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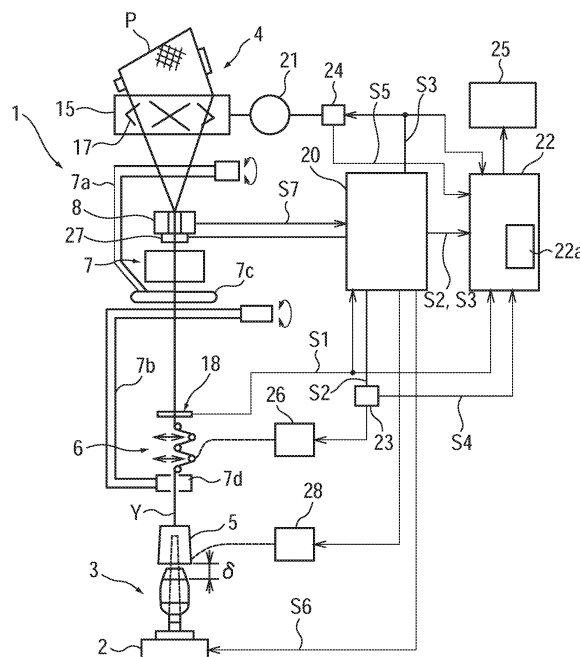
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(54) **Automatic winder and method for detecting malfunction in automatic winder**

(57) The present invention provides an automatic winder including a winding unit (1) guiding a yarn (Y) unwound from a yarn supplying bobbin (3) through a yarn path to a yarn winding device (4) and winding the yarn (Y) into a package (P) in the yarn winding device (4) to manufacture the package (P). The automatic winder includes a tension sensor (18) measuring tension of the yarn (Y) passing through the yarn path, and a component malfunction detecting section (22) detecting any of a plurality of components of the winding unit (1) which is malfunctioning, based on a tension measured value detected by the tension sensor (18).

FIGURE 2



Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to an automatic winder including a winding unit that winds a yarn unwound from a yarn supplying bobbin into a package in a yarn winding device to manufacture the package, and a method for detecting malfunction in the automatic winder which method detects any of the components of the winding unit which is malfunctioning.

Description of Related Art

[0002] Figure 1 is a diagram showing an example of the general configuration of a winding unit in a conventional automatic winder. The winding unit 1 includes a yarn supplying bobbin 3 located at the bottom of the winding unit 1 and insertingly installed upright on a tray 2 and a yarn winding device 4 located at the top of the winding unit 1 to wind a yarn Y unwound from the yarn supplying bobbin 3 into a package P. A yarn unwinding assisting device 5, a tension applying portion 6, a splicer (yarn splicing device) 7, and a slub catcher 8 are provided in this order along a yarn path between the yarn supplying bobbin 3 and the yarn winding device 4; the yarn unwinding assisting device 5 is located lowest among these members.

[0003] The slub catcher 8 includes an integral or separate cutter (not shown in the drawings) so that when a yarn defect is detected, the corresponding portion can be immediately cut with the cutter. A package P side yarn end and a yarn supplying bobbin 3 side yarn end resulting from the cutting are guided to the splicer 7 by yarn end catching portion (not shown in the drawings) for catching the respective yarn ends using suction air. The splicer 7 then splices the yarn ends. Guides 9, 10, 11 are provided, for example, above and below the slub catcher 8 and below the splicer 7 to guide the traveling yarn Y. A plate 12 is provided in a direction crossing the yarn path. A U-shaped guide groove 13 is formed in the plate 12. The guide groove 13 is substantially formed of and partitioned by a hard chip such as ceramic.

[0004] The yarn winding device 4 includes a traverse drum 15 rotated by a driving drum 14, and a cradle 16 that supports the package P so that the package P can rotate in contact with the traverse drum 15 under an appropriate pressure. A traverse groove 17 is formed in a peripheral surface of the traverse drum 15 to wind the yarn Y into the package P while traversing the yarn Y over an appropriate range. The driving drum 14 is driven by a motor (not shown in the drawings).

[0005] In the winding unit 1 configured as described above, the tension applying portion 6 conventionally adjusts winding tension based on empirical rules. That is, the tension applying portion 6 reduces the tension with

increasing winding diameter of the package P so as to set the winding density of the package P to an ideal value. For example, the cradle 16, which supports the package P, is linked to the tension applying portion 6 via a lever link mechanism so as to reduce the tension exerted by the tension applying portion 6 in a correlation with movement of the cradle 16. However, this tension adjustment cannot deal with a possible variation in tension during winding. Then, for example, the tension may disadvantageously become excessive to break the yarn Y or make the winding shape of the package P improper.

