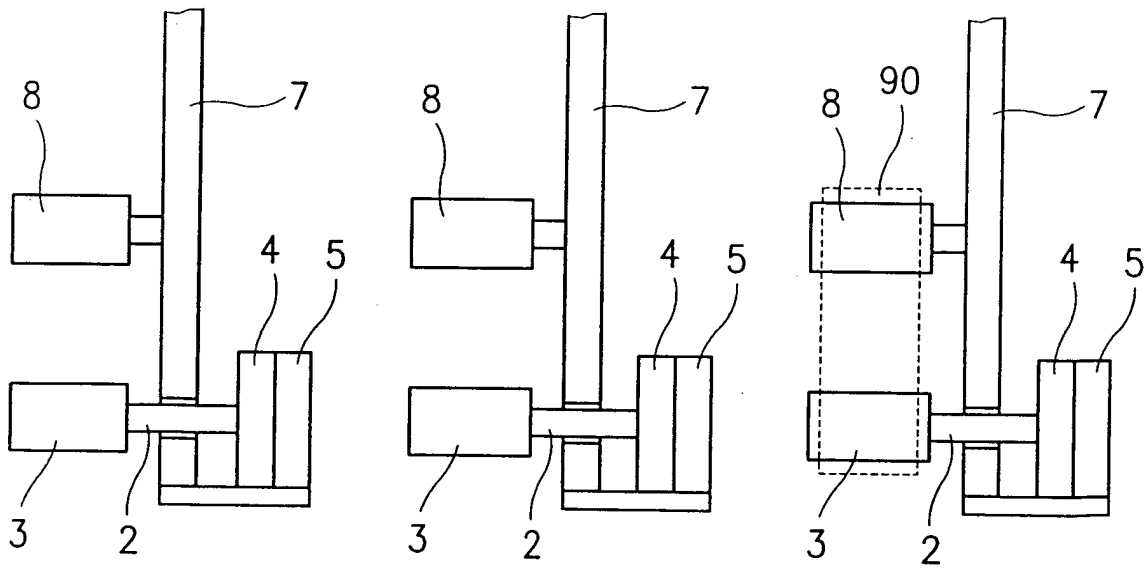
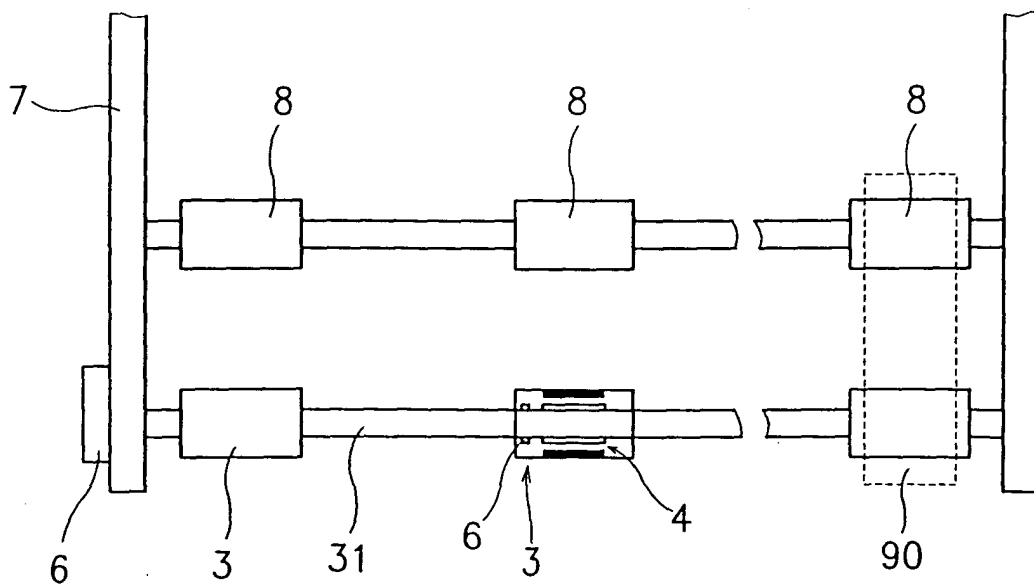
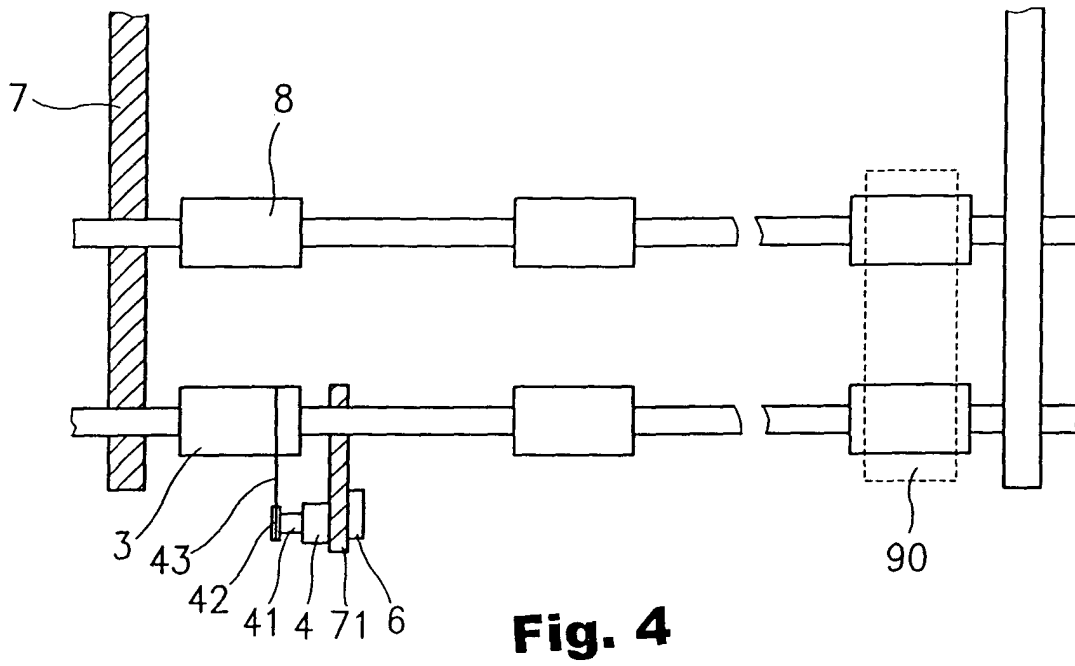


