(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 873 757 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
20.05.2015 Bulletin 2015/21

(51) Int Cl.:
D01H 13/18 *(2006.01)*

(21) Application number: **14191683.3**

(22) Date of filing: **04.11.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **18.11.2013 JP 2013238100**

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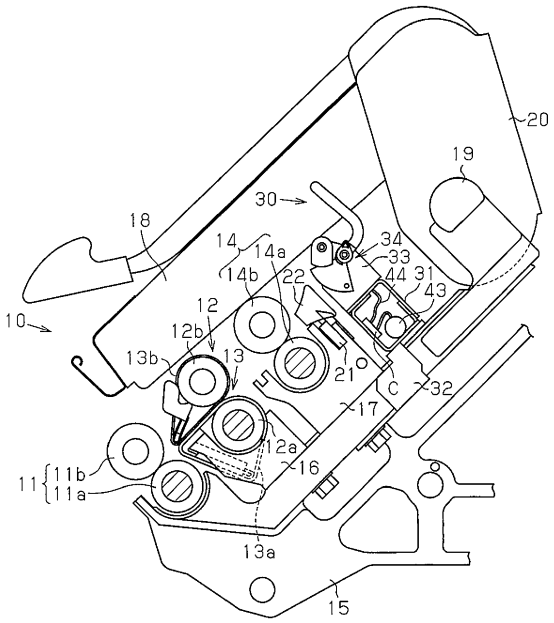
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(54) **Fiber bundle supply interruption device for spinning machine**

(57) A fiber bundle supply interruption device for a spinning machine includes a drafting unit (10), which includes a back roller (14a, 14b), a duct (31), which has a length that is greater than or equal to a length of four spindles, and a fiber bundle holding mechanism (34), which is coupled to the duct. The fiber bundle holding mechanism holds a fiber bundle to be supplied to the drafting unit at a position rearward from the back roller of the drafting unit. The fiber bundle holding mechanism includes a holding member (34), which holds the fiber bundle, a biasing member (38), which biases the holding member from a fiber bundle releasing position to a fiber bundle holding position, and an actuator (40), which switches the holding member between a state in which the holding member is maintained at the fiber bundle releasing position and a state in which the holding member is released from the maintained state. The duct accommodates wiring (43, 44) required for driving the actuator.

Fig.1



EP 2 873 757 A1

Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a fiber bundle supply interruption device for a spinning machine. More specifically, the present invention relates to a fiber bundle supply interruption device for a spinning machine, which includes a drafting unit and interrupts supply of a fiber bundle to the drafting unit.

[0002] In fine spinning machines that spin a yarn from a roving or a sliver, the spinning is simultaneously performed in a plurality of spindles. Even if the yarn is cut during the spinning, the spinning in the spindles other than the spindle in which the yarn is cut continues. In some of the fine spinning machines, the supply of the fiber bundle even to the drafting unit of the spindle in which the yarn is cut continues, and the fiber bundle supplied from the drafting unit is drawn and collected. Some fine spinning machines include an interruption device, which interrupts the supply of the fiber bundle to the drafting unit of the spindle in which the yarn is cut. As the interruption device, a stop device in a drafting unit that saves space and is applicable to an existing fine spinning machine is disclosed in Japanese Laid-Open Patent Publication No. 5-195333.

[0003] The stop device disclosed in the above publication is formed integrally with an adjustment and load device for raising a top feed roller (top back roller). The stop device is maintained in the state in which the fiber bundle is supplied to the drafting unit in the normal operation state of the spinning machine. The stop device is brought into a state in which the supply of the fiber bundle is interrupted based on yarn-cut signals generated by a sensor when the yarn is cut. The interruption of the supply of the fiber bundle is performed by holding a stop flap at a pressing position, in which the stop flap presses the fiber bundle on a table. A mechanism that moves the stop flap between the pressing position and a retreated position includes an electromagnet controlled based on the yarn-cut signals. The electromagnet is contained in the support arm. A control cable (wiring) is guided from the electromagnet rearward of a machine base through the inside of a support arm and a bracket, which supports the support arm.

[0004] The above stop device is easily added to an existing fine spinning machine. When adding the stop device, it is necessary to couple two stop devices to a support arm (weighting arm) of the drafting unit for two spindles. Accordingly, since operations for incorporating two electromagnets into the support arm are needed, the coupling operation is troublesome. Since the wirings required for driving the electromagnets are drawn out of the bracket, which supports the weighting arm, for every two spindles, the wiring operation is also troublesome.

SUMMARY OF THE INVENTION

[0005] An objective of the present invention is to provide a fiber bundle supply interruption device for a spinning machine that is easily added to an existing spinning machine and facilitates wiring.

[0006] To achieve the foregoing object, a fiber bundle supply interruption device for a spinning machine includes: a drafting unit; a duct; and a fiber bundle holding mechanism. The drafting unit includes a back roller. The duct has a length that is greater than or equal to a length of four spindles. The fiber bundle holding mechanism is coupled to the duct and holds a fiber bundle to be supplied to the drafting unit at a position rearward from the back roller of the drafting unit. The fiber bundle holding mechanism includes a holding member, which holds the fiber bundle, a biasing member, which biases the holding member from a fiber bundle releasing position to a fiber bundle holding position, and an actuator. The actuator switches the holding member between a state in which the holding member is maintained at the fiber bundle releasing position and a state in which the holding member is released from the maintained state. The duct accommodates wiring required for driving the actuator. The phrase fiber bundle is directed to a fiber bundle that is scarcely twisted, such as of a roving and a sliver.

[0007] Other aspects and advantages of the present invention will become apparent from the following description, taken in conjunction with the accompanying drawings, illustrating byway of example the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The invention, together with objects and advantages thereof, may best be understood by reference to the following description of the presently preferred embodiments together with the accompanying drawings in which:

Fig. 1 is a side view schematically illustrating a drafting unit;
Fig. 2 is a partially enlarged view schematically illustrating surroundings of the roving supply interruption device of Fig. 1;
Fig. 3 is a partial cross-sectional view taken along line 3-3 of Fig. 2;
Fig. 4 is a perspective view schematically illustrating a fiber bundle holding mechanism;
Fig. 5 is a diagram as viewed along arrow B in Fig. 3;
Fig. 6 is a side view illustrating a state in which a holding member has been rotated to a holding position;
Fig. 7A is a side view schematically illustrating operation of the fiber bundle holding mechanism; and
Fig. 7B is a side view schematically illustrating operation of the fiber bundle holding mechanism.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] Hereinafter, a fine spinning machine according to one embodiment of the present invention will be described according to Figs. 1 to 7B.

