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

(11) **EP 2 520 697 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
09.04.2014 Bulletin 2014/15

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

(21) Application number: **11003755.3**

(22) Date of filing: **06.05.2011**

(54) **Device for stopping a rove supply in a spinning apparatus**

Vorrichtung zum Stoppen einer Vorgarneinspeisung in einer Spinnmaschine

Dispositif d'arrêt d'approvisionnement de mèche dans un appareil de filature

(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

(43) Date of publication of application:
07.11.2012 Bulletin 2012/45

(73) Proprietor: **Vantex Technologies GmbH**
83727 Schliersee (DE)

(72) Inventor: **Micheletti, Umberto**
83727 Schliersee (DE)

(74) Representative: **Rings, Rolf**
Rings & Spranger
Patentanwälte
Postfach 86 06 09
81633 München (DE)

(56) References cited:
FR-A5- 2 050 634

EP 2 520 697 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] The present invention relates to a device for stopping a rove supply in a spinning or twisting apparatus after the break of a yarn according to the preamble of claim 1. The purpose of such stopping devices is to prevent a rove, which is supplied to a drafting zone of such a twisting apparatus, from being continuously delivered even after a yarn break has occurred. The stopping device is provided in order to stop a rove before the back rollers of a drafting zone of the spinning apparatus so that the elements of the drafting zone are prevented from damage and that the formation of a lap of fibres of rove material around the rollers is avoided. Such yarn breaks are a major problem in spinning machineries. Not only is the continuous operation of the spinning interrupted, but also the total efficiency of the spinning is decreased. After such a break of the yarn, the operator of the spinning apparatus does not only have to reinstall the correct connection of the rove with the spun yarn on the delivery end of the drafting zone, but often has to remove waste material of rove, which, after a yarn break, has been further delivered into the rollers of the drafting zone. In order to reduce the damage and efficiency losses due to such a yarn break, several types of devices have been proposed in the prior art as known e.g. from FR 2 050 634 A5.

[0002] For example, pneumatic stopping devices have been used in dry spinning devices, with a suction nozzle being arranged close to the yarn so that any fibre, which comes out at the front end of a drafting zone and which is not formed into a yam, is collected by the suction nozzle. Such pneumatic devices with a suction nozzle therefore stop the fibres or material from wrapping around the delivery roller in the drafting zone. One disadvantage of such a type of pneumatic stopping device is that the amount of waste material is considerably increased, because the delivery of the rove is not stopped, but the material is only guided to a waste container. For a reintroduction of such waste material, the fibres have to undergo again the preparation processes as known to a person skilled in the art. A further disadvantage of such pneumatic devices in dry spinning processes is the increase in energy consumption. The pneumatic device has to be operated at all times and at all spinning positions in the spinning apparatus.

[0003] In the area of wet spinning, the spinning of linen, for example, another type of stopping device has been used in the prior art so far: first, there are mechanical devices, which comprise a number of different levers, which are arranged close to the entry of the drafting zone and which are provided to stop the rove directly before the entry into the drafting zone. The construction of such mechanical devices is rather complex and requires an adaptation of the spinning apparatus. Other mechanical systems for stopping a rove lead to the stop of the operation of the feed rollers after the break of a yarn. For example, rove stopping systems are known which operate by stopping a feed pressing roller without stopping the parallel roller. These systems act by blocking in different ways only one of the feed rollers. However, such systems are not very reliable and are very difficult to maintain. This system further has the disadvantage that not only one - spinning position is interrupted due to the yarn break, but that also the other, parallel spinning positions have to be stopped until the yam break has been repaired. Furthermore, in the prior art, rather complex stopping devices with electronic systems, such as piezoelectric sensors, have been developed in order to detect the yam break and to react upon the occurrence of a yam break signal, for example by cutting the rove behind the back rollers. Such electronic systems are complex in construction and not very reliable in dirty and sometimes wet conditions and require a lot of maintenance. The optical sensors are sensitive to dirt and furthermore require a complex integration of the stop system into the control of the spinning apparatus.

[0004] In view of these disadvantages of the prior art stopping devices, it is a problem of the present invention to provide a device for stopping a rove delivery after the break of a yarn in a spinning apparatus, which is reliable in the functioning, is easy to use, saves energy and prevents an increase in waste material upon the break of a yarn and an efficiency decrease in spinning. Furthermore, it is an object of the present invention to provide such a stopping device, which is adaptable to different types of spinning apparatuses without a major change in the existing constructions.

[0005] This problem is solved by means of a device for stopping a rove supply according to the features of claim 1. According to the invention, a device as defined in claim 1 for stopping a rove supply in a spinning apparatus is provided, which comprises a mechanical sensing lever with a sensing pin being repeatedly in contact with the yarn at the output side of a drafting zone of a spinning apparatus, which is pivotally mounted on a pivot axis, wherein the device is characterized in that said sensing lever has a release lever opposite to said sensing lever, which release lever is provided with a longitudinal release part being in engagement with a spring-loaded clamp device such that in normal operation the clamp device is open and is closed after the break of a yarn through the conjoint pivot movement of said sensing lever and said release lever about said pivot axis in order to firmly clamp the rove at the input side of the drafting zone before the back rollers of the drafting zone of the spinning apparatus. If the yarn breaks at the delivery end or output side of the drafting zone, the mechanical clamp device is immediately closed and will firmly hold the rove at the input side of the drafting zone. Due to the further rotational movement of the rollers in the drafting zone, the rove will consequently be broken well before the input side of the drafting zone so that the further supply of rove into the spinning apparatus is prevented. The stop of the rove supply is very reliable, as the elements of the stopping device are purely mechanical. The clamp device as well as the sensing lever with its release lever function without

the use of complex sensors or control devices.

[0006] In an advantageous form of realization of the invention, the clamp device is arranged in a predetermined distance from the entry of the drafting zone, i.e. a distance from the back rollers. Since the clamp device is arranged at the input side in a distance from the drafting zone and not within the drafting zone, the installation of the stopping device does not require any changes in the construction or design of the spinning apparatus. The device may be simply installed without any impact on the normal functioning of the spinning apparatus. At the delivery side (output side) of the drafting zone, the sensing lever is repeatedly brought into contact with the yarn such that a yarn break in this critical section is immediately sensed by the sensing lever. According to an aspect of the invention, the frequency of sensing contacts and the pressure of these contacts can be adjusted to suit all yarn counts. Upon yam break, the sensing lever immediately moves together with the release lever in a pivot movement into such a position that the clamp device at the input end of the drafting zone is directly activated. By means of relatively simple mechanical elements, a surprising, efficient stopping action is created. Since the sensing lever and the release lever activate the preloaded clamp device directly and not by means of several intermediate levers or gears, the stopping device according to the invention is very reliable and not prone to disturbances, e.g. due to dirt or other surrounding influences. Due to the special mechanical design and construction of the stopping device according to the invention, the device does not require any additional energy for its operation. This leads to energy savings in comparison to pneumatic or electronic rove stop systems as they have been used in the prior art.

[0007] The conjoint pivot movement of the sensing lever and the release lever for releasing the preloaded clamp device has the advantage that, after the break of a yarn, the operator of the spinning apparatus receives also a visual indication in a row of a large number of spinning positions in a spinning apparatus. The end of the sensing lever with its sensing pin will protrude compared to the other sensing levers in the row of spinning positions so that an immediate visual indicator is given that the operator has to take action and repair the disorder in a specific position. Since the rove is not cut, but is actively clamped through the clamp device, in particular corresponding eccentric clamp elements, the restoration of the correct operation is rather simple to realize. The operator does not have to search for the rove end, but can directly take the clamped rove end and reintroduce it into the drafting zone and connect it with the already drafted yam at the output side. The handling of the stopping device is therefore very simple and reliable. Furthermore, the mechanical construction and the form of the stopping device according to the invention with a sensing pin and a sensing lever at the output side of the drafting zone and a clamp device at the input side are advantageous in that the stopping device can also be installed in existing spinning apparatuses. No changes have to be made in the drafting zone of the spinning apparatus. The stopping device according to the invention can simply be attached to the existing frames or drive shafts of the spinning machinery since it is specifically designed without components inside of the area of the drafting zone.

