United States Patent [19]

Stahlecker et al.

[11] E **Re. 30,201**

[45] Reissued **Feb. 5, 1980**

[54] **METHOD AND APPARATUS FOR START-SPINNING A THREAD ON AN OPEN-END SPINNING UNIT OF AN OPEN-END SPINNING MACHINE**

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[21] Appl. No.: **934,009**

[22] Filed: **Aug. 16, 1978**

Related U.S. Patent Documents

Reissue of:

[64] Patent No.: **3,987,610**
Issued: **Oct. 26, 1976**
Appl. No.: **528,471**
Filed: **Nov. 29, 1974**

[30] **Foreign Application Priority Data**

Dec. 4, 1973 [DE] Fed. Rep. of Germany 2360296
Aug. 6, 1974 [DE] Fed. Rep. of Germany 2437762

[51] **Int. Cl.**[2] **D01H 1/12;** D01H 1/34; D01H 15/00

[52] **U.S. Cl.** **57/263;** 57/58.89; 57/80

[58] **Field of Search** 57/58.89–58.95, 57/263, 78, 80, 81, 83, 92, 93

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Primary Examiner—Donald Watkins
Attorney, Agent, or Firm—Craig and Antonelli

[57] **ABSTRACT**

In order to be able to start-spin on the individual spinning units of an open-end spinning machine under conditions which deviate from the operating conditions and which are, in particular, significantly more favorable for start-spinning, the end of the thread is placed on a ring of fibres located in the spinning rotor at a spinning rotor speed which is reduced relative to the operating speed. At the same time, the sliver feed is reduced in such a manner that the amount of sliver feed corresponds to the reduced speed of the spinning rotor. This reduced sliver speed is produced by a mobile start-spinning unit which is equipped with means which intervene in the drive and/or control of the drive or control means causing feed of the sliver.