Fig. 3



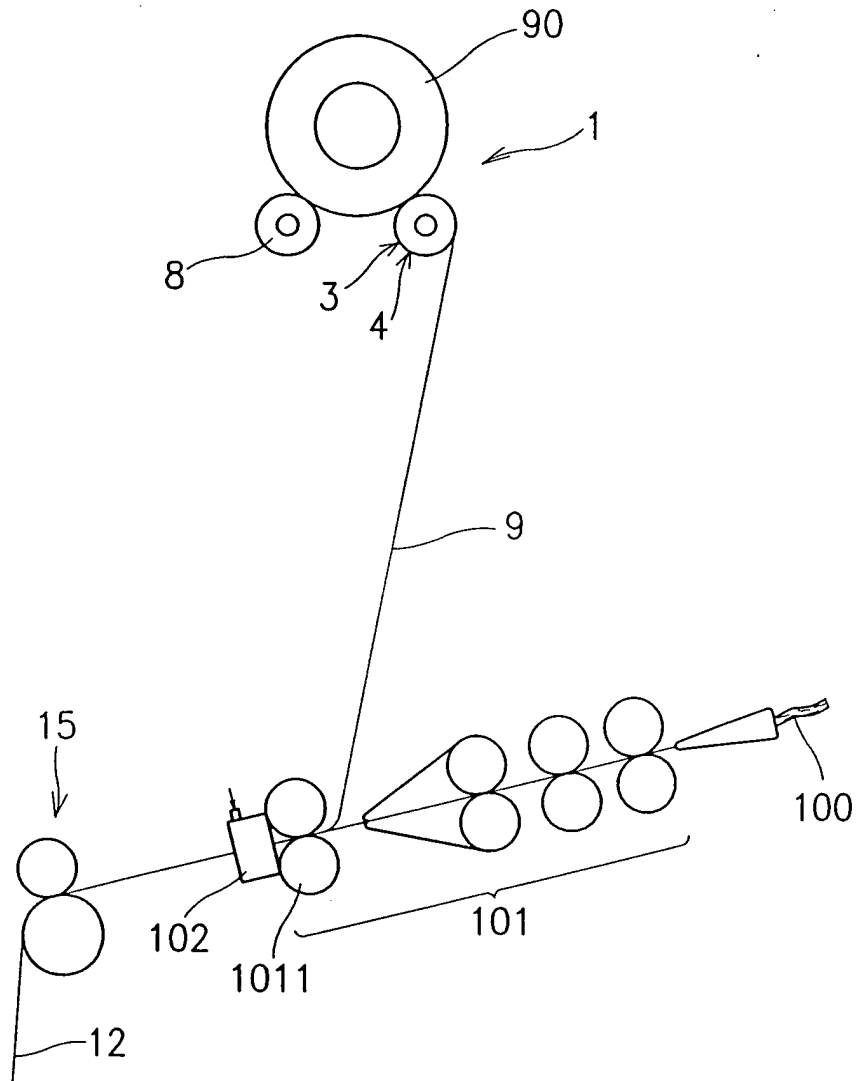


Fig. 6