[0010] As shown in Fig. 1, a drafting unit 10 is of a three-pair-roller type configuration, and includes a front roller set 11, an apron set 13 wound around a middle roller set 12, and a back roller set 14.

[0011] The front roller set 11 is configured by a front bottom roller 11 a and a front top roller 11 b. The middle roller set 12 is configured by a middle bottom roller 12a and middle top roller 12b. A bottom apron member 13a is wound around the middle bottom roller 12a, and a top apron member 13b is wound around the middle top roller 12b. The back roller set 14 is configured by a back bottom roller 14a and a back top roller 14b.

[0012] The front bottom roller 11 a is supported by a roller stand 15. The middle bottom roller 12a and the back bottom roller 14a are supported by the roller stand 15 through a middle bottom roller supporting portion 16, a back bottom roller supporting portion 17, and a bearing (not shown). The middle bottom roller supporting portion 16 and the back bottom roller supporting portion 17 are fixed to the roller stand 15 such that the positions of the middle bottom roller supporting portion 16 and the back bottom roller supporting portion 17 are adjustable in the front-back direction of the machine (lateral direction in Fig. 1).

[0013] A weighting arm 18 is rotationally supported through a bracket 20 by a pivot 19, which is supported by the roller stand 15. The front top roller 11 b, the middle top roller 12b, and the back top roller 14b are supported by the weighting arm 18 through a top roller supporting portion (not shown).

[0014] Behind the back bottom roller 14a, a supporting bar 21 extends along the back bottom roller 14a. A trumpet 22, which guides a roving S as a fiber bundle, is fixed to the supporting bar 21.

[0015] A fiber bundle supply interruption device is provided behind the back roller set 14. The fiber bundle supply interruption device is provided such that a fiber bundle holding mechanism 30, which holds the roving S to be supplied to the drafting unit 10 at a position rearward from the back roller set 14, is coupled to the duct 31. The duct 31 has a length that is greater than or equal to the length of four spindles. The duct 31 is formed to have a length sufficient to couple the fiber bundle holding mechanism 30 for twenty-four spindles to the duct 31, for example. The duct 31 is provided along the roller stand 15 in a moveable manner in the front-back direction, and fixed on a coupling member 32. The coupling member 32 is coupled with the back bottom roller supporting portion 17, which supports the back bottom roller 14a, in an integrally moveable manner. That is, the fiber bundle holding mechanism 30 is formed integrally with the back bottom roller supporting portion 17 of the drafting unit 10 in a position adjustable manner.

[0016] As shown in Figs. 3 and 5, the fiber bundle holding mechanism 30 is provided for each pair of spindles. That is, the fiber bundle holding mechanism 30 is provided for two spindles that form a pair. Two L-shaped supporting boards 33 are each fixed to the upper surface of the duct 31 by a bolt with a hexagon socket. Each holding member 34 is supported by the corresponding supporting board 33 such that the holding member 34 is rotated between a fiber bundle releasing position (position shown in Fig. 2) and a fiber bundle holding position (position shown in Fig. 6). The fiber bundle holding mechanism 30 includes fiber bundle guides 36. The fiber bundle guides 36 hold the roving S as a fiber bundle in cooperation with the corresponding holding members 34. The fiber bundle guides 36 guide the roving S supplied from a roving spool hung by a creel (not shown) in the state in which the fiber bundle guides 36 do not hold the roving S as a fiber bundle in cooperation with the corresponding holding members 34.

[0017] More specifically, as shown in Figs. 2, 3, 4, and 6, each holding member 34 has a cylindrical holding portion body 34a, an L-shaped lever portion 34b in a side view, and a sectoral locked board 34c in a side view. Each lever portion 34b is formed integrally with an end of the corresponding holding portion body 34a, and is located above a supporting shaft 37 (rotation center). Each locked board 34c is located below the supporting shaft 37 (rotation center). Each holding portion body 34a includes a substantially triangular roving holding portion 34d in a side view on an outer circumferential portion of the holding portion body 34a that is away from the supporting board 33. A locking projection 34e is formed on the basal end of each roving holding portion 34d.

[0018] As shown in Fig. 3, each holding member 34 is rotationally supported at the holding portion body 34a by the corresponding supporting shaft 37 fixed to the supporting board 33. As for each holding member 34, a torsion spring 38 as a biasing member is externally applied on the basal end of the corresponding roving holding portion 34d of the holding portion body 34a. Each torsion spring 38 plays a role to bias the corresponding holding member 34 from a fiber bundle releasing position to a fiber bundle holding position. In the fiber bundle holding position, each roving holding portion 34d presses the corresponding fiber bundle guide 36. Each torsion spring 38 biases the holding member 34 toward the fiber bundle holding position in the state in which one end of the holding member 34 is fixed to the supporting board 33, and the other end of the holding member 34 is locked by the locking projection 34e. Accordingly, the holding members 34 are maintained at a position in which the roving holding portions 34d hold the roving S in cooperation with the fiber bundle guides 36 in the state free from the application of an external force.

[0019] Each fiber bundle guide 36 is supported by the corresponding supporting board 33 through a supporting shaft 39, which passes through the fiber bundle guide 36

and is fixed to the supporting board 33. Each fiber bundle guide 36 is formed cylindrical.

[0020] The fiber bundle holding mechanism 30 is arranged at a position in which the distance between the holding position of the roving S by the holding members 34 and the fiber bundle guides 36 and the nipping position of the roving S by the back roller set 14 is greater than the fiber length of the fibers that configure the roving S.