15 Claims, 10 Drawing Figures

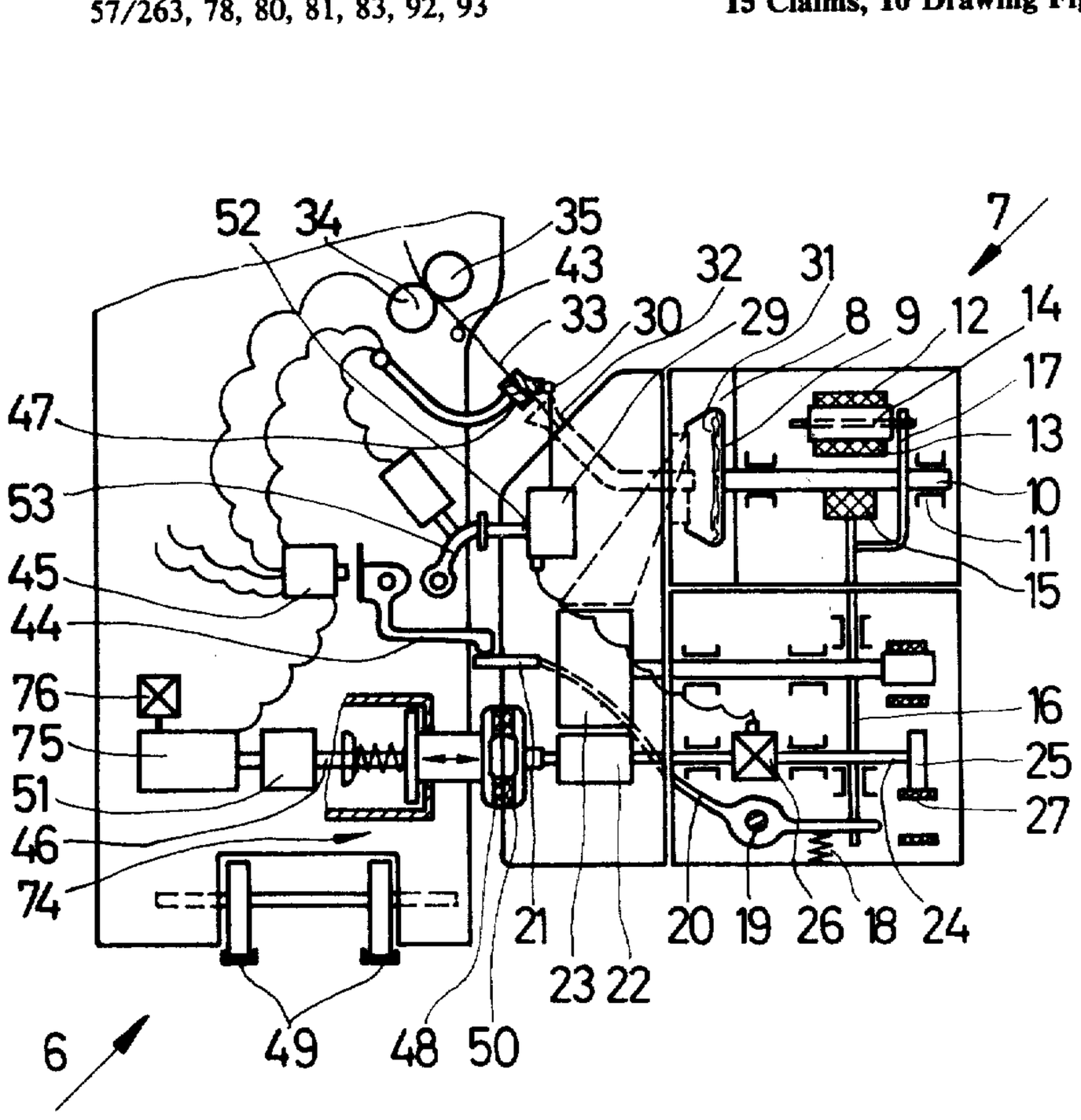

Fig. 1

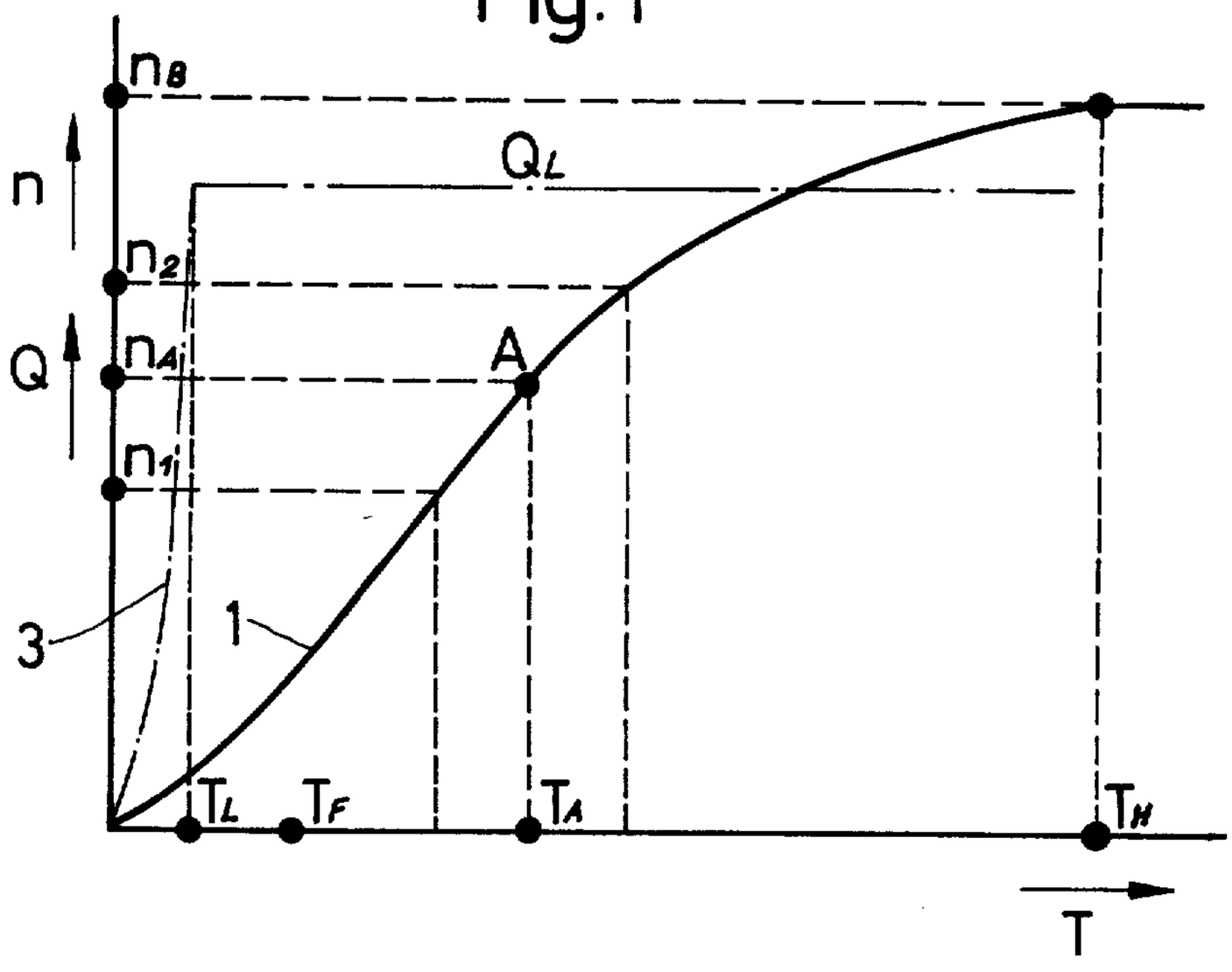

Fig. 2

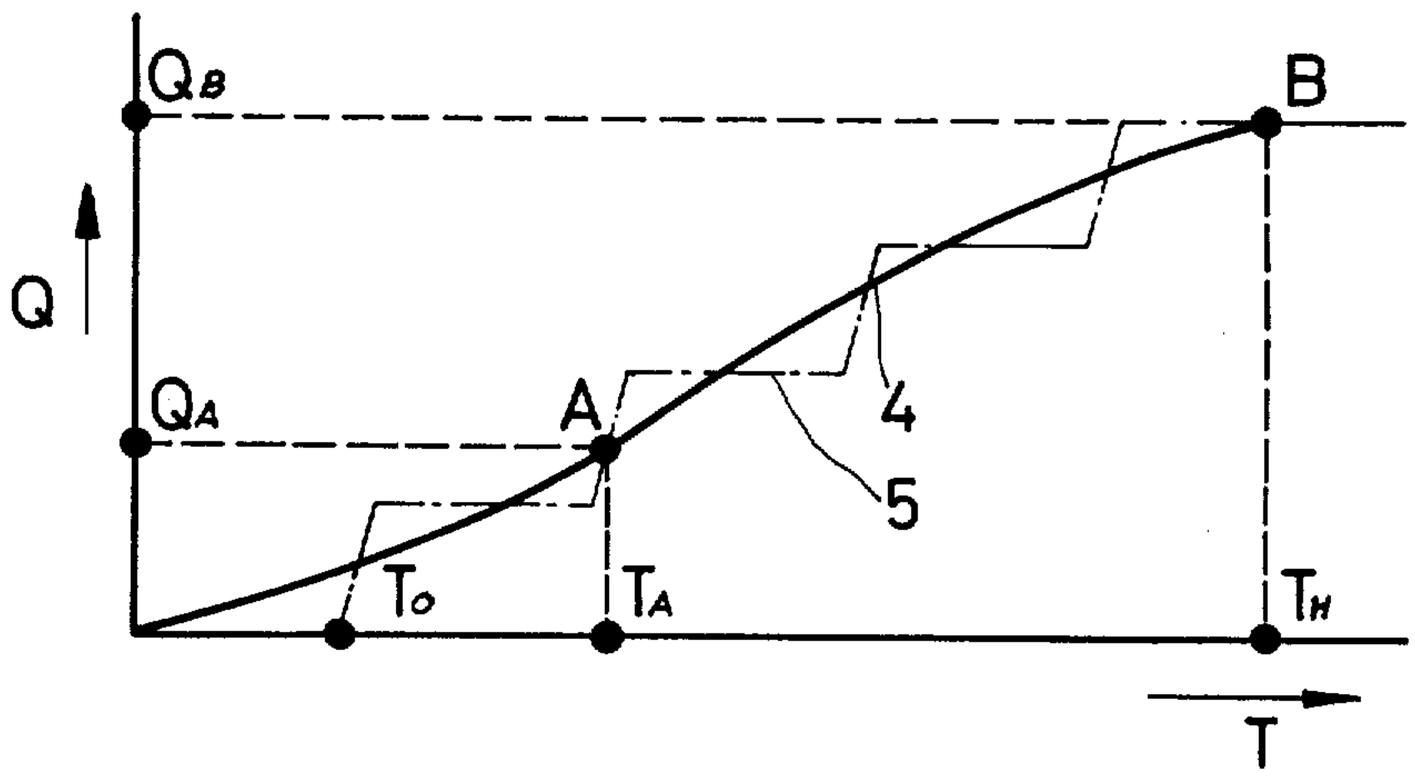

Fig.3

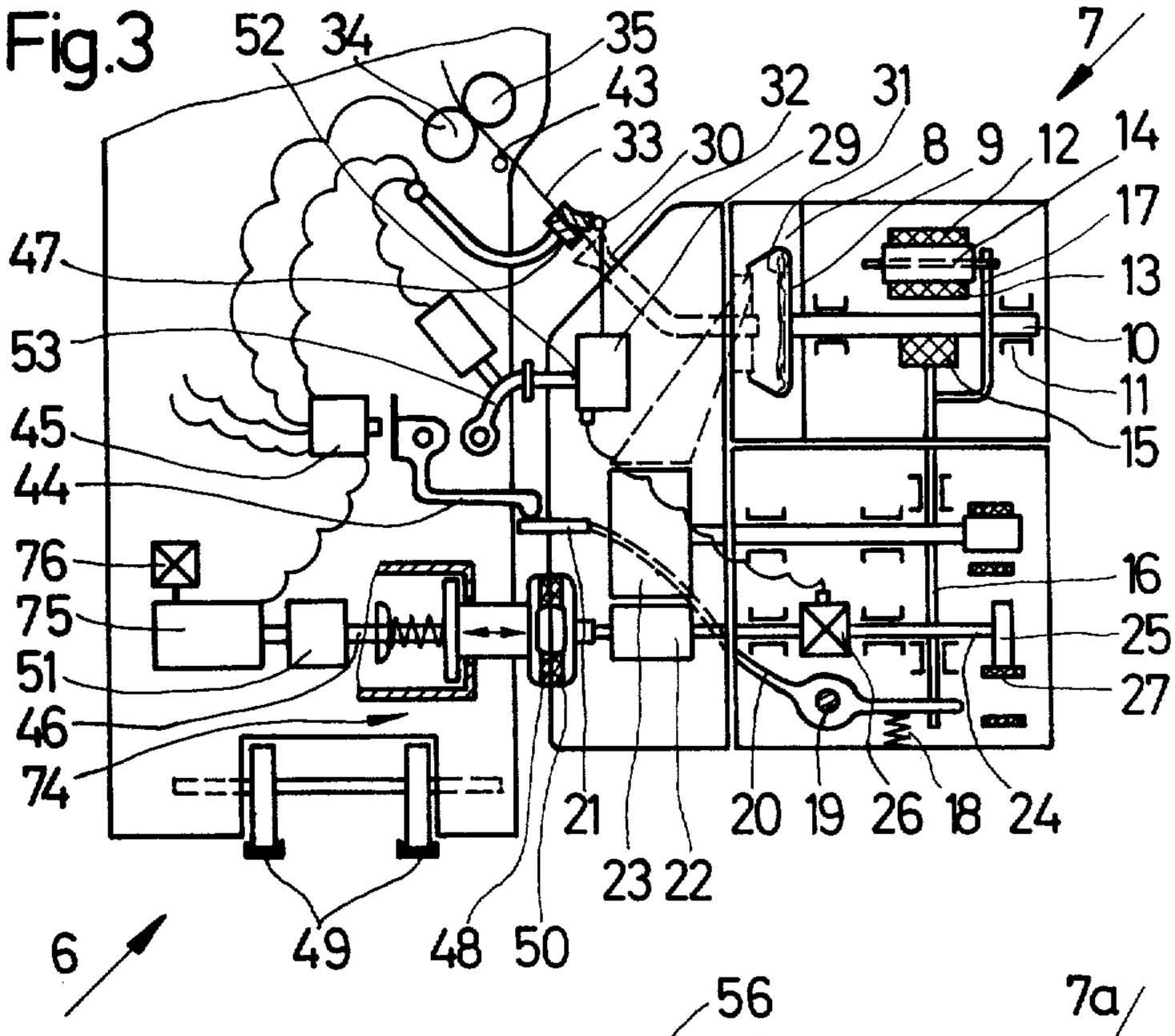