[0008] According to the main embodiment of the present invention, the sensing lever and the release lever of the stopping device have an essentially L-shaped integral form and/or the sensing pin is provided as a separate and exchangeable element. The L-shape has the advantage that the stopping device may be mounted behind the drafting zone without a change in the construction of the existing spinning apparatus. According to an advantageous embodiment of the invention, the sensing lever and the release lever are formed in a single-piece element, for example by moulding of a plastic material or the like. The single-piece construction of the levers has the advantage that only a reduced number of different elements and moving parts for the device are required. Nevertheless, the sensing lever and the release lever provide together with the preloaded clamp device a very reliable and fast stop action after the break of a yarn. The reduced number of parts of the stopping device has also the advantage that the device is less sensitive to damages. In case there still occurs a damage of one of the parts, it may simply be exchanged with new parts, as the stopping device is easily accessible from the outside of the machinery. By means of the sensing pin in form of a separate and exchangeable element it is possible to accommodate all different positions of the yarn as required. The sensing pin may be provided in different shapes and sizes to adapt its position on different designs of spinning frames. The different sizes and weights of sensing pins may be corrected by exchanging a counter-balance or its position on the backside of the sensing lever.

[0009] The clamp device comprises two opposite counter-acting eccentric clamps, which are pivotally mounted on both sides of the rove such that a pulling force of said yarn by means of the rollers in the drafting zone will automatically increase the clamping effect of said clamp device. This measure prevents that the stop of the rove is unintentionally released. A further pull on the rove from the side of the drafting zone will inevitably lead to an increase in the clamping effect. The clamping of the rove is therefore not only guaranteed by means of the preloading through a spring or the like, but also through the specific construction and arrangement of the clamp elements of the clamp device. By means of these measures, the reliability of the device is increased.

[0010] According to a further embodiment of the invention, the clamp device has a preloading spring for an automatic closing of the clamps upon release through the release part of the release lever/sensing lever. In the open state, the clamp device is securely held by the release lever against the preloading force of the spring of the clamp device. After the release part of the release lever has moved in a specific position, the clamp device

is automatically activated and will due to the preloading force directly change from its open state into its closed state, in which the rove passing through the gap between the clamp elements of the clamp device is firmly held through a clamp action. The provision of a spring for preloading one or both of the clamp elements of the clamp device is a simple and nevertheless very reliable means. According to an advantageous aspect of the invention, the preloading spring may be integrated within a clamp element so that the spring, which is normally made of metal, is protected against corrosion due to the sometimes wet environment.

[0011] According to a further embodiment of the invention, the sensing lever is pivotally mounted on a common support element with said pivot axis and a rocking cam, which rocking cam is directly or indirectly driven by the back rollers or the shaft of the back rollers of a drafting zone of the spinning apparatus such that the sensing lever is repeatedly moved against said yam at the output side of the drafting zone. The common support element further simplifies the construction and the installation of the stopping device also in existing spinning apparatuses. The rocking cam may be installed on the common support element close to, for example, the back rollers of the drafting zone, which may be used for the rotational movement of the rocking cam in such a manner that the cam surface is in contact with an inside surface of the sensing lever and/or activating lever. Through these measures according to the invention, the sensing lever and its sensing pin are repeatedly brought into contact with the yarn in order to mechanically sense whether or not a yam break has occurred. According to an advantageous characteristic of the invention, such a repeated rocking or forward movement of the levers of the stopping device against the yam may be realized about 5 times per minute. However, this is not limiting to the scope of the invention, but is only a particularly advantageous embodiment. According to one further aspect of the invention, the number of rocking movements and contacts with the yarn may be adjusted. For example, by changing a gear at the driving end of the cam shaft, the sensing contact can be varied from 2 to 6 times per minute.

[0012] According to a further embodiment of the invention, the sensing lever and/or the release lever is provided with a leaf spring element on an inside region coming into contact with the rocking cam. By means of this, the rocking cam action is absorbed through the flexible surface of the leaf-spring-type element so that in a closed position of the stopping device the levers are not damaged. Such a spring element in the form of a leaf-spring-type element may be provided as a separate leaf spring installed within a recess in the inner side of the release lever or sensing lever. Alternatively, the leaf-spring-type element may be formed in an integral shape with the levers, e.g. by providing a longitudinal slot and a surface with a reduced thickness in the material, in particular plastic material, of the levers. Other forms of such a soft leaf-spring-type element may also be provided and are within the knowledge of a person skilled in the art.

[0013] According to a further embodiment of the invention, a rocking cam for driving the sensing lever against the yarn and back again is provided with a rocking shaft being synchronized with the rotational speed of rollers of the drafting zone. Due to these measures, the movement of the sensing lever is always automatically adapted to the speed of production of yam in the drafting zone. According to a further aspect of the invention, the rotational speed of the rocking cam shaft is adjustable, so that the device has a further possibility of an additional adjustment of the sensing lever speed.

[0014] According to a further embodiment of the invention, the pivot axis of the sensing lever is arranged at a predetermined balanced position such that the sensing pin is repeatedly pushed against the yam with a predetermined force. The balanced mounting of the sensing lever and the release lever has the advantage that no additional preloading elements, such as springs or the like, are necessary in order to realize the predetermined sensing force of the sensing lever. According to a particular embodiment of the invention, the amount of the sensing force of the sensing lever may be in the range of 50-200 g per push action.

[0015] According to a further embodiment of the invention, the sensing lever is provided with at least one movable or adjustable balance weight for the adjustment of the specific pressure or force applied by the sensing pin onto the yam. The movable balance weight may, for example, be attached to the levers at a discrete number of positions. Through this measurement, it is possible to easily adjust the sensing force of the sensing pin without a change in the design of the stopping device and in particular its levers and without a change in the position of the pivot axis. This simplifies the stopping device and enables the operator to easily adapt the respective devices to different spinning apparatuses or conditions.

[0016] According to a further embodiment of the invention, the clamp device has an activating lever with an engagement portion for engagement with the release part of the release lever, and furthermore has a release lever for returning the clamp device from its closed position back into its open position for the restarting of the operation of the spinning apparatus. The provision of an activating lever has the advantage that the release end of the release lever may be located not too close to the rove, but in a certain distance from it. The engagement portion of the activating lever of the clamp device is during correct operation of the spinning apparatus in engagement with the release part of the release lever such that the rocking movement of the sensing lever and release lever does not lead to an inadvertent activation of the clamp device. According to a further aspect of the invention in this regard, the release part is provided in the form of a longitudinal groove at the end of the release lever, which is open to one side. In this groove, the engagement portion of the activating lever of the clamp device may move by a certain predetermined amount without leaving

the engagement with the levers. Only in the case of a yarn break, when the sensing lever moves beyond the usual position of the yarn, the groove of the release part is moved to such a position that the engagement portion of the activating lever of the clamp device is released. After release, the clamp device is directly closed through the action of the preloading spring. The engagement portion of the activating lever of the clamp device is then in a position beyond the end of the release lever such that the system is effectively deactivated. Only through the active pulling of the release lever of the clamp device and simultaneously the reintroduction of the engagement portion into the groove of the release lever through an operator, the system is put in its preloaded open position again, in which the normal operation of the spinning can be effected.