[0006] To solve this problem, the Unexamined Japanese Patent Application Publication (Tokkai-Hei) No. 10-87175 discloses that a tension sensor 18 is provided at a traverse support point position of the traverse drum 15 to measure the winding tension of the yarn Y during winding. A controller (not shown in the drawings) controls a driving section for the tension applying portion 6 based on a tension measured value obtained by the tension sensor 18. The controller then performs feedback control such that the yarn Y is wound under an optimum winding tension at which possible yarn breakage or the like is prevented. To adjust the winding tension, the following operation may be performed besides the control of the driving section for the tension applying portion 6: the controller outputs a control signal to a motor (not shown in the drawings) that drives the driving drum 14, which drives the traverse drum 15, to control the rotation number of the motor to change the peripheral speed of the package P.

BRIEF SUMMARY OF THE INVENTION

[0007] As described above, the winding unit 1 includes a large number of components such as the yarn unwinding assisting device 5, the tension applying portion 6, the splicer 7, the slub catcher 8, and the yarn winding device 4 which are provided in the winding unit 1 along the yarn path. Any of the components may malfunction during operation. When any component malfunctions during operation, detecting which of the components is malfunctioning is difficult.

[0008] An object of the present invention is to provide an automatic winder that detects any malfunctioning winding unit component to be easily based on a tension measured value from a tension sensor measuring the winding tension of a yarn being wound, and a method of detecting malfunctioning in the automatic winder.

[0009] To accomplish this object, the present invention provides an automatic winder including a winding unit guiding a yarn unwound from a yarn supplying bobbin through a yarn path to a yarn winding device and winding the yarn into a package in the yarn winding device to manufacture the package. The winding unit comprises a tension sensor measuring tension of the yarn. The automatic winder includes a component malfunction detecting section for detecting any of a plurality of components of the winding unit which is malfunctioning, based on a

tension measured value detected by the tension sensor.

[0010] When the tension sensor measures the tension applied to the yarn, a tension change condition varies between when any of the components of the winding unit is malfunctioning and when none of the components are malfunctioning. Moreover, the tension change condition (change pattern) resulting from the malfunctioning varies among the plurality of components. Thus, the component malfunction detecting section can detect which of the components is malfunctioning based on the tension change condition measured by the tension sensor. For example, the component malfunction detecting section pre-stores a tension change pattern for each of the components which is observed when the component malfunctions. Then, which of the components is malfunctioning can be easily detected by comparing a change in the tension measured value obtained by the tension sensor with the stored tension change patterns.

[0011] Furthermore, in the automatic winder, the component malfunction detecting section has a storage section in which a plurality of tension patterns are stored, the plurality tension patterns are an optimum winding tension and tension patterns obtained when the respective components malfunction, and when a tension measured value obtained by the tension sensor (18) deviates from the optimum tension pattern, the tension measured value is compared with each of the tension patterns obtained when the respective components malfunction, to determine a malfunctioning component. Thus, the malfunctioning component is determined.

[0012] Furthermore, in the present invention, the automatic winder includes a tension applying portion applying tension to the yarn passing through the yarn path and a driving section driving the tension applying portion. The tension measured value obtained by the tension sensor is fed back to a controller which then controls the tension applied by the tension applying portion. The component malfunction detecting section determines that the tension applying portion is malfunctioning when the tension remains unchanged even through the controller transmits an appropriate tension applying portion control signal to the driving section for the tension applying portion based on the tension measured value.

[0013] Where the tension applying portion is defective, even though the controller transmits an appropriate tension applying portion control signal to the tension applying portion based on the tension measured value, the tension applying portion fails to apply the appropriate tension to the yarn according to the tension applying portion control signal. Thus, where the tension remains unchanged even though the controller transmits the appropriate tension applying portion control signal to the tension applying portion based on the tension measured value, the component malfunction detecting section easily determines that the tension applying portion is malfunctioning. An away-from-tension applying portion condition can be similarly sensed in which the tension applying portion per se is not defective but the yarn fails to pass

through the tension applying portion and travels away from the tension applying portion.

[0014] According to the present invention, the automatic winder includes a controller controlling rotation number of a motor driving the yarn winding device to control the tension of the yarn passing through the yarn path. The tension measured value obtained by the tension sensor is fed back to the controller which then controls the tension. When the tension remains unchanged even though the controller transmits an appropriate motor control signal to the motor based on the tension measured value, the component malfunction detecting section determines that the yarn winding device is malfunctioning.