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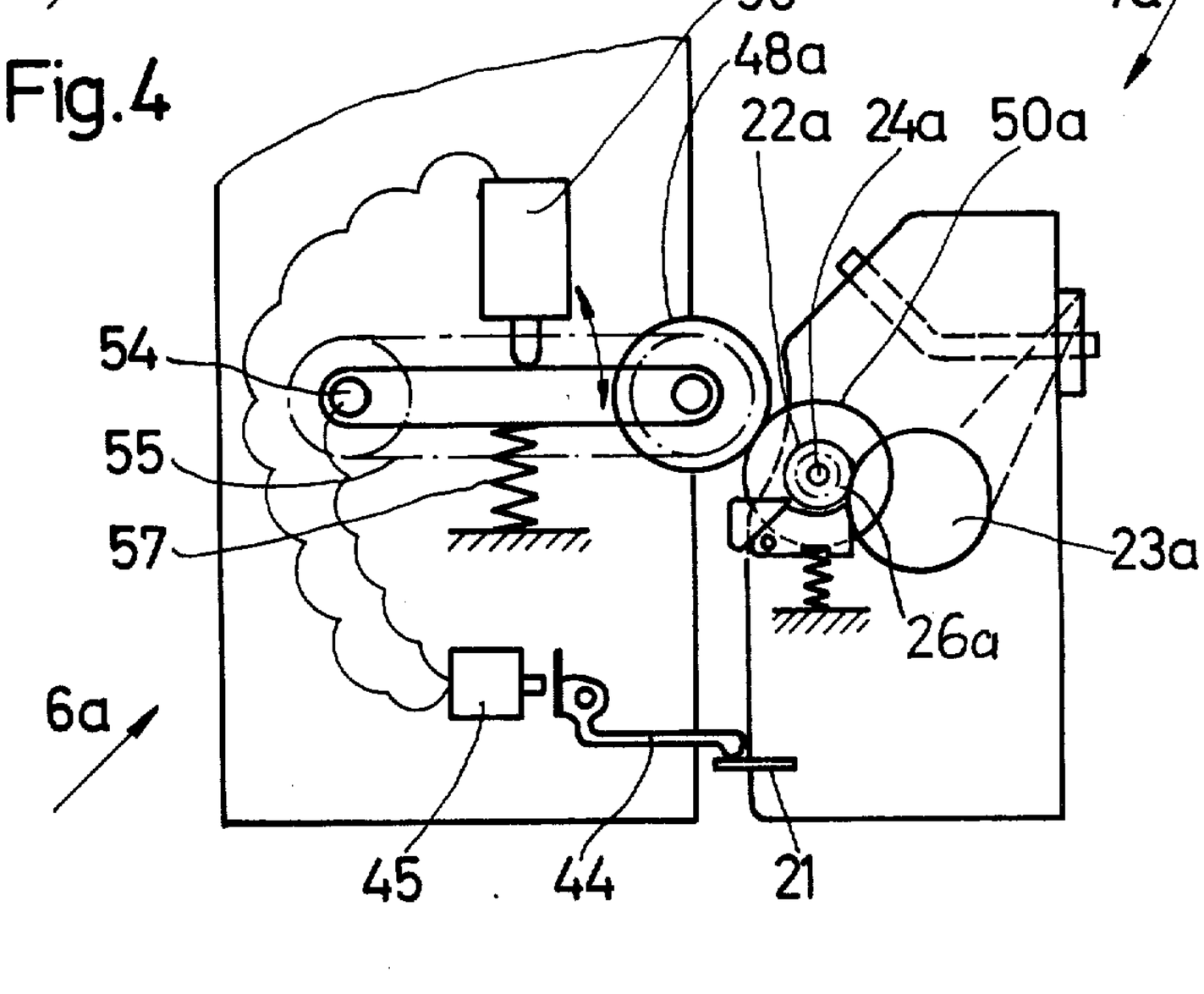
Fig.4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7a
48a
22a
24a
50a
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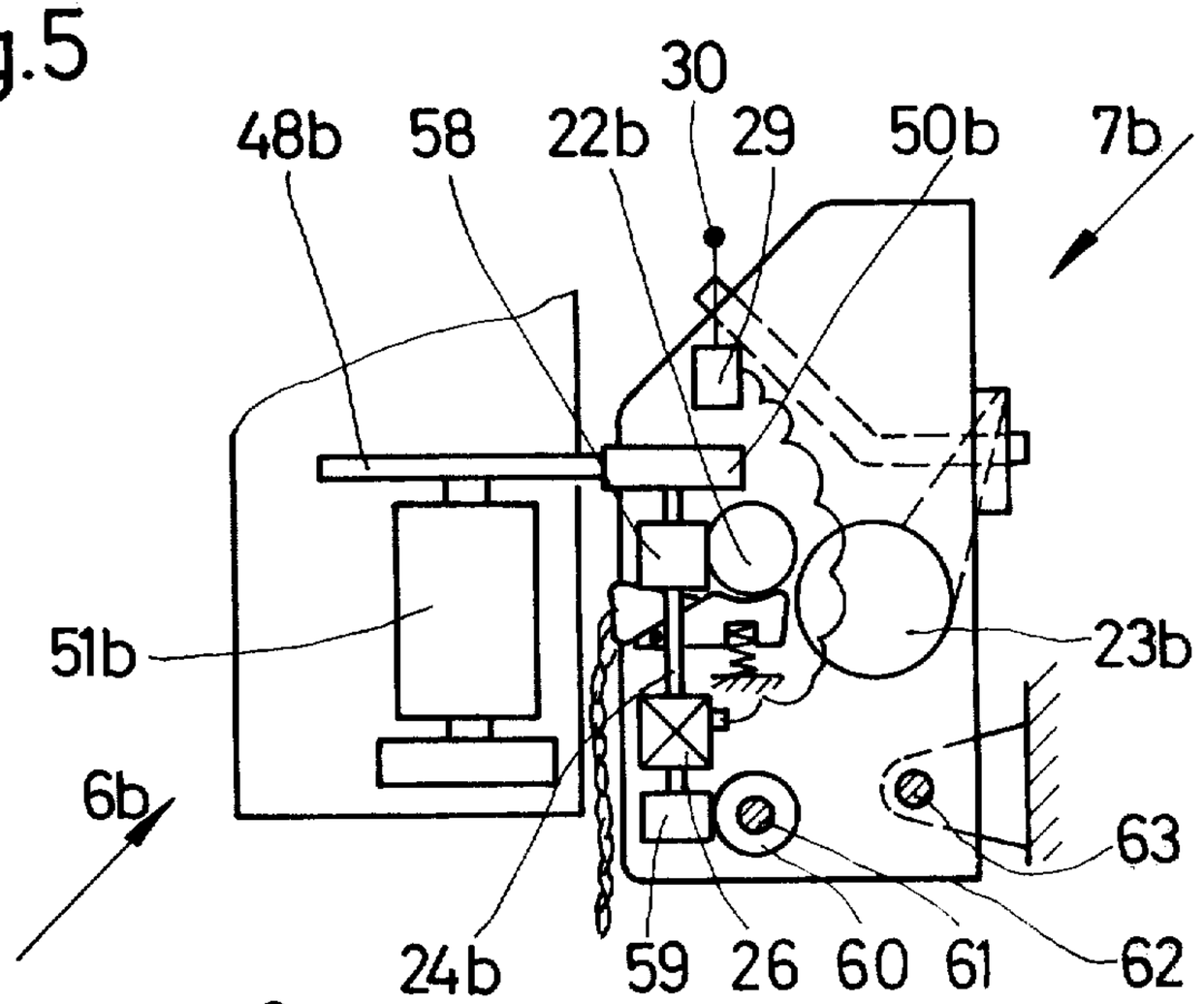
57
23a
26a
6a
45
44
21