[0017] According to a further embodiment of the invention, the stopping device is designed as a retrofit device, which may be mounted on an existing spinning apparatus, in particular without major changes in its construction. This makes it possible to install the stopping device in existing spinning apparatuses of even different types. According to a further aspect of the invention, the elements of the stopping device are provided with screwless-type mounting means, in particular in the form of clip-type mounting means. Therefore, the operator or person who installs the stopping device does not need any tools. The installation is very fast and simple to realize. Also in case of a damage of one of the parts of the stopping device, an exchange and repair of the device is easy to execute.

[0018] The above-mentioned objects, features and advantages of the present invention will become more apparent from the following detailed description of some preferred embodiments of the invention made with reference to the accompanying drawings. In the drawings are:

Fig. 1	a perspective view of an embodiment of the stopping device according to the invention, which is installed in a spinning apparatus having a drafting zone A;
Fig. 2 and 3	side views of an embodiment of the stopping device according to the invention showing different positions of the device in the normal operation of the spinning apparatus; and
Fig. 4 and 5	side views of an embodiment of the stopping device according to the invention showing different positions after a yarn break has occurred.

[0019] In Figs. 1 to 3, an embodiment of the stopping device according to the invention is shown in a situation of a normal operation of the spinning apparatus, i.e. before a yarn break has occurred. The stopping device comprises a mechanical sensing lever 7 being pivotally mounted on a pivot axis X on the back side of a drafting zone A of the spinning apparatus. At its front end, the sensing lever 7 is provided with a laterally protruding sensing pin 8, which is repeatedly brought into contact with the yam 11 by means of a rocking movement of the sensing lever 7. In the figures, the repeated rocking movement or push of the sensing lever 7 and its sensing pin 8 is indicated by arrow B. The purpose of this repeated contact of the sensing lever 8 and the continuously fed yarn 11 is to monitor the correct operation of the spinning apparatus, in other words to receive information in case a break of the yarn 11 has occurred at the delivery side (output side) of the drafting zone A. For providing the rocking movement B of the sensing pin 8, the sensing lever 7 is in contact with a rocking cam 15, which is driven by a shaft 18. The rocking cam 15 has a cam surface, which comes into contact with the inside of the sensing lever 7. Since the sensing lever 7 is pivotally mounted on the axis X, the rotational movement of the rocking cam 15 pushes the sensing lever 7 and the sensing pin 8 repeatedly back, so that the sensing pin 8 is moved against the yarn 11 coming out from the drafting zone A. In order to realize this rocking function of the sensing lever 7, the sensing lever 7, which is here formed integrally with a release lever 9, is designed and mounted such that a specific balanced arrangement is given, so that the sensing pin 8 is pushed against the yam 11 with a predetermined sensing force, according to an advantageous example of the invention with a force of about 50 to 200 g. In order to be able to adjust the sensing force of the sensing pin 8, the sensing lever 7 is here provided with a protruding further arm on its back side with several groove portions 14, into which a balance weight 17 may be placed. With five weight adjustment points 14, in this example realized through grooves, the balance weight 17 can be adjusted in order to set a predetermined sensing force, which, by the sensing pin 8, is applied onto the yarn 11 passing by in the feed direction F at the feeding speed.

[0020] From a comparison of Fig. 2 with Fig. 3, the forward and backward movement of the sensing lever 7 with its sensing pin 8 can be taken. Due to the continuous rotation of the rocking cam 15 about its rocking shaft 18, the sensing pin 8 is moved from its contact position with the yam 11 (Fig. 2) back to the position shown in Fig. 3, in which the sensing pin 8 is in a certain distance from the yam 11 passing by. Then, the sensing pin 8 is again brought into pushing contact with the yarn 11, as the balance weight 17 and the form and mounting of the sensing lever 7 are provided such that the sensing lever 7 will due to the gravity move against the yam 11 (left-hand side in Figs. 2 and 3). In this embodiment of the invention, the rocking cam 15 comes into contact with a leaf-spring-type element 16 provided at the inside of the sensing lever 7. The leaf-spring-type element 16 is a flexible part, which avoids the sensing lever 7 from being damaged in a yam break situation, which will be explained in more detail later in this specification. At the opposite end of the pivot axis X, the sensing lever 7 is provided with a release

part or release lever 9. The release lever 9 is also moved forward and backward, which is in the drawings shown by arrow B. At the upper end, the release lever 9 is provided with a release part 9a, which is in this example realized in the form of a longitudinal groove open to one side. The longitudinal release part 9a is in this situation of a normal, correct functioning of the drafting device in engagement with an engagement part 12f of a clamp device 12. In Figs. 1 to 3, the clamp device 12 is shown in its open state, which means that the clamps 12a, 12b are open and provide a certain gap, which is sufficiently large for the passing of the rove 13 coming from the delivery side of the rove material (cf. arrow F in Fig. 1 to 3). The clamps 12a, 12b are pivotally mounted to one another, respectively, and have an outer cam surface, which is formed such that upon closing of the clamp device an increasing clamp effect is created on the rove 13. The clamps 12a, 12b of the clamp device 12 are furthermore provided with meshing gears 12c on one side of the clamp device 12, which is in a position beside the rove 13. The meshing gears 12c provide a combined movement of the clamps 12a, 12b and the activating lever 12d and the release lever 12e, which will be described in more detail with regard to the following figures. During normal operation of the spinning apparatus, the forward and backward movement of the release lever 9 (cf. arrow B in Figs. 2 and 3) is realized such that the engagement portion 12f of the clamp device 12 remains in any situation within the longitudinal release groove 9a of the release lever 9, so that the clamp device 12 is held in its open position shown in Figs. 1, 2 and 3.

[0021] The elements and components of the stopping device 10 according to this embodiment are provided with screwless mounting means 5, 6 in order to be easily replaced in case of damage. The screwless mounting means 5, 6 are, for example, formed as clip-on elements, which may be mounted on mounting pins by means of a clipping action. Furthermore, in this embodiment of the invention, the sensing lever 7, the release lever 9 and the rocking cam 15 are mounted on a common support element 19. The complete stopping device with the sensing lever 7, the rocking cam 15 and the clamp device 12 may therefore easily be installed in existing spinning apparatuses as a so-called retrofit device. The components and parts of the stopping device 10 are preferably made of a resin material, such as plastic, so that the device 10 may also be used in corrosion-aggressive environments, such as wet spinning apparatuses. The material of the components of the stopping device is chosen such that they are resistant to temperatures of up to 80° C. The stopping device according to the invention is therefore resistant to water, oil and normal chemicals. Furthermore, the rather simple construction of the mechanical parts of the stopping device 10 does not require lubrication or maintenance activities. The clamp device 12 is provided with a preloading spring, which is preferably mounted within one or both of the clamps 12a, 12b, so that the spring is not exposed to the sometimes wet surroundings and may be made of metal. The preloading spring is installed in the clamp device 12 such that, upon release of the engagement part 12f of the clamp device from the release groove 9a, the clamps 12a, 12b will automatically be brought into a closed position, which is shown in Fig. 5, which will be described later.

[0022] With reference to Figs. 4 and 5, the functioning of the stopping device 10 according to the invention and according to the shown embodiment is explained in a situation, in which the yam 11 is broken. When a yarn break occurs, the sensing pin 8 on the free end of the sensing lever 7 is moved beyond the point where normally the yam 11 passes by, which is in Fig. 4 indicated by arrows C. Due to the gravity and the balance weight 17, the sensing lever 7 together with its release lever 9 moves around the pivot axis X further than the normal position compared to the case where the yarn 11 is not broken. The release lever 9 has a release part 9a, here in the form of a longitudinal groove, which is dimensioned such that the engagement portion 12f of the activating lever 12d of the clamp device will leave the engagement with the release lever 9 (cf. Fig. 5). The preloaded clamp device 12 will then automatically be closed due to the force of a preloading spring, which is provided within the clamp device 12 neither on one clamp or on both clamps 12a, 12b. The closing of clamps 12a, 12b is indicated in Fig. 5 by arrows D. Since meshing gears 12c are here provided besides the rotational clamps 12a, 12b of the clamp device 12, the movement of the eccentric clamps 12a, 12b is combined and counter-acting, which means that the two clamps 12a, 12b rotate in opposite directions, so that the cam surfaces of the eccentric clamps 12a, 12b comes into contact with one another as well as with the rove 13 to firmly hold the rove 13 and to prevent a further delivery in the feed or delivery direction F.