[0021] As shown in Figs. 3 and 5, actuators 40, each corresponding to one of the locked boards 34c, are provided between the supporting boards 33. Each actuator 40 switches the corresponding holding member 34 between the state in which the holding member 34 is maintained at the fiber bundle releasing position and the state in which the holding member 34 is released from the maintained state. Each actuator 40 includes a pin 40a and contains a spring, which biases the pin 40a in the protruding direction, and a solenoid. Each actuator 40 is configured such that the pin 40a is drawn into the actuator 40 against the biasing force of the spring in the state in which current flows through the solenoid. Each actuator 40 is provided, in the state in which the holding member 34 is arranged at the fiber bundle releasing position, at a position in which the tip end of the pin 40a enters the hole as a locked portion 42 formed in the locked board 34c and the holding member 34 is maintained at the fiber bundle releasing position. Each actuator 40 is arranged below the weighting arm 18 of the drafting unit 10. As shown in Fig. 3, the actuators 40 are fixed to the supporting member 41 (not shown in Fig. 5) provided between the supporting boards 33.

[0022] Each locked board 34c is formed such that the locked portion 42 is located at a position in which the locked portion 42 is locked by the pin 40a in the state in which each holding member 34 is arranged at the fiber bundle releasing position. Each locked board 34c is formed in the shape that is locked by the tip end of the pin 40a, which is biased in the direction toward the locking position, in the state in which the holding members 34 are arranged at the fiber bundle holding position, or the state in which the holding members 34 are in the middle position between the fiber bundle releasing position and the fiber bundle holding position. That is, each locked board 34c is maintained in the state in which the tip end of the pin 40a contacts the locked board 34c in the state in which the locked state of the pin 40a and the locked portion 42 is canceled, the holding member 34 is moved from the fiber bundle releasing position, and the actuator 40 is in the non-excited state.

[0023] In the fine spinning machine, a controller C is provided in the duct 31 to check whether the yarn is cut in the spindle based on the yarn-cut signals of the yarn-cut sensor (not shown) and excite the solenoids of the actuators 40 of the fiber bundle holding mechanism 30 corresponding to the spindle in which the yarn is cut to interrupt the supply of the roving S to the spindle in which the yarn is cut. The controller C is connected to main wiring 43, which supplies electric power to excite the solenoids. The solenoid of each actuator 40 is connected through branch wiring 44 to a circuit branched from the power supply for the solenoids through an electric element for exciting the solenoids such as a transistor in the controller C. As for the excitation time of the solenoids of the actuators 40, the solenoids are each excited for only a short period required to move the pin 40a to the position in which the locked state of the tip end of the pin 40a and the locked portion 42 of the locked board 34c is cancelled. The controller C is configured to be divided into a plurality of pieces by connecting the devices by the main wiring 43.

[0024] Next, the operation of the fiber bundle holding mechanism 30 as above configured will be described.

[0025] As shown in Figs. 1 and 2, in the non-yarn-cut state, the holding members 34 are arranged at the fiber bundle releasing position in which the roving holding portions 34d do not hold the roving S. In this state, each locked portion 42 of the locked board 34c is locked by the corresponding pin 40a of the actuator 40, and the holding member 34 is maintained at the fiber bundle releasing position. The non-yarn-cut state is directed to not only a state in which the roving S is supplied through the fiber bundle guides 36 to the drafting unit 10 and spun but also a state in which the roving S is not yet supplied to the drafting unit 10 prior to the start of the spinning. In the state prior to the start of the spinning, the controller C does not determine the yarn is cut even in the state the yarn-cut sensor does not detect the yarn, and the solenoid in each actuator 40 is maintained in the OFF state, i.e., the non-excited state.

[0026] When the operation of the fine spinning machine is started, the roving S supplied from the roving spool hung by a creel (not shown) is guided by the fiber bundle guides 36 and the trumpet 22 to be supplied to the back roller set 14. The roving S supplied to the back roller set 14 is drafted between the back roller set 14 and the apron set 13 and between the apron set 13 and the front roller set 11 to be a fleece. The fleece becomes a yarn and is wound on a bobbin through a snail wire and a traveler (not shown).

[0027] When the yarn is cut, the spindle in which the yarn is cut is identified by the detection signals of the yarn-cut sensor (not shown). An excitation current is then supplied from the controller C to the actuators 40 of the fiber bundle holding mechanism 30 corresponding to the spindle in which the yarn is cut for a short period. The pins 40a are each drawn and the locked state of the locked board 34c by the pin 40a is cancelled. Accordingly, the holding members 34 are rotated to the fiber bundle holding position by the effect of the torsion springs 38, and the roving holding portions 34d hold the roving S in cooperation with the corresponding fiber bundle guides 36 behind the back roller set 14 as shown in Fig. 7A.

[0028] When the roving S is held by the roving holding portions 34d and the fiber bundle guides 36, the movement of the roving S is prevented at a position in which the roving S is held. At this time, the driving of the drafting

unit 10 is continued, and the roving S is pulled by the back roller set 14 in the state in which the roving S is held by the roving holding portions 34d and the fiber bundle guides 36.

[0029] If the distance between the holding position by the roving holding portions 34d and the fiber bundle guides 36 and the nipping position of the roving S by the back roller set 14 is less than the fiber length, at least some fibers, which configure the roving S, are subjected to the nipping effect by the back roller set 14 in the state in which the fibers are subjected to the holding effect by the roving holding portions 34d and the fiber bundle guides 36 and the nipping effect by the back roller set 14 simultaneously. As a result, in the case in which the torque increases when the back roller set 14 pulls the roving S so that the cutting of a plurality of pieces of the yarn is simultaneously caused, a motor, which drives the back roller set 14, is likely to be excessively loaded. Since the roving S is cut in the state in which the end of the roving S comes between the back roller set 14 and the middle roller set 12 (apron set 13) as shown in Fig. 7B, the back roller set 14 rotates in the state in which the roving S remains stationary. This wears out a rubber cot (not shown), which coats the back roller set 14.

[0030] However, since the distance between the holding position by the roving holding portions 34d and the fiber bundle guides 36 and the nipping position of the roving S by the back roller set 14 is greater than the fiber length, some fibers, which configure the roving S and are held by the roving holding portions 34d and the fiber bundle guides 36, are not nipped by the back roller set 14. Some fibers, which configure the roving S and are subjected to the nipping effect by the back roller set 14, are not subjected to the holding effect by the roving holding portions 34d and the fiber bundle guides 36. Accordingly, the roving S is moved such that the fibers, which are not held by the roving holding portions 34d and the fiber bundle guides 36, are subjected to the nipping effect by the back roller set 14 to be drawn out from a group of the fibers. This cuts the roving S without increasing the torque of the back roller set 14.