Fig.5


30
48b
58
22b
29
50b
7b
51b
23b
6b
63
24b
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60
61
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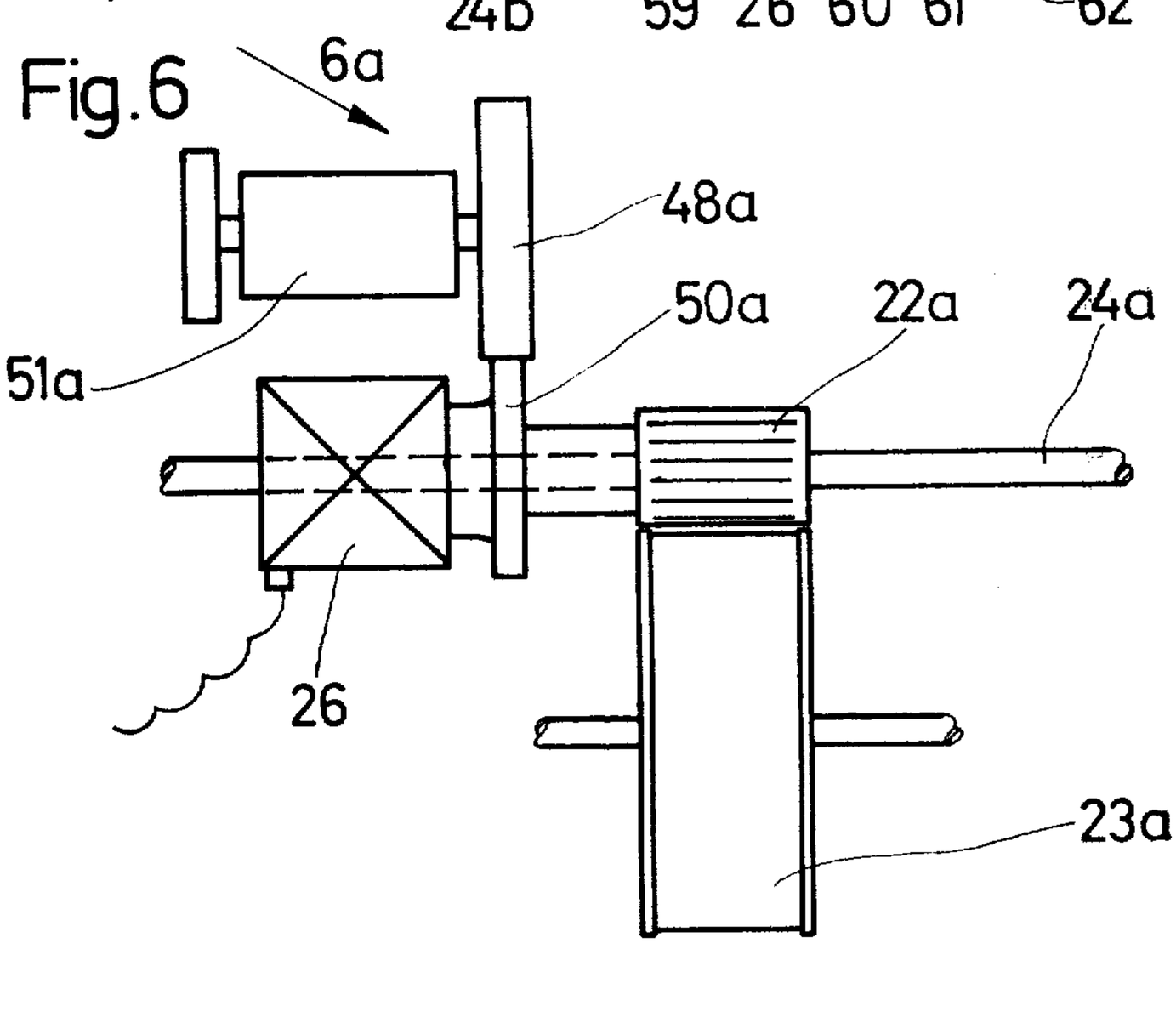
Fig.6