[0023] Because of the further rotational movement of in particular back rollers 1, 2 and front rollers 3, 4, an increasing tension is applied onto the rove 13 and the broken end of the yam 11 (cf. arrows F in Fig. 4). The increasing tension applied onto the rove 13, which is firmly held outside of the drafting zone A and in a distance from the back rollers 1, 2 by the clamp device 12, will lead to an increase in the clamping effect of both eccentric clamps 12a, 12b. As a result, the rove 13 will break in a position between the back rollers 1, 2 and the clamp device 12, as shown in Fig. 5. A further delivery of rove 13 into the critical drafting zone A is then prevented. Until the operator has reinstalled the rove in the drafting zone A, the end of the broken rove 13 is firmly held by means of the clamps 12a, 12b of the clamp device. In this example the two counter-acting clamps 12a, 12b have an eccentric protruding part with a curved surface of approximately a quarter of a circle.

[0024] In this last situation as shown in Fig. 5, the continued rotation of the rocking cam 15 is absorbed by the leaf-spring-type element 16, so that any damage of the sensing lever or other parts is prevented. In case a part or component of the stopping device 10 will nevertheless

be damaged, an easy repair is possible due to the screwless mounting means 5, 6, with which the sensing lever 7 and/or the rocking cam 15 are installed on the basic support frame of the spinning apparatus. In one embodiment of the invention also the clamp device 12 is provided with screwless mounting means (not shown in the figures). Such screwless mounting means 5, 6 as used in the embodiment may have the form of U-shaped clip elements made of a resilient plastic material.

[0025] In order to restart the operation of this spinning position in a row of a large number of spinning positions in a spinning apparatus (cf. Fig. 1), the operator has to grip the end of the rove 13 and push the activating lever 12d with a kind of gripping part downwards (cf. Fig. 5), so that the clamps 12a, 12b will open again and the activating lever 12d will move with its engagement portion 12f also downwards to a position as shown in Figs. 1 to 4 close to the release part 9a due to the meshing gears 12c. The end portion of the release lever 9 beyond the release part 9a is provided with an inclined surface of around 45° compared to the longitudinal axis of the lever 9 or the release groove 9a. This leads to nose-like shape of the end of the release lever 9. The engagement portion 12f can easily be introduced into the groove-like engagement portion 9a, and the end of the rove 13 may be connected to the already drafted yarn 11 on the output side of the drafting zone. After this simple operation with only a manual actuation of two parts of the stopping device 10 according to the invention, the spinning apparatus is in order again, and the production of yam may be continued. The handling of the stopping device 10 is rather simple and very reliable. The reduced number of only mechanical components of the stopping device 10 is a further advantage. Because of the especially adapted L-shaped design of the sensing lever 7 and the release lever 9 of the stopping device 10, the stopping device 10 can be mounted completely outside of the drafting zone A from behind of the spinning apparatus and with the sensing pin 8 on the output side of the drafting zone, whereas the clamp device 12 is positioned in a distance from the back rollers 1, 2, so that in any situation the further supply of rove 13 into the drafting zone A is effectively prevented. The clamp device is according to one further aspect of the invention located in distance of 15 to 12 cm from the back rollers 1, 2. Any interference with critical parts in the drafting zone A is hereby prevented.

[0026] The invention is not limited to the embodiments described and shown in detail here. The stopping device 10 may have a different type of clamp device 12. For example, a clamp device 12 could have only one eccentric clamp, which has a fixed counter-element, which provides the same function of an increased clamping force due to the further pull from the side of the drafting area A due to the continued rotation of the rollers 1, 2, 3, 4. Also, the construction and form of the sensing lever 7 with the release lever 9 and the release part 9a can be modified within the scope of the invention as defined in independent following claim 1: the lever 7, 9 is not necessarily provided in an approximately L-shaped form. The release part 9a can be an open surface instead of a groove-like element. The balance weight 17 with the weight adjustment positions 14 can be eliminated provided that the form and position of the pivot axis X are chosen in such a manner that the repeated pushing of the sensing pin 8 can be accomplished. Also, the form of the rocking cam 15 can be different as long as the repeated rocking movement of the sensing lever 7 is realized.

Claims

1. Device (10) for stopping a rove supply in a spinning or twisting apparatus after breakage of a yam (11) at the output side of a drafting zone (A) which comprises at least a pair of front rollers (3, 4) and a pair of back rollers (1, 2), whereby the rove (13) is delivered in normal operation by a pair of feed rollers from the input side and is formed to said yarn (11) in the drafting zone (A) and whereby the rove delivery is stopped upon breakage of the yarn (11), the stopping device (10) comprises a mechanical sensing lever (7) with a sensing pin (8) being repeatedly in contact with said yarn (11) and said sensing lever (7) is pivotally mounted on a pivot axis (X), **characterized in that** said sensing lever (7) has a release lever (9) opposite to said sensing lever (7) which is provided with a longitudinal release part (9a) being in engagement with a spring-loaded clamp device (12) such that in normal operation of the apparatus said clamp device (12) is open and closes after the break of the yam (11) through the conjoint pivot movement of said sensing lever (7) and said release lever (9) about said pivot axis (X) to firmly clamp the rove (13) at the input side of said drafting zone (A) before said back rollers (1, 2), and that said clamp device (12) comprises two opposite counter-acting excentric clamps (12a, 12b) which are pivotally mounted on both sides of the rove (13) such that a pulling force of said yam (11) will automatically increase the clamp effect of said clamp device (12).

2. Device (10) according to claim 1, **characterized in that** said sensing lever (7) and said release lever (9) have an essentially L-shaped integral form and that said sensing pin (8) is provided as a separate and exchangeable element.

3. Device (10) according to claim 1 or 2, **characterized in that** said clamp device (12) has a preloading spring for an automatic closing of the clamps upon release through said release part (9a) of said release lever (9).

4. Device (10) according to any one of the preceding claims, **characterized in that** said sensing lever (7)

is pivotally mounted on a common support element with said pivot axis (X) and a rocking cam (15) being directly or indirectly driven by said back rollers (1, 2) such that said sensing lever (7) is repeatedly moved against said yam (11).

5. Device (10) according to claim 4, **characterized in that** said sensing lever (7) and/or said release lever (9) is provided with a leaf spring element (16) on the inside region coming into contact with said rocking cam (15).

6. Device (10) according to any one of 1-3 claims, **characterized in that** a rocking cam (15) for driving the sensing lever (7) is provided with a rocking shaft (18) being synchronized with the rotational speed of rollers (1, 2) of the drafting zone.

7. Device (10) according to any one of the preceding claims, **characterized in that** said pivot axis (X) is arranged at a predetermined balanced position of said sensing lever (7) such that said sensing pin (8) is repeatedly pushed against said yam (11) with a predetermined force.

8. Device (10) according to any one of the preceding claims, **characterized in that** said sensing lever (7) is provided with at least one movable balance weight (17) for adjustment of the pressure or force applied by said sensing pin (8) on said yarn (11).

9. Device (10) according to any one of the preceding claims, **characterized in that** said clamp device (12) has an activating lever (12d) with an engagement portion (12f) for engagement with said release part (9a) and a release lever (12e) for returning said clamp device (12) from its closed position back in its open position.