[0031] If the distance between the holding position by the roving holding portions 34d and the fiber bundle guides 36 and the nipping position of the roving S by the back roller set 14 is excessively greater than the fiber length, the distance between the nipping point by the back roller set 14 and the end of the roving S is excessively long when the roving S is cut between the back roller set 14 and the fiber bundle holding mechanism 30 so that the roving S is likely to be wound around the back bottom roller 14a. Accordingly, it is preferable that the distance between the holding position by the roving holding portions 34d and the fiber bundle guides 36 and the nipping position of the roving S by the back roller set 14 be less than the circumferential length of the back bottom roller 14a.

[0032] The actuators 40 are excited for a short period. This draws each pin 40a to cancel the locked state of the locked board 34c by the pin 40a. This rotates the holding members 34 such that the roving holding portions 34d move toward the fiber bundle holding position. The excitation of the actuators 40 is cancelled in the middle of the rotation of the holding members 34 so that the pins 40a are each brought into contact with the corresponding locked board 34c. The pins 40a are each maintained in contact with the locked board 34c even in the state in which the roving holding portions 34d are each arranged at the fiber bundle holding position.

[0033] When the repairing operation of the cut yarn is performed, the lever portions 34b of the holding members 34 are manipulated by the operator or an automatic yarn piecing device so that the holding members 34 are arranged at the fiber bundle releasing position against the biasing force of the torsion springs 38. During a period in which the holding members 34 rotate from the fiber bundle holding position to the fiber bundle releasing position, the pins 40a are maintained in contact with the corresponding locked boards 34c. Accordingly, the manipulation of the lever portions 34b smoothly rotates the holding members 34 to the fiber bundle releasing position. When the holding members 34 rotate to the fiber bundle releasing position, the locked portions 42 of the locked boards 34c face the corresponding pins 40a and the tip ends of the pins 40a lock the corresponding locked portions 42. As a result, even if the operator or the automatic yarn piecing device lets go of the lever portions 34b, the holding members 34 are maintained at the fiber bundle releasing position against the biasing force of the torsion springs 38, and return to the spinnable state. The yarn piecing is performed in this state.

[0034] The fiber bundle holding mechanism 30 is arranged at a predetermined position of the spinning machine in the state in which the fiber bundle holding mechanism 30 is coupled to the duct 31. Accordingly, before coupling the duct 31 to the spinning machine, a plurality of the fiber bundle holding mechanisms 30 are coupled on the duct 31 such that the holding members 34 are arranged at an interval of the length of the spindle. The duct 31 is then coupled to the spinning machine. This facilitates the coupling of the fiber bundle holding mechanism 30 to the spinning machine more than in the case in which the fiber bundle holding mechanism 30 is directly coupled to the spinning machine without providing the duct 31.

[0035] Generally, in the drafting unit, the position of the back roller set 14 is adjusted once or twice per year. If the position of the back bottom roller 14a is adjusted, it is also necessary to adjust the position of the fiber bundle holding mechanism 30. The duct 31 is fixed on the coupling member 32 coupled to the back bottom roller supporting portion 17 in the integrally movable manner. The back bottom roller supporting portion 17 supports the back bottom roller 14a. Accordingly, the position adjustment of the fiber bundle holding mechanism 30 is performed integrally with the back bottom roller 14a of the drafting unit 10. As a result, it is not necessary to espe-

cially perform the position adjustment of the fiber bundle holding mechanism 30.

[0036] The above embodiment has the following advantages.

(1) The fiber bundle supply interruption device includes the drafting unit 10, which includes the back roller set 14, the duct 31, which has the length that is greater than or equal to the length of four spindles, and the fiber bundle holding mechanism 30, which is coupled to the duct 31 and holds the fiber bundle (roving S) to be supplied to the drafting unit 10 at a position rearward from the back roller set 14 of the drafting unit 10. The fiber bundle holding mechanism 30 includes biasing members that bias the corresponding holding members 34 from the fiber bundle releasing position to the fiber bundle holding position, and the actuators 40, which switch the corresponding holding members 34 between the state in which the holding members 34 are maintained at the fiber bundle releasing position and the state in which the holding members 34 are released from the maintained state. Accordingly, before coupling the duct 31 to the spinning machine, a plurality of the fiber bundle holding mechanisms 30 are coupled on the duct 31 such that the holding members 34 are arranged at an interval of the spindles. The duct 31 is then coupled to the spinning machine. This facilitates the coupling operation of the fiber bundle holding mechanism 30 to the spinning machine more than in the case in which the fiber bundle holding mechanism 30 is directly coupled to the spinning machine without providing the duct 31.

(2) The duct 31 accommodates the main wiring 43 and the branch wirings 44 required for driving the actuators 40. This facilitates the arrangement of the main wiring 43 and the branch wirings 44 more than in the conventional case.

(3) The actuators 40 are arranged below the weighting arm 18 of the drafting unit 10. The actuators 40 may be arranged not below the weighting arm 18 but below the position in which the fiber bundle passes. However, if the actuators 40 are arranged below the weighting arm 18, the arrangement space is more easily ensured and a passage through which the fiber bundle passes during the spinning resists the collection of floating fibers.

(4) The fiber bundle holding mechanism 30 is provided for each pair of spindles. The fiber bundle holding mechanisms 30 may be configured to be coupled to the duct 31 independent from each other for each spindle, for example. However, if the fiber bundle holding mechanism 30 is provided for each pair of spindles, the configuration is simplified in the relationship with the weighting arm 18, which supports the top rollers of the drafting unit 10.

(5) The holding members 34 are rotationally provided between the fiber bundle releasing position and the fiber bundle holding position. The biasing members are the torsion springs 38. Each holding member 34 may be configured to move between the fiber bundle releasing position and the fiber bundle holding position according to a translatory movement. However, if the rotating configuration is employed, the space of the movement range of the holding member 34 is more easily ensured. The weight of the holding members 34 or the weight biases the holding members 34 from the fiber bundle releasing position to the fiber bundle holding position. However, if the torsion springs 38 are employed, the torsion springs 38 reliably bias the holding members 34.