6a
48a
51a
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22a
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Fig.7

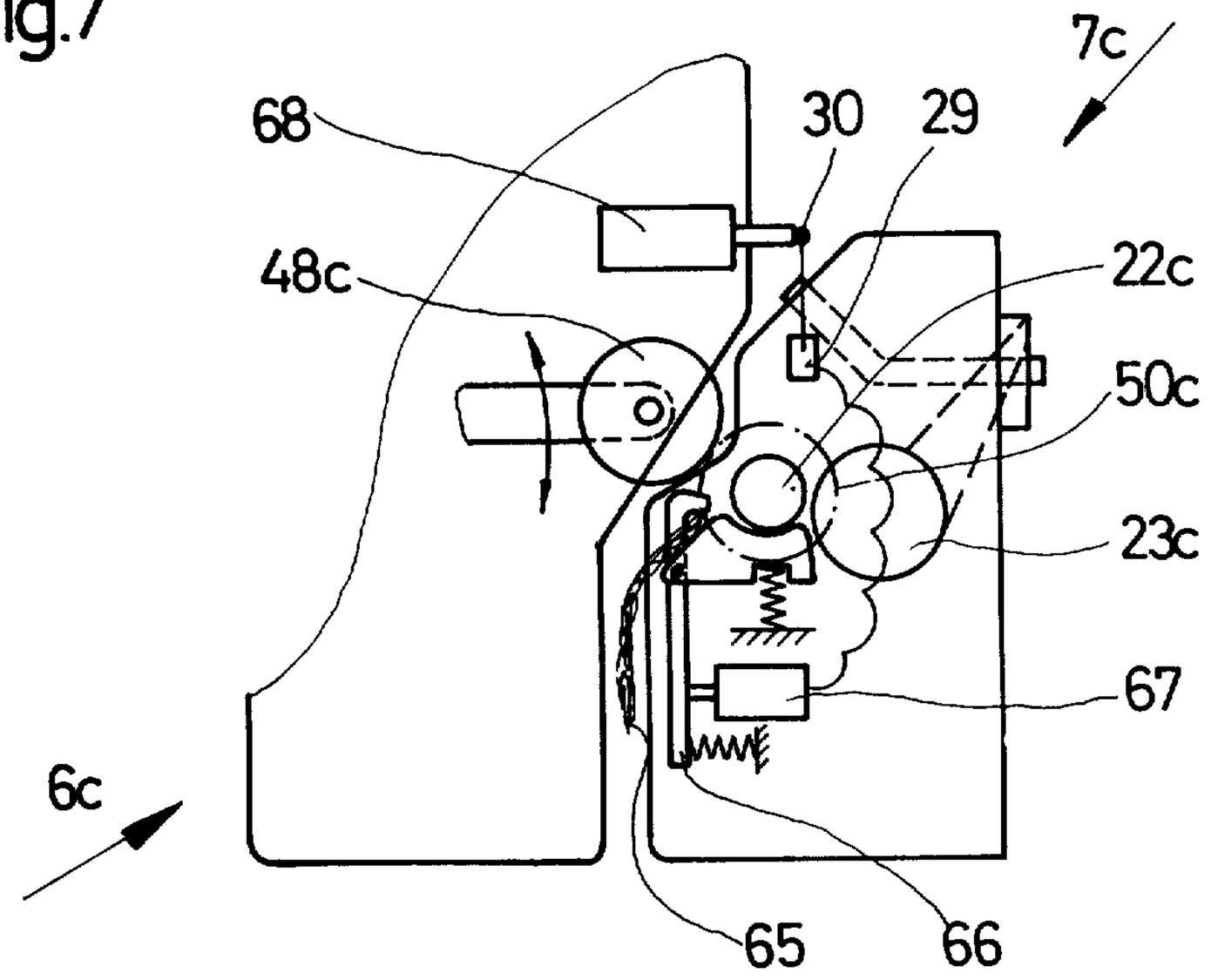


Fig.8

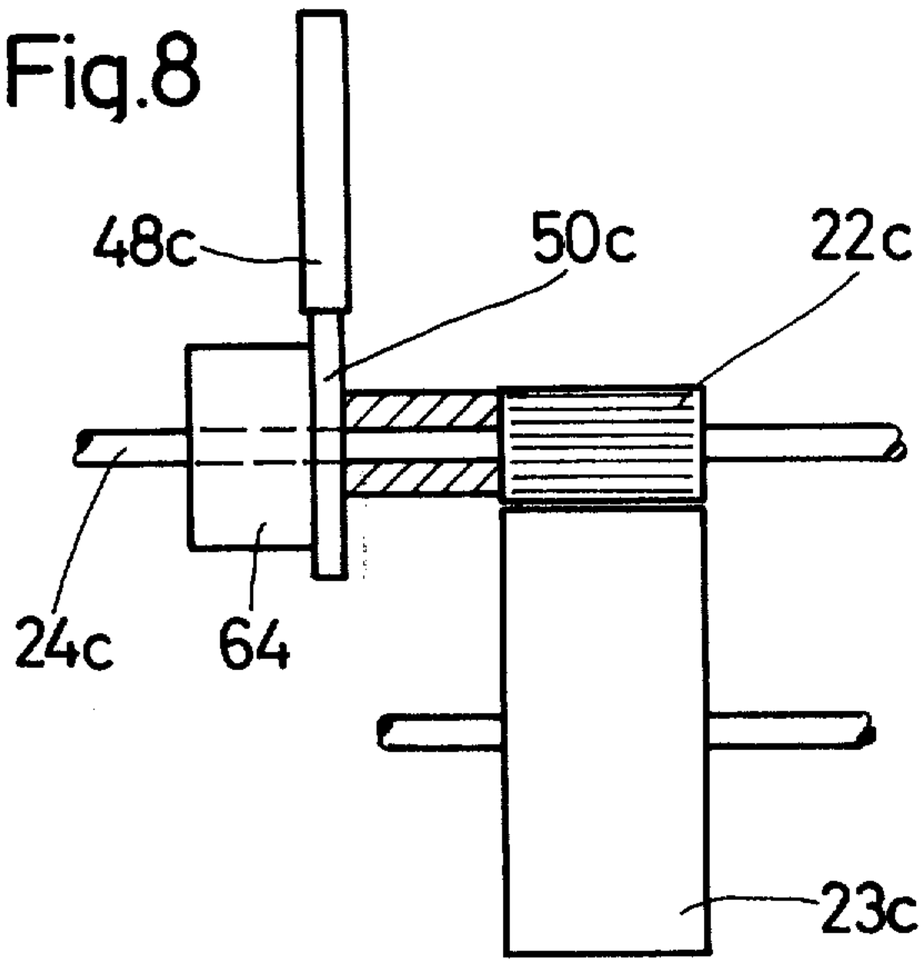


Fig.9

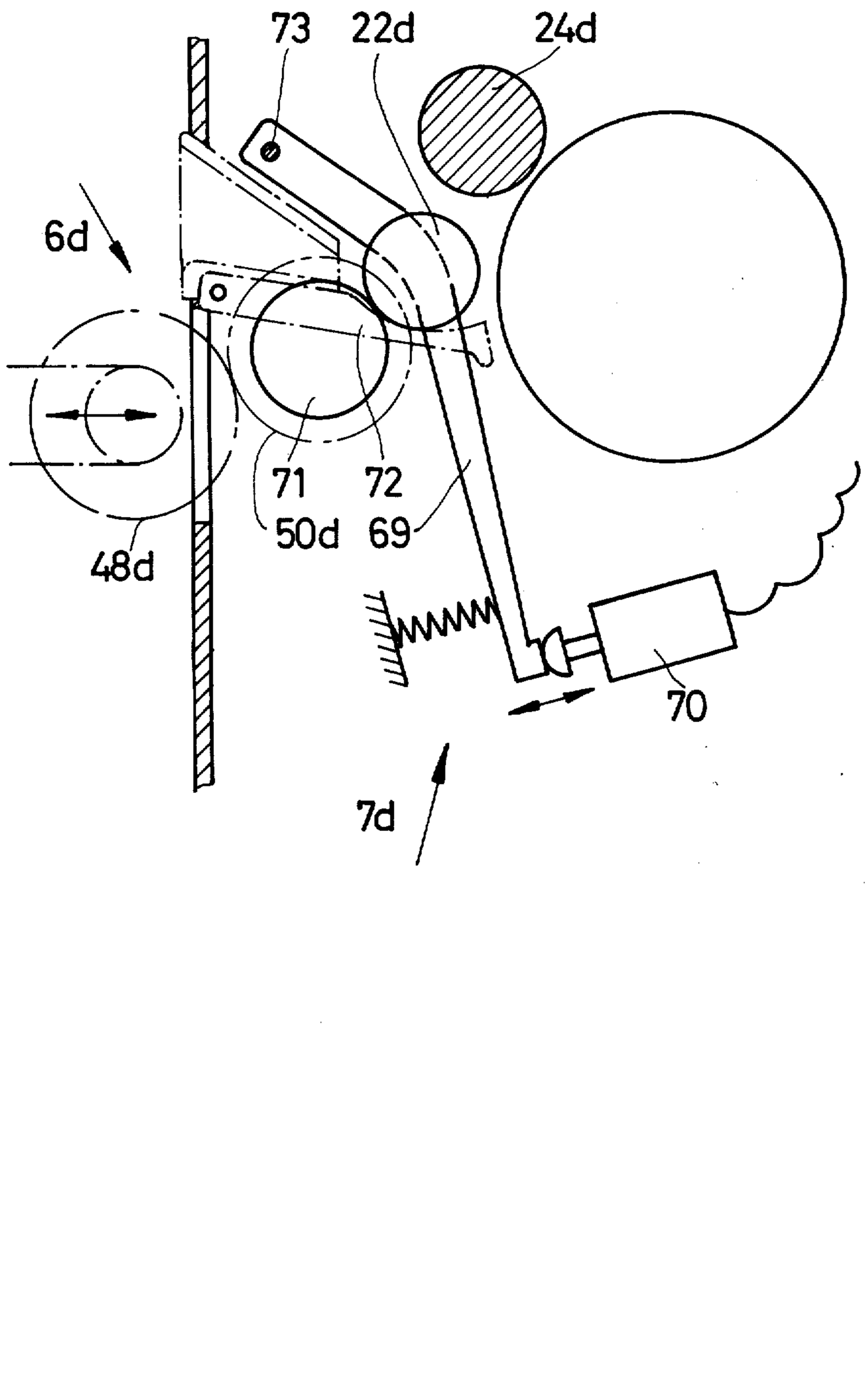
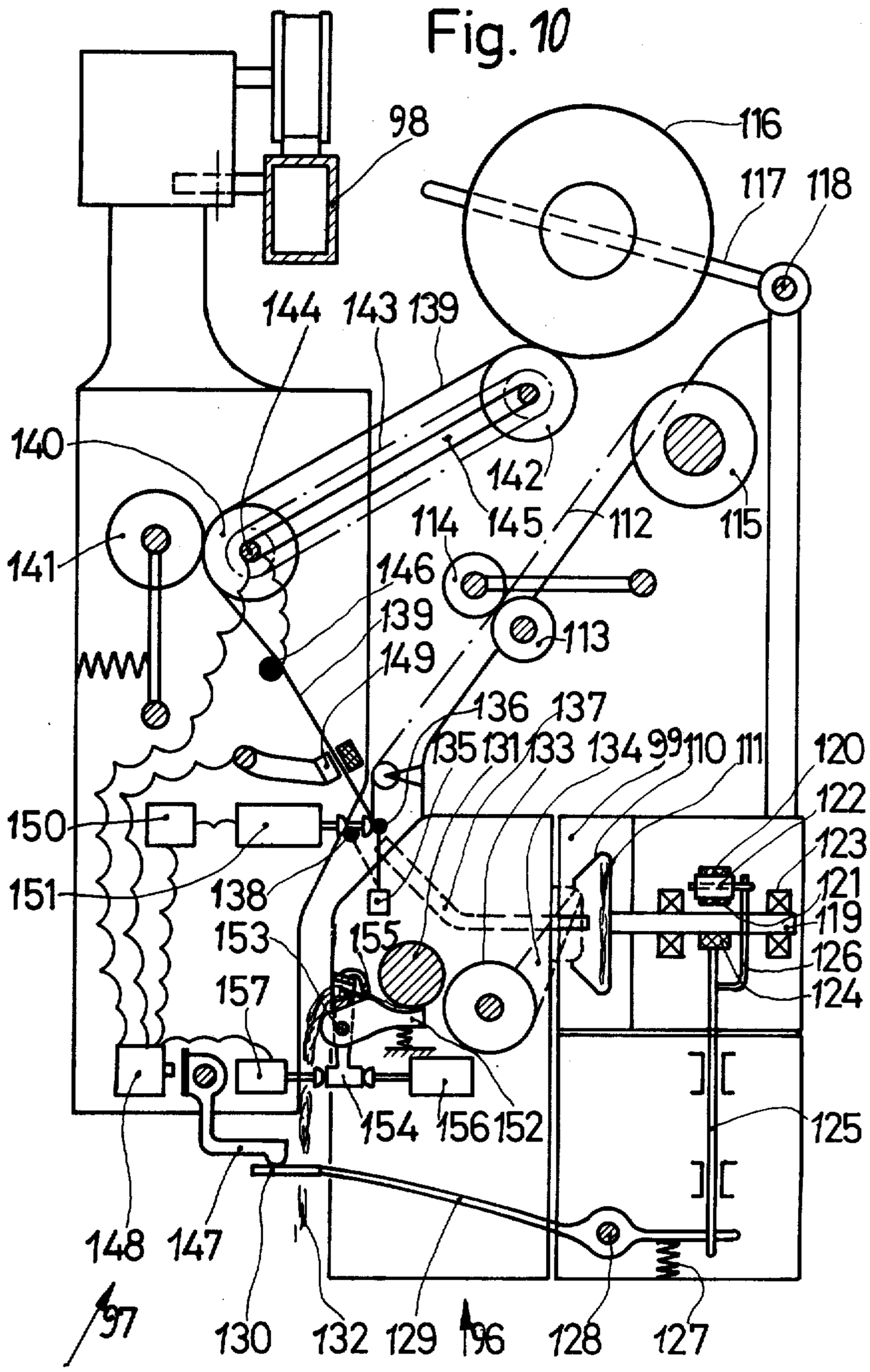


Fig. 10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METHOD AND APPARATUS FOR START-SPINNING A THREAD ON AN OPEN-END SPINNING UNIT OF AN OPEN-END SPINNING MACHINE

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

The present invention relates to a method for start-spinning a thread on open-end spinning units of an open-end spinning machine, in which an end of the thread is returned to a spinning rotor, placed on a ring of fibres deposited in the spinning rotor and then drawn off again.

It is the object of the present invention to permit neat start-spinning of a thread which is largely independent of the technological conditions of the open-end spinning unit in the operating condition. It is a further object of the invention to achieve the technological conditions for start spinning independently of the operating condition, without necessitating excessive design and manufacturing effort, whereby, primarily, the sliver feed for the start-spinning operation can be designed in such a manner that it corresponds to the speed of the spinning rotor during the start-spinning operation.

According to the present invention, this object is solved in that during the placing of the end of the thread on the ring of fibres, the speed of the spinning rotor is reduced relative to its operating speed and in that a mobile start-spinning unit intervenes in the drive and/or control means providing the sliver feed and thus controlling the volume of the ring of fibres deposited in the spinning rotor.

This permits the design changes on the individual spinning units to be limited to providing a possibility of intervention for the start-spinning unit. No other significant changes must be made to the usual drive of the unit for feeding the sliver. The additional constructional effort is therefore minimal, thereby permitting the manufacturing costs to be kept low. In an advantageous further development of the invention, for performing the method the start-spinning unit has an auxiliary drive for the sliver feed, which can be coupled with the switched off drive during the start-spinning operation. By means of this apparatus, it is possible, in a simple manner, to meter the sliver feed in such a manner that there is a suitable fiber ring in the spinning rotor when the end of the tread is placed thereon. This utilizes the fact that, normally, during a thread break or similar event the feed means of the corresponding open-end spinning unit are practically always interrupted, so that it is merely necessary to also provide that this drive remains shut off until after the start-spinning operation has been performed.

In another embodiment of the invention, the start-spinning unit contains intermittently operating switching means which can be connected with the switching means of a clutch which is associated to the sliver feed and which can be switched on and off. This also requires hardly any increased effort, as those elements of the spinning units are generally employed which always have to be present. Here, also, it is possible to control the starting characteristic of the sliver feed in a simple manner by switching it on and off, so that there is a suitable ring of fibres in the spinning rotor on which to

place the end of the thread, thus providing a perfect start-spinning point.

In a further embodiment of an apparatus according to the present invention, the start-spinning unit contains an auxiliary brake which can be coupled with the means for feeding the sliver. This apparatus also requires only very simple modification of the means in the open-end spinning units for feeding the sliver, while the special design of the start-spinning unit can be kept very simple. There is no difficulty in creating a low-wearing auxiliary brake, which ensures the desired starting characteristic.

In order, in a further development of the invention, to create an apparatus which operates with very precise timing and with only a limited degree of time lag, the start-spinning unit contains intermittently operating control means which intervene directly from the outside in trapping means which interrupt the silver feed and which interrupt the trapping effect thereof intermittently. Since the switching means intervene directly in the trapping means, the sliver feed is switched on and off alternately without any delay for all practical purposes.

The above discussed and other objects, features and advantages of the present invention will become more apparent from the following description thereof, when taken in connection with the accompanying drawings, in which

FIG. **1** shows a graphic representation of the starting sequence of a spinning unit with the start-spinning operation indicated therein;

FIG. **2** shows a graphic representation of a reduced sliver feed during the starting sequence of a spinning unit;

FIG. **3** shows an apparatus for performing the method according to the invention, containing an auxiliary drive;

FIGS. **4** and **5** show further apparatuses with auxiliary drives for the sliver feed;

FIGS. **6** to **9** show further embodiments of the invention; and

FIG. **10** shows an embodiment of the invention with switching means acting directly on a clamping lever controlling the sliver feed.

Referring now to the drawings, wherein like reference numerals designate like parts throughout the several views, FIG. **1** shows the spread n of a spinning rotor during time T, in the form of a curve **1**, during a starting sequence. The spinning rotor, starting from a standstill, reaches the operating speed, n_B at the moment T_H. It has been shown that a favourable speed range, in which the start-spinning operation can be performed most reliably, is located between speeds n_1 nn_2, for example. Within this range, it is possible to stipulate a start-spinning point A on curve **1**, which then also includes start-spinning time T_A and start-spinning speed n_A, which is clearly slower than operating speed n_B.

To perform start-spinning at point A, the end of the thread must be returned prior to start-spinning time T_A, for example at time T_F, indicated on the abscissa, in order for the end of the thread to reach the ring of fibres deposited in the spinning rotor at time T_A, whereupon draw-off of the thread is initiated.