10. Device (10) according to any one of the preceding claim, **characterized in that** said release part (9a) is provided in form of a longitudinal groove at the end of said release lever (9) which is open to one side.

11. Device (10) according to any one of 4-6 claims, **characterized in that** said sensing lever (7) and/or said rocking cam (15) and/or said clamp device (12) are provided with screwless-type mounting means, in particular in the form of clip-type mounting means (5, 6).

12. Use of a device (10) according to any one of the preceding claims, **characterized in that** said stopping device (10) is designed as a retrofit device which may be mounted on existing spinning apparatuses.

Patentansprüche

1. Vorrichtung (10) zum Stoppen einer Vorgarnzufuhr in einer Spinnvorrichtung oder einer Zwirnvorrichtung nach einem Bruch eines Garns (11) an der Ausgangsseite einer Streckzone (A), welche mindestens ein Paar von vorderen Walzen (3, 4) und ein Paar von hinteren Walzen (1, 2) umfasst, wobei das Vorgarn (13) im normalen Betrieb durch ein Paar von Zuführwalzen von der Eingangsseite her befördert wird und in der Streckzone (A) zu dem Garn (11) geformt wird und wobei die Beförderung des Vorgarns nach einem Bruch des Garns (11) gestoppt wird, wobei die Stoppvorrichtung (10) einen mechanischen Abtasthebel (7) mit einem Abtaststift (8) umfasst, welcher wiederholt mit dem Garn (11) in Kontakt steht, und der Abtasthebel (7) schwenkbar an einer Schwenkachse (X) montiert ist, **dadurch gekennzeichnet, dass** der Abtasthebel (7) einen Freigabehebel (9) gegenüberliegend zu dem Abtasthebel (7) aufweist, welcher mit einem longitudinalen Freigabeteil (9a) versehen ist, das mit einer federbelasteten Klemmeinrichtung (12) derart in Eingriff steht, dass beim normalen Betrieb der Vorrichtung die Klemmeinrichtung (12) offen ist und nach dem Bruch des Garns (11) durch die gemeinsame Schwenkbewegung des Abtasthebels (7) und des Freigabehebels (9) um die Schwenkachse (X) schließt, um das Vorgarn (13) an der Eingangsseite der Streckzone (A) vor den hinteren Walzen (1, 2) fest zu klemmen, und dass die Klemmeinrichtung (12) zwei gegenüberliegende, entgegenwirkende exzentrische Klemmen (12a, 12b) umfasst, welche schwenkbar an beiden Seiten des Vorgarns (13) derart montiert sind, dass eine Zugkraft des Garns (11) automatisch die Klemmwirkung der Klemmeinrichtung (12) erhöhen wird.

2. Vorrichtung (10) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Abtasthebel (7) und der Freigabehebel (9) eine im Wesentlichen L-förmige, einstückige Form aufweisen und dass der Abtaststift (8) als ein separates und austauschbares Element vorgesehen ist.

3. Vorrichtung (10) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Klemmeinrichtung (12) eine Vorspannungsfeder zum automatischen Schließen der Klemmen auf die Freigabe durch den Freigabeteil (9a) des Freigabehebels (9) hin aufweist.

4. Vorrichtung (10) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Abtasthebel (7) schwenkbar an einem gemeinsamen Halteelement mit der Schwenkachse (X) und einem Schaukelnocken (15), welcher direkt oder indirekt durch die hinteren Walzen (1, 2) angetrieben

wird, derart montiert ist, dass der Abtasthebel (7) wiederholt gegen das Garn (11) bewegt wird.

5. Vorrichtung (10) nach Anspruch 4, **dadurch gekennzeichnet, dass** der Abtasthebel (7) und/oder der Freigabehebel (9) mit einem Blattfederelement (16) an dem inneren Bereich versehen ist, welcher mit dem Schaukelnocken (15) in Kontakt gelangt.

6. Vorrichtung (10) nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** ein Schaukelnocken (15) zum Antreiben des Abtasthebels (7) mit einer Schaukelwelle (18) versehen ist, welche mit der Drehzahl der Walzen (1, 2) der Streckzone synchronisiert ist.

7. Vorrichtung (10) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Schwenkachse (X) an einer vorherbestimmten, ausbalancierten Position des Abtasthebels (7) derart angeordnet ist, dass der Abtaststift (8) mit einer vorherbestimmten Kraft wiederholt gegen das Garn (11) gestoßen wird.

8. Vorrichtung (10) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Abtasthebel (7) mit mindestens einem bewegbaren Ausgleichsgewicht (17) für eine Einstellung des Drucks oder der Kraft versehen ist, welche durch den Abtaststift (8) auf das Garn (11) angelegt wird.

9. Vorrichtung (10) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Klemmeinrichtung (12) einen Aktivierungshebel (12d) mit einem Eingriffsabschnitt (12f) zum Eingriff mit dem Freigabeteil (9a) und einen Freigabehebel (12e) zum Zurückbringen der Klemmeinrichtung (12) von ihrer geschlossenen Position in ihre offene Position aufweist.

10. Vorrichtung (10) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Freigabeteil (9a) in Form einer longitudinalen Nut an dem Ende des Freigabehebels (9) vorgesehen ist, welche zu einer Seite hin offen ist.

11. Vorrichtung (10) nach einem der Ansprüche 4 bis 6, **dadurch gekennzeichnet, dass** der Abtasthebel (7) und/oder der Schaukelnocken (15) und/oder die Klemmeinrichtung (12) mit Montagemitteln vom schraubenlosen Typ versehen sind, insbesondere in der Form von Montagemitteln (5, 6) vom Cliptyp.

12. Verwendung einer Vorrichtung (10) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Stoppvorrichtung (10) als eine Nachrüstungseinrichtung konstruiert ist, welche an bestehende Spinnvorrichtungen montiert werden kann.

Revendications

1. Dispositif (10) d'arrêt d'approvisionnement de mèche dans un dispositif de filature ou dispositif à retordre après la casse d'un fil (11) au côté de sortie d'une zone d'étirement (A), comprenant au moins une paire de rouleaux avant (3, 4) et une paire de rouleaux arrière (1, 2), la mèche (13) étant approvisionnée en opération normale du côté d'entrée par une paire de rouleaux d'alimentation et étant formée en fil (11) dans la zone d'étirement (A), et l'approvisionnement de la mèche étant arrêté lors d'une casse du fil (11), le dispositif d'arrêt (10) comprenant un levier d'exploration (7) mécanique avec une cheville d'exploration (8) étant de façon répétée en contact avec le fil (11), et le levier d'exploration (7) étant monté de façon pivotante sur un axe de pivotement (X), **caractérisé en ce que** le levier d'exploration (7) présente un levier de libération (9) opposé au levier d'exploration (7), qui est prévu avec une pièce de libération (9a) longitudinale étant engrenée avec un dispositif de serrage (12) qui est sous la contrainte d'un ressort de telle manière qu'en opération normale du dispositif le dispositif de serrage (12) est ouvert et se ferme après la casse du fil (11) par le mouvement de pivotement conjoint du levier d'exploration (7) et du levier de libération (9) autour de l'axe de pivotement (X) pour serrer fermement la mèche (13) au côté d'entrée de la zone d'étirement (A) avant les rouleaux arrières (1, 2), et **en ce que** le dispositif de serrage (12) comprend deux bornes (12a, 12b) excentriques à effet opposé, qui sont montées de façon pivotante sur les deux côtés de la mèche (13) de sorte qu'une force de traction du fil (11) va augmenter automatiquement l'effet de serrage du dispositif de serrage (12).

2. Dispositif (10) selon la revendication 1, **caractérisé en ce que** le levier d'exploration (7) et le levier de libération (9) présentent essentiellement une forme en L d'un seul tenant, et **en ce que** la cheville d'exploration (8) est prévue comme un élément séparé et remplaçable.