(6) Each actuator 40 is configured to contain the solenoid and the spring such that the pin 40a biased by the spring to the protruding position is drawn from the protruding position to the retracted position by the solenoid in the excited state. Accordingly, the excitation for a short period simplifies the configuration for cancelling the state in which the holding members 34 are maintained at the fiber bundle releasing position.

(7) The fiber bundle holding mechanism 30 is formed integrally with the back bottom roller supporting portion 17 of the drafting unit 10 in a position adjustable manner. According to the configuration, when the position of the back bottom roller 14a is adjusted, the position of the fiber bundle holding mechanism 30 is also simultaneously adjusted to an appropriate position.

(8) The fiber bundle holding mechanism 30 is coupled to the duct 31, and the duct 31 is fixed on the coupling member 32 coupled to the back bottom roller supporting portion 17 in the integrally movable manner. The back bottom roller supporting portion 17 supports the back bottom roller 14a. This simplifies the configuration for, when the position of the back bottom roller 14a is adjusted, simultaneously adjusting the position of the fiber bundle holding mechanism 30 to an appropriate position as well.

(9) The fiber bundle holding mechanism 30 includes the fiber bundle guides 36, and the fiber bundle guides 36 and the holding members 34 cooperate with each other to hold the fiber bundle (roving S). The configuration allows the holding members 34 to reliably hold the fiber bundle in comparison to the case in which the fiber bundle guides 36 are not provided.

[0037] The present invention is not limited to the above embodiment. The embodiment may be modified as follows, for example.

[0038] The fiber bundle may be of not only the roving S but also the sliver. For example, even in a ring fine spinning machine, a fiber bundle supply interruption device may be used for a ring fine spinning machine that spins yarn from a sliver using a drafting unit that drafts a fiber bundle by far greater drafting ratio than in a normal

drafting unit with three pairs of rollers as a drafting unit.

[0039] The spinning machine is not limited to the ring fine spinning machine. The spinning machine may be a bundle spinning machine or a friction spinning machine, for example.

[0040] The spinning machine may be a roving frame.

[0041] The length of the duct 31 is not limited to the length corresponding to the length of twenty-four spindles as long as it has at least a length greater than or equal to the length of four spindles. The length of the duct 31 may be a length corresponding to the fiber bundle holding mechanism 30 for less than twenty-four spindles or a length corresponding to the fiber bundle holding mechanism 30 for more than twenty-four spindles.

[0042] The positions of the actuators 40 are not limited to the position below the weighting arm 18. For example, the actuators 40 may be arranged below the roving passage.

[0043] The configuration of the fiber bundle holding mechanism 30 is not limited to the configuration of the two spindles. For example, each fiber bundle holding mechanism 30 may be configured to be independently coupled to the duct 31 for each spindle.

[0044] The biasing members that bias the holding members 34 from the fiber bundle releasing position to the fiber bundle holding position are not limited to the torsion springs 38. For example, the holding members 34 may be configured such that a weight is provided for biasing each holding member 34 toward the fiber bundle holding position or the weight of the holding members 34 biases the holding members 34 toward the fiber bundle holding position.

[0045] The holding members 34 are not limited to the configuration in which the holding members 34 are rotationally provided between the fiber bundle releasing position and the fiber bundle holding position. The holding members 34 may be configured to move between the fiber bundle releasing position and the fiber bundle holding position according to a translatory movement.

[0046] The configuration in which the fiber bundle holding mechanism 30 is formed integrally with the back bottom roller 14a of the drafting unit 10 in a position adjustable manner is not limited to the configuration in which the duct 31 is fixed on the coupling member 32 coupled with the back bottom roller supporting portion 17 in a position adjustable manner. The back bottom roller supporting portion 17 supports the back bottom roller 14a. For example, the supporting boards 33 of the fiber bundle holding mechanism 30 may be configured to be coupled on the duct 31 via the coupling member 32, which is coupled to the back bottom roller supporting portion 17 in an integrally movable manner.

[0047] The duct 31 may be fixed to a coupling member from the roller stand 15 or the pivot 19. That is, the fiber bundle holding mechanism 30 need not be formed integrally with the back bottom roller supporting portion 17 of the drafting unit 10 in a position adjustable manner.

[0048] The shape of the duct 31 is not limited to a tetragonal tube-like. The shape of the duct 31 may be of any shape, for example, a pentagonal tube-like or a hexagonal tube-like as long as the duct 31 can be supported by the roller stand 15 and the fiber bundle holding mechanism 30 can be coupled to the duct 31.

[0049] Holding members that hold the roving S in cooperation with the holding members 34 may be provided separately from the fiber bundle guides 36.

[0050] Each locked portion 42, which is formed in the locked board 34c and locked by the corresponding pin 40a, is not limited to a hole. The locked portion 42 may be a recess, a groove, or a cutout.

[0051] Each locked board 34c need not be sectoral. The locked board 34c may be of any shape as long as the locked board 34c includes the locked portion 42 to be locked by the corresponding pin 40a and is always in contact with the tip end of the pin 40a in the state in which the holding member 34 is in the middle of the movement from the fiber bundle releasing position to the fiber bundle holding position and arranged at the fiber bundle holding position.

[0052] Therefore, the present examples and embodiments are to be considered as illustrative and not restrictive and the invention is not to be limited to the details given herein, but may be modified within the scope and equivalence of the appended claims.

[0053] A fiber bundle supply interruption device for a spinning machine includes a drafting unit, which includes a back roller, a duct, which has a length that is greater than or equal to a length of four spindles, and a fiber bundle holding mechanism, which is coupled to the duct. The fiber bundle holding mechanism holds a fiber bundle to be supplied to the drafting unit at a position rearward from the back roller of the drafting unit. The fiber bundle holding mechanism includes a holding member, which holds the fiber bundle, a biasing member, which biases the holding member from a fiber bundle releasing position to a fiber bundle holding position, and an actuator, which switches the holding member between a state in which the holding member is maintained at the fiber bundle releasing position and a state in which the holding member is released from the maintained state. The duct accommodates wiring required for driving the actuator.