The dash-dotted curve **3** also contained in FIG. **1** represents the course of sliver feed Q through time T. As can be seen from this curve **3**, after only a short time the sliver feed attains its maximum value Q_L at time T_L. The period of time required therefor is considerably

shorter than the period of time required for the starting sequence of the spinning rotor.

Curves **1** and **3** in FIG. **1** show clearly that at start-spinning time T_A the fibre feed is greater than that required by operating conditions, which must result in a change in the quality of the yarn at the start-spinning point. For this reason, measures must be taken to ensure a suitable ratio between the fibre feed at start-spinning time T_A and the reduced start-spinning speed n_A of the spinning rotor. This is possible, for example, in that the fibre feed is initiated with a delay, so that time T_L, at which the operating feed quality Q_L is attained, is after start-spinning time T_4. Because of the steepness of curve **3**, the switch-on and start-spinning must be performed at precisely stipulated moments, as the sliver feed conditions change very rapidly. In order to provide a longer period of time for the start-spinning operation, it is therefore advantageous to provide aids through which steepness of curve **3** can be reduced, permitting operating feed Q_L to be attained later.

It would be favourable for the start-spinning operation if curve **3** were influenced in such a manner that it had the same steepness as curve **1**. A curve **4** of this type is illustrated in FIG. **2**, which shows feed Q over time T. A curve **4** of this type for the starting sequence of the feed can be realized with the present invention.

In many cases, it is sufficient for curve **4** to only be approximated, for example through a curve **5**, shown as a dash-dotted line in FIG. **2**. The latter possibility is described in detail in the invention of the main patent application and can be realized by delayed switch-on of the sliver feed at time T_0, followed by repeatedly switching off the drive briefly.

With the embodiment according to FIG. **3**, both curve **4** as well as curve **5** in FIG. **2** can be realized when the sliver feed is started. Provided in the embodiment shown in FIG. **3** is a start-spinning unit **6**, which travels on rails **49** along an open-end spinning machine, of which only one spinning point **7** is illustrated schematically as a cross section. Rotating in an underpressure chamber **8** is a spinning rotor **9**, whose shaft **10** is mounted in bearings **11** in a housing located therebehind. Shaft **10** is driven by means of a tangential belt, whose bottom track **13** is pressed against the shaft by a pressure roller **14** in the operational condition, while the upper track **12** returns over pressure roller **14**. In the illustrated brake condition, pressure roller **14** is lifted away from rotor shaft **10** together with the lower track **13** of the tangential belt, whereby rotor shaft **10** is braked with a brake **15**. Brake **15** has an actuating rod **16**, which is coupled with a lift-off mechanism **17** for pressure roller **14**. Actuating rod **16** of brake **15** can be adjusted by means of a double lever **20**, which is pivotally mounted about an axle **19**. A tension spring **18** acts on double lever **20**, said tension spring **18** pulling it into a position which releases rotor shaft **10**. The free arm **21** of double lever **20** extends out of spinning unit **7** to the front.

Fibres are supplied to spinning rotor **9** in a separated state. To accomplish this, a sliver is caught by a feed roller **22** and advanced to a separating roller **23**, from where the separated fibres reach spinning rotor **9**. Feed roller **22** is connected to a toothed belt **27**, extending in the longitudinal direction of the machine, by means of a shaft **24** and a gear **25**. The connection between gear **25** and feed roller **22** can be interrupted by means of a solenoid clutch **26**, which divides shaft **24**. Clutch **26** is electrically connected with a switch **29** of a thread stop-motion **30**, which switches off clutch **26** in the event of a thread break.

Start-spinning unit **6**, which is only illustrated schematically, picks up a thread end **33** from an unillustrated winding cone and returns it to the spinning rotor through a yarn removal channel **32**, whereby it is placed on a ring of fibres **31** in the spinning rotor. The thread end **33** is returned by means of auxiliary draw-off rollers **34** and **35** of start-spinning unit **6**, of which at least roller **34** can be driven in either sense of rotation. The thread end is sucked into spinning rotor **9** by means of the suction in underpressure chamber **8**. The reversal of the sense of rotation of auxiliary draw-off roller **34** is controlled by means of a thread tension feeler **43** of start-spinning unit **6**.

In order to be able to start spinning at a rotor speed which is lower than the operating speed, the start-spinning operation is performed during the starting sequence of spinning rotor **9**. To accomplish this, start-spinning unit **6** has an actuating lever **44**, which is located opposite the free lever arm **21** of double lever **20** of brake **15** when start-spinning unit **6** is aligned precisely with the respective spinning unit **7**. When free arm **21** of brake **15** is released, which can be controlled automatically, actuating lever **44** is actuated and, in turn, actuates a starting switch **45**, which has a time-lag relay. Starting switch **45** is connected with a drive motor of auxiliary draw-off rollers **34** and **35** for performing the start-spinning operation, on the one hand, and with an auxiliary drive, on the other, through which feed roller **22** is driven in such a manner that its starting characteristic, and thus feed of the sliver, corresponds at least approximately to the starting characteristic of the spinning rotor.

In the illustrated embodiment, the auxiliary drive of start-spinning unit **6** has an electric variable-speed motor **75**, whose runup can be adjusted by means of a controlling element **76**. A wound-rotor motor with appropriate rheostatic starting circuitry or a d.c. motor whose runup can be otherwise controlled can be provided for this purpose. Variable-speed motor **75** drives a shaft **46**, which is connected with a driving wheel **48**. Shaft **46** and driving wheel **48** are connected via adjusting means **74**, which permit driving wheel **48** to be shifted axially. Arranged opposite driving wheel **48** is a counterwheel **50**, which is rigidly connected with feed roller **22** and which is accessible from the outside. A gear or friction clutch can be located between driving wheel **48** and counterwheel **50**.

Since the sliver feed is driven by means of the auxiliary drive of start-spinning unit **6** during the start-spinning operation, the main drive of the sliver feed must remain off during this period, whereby clutch **26** remains open. This can be controlled by means of an electrical timing element, for example, which only closes clutch **26** after a delay, even if thread stop-motion **30** has been placed in its operating position again, which, in the illustrated embodiment, is performed by means of a thread trapper **47** of start-spinning unit **6**, which offers the thread end to the opening of the yarn removal channel **32**. In this embodiment, it can be ensured, with the aid of additional switching means of start-spinning unit **6**, that clutch **26** remains open, so that here, also, the sophistication of the individual spinning units **7** remains small. For this purpose, switch **29** of thread stop-motion **30** is designed as a double switch, which can also be switched by a pusher **52** in such a manner that clutch **26** remains open. The pusher is re-

versed by means of a lever **53** of start-spinning unit **6** associated to it, said lever **53** being switched with the aid of an electric servo element. This servo element, and thus lever **53**, can be coupled electrically with thread trapper **47**, so that swivelling thread stop-motion **30** into its operating position with the aid of thread trapper **47** results in actuation of pusher **52**, so that clutch **26** remains open. After the start-spinning operation, clutch **26** is closed, thereby starting the main drive of the sliver feed. In order to avoid mutual damage to the auxiliary drive and the main drive, free-wheeling means are installed in the auxiliary drive. This also ensures that the transition of the sliver feed from the auxiliary drive to the main drive is uniform and smooth.

It is also possible to actuate the servo element of lever **53** with a timing programme in such a manner as to switch the main drive of feed roller **22** on and off intermittently, which results in a starting-sequence characteristic according to curve **5** in FIG. **2**. This permits the runup characteristic of the sliver feed to be adapted to the runup characteristic of the spinning rotor in the desired manner, without the employment of an auxiliary drive.

The embodiment shown in FIG. **4** corresponds primarily to the embodiment shown in FIG. **3**. In this embodiment, a shaft **24a**, extending through the machine in its longitudinal direction, is provided as the main drive for a feed roller **22a**; shaft **24a** is connected with feed roller **22a** by means of a solenoid clutch **26a**. Connected rigidly with feed roller **22a** is a drive wheel **50a**, to which is associated an auxiliary drive of a start-spinning unit **6a**, which can travel along the spinning machine. The auxiliary drive has a driving wheel **48a**, which is pivotally arranged about an axle **54** and which is driven by means of a toothed belt **55**. Driving wheel **48a** can be caused to mesh with drive wheel **50a** against the effect of a spring **57** by means of a solenoid switch **56**. Solenoid switch **56** is switched, in accordance with FIG. **3**, by means of free arm **21** of a brake lever, an actuating lever **44** and a starting switch **45**.

Shown in FIG. **5** is an embodiment in which feed rollers **22b** of the individual spinning units **7b** are driven by means of a shaft **61**, extending through the machine longitudinally, by means of a standing shaft drive **24b**. One end of standing shaft **24b** has a helical gear **59**, which meshes with a corresponding gear **60** of shaft **61**. Also mounted on standing shaft **24b** is a further helical gear **58**, which meshes with a corresponding gear on feed roller **22b**. The standing shaft is divided between helical gears **58** and **59** by means of a solenoid clutch **26**. This solenoid clutch **26** is switched by a switch **29** of a thread stop-motion **30** in a similar manner to that in the embodiment according to FIG. **1**. Standing shaft **24b** extends beyond helical gear **58**, and its free end has a drive wheel **50b**, whose periphery protrudes beyond the enclosure of spinning unit **7b**. Associated to this drive wheel **50b** is a driving wheel **48b** which belongs to an auxiliary drive, containing free-wheeling means **51b**, of a mobile start-spinning unit **6b**. In this embodiment also, in which that portion containing feed roller **22b** and separating roller **23b** can be swivelled away about an axle **63**, the desired starting characteristic of the sliver feed can be realized by means of an auxiliary drive controlled by the start-spinning unit. It is ensured, in a manner corresponding to that of FIG. **3**, that clutch **26** remains open during the start-spinning operation.