3. Dispositif (10) selon la revendication 1 ou 2, **caractérisé en ce que** le dispositif de serrage (12) présente un ressort de tension préalable pour une fermeture automatique des bornes lors d'une libération par la pièce de libération (9a) du levier de libération (9).

4. Dispositif (10) selon l'une des revendications précédentes, **caractérisé en ce que** le levier d'exploration (7) est monté de façon pivotante sur un élément de support commun avec l'axe de pivotement (X) et une

came de balançoire (15) étant entraînée de façon directe ou indirecte par les rouleaux arrières (1, 2) de sorte que le levier d'exploration (7) est déplacé de façon répétée contre le fil (11).

5. Dispositif (10) selon la revendication 4, **caractérisé en ce que** le levier d'exploration (7) et/ou le levier de libération (9) est prévu avec un élément de ressort à lames (16) à la région interne, laquelle vient en contact avec la came de balançoire (15).

6. Dispositif (10) selon l'une des revendications 1 à 3, **caractérisé en ce qu'**une came de balançoire (15) pour entraîner le levier d'exploration (7) est prévue avec un pivot de balançoire (18) étant synchronisé avec la vitesse des rouleaux (1, 2) de la zone d'étirement.

7. Dispositif (10) selon l'une des revendications précédentes, **caractérisé en ce que** l'axe de pivotement (X) est disposé à une position prédéterminée et équilibrée du levier d'exploration (7) de sorte que la cheville d'exploration (8) est poussée de façon répétée contre le fil (11) avec une force prédéterminée.

8. Dispositif (10) selon l'une des revendications précédentes, **caractérisé en ce que** le levier d'exploration (7) est prévu avec au moins un poids d'équilibre (17) mobile pour le réglage de la pression ou la force, laquelle est appliquée par la cheville d'exploration (8) sur le fil (11).

9. Dispositif (10) selon l'une des revendications précédentes, **caractérisé en ce que** le dispositif de serrage (12) présente un levier d'activation (12d) avec une partie d'engrènement (12f) pour l'engrènement avec cette partie de libération (9a) et un levier de libération (12e) pour ramener le dispositif de serrage (12) de sa position fermée à sa position ouverte.

10. Dispositif (10) selon l'une des revendications précédentes, **caractérisé en ce que** la partie de libération (9a) est prévue en forme d'une rainure longitudinale à l'extrémité du levier de libération (9), laquelle est ouverte à un côté.

11. Dispositif (10) selon l'une des revendications 4 à 6, **caractérisé en ce que** le levier d'exploration (7) et/ou la came de balançoire (15) et/ou le dispositif de serrage (12) sont prévus avec des moyens de montage du type sans vis, en particulier en forme des moyens de montage (5, 6) du type clip.

12. Utilisation d'un dispositif (10) selon l'une des revendications précédentes, **caractérisée en ce que** le dispositif d'arrêt (10) est construit comme un dispositif d'équipement complémentaire, qui peut être monté à des dispositifs de filature existants.

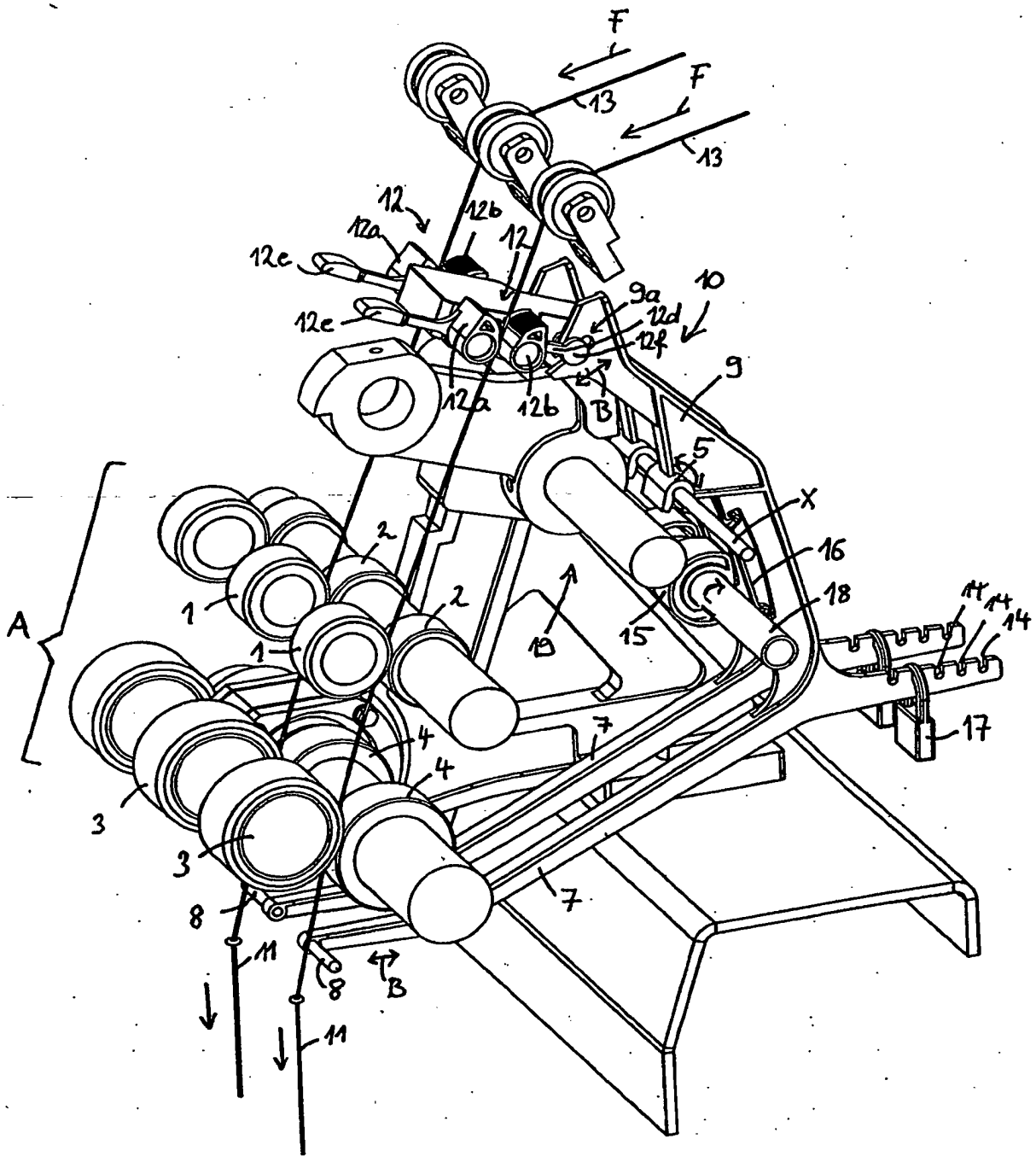
F
F
13
13
12
12a
12b
12
12e
12e
9a
12d
12f
10
9
12a
12b
B
5
X
16
18
14
14
14
A
1
1
2
2
2
15
19
17
4
4
7
3
3
7
8
11
8
B
11