Claims

1. A fiber bundle supply interruption device for a spinning machine, comprising:

   a drafting unit (10), which includes a back roller (14a, 14b);
   a duct (31) having a length that is greater than or equal to a length of four spindles; and
   a fiber bundle holding mechanism (30), which is coupled to the duct (31) and holds a fiber bundle to be supplied to the drafting unit (10) at a position rearward from the back roller (14a, 14b) of

the drafting unit (10), wherein
the fiber bundle holding mechanism (30) includes
a holding member (34), which holds the fiber bundle,
a biasing member (38), which biases the holding member (34) from a fiber bundle releasing position to a fiber bundle holding position, and
an actuator (40), which switches the holding member (34) between a state in which the holding member (34) is maintained at the fiber bundle releasing position and a state in which the holding member (34) is released from the maintained state, and
the duct (31) accommodates wiring (43, 44) required for driving the actuator (40).

2. The fiber bundle supply interruption device for a spinning machine according to claim 1, wherein the actuator (40) is arranged below a weighting arm (18) of the drafting unit (10).

3. The fiber bundle supply interruption device for a spinning machine according to claim 1 or 2, wherein the fiber bundle holding mechanism (30) is provided for two spindles that form a pair.

4. The fiber bundle supply interruption device for a spinning machine according to any one of claims 1 to 3, wherein the holding member (34) is configured to rotate between the fiber bundle releasing position and the fiber bundle holding position, and the biasing member is a torsion spring (38).

5. The fiber bundle supply interruption device for a spinning machine according to any one of claims 1 to 4, wherein
the drafting unit (10) includes a back bottom roller (14a) and a back bottom roller supporting portion (17), which supports the back bottom roller (14a), and
the fiber bundle holding mechanism (30) is formed integrally with the back bottom roller supporting portion (17) of the drafting unit (10) in a position adjustable manner.

6. The fiber bundle supply interruption device for a spinning machine according to any one of claims 1 to 5, wherein the fiber bundle holding mechanism (30) further includes a fiber bundle guide (36), and the fiber bundle guide (36) and the holding member (34) cooperate with each other to hold the fiber bundle.

Fig.1

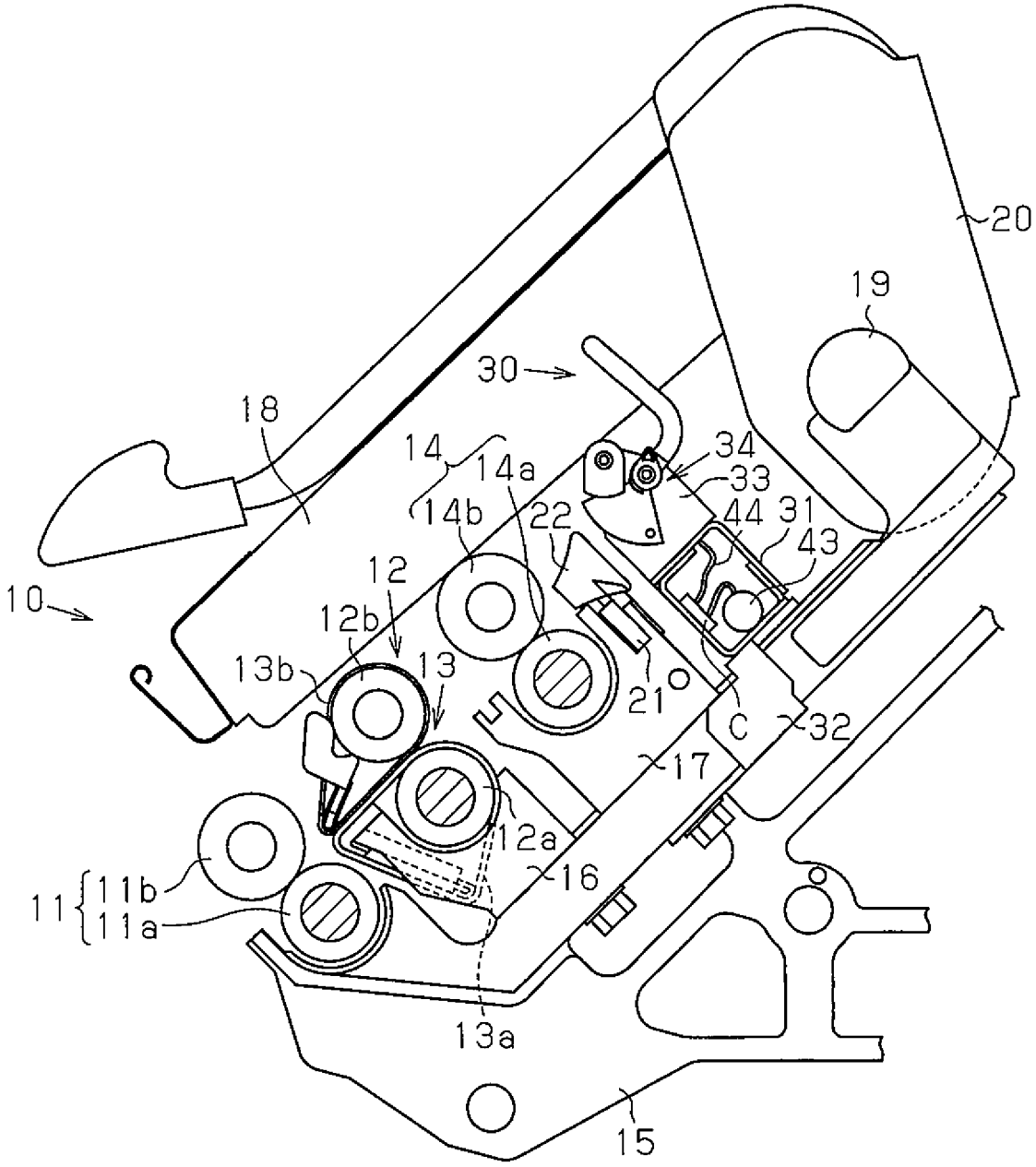

20
19
30
18
14
14a
34
33
14b
22
44
31
43
12
10
12b
13b
13
21
C
32
17
12a
16
11
11b
11a
13a
15