[0015] Where the yarn winding device including the traverse drum, the driving drum, the drum driving motor, and the cradle is defective, even when the controller transmits the appropriate control signal to the motor based on the tension measured value, the package fails to be properly rotated according to the control signal. This prevents the appropriate tension from being applied to the yarn. Therefore, where the tension remains unchanged even though the component malfunction detecting means transmits the appropriate motor control signal to the motor based on tension measured value, the component malfunction detecting section can easily determine that the yarn winding device is defective.

[0016] According to the present invention, the automatic winder is characterized in that the component malfunction detecting section determines that the yarn supplying bobbin has fallen down when a tension change in a particular waveform is observed in the tension measured value obtained by the tension sensor.

[0017] When the yarn supplying bobbin falls down, the tension applied to the yarn exhibits a variation in the particular waveform as described below. Therefore, when the tension sensor detects a tension change in the particular waveform, the component malfunction detecting means determines that the yarn supplying bobbin has fallen down.

[0018] According to the present invention, the automatic winder is characterized in that when the tension increases in proportion to unwinding of the yarn from the yarn supplying bobbin, the component malfunction detecting section determines that the yarn unwinding assisting device controlling an unwinding balloon from the yarn supplying bobbin is malfunctioning.

[0019] As described below, the yarn unwinding assisting device has the function of inhibiting a possible variation in tension applied to the yarn unwound from the yarn supplying bobbin and a possible increase in tension associated with progression of the unwinding. Thus, when the tension increases in proportion to the unwinding of the yarn from the yarn supplying bobbin, the component malfunction detecting section can easily determine that the yarn unwinding assisting device is malfunctioning.

[0020] Furthermore, the present invention provides a

method for detecting malfunction in an automatic winder including a winding unit that guides a yarn unwound from a yarn supplying bobbin through a yarn path to a yarn winding device winding the yarn into a package in the yarn winding device to manufacture the package, the method detecting any malfunctioning winding unit component of the automatic winder. The method uses a tension sensor measuring tension of a yarn passing through a yarn path and a tension measured value detected by the tension sensor to detect any of components of the winding unit which is malfunctioning.

[0021] Where any of the components provided in the winding unit malfunctions, the tension applied to the yarn passing through the yarn path changes. The tension change resulting from the malfunctioning component varies among the components. Thus, any malfunctioning component can be easily detected based on the condition of the change in the tension measured value from the tension sensor.

[0022] The present invention allows which of the plurality of components provided in the winding unit is malfunctioning to be detected based on the tension measured value from the tension sensor. This enables the malfunctioning to be dealt with immediately after the malfunctioning has occurred. Checking a record of past improper tensions allows estimation of a yarn winding length corresponding to a point in time when the operation on the package has become improper. This enables the improper part of the yarn to be unwound and removed.

[0023] Other features, elements, processes, steps, characteristics and advantages of the present invention will become more apparent from the following detailed description of preferred embodiments of the present invention with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024]

Figure 1 is a diagram showing an example of the configuration of a winding unit in a conventional automatic winder.

Figure 2 is a diagram showing an example of the configuration of a winding unit in an automatic winder including a component malfunction detecting section according to the present invention.

Figure 3 is a diagram showing an example of variation in the unwinding tension of a yarn supplying bobbin.

Figure 4 is a diagram showing an example of variation in an unwinding tension measured value obtained by a tension sensor sensing the tension via a piezoelectric element.

Figure 5 is a diagram showing an example of variation in an unwinding tension measured value obtained by a tension sensor detecting the tension via a piezo element.

Figure 6 is a diagram showing an example of variation in an unwinding tension measured value obtained by a tension sensor detecting the tension via a micro-distance sensor.

Figure 7 is a diagram showing an example of variation in unwinding tension measured value observed where the yarn supplying bobbin falls down.

Figure 8 is a diagram showing an example of variation in unwinding tension measured value observed when a yarn unwinding assisting device malfunctions.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0025] An embodiment of the present invention will be described with reference to the drawings. Figure 2 shows an example of the general configuration of a winding unit in an automatic winder according to the present invention, and the general configuration of a component malfunction detecting section for detecting any malfunctioning component of the winding unit. In Figure 2, components denoted by the same reference numerals as those in Figure 1 are the same as the corresponding components in Figure 1. The winding unit 1 includes a controller 20 that controls tension applied to a yarn Y. A tension measured value signal S1 is input to the controller 20; the tension measured value signal S1 is obtained by a tension sensor 18.

[0026] Based on the input tension measured value signal S1, the controller 20 outputs a control signal S2 allowing a driving section (solenoid) 26 for a tension applying portion 6 to be controlled. The controller 20 thus controllably subjects the yarn Y to an optimum winding tension under which the yarn Y is prevented from being broken. That is, the controller 20 performs feedback control such that the tension measured value signal S1 obtained by the tension sensor 18 is fed back to the controller 20. For example, as shown in Figure 3, the winding tension applied when the yarn Y is unwound from one yarn supplying bobbin 3 tends to increase as the operation approaches the end of the unwinding (see a part of Figure 3 denoted by reference numeral 31). The winding tension is kept optimum by performing control such that the adverse effect of the above-described tendency is eliminated.