FIG. **6** shows an embodiment which is similar to that shown in FIG. **4** in which a feed roller **22a**, which precedes a separating roller **23a**, is arranged on a shaft **24a**, extending through the machine in the longitudinal direction thereof, with the aid of a solenoid clutch **26**. Feed roller **22a** is rigidly connected with a drive wheel **50a**, which belongs to an auxiliary drive of a start-spinning unit **6a**, which contains freewheeling means **51a**.

FIGS. **7** and **8** show an embodiment of the invention in which one feed roller **22c** for each spinning point **7c** is arranged on a drive shaft **24c**, extending through the machine in the longitudinal direction thereof, with the aid of a slip clutch **64**. Slip clutch **64** and feed roller **22c** are rigidly connected with a drive wheel **50c**, to which is associated a driving wheel **48c** of an auxiliary drive of a start-spinning unit **6c**, which travels along the spinning machine. This driving wheel **48c** is pivotally arranged on an arm in such a manner that it can be meshed with drive wheel **50c**. In this embodiment of the invention, the drive of feed roller **22c** is not interrupted, even if there is a thread break. In this embodiment, the sliver feed is interrupted by trapping sliver **65** with a clamping lever **66**, which traps the sliver against an undercasing lever which is associated to separating roller **23c**. In this connection, it is possible for the undercasing lever to be able to be moved slightly out of the area of separating roller **23c** against the effect of a spring. Trapping is performed by means of a solenoid switch **67**, acting on clamping lever **66**, said solenoid switch **67** being controlled by switch **29** of thread stop-motion **30**. In this embodiment, there is an electrically controlled actuating member **68** in start-spinning unit **6c**, which places thread stop-motion **30** in the operating position for start spinning, so that clamping lever **66** releases the sliver feed. In this case, driving wheel **48c** drives drive wheel **50c**, and thus feed roller **22c**, with the desired starting characteristic, whereby the required slip is permitted in slip clutch **64**. In this embodiment, driving wheel **48c** acts as a sort of brake for the main drive in order to achieve the delayed starting characteristic. To achieve the same effect, drive wheel **50c** or driving wheel **48c** could also be designed as brake discs, for example, which are braked with metered braking force during the start-spinning operation by braking means in start-spinning unit **6**.

It is also possible to do without delay of the drive of feed roller **22a** and, instead, to switch the sliver feed on and off intermittently by intermittently actuating clamping lever **66**, which also permits the desired starting characteristic to be realized. To accomplish this, electrical switching element **68** would have to perform intermittent control movements.

In the embodiment shown in FIG. **9**, a feed roller **22d** is mounted on a swivel lever **69** which can be pivoted about an axle **73** and which operates conjointly with an undercasing lever **72**. The feed roller is pressed against a drive shaft **24d**, extending through the machine, by means of spring force. To interrupt the sliver feed in this embodiment, swivel lever **69** is swivelled out, together with an electrical actuating element **70**, which is also switched by a switch of a thread stop-motion, in such a manner that feed roller **22d** lifts off drive shaft **24d**. Arranged on the side of feed roller **22d** which is opposite drive shaft **24d** is a further roller **71**, which is connected with a drive wheel **50d**. A driving wheel **48d** of an unillustrated, mobile start-spinning unit is associated to this drive wheel **50d**. In this embodiment, also, feed roller **22d** can be driven by an auxiliary drive of the start-spinning unit during the start-spinning operation,

while the main drive of feed roller **22**d remains switched off during this period.

With the embodiment shown in FIG. **10**, curve **5** in FIG. **2**, especially, can be realized when the sliver feed is started. Shown in this FIG. **10** is a start-spinning unit **97**, which travels along a spinning machine on a rail **98** and which is moved to a spinning unit **96** at which a start-spinning operation is to be performed. The spinning machine is equipped with a plurality of spinning units **96** of this type, arranged one beside the other. Each spinning unit **96** contains a spinning rotor **110**, rotating in an underpressure chamber **99**, whereby a ring **111** of separated fibres is deposited continually in spinning rotor **110** and is normally drawn off as the continuously spun yarn **112** represented by the dash-dotted line in FIG. **10**. The yarn is drawn off by means of draw-off rollers **113** and **114** and a winding roller **115**, which, in the operating condition, is in a contacting relationship with a winding cone **116** which is mounted on an arm **117**, which can be pivoted about an axle **118**.

Spinning rotor **110** is mounted in two bearings **123** by means of a shaft **119**. It is driven by a tangential belt **120** **121**, whose lower track **121** is pressed against shaft **119** by a pressure roller **112** in the operating condition. To remedy a thread break, pressure roller **122** is lifted away from shaft **119** with lower track **121**, while a brake lining **124** simultaneously presses against rotor shaft **119**. This situation is represented in FIG. **10**. Tangential belt **120**, **121** is lifted off and brake lining **124** is applied by means of interconnected levers **125** and **126**, which can be operated by means of a common actuating lever **129**. The free end **130** of actuating lever **129**, which can be pivoted about an axle **128** and is loaded in the direction of its operating position by means of a tension spring **127**, protrudes from the front of spinning unit **96**.

The ring **111** of separated fibres continuously deposited in spinning rotor **110** is provided by a sliver **132**, which is supplied by a feed roller **131** operating conjointly with a trough **152**, to a separating roller **133**, rotating at a considerably higher speed, from where the separated fibres are supplied to spinning rotor **110** through a fibre feed channel **134**. Feed roller **131** and separating roller **133** are driven by unillustrated drive means. In the event of the thread break, or if the spinning machine is switched off, the supplied sliver **132** is trapped with a clamping lever **154**, whose nose **155** presses against sliver **132** and traps it on trough **152**. This is to avoid clogging spinning rotor **110** and separating roller **133**.

The trapping of sliver **132** is controlled by a thread stop-motion **136**, which is arranged at the end of a yarn removal channel **137** and over which the spun yarn **112** is advanced. If the thread tension is reduced as a result of a thread break, thread stop-motion **136** assumes the position **138** represented by the dashed line. Actuating a switch **135** causes clamping lever **154** to be pressed to the left by means of a lifting magnet **156** coupled with said switch **135**, whereby sliver **132** is trapped by nose **155** of clamping lever **154**. This thus interrupts the feed of sliver **132**.

It is the task of start-spinning unit **97**, which travels along the spinning machine, to find the broken end **139** of the thread on cone **116** in the event of a thread break, and to return it to spinning rotor **110** for start-spinning. Start-spinning unit **97** contains a lift-off roller **142**, with which cone **116** can be lifted off its winding roller **115**. Lift-off roller **142** is also driven by the driven draw-off roller **140** of a pair of draw-off rollers **140**, **141**, by means of a toothed belt **143**. Draw-off roller **140**, and thus lift-off roller **142**, can be driven in either sense of rotation. In the illustrated embodiment, lift-off roller **142** is mounted about a swivel arm **145**, which can be pivoted about the shaft **144** of driven draw-off roller **140**. The end **139** of the thread drawn off by start-spinning unit **97** is led over a thread tension feeler **146**, which controls the reversal of the sense of rotation from feed to spinning rotor **110** to draw-off again. Start-spinning unit **97** further contains a rotatable thread trapper **149**, which offers the end **139** of the yarn to be start-spun again to yarn removal channel **137**, through which the end of the yarn is then sucked with the aid of an underpressure in rotor chamber **99** in order to be placed on the ring **111** of separated fibres.

Start-spinning unit **97** is switched on by means of actuating lever **147**, which acts on a starting switch **148** equipped with a time-lag relay. This starting switch **148** is electrically coupled with a drive motor of draw-off roller **140**, on the one hand, and with rotatable thread trapper **149** as well as with a switch **150**, on the other. By means of a lifting magnet **151**, switch **150** can move the thread stop-motion from its inoperable position **138** to the right in FIG. **10**, beyond its operating position **136**.

Start-spinning unit **97** operates in the following manner: The initial position is illustrated in FIG. **10**, i.e. rotor shaft **119** is braked, actuating lever **147** rests on the outer end **130** of double lever **129**, threaded trapper **149** holds thread **139** to be start spun in the illustrated position, driven rollers **140** and **142** are stopped, and yarn winding cone **116** is in a contacting relationship with lift-off roller **142** and thus no direct contact with spinning unit **96**.

After the brake is released, the outer end **130** of double lever **129** moves upward under the effect of tension spring **127**. This lowers actuating lever **125** of brake **124** and the lift-off means for pressure roller **122**, on the one hand, i.e. tangential belt **121** presses against rotor shaft **119**, thereby driving spinning rotor **110**. On the other hand, actuating lever **147** of start-spinning unit **97** is lifted, thereby actuating starting switch **148**. By means of a time-lag relay or similar means connected with said switch **148**, both draw-off roller **140** and lift-off roller **142** are driven in such a manner, with simultaneous opening of thread trapper **149**, that thread **139** to be start spun is introduced into yarn removal channel **137** and further into spinning rotor **110**. By means of switch **150**, lifting magnet **151** presses thread stop-motion **138** into position **136**, i.e. to the right of its operating position, which causes clamping means **154**, **155** to not release sliver **132** for the moment. This is important, as can be seen by the following. Starting switch **148** also actuates a connected changeover switch **157**, which is designed as a solenoid switch and which alternately presses clamping means **154** to the right against the resistance of lifting magnet **156** and release it again at preselected times and intervals. This causes nose **155** of clamping element **154** to lift off sliver **132** intermittently, thereby alternately starting and stopping the feed, as feed roller **131** was not switched off and thus constantly rotates. This entire sequence must have occurred before spinning rotor **110** has achieved its operating speed. At a given, predetermined tension of thread **139**, which has now been start spun, thread tension feeler **146** causes rollers **140** and **142** to reverse direction, which concludes the actual start-spinning opera-

tion. Winding roller **116** and thread **139** must then still be returned to spinning unit **96** by unillustrated means.