Fig.2

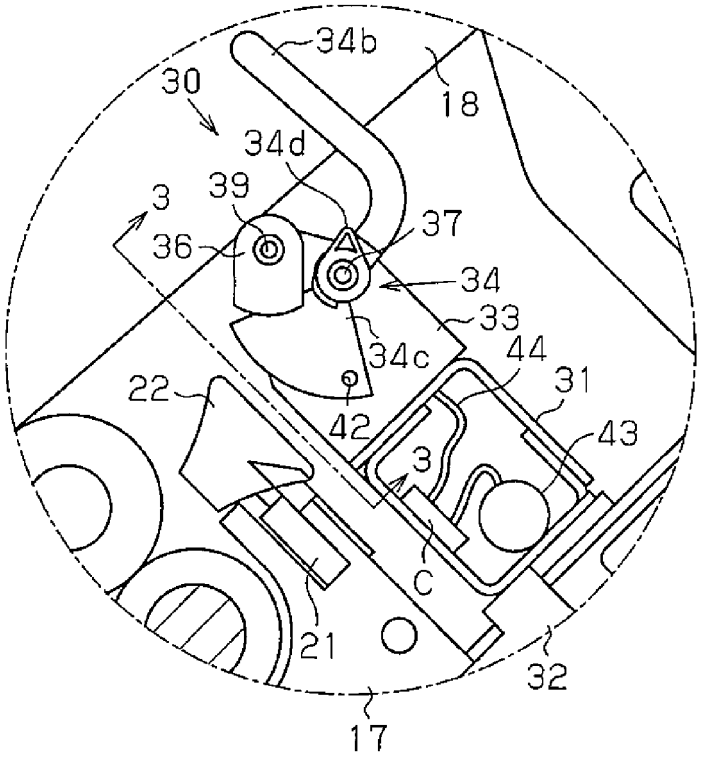

34b
30
18
34d
39
3
37
36
34
33
34c
44
31
22
42
43
3
C
21
32
17

Fig.3

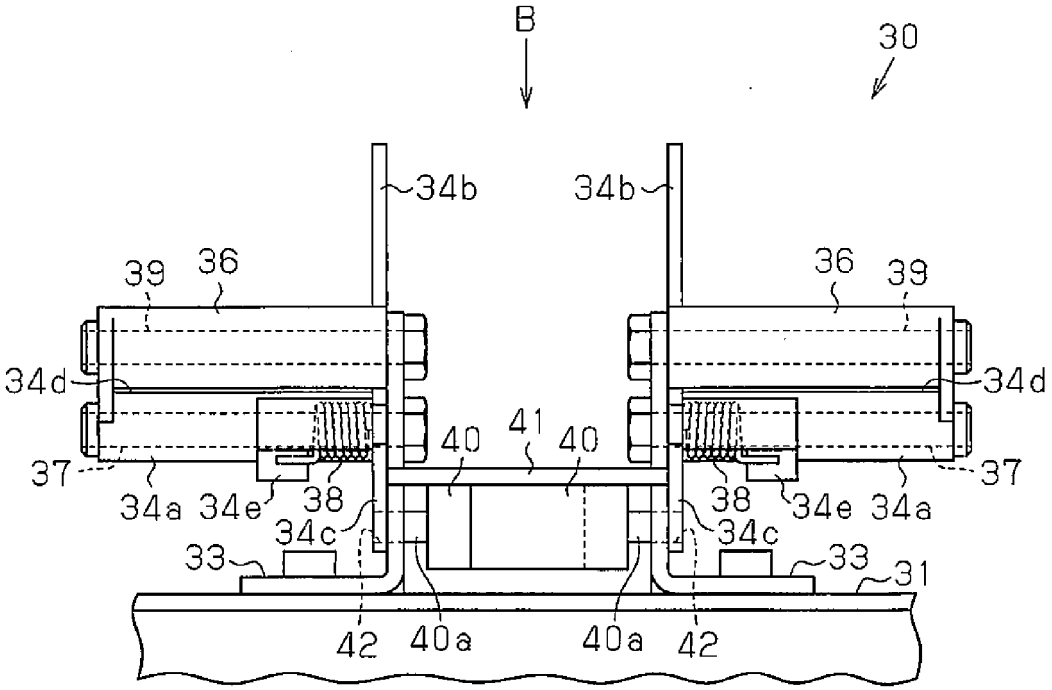

B
30
34b
34b
39
36
36
39
34d
34d
37
37
40
41
40
34a
34e
38
38
34e
34a
34c
34c
33
33
31
42
40a
40a
42