Fig. 1

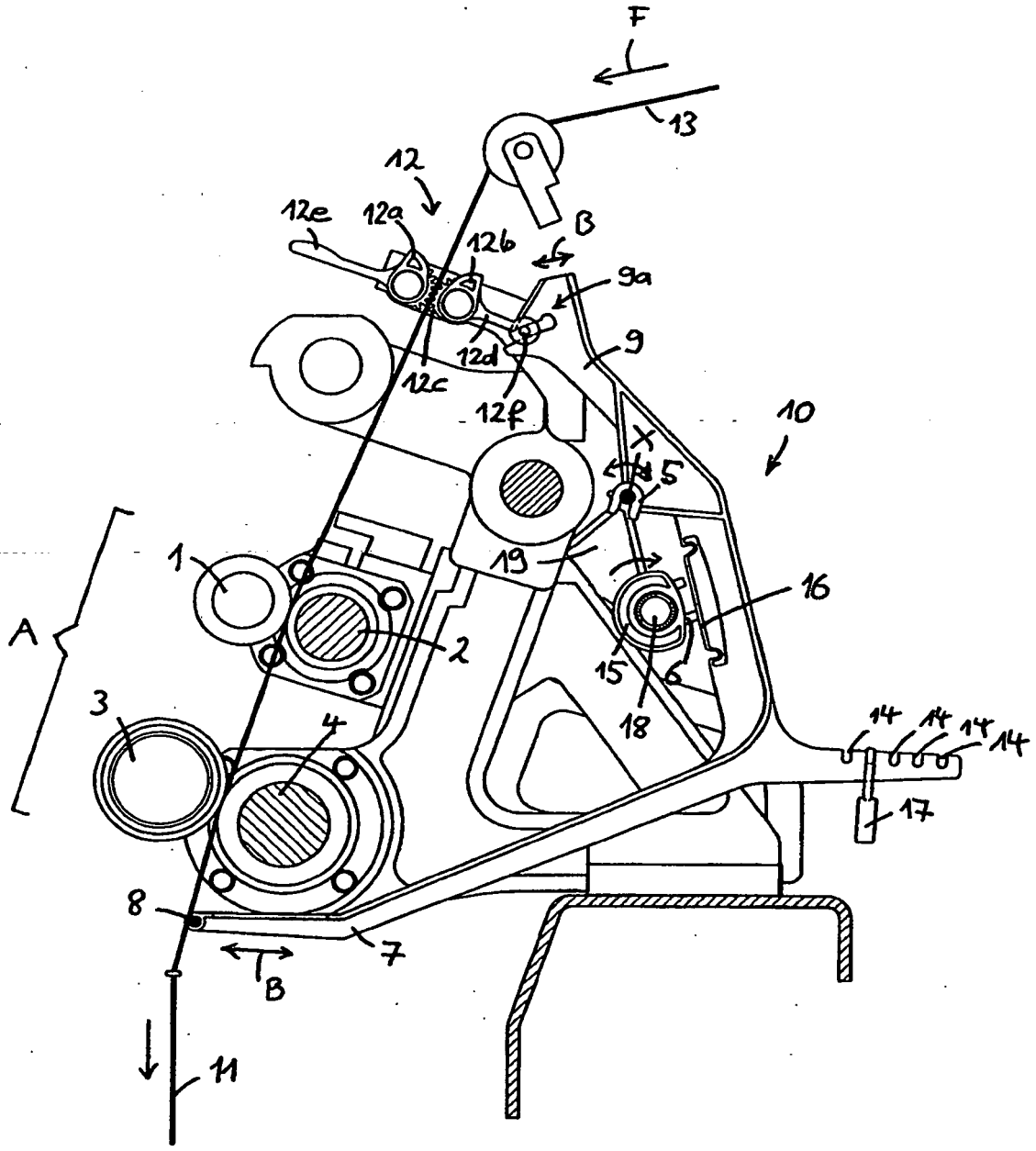
F
13
12
12e
12a
12b
B
9a
9
12d
12c
12f
10
X
5
19
16
1
A
2
15
6
18
3
4
14
14
14
14
17
8
7
B
11

Fig. 2

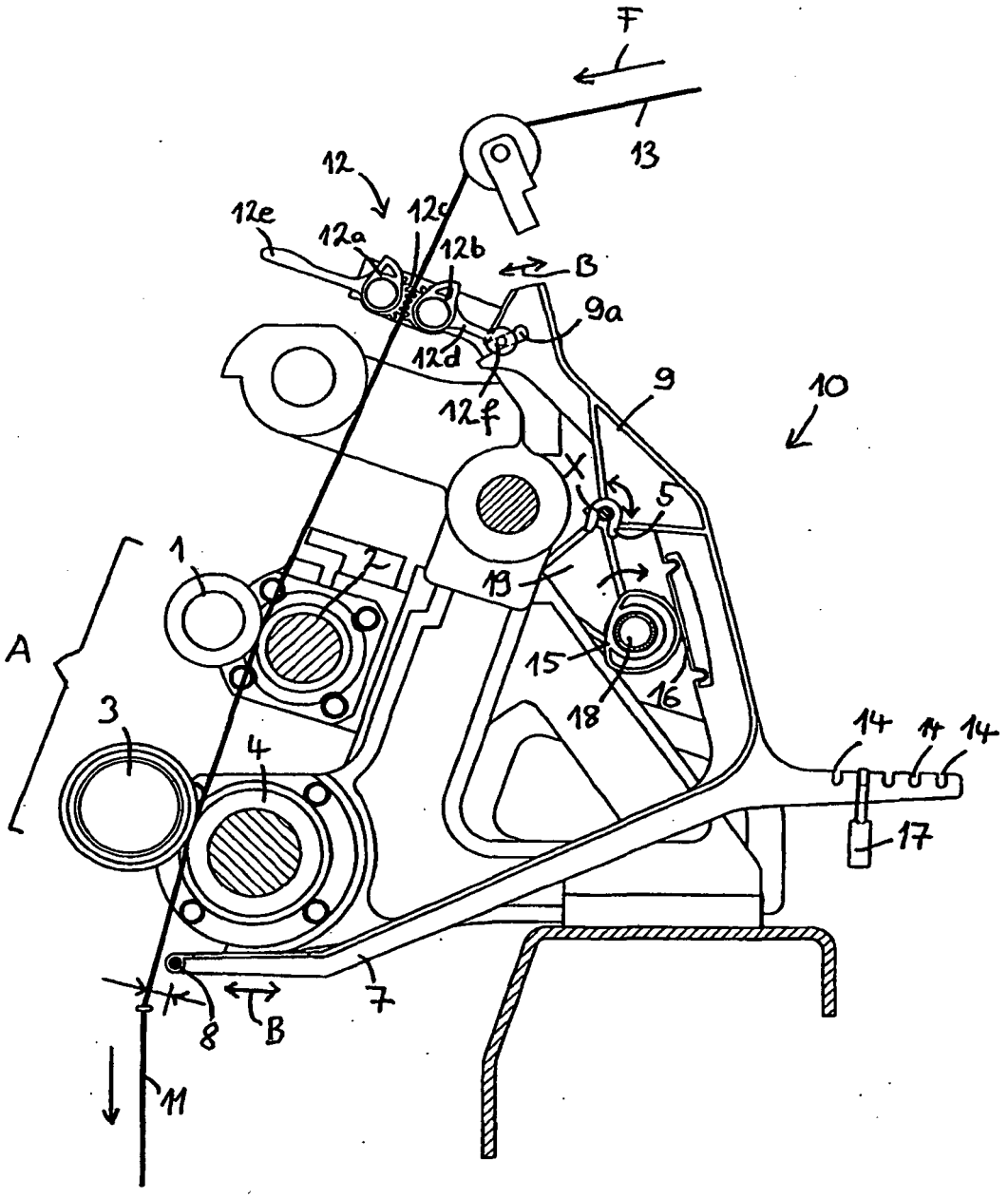
F
13
12
12e
12a
12c
12b
B
9a
12d
12f
9
10
5
1
7
13
A
15
16
18
14
14
14
3
4
17
8
B
7
11