Since lifting magnet **156** must constantly press clamping lever **154** to the left when switching means **157** switch intermittently, it can be seen that thread stop-motion **136** must not switch off lifting magnet **156** for the time being. This is the reason why lifting magnet **151** pressed thread stop-motion **136** to the right of its operating position. After the start-spinning operation has been completed, lifting magnet **151** releases the thread stop-motion, so that said thread stop-motion can assume its operating position **136**, whereby lifting magnet **156** is switched off and sliver **132** is thereby released again through the effect of an unillustrated spring of clamping lever **154, 155**.

Through the present invention, the sluggishness of switch **135**, and thus the coupling with lifting magnet **156**, no longer makes any difference, as clamping lever **154** is acted upon directly through intermittent reciprocating-piston switch **157**.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It should therefore be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

Having thus fully disclosed our invention, what we claim is:

[1. A method for start-spinning a thread on open-end spinning units of an open-end spinning machine, in which an end of the thread is returned to a spinning rotor, placed on a ring of fibres deposited in said spinning rotor and then drawn off again, whereby during said placing of said end of the thread on said ring of fibres, the speed of said spinning rotor is reduced relative to its operating speed and whereby a mobile start-spinning unit intervenes in the drive and/or control of means providing the sliver feed and thus controlling the volume of said ring of fibres deposited in said spinning rotor, wherein said thread is returned to said spinning rotor and placed on said ring of fibres during acceleration of said spinning rotor from a previously braked condition to its operating speed.**]**

[2. An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, having a mobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in one of drive means and control means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, wherein a common mechanical drive means is provided for rotatably driving spinning rotors of a plurality of said spinning units, and wherein said means which intervene include means for interrupting the rotatable drive of one of said spinning rotors without interrupting the rotatable drive of the other of said commonly driven spinning rotors.**]**

[3. An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, having a mobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in one of drive means and control means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, wherein said means for placing said end of the thread and said means for reducing the speed of said spinning rotor relative to its operating speed are constructed and synchronized such that said thread is returned to said spinning rotor and placed on said ring of fibres during acceleration of said spinning rotor from a previously braked condition to its operating speed.**]**

4. An apparatus for start-spinning a thread on an open-end spinning unit of an openend spinning machine, having amobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in drive means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, in which said start-spinning unit contains a driving wheel which, through adjustment, can be coupled with a corresponding drive wheel of the drive means associated to the open-end spinning unit for the feed of said sliver.

5. The apparatus according to claim **4**, in which said drive wheel is arranged on a standing shaft which drives a feed roller for feeding the sliver by means of helical gears.

6. An apparatus for start-spinning a thread on an open-end spinning unit of an openend spinning machine, having a mobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in drive means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, in which an auxiliary drive of the start-spinning unit has freewheeling means.

7. An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, having a mobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in control means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, in which, through transmission means of the start-spinning unit, a thread stop-motion connected with a reversing switch is caused to interrupt a stationary drive for feeding the sliver.

8. An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, having a mobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in drive means pro-

viding the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, in which the sliver is fed by means of a feed roller, which, under normal operating conditions, is pressed against a drive shaft extending over a plurality of spinning units and which, in the event of a thread break, is lifted off the drive shaft by an actuating element which is electrically connected with a thread stop-motion, and is pressed against a roller which is driven by a driving wheel of the start-spinning unit.

9. The apparatus according to claim **8**, in which said feed roller is associated to a trough which traps the sliver, said trough performing the swivel movement of the feed roller.

[10. An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, having a mobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in control means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, in which the start-spinning unit contains intermittently operating switching means which can be connected with the switching means of a clutch which is associated to the sliver feed and which can be switched on and off.**]**

11. An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, having a mobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in control means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, in which said start-spinning unit contains switching means which can be coupled to trapping means, associated to each spinning unit, for interrupting the sliver feed, said switching means permitting said trapping means to be switched either on or alternatively on and off at predetermined time.

12. An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, having a mobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring or fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in drive means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, in which said start-spinning unit contains an auxiliary brake which can be coupled with the means for feeding the sliver.

13. The apparatus according to claim **12**, in which a known feed roller is provided for feeding the sliver, said roller being able to be coupled with said auxiliary brake by means of a slip clutch arranged on a shaft extending over a plurality of spinning units and by means of a gear.

14. An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, having a mobile start-spinning unit with means for returning an end of the thread to a spinning rotor, for placing said end of the thread on a ring of fibres located in said spinning rotor and for drawing off the start-spun thread again, as well as means for reducing the speed of said spinning rotor relative to its operating speed, and means which intervene in control means providing the feed of the sliver forming said fibre ring for the purpose of reducing the rate of said formation of said fibre ring, in which said start-spinning unit contains intermittently operating switching means which intervene directly from the outside in trapping means which interrupt the sliver feed and which intermittently interrupt said trapping effect.

15. The apparatus according to claim **14**, in which each open-end spinning unit is equipped with a thread tension feeler controlling the actuation of the trapping means, whereby adjusting means of the start-spinning unit are associated to said feeler, said adjusting means placing said feeler, during the start-spinning operation, in a position extending beyond the operating position, in which said trapping means remain switched on.

16. The apparatus according to claim **15**, in which each open-end spinning unit contains a clamping lever which traps the sliver in a trough, which can be loaded in the clamping direction with an adjusting member, opposite which an adjusting member of the start-spinning unit is arranged on the clamping lever and aligned oppositely, said latter adjusting member being dimensioned significantly stronger.

[17. A method for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, comprising:

reducing the speed of a spinning rotor of said spinning unit to a speed below its operational spinning speed,

intervening in at least one of the drive and control of sliver feed means of said spinning unit so as to control the volume of fibres deposited by said sliver feed in said spinning rotor,

placing an end of a thread piece on a ring of fibres deposited in said spinning rotor and drawing said thread piece out of said spinning rotor upon connection of said end with said fibres,

and controlling the speed of said rotor and the timing of said intervening step such that the rotor is accelerating toward said operational spinning speed during said placing step.**]**

18. A method **[**according to claim **17,]** *for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, comprising:*

reducing the speed of a spinning rotor of said spinning unit to a speed below its operational spinning speed,

intervening in at least one of the drive and control of sliver feed means of said spinning unit so as to control the volume of fibres deposited by said sliver feed in said spinning rotor,

placing an end of a thread piece on a ring of fibres deposited in said spinning rotor and drawing said thread piece out of said spinning rotor upon connection of said end with said fibres,

and controlling the speed of said rotor and the timing of said intervening step such that the rotor is accelerating toward said operational spinning speed during said placing step,

wherein said step of controlling the speed of said rotor and the timing of said intervening step includes rotatably driving said rotor by auxiliary

driving means that are separate from main drive means that normally drive said rotor at its operational spinning speed.

19. A method according to claim 18, wherein said spinning unit is one of a plurality of spinning units having respective spinning rotors driven by a common main drive means, and wherein said controlling the speed of said rotor and the timing of said intervening step includes interrupting the drive connection between said main drive means and one of said spinning rotors without interrupting the drive connection of other of said spinning rotors and said main drive means.

[20. An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, said apparatus comprising:

reducing means for reducing the speed of a spinning rotor of said spinning unit to a speed below its operational spinning speed,

intervening means for intervening in at least one of the drive and control of sliver feed means of said spinning unit so as to control the volume of fibres deposited by said sliver feed in said spinning rotor,

placing means for placing an end of a thread piece on a ring of fibres deposited in said spinning rotor and drawing said thread piece out of said spinning rotor upon connection of said end with said fibres,

and controlling means for controlling the speed of said rotor and the timing of said intervening step such that the rotor is accelerating toward said operational spinning speed during said placing by said placing means.]

21. [An apparatus according to claim 20,] *An apparatus for start-spinning a thread on an open-end spinning unit of an open-end spinning machine, said apparatus comprising:*

reducing means for reducing the speed of a spinning rotor of said spinning unit to a speed below its operational spinning speed,

intervening means for intervening in at least one of the drive and control of sliver feed means of said spinning unit so as to control the volume of fibres deposited by said sliver feed in said spinning rotor,

placing means for placing an end of a thread piece on a ring of fibres deposited in said spinning rotor drawing said thread piece out of said spinning rotor upon connection of said end with said fibres,

and controlling means for controlling the speed of said rotor and the timing of said intervening step such that the rotor is accelerating toward said operational spinning speed during said placing by said placing means,

wherein said control means includes means for rotatably driving said rotor by auxiliary driving means that are separate from main drive means that normally drive said rotor at its operational spinning speed.

[22. Apparatus according to claim 20, wherein said spinning unit is one of a plurality of spinning units having respective spinning rotors driven by a common main drive means, and wherein said control means includes means for interrupting the drive connection between said main drive means and one of said spinning rotors without interrupting the drive connection of other of said spinning rotors and said main drive means.]

[23. Apparatus according to claim 20, wherein said reducing means, intervening means, placing means, and controlling means are carried on a mobile unit which is mounted for movement along a plurality of spinning units.]

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