Fig.4

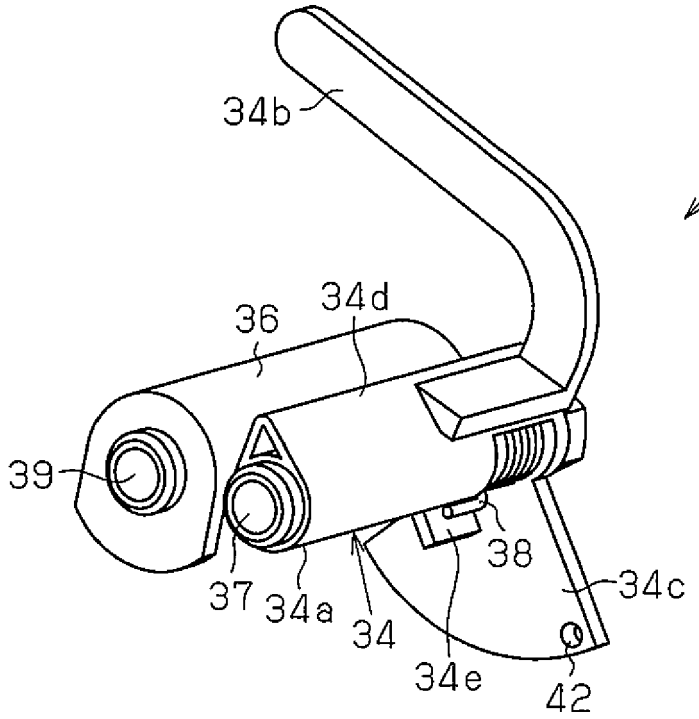

34b
30
34d
36
39
38
37
34a
34
34c
34e
42

Fig.5

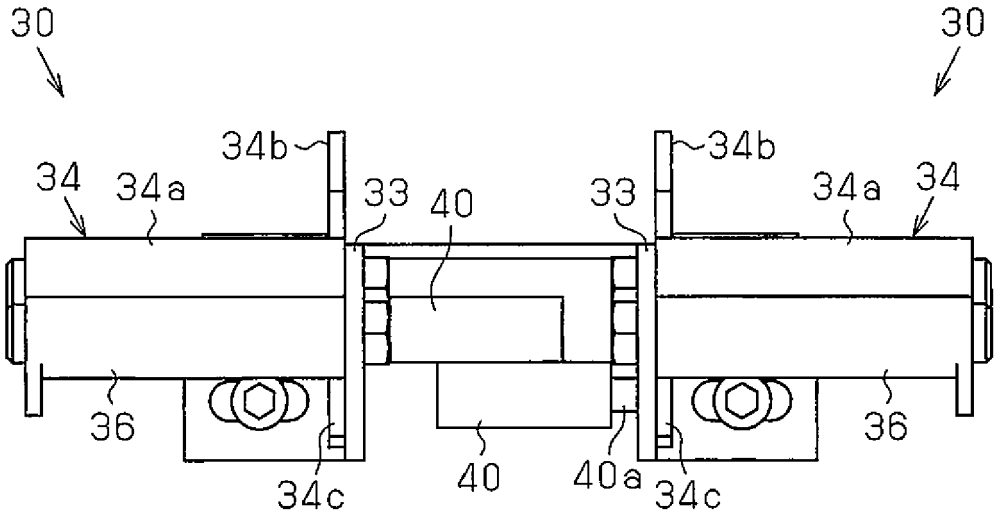

30
30
34b
34b
34
34a
33
40
33
34a
34
36
36
34c
40
40a
34c

Fig.6

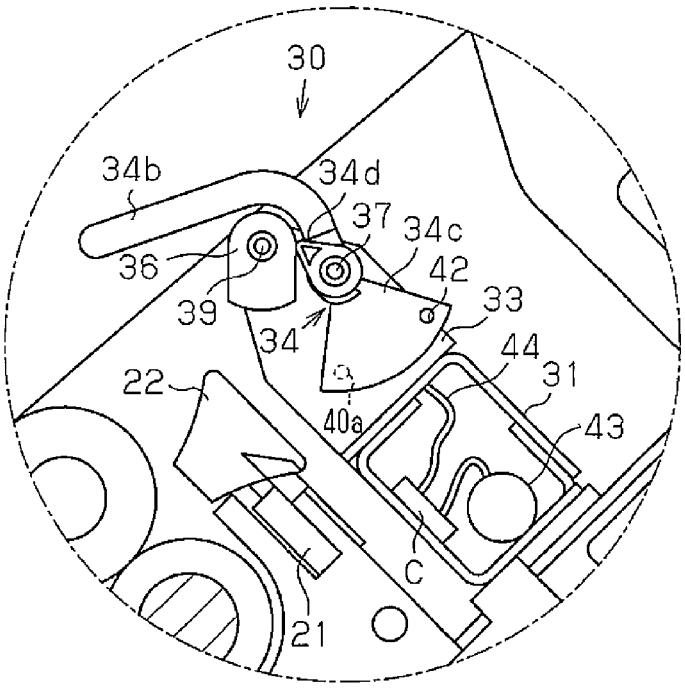


Fig.7A

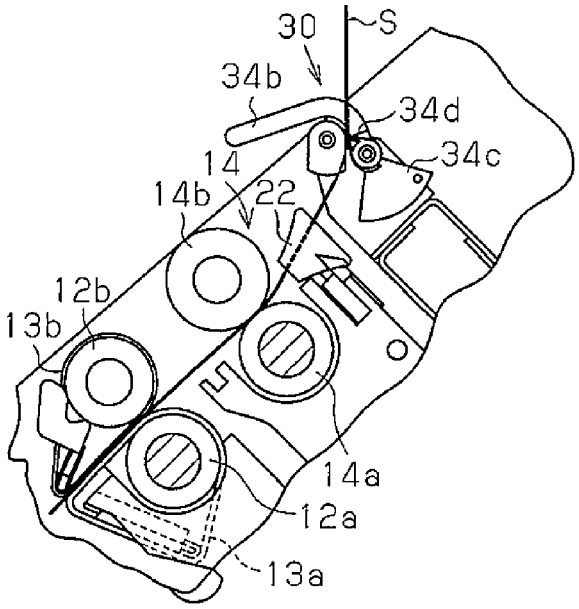
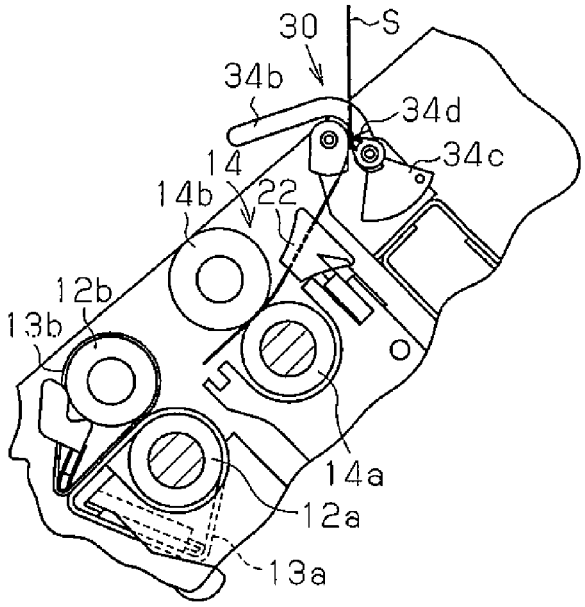


Fig.7B



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EUROPEAN SEARCH REPORT

Application Number
EP 14 19 1683

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Place of search	Date of completion of the search	Examiner
Munich	17 March 2015	Humbert, Thomas

CATEGORY OF CITED DOCUMENTS

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