Fig. 3

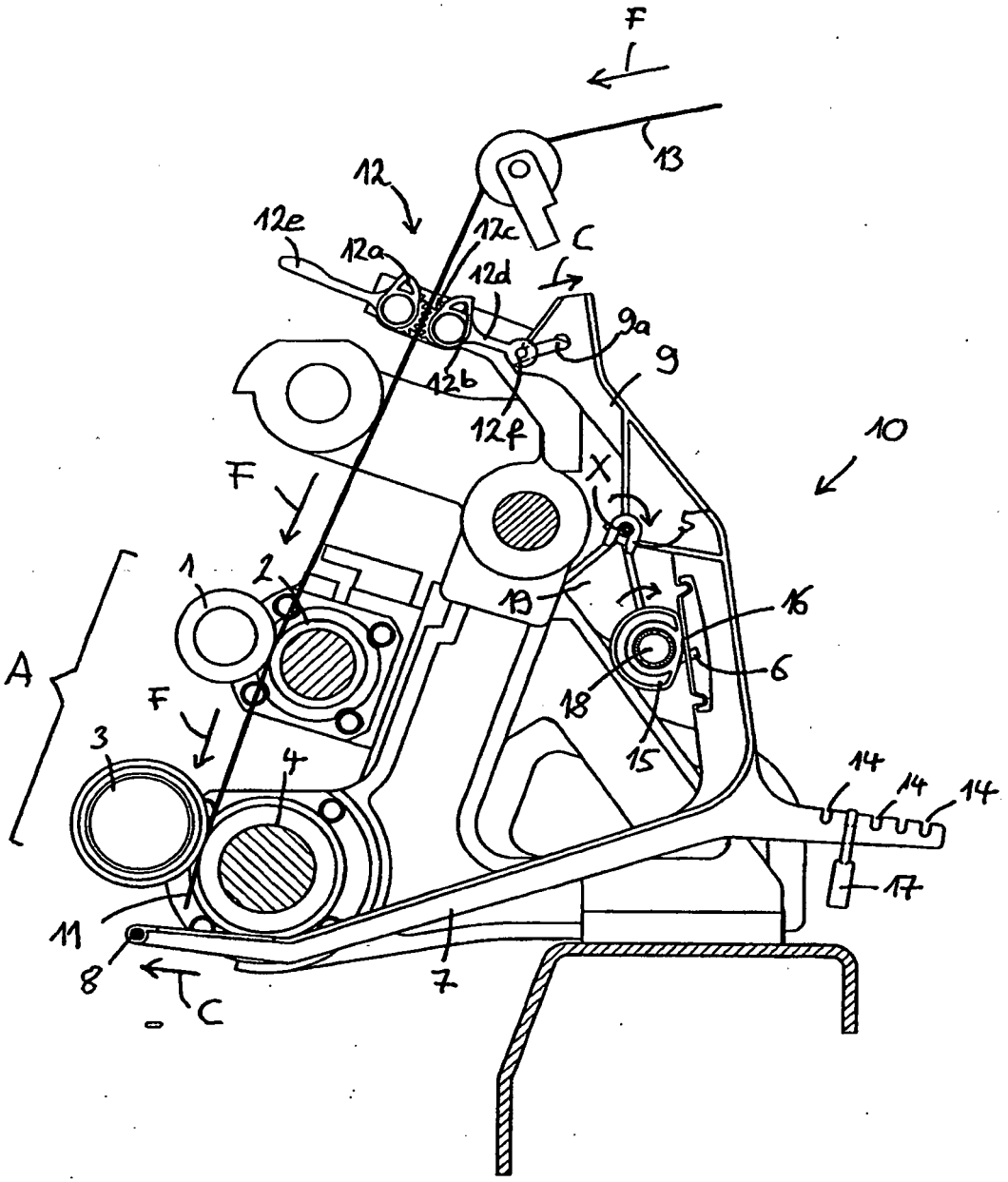
F
13
12
12e
12a
12c
C
12d
9a
9
12b
12f
10
F
X
5
A
1
2
13
16
6
18
F
15
3
4
14
14
14
17
11
8
C
7

Fig. 4

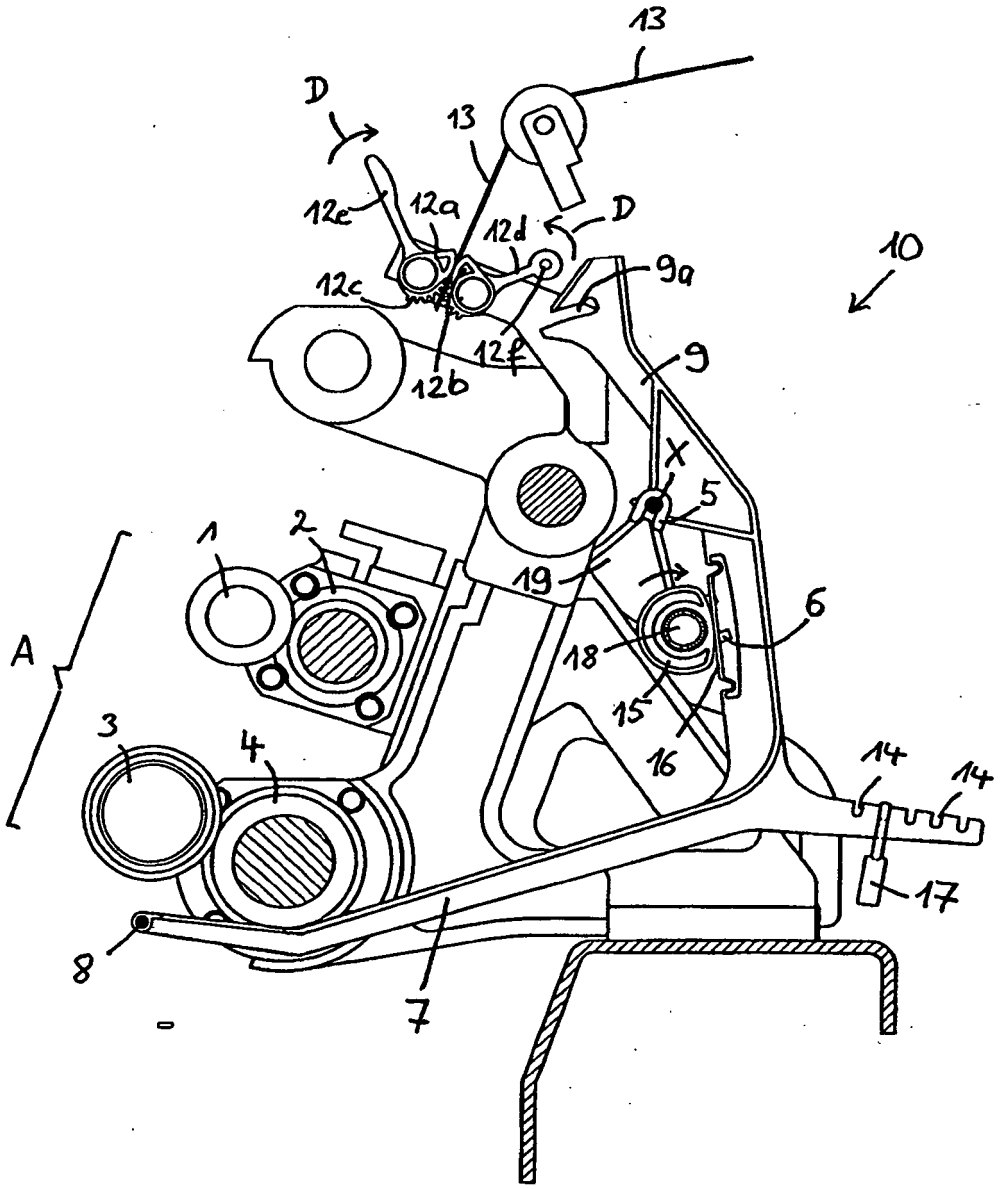
13
D
13
12e
12a
12d
D
10
12c
9a
12f
9
12b
X
5
1
2
19
6
A
18
3
4
15
16
14
14
17
8
7

Fig.5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- FR 2050634 A5 **[0001]**