[0027] The optimum value of the winding tension is varied depending on the winding diameter of a package P. For an inner layer portion corresponding to the start of winding, a higher tension is set to increase winding density. For an outer layer portion, a lower tension is set to reduce the winding density. To adjust the winding tension, a control signal S2 may be output to the driving section 26 for the tension applying portion 6 to control operation of the tension applying portion 6. Alternatively, the controller 20 may output a control signal S3 to a motor 21 for a yarn winding device 4. The rotation number of the motor 21 may be controlled via the control signal S3

so as to control the rotation number of a driving drum 14 that drives a traverse drum 15 to change the peripheral speed of the package P. The rotational control of the yarn winding device 4 allows the winding tension to be reliably controlled.

[0028] The slub catcher 8 includes an integral or separate cutter 27. The slub catcher 8 detects a defect in the yarn Y and outputs a yarn defect detection signal S7 to the controller 20. Then, the cutter 27 is immediately driven to cut the defective portion. A package P side yarn end and a yarn supplying bobbin 3 side yarn end of the cut yarn Y are caught by yarn end catching portion 7a, 7b including an upper yarn end suction port 7c and a lower yarn end suction port 7d. The yarn ends are then guided to a splicer 7 for yarn splicing. When the unwinding of the yarn Y from the yarn supplying bobbin 3 is completed, the controller 20 outputs, to a tray 2, a yarn supplying bobbin switching signal S6 allowing the yarn supplying bobbin 3 to be switched to a new one. The yarn unwinding assisting device 5 is controlled by the controller 20 via a driving mechanism 28 so as to maintain the distance δ between the lower end of the yarn unwinding assisting device 5 and a chase portion from the yarn supplying bobbin 3 substantially constant.

[0029] Reference numeral 22 is a component malfunction detecting section that detects when any of the components provided in the winding unit 1 malfunctions. The tension measured value signal S1 obtained by the tension sensor 18 is input to the component malfunction detecting section 22. A detection control signal S4 is input to the component malfunction detecting section 22; the detection control signal S4 indicates that a sensor 23 has detected the control signal S2, output to the driving section 26 for the tension applying portion 6 by the controller 20. Moreover, a detection control signal S5 is input to the component malfunction detecting section 22; the control signal S5 indicates that a sensor 24 has detected the control signal S3, output to the motor 21 by the controller 20. A display section 25 is connected to the component malfunction detecting section 22. The component malfunction detecting section 22 monitors the tension measured value signal S1 obtained by the tension sensor 18. The component malfunction detecting section 22 determines, through the monitoring, whether or not any of the components of the winding unit 1 is malfunctioning, based on the condition of a change in tension measured value. When any of the components is malfunctioning, the component malfunction detecting section 22 stores the name of the malfunctioning component, the occurrence time of the malfunctioning, and the like in a storage section 22a. The component malfunction detecting section 22 displays the name of the malfunctioning component, the occurrence time of the malfunctioning, and the like on the display section 25.

[0030] The controller 20 inputs the control signals S2, S3 to the component malfunction detecting section 22; the control signal S2 is output to the driving section of the tension applying portion 6 by the controller 20, and

the control signal S3 is output to the motor 21 by the controller 20. The controller 20 outputs the appropriate control signal S2 to the driving section of the tension applying portion 6 based on the tension measured value signal S1. The component malfunction detecting section 22 has the function of determining that the tension applying portion 6 (including the driving section 26) is malfunctioning if the tension measured value signal S1 remains unchanged even though the appropriate control signal S2 has been output. The component malfunction detecting section 22 has the function of determining that the yarn winding device 4 is malfunctioning where the tension measured value signal S1 remains unchanged even though the appropriate control signal S3 has been output to the motor 21 based on the tension measured value signal S1.

[0031] The component malfunction detecting section 22 has the function of determining that the yarn supplying bobbin 3 has fallen down where the tension measured value signal S1 exhibits a tension a change in particular waveform as shown below. The component malfunction detecting section 22 has the function of determining that the yarn unwinding assisting device 5, controlling an unwinding balloon from the yarn supplying bobbin 3, is malfunctioning where the tension increases in proportion to the unwinding of the yarn from the yarn supplying bobbin 3, as described below.

[0032] Figures 4 to 6 are diagrams showing the tension measured value obtained by the tension sensor 18 when the yarn Y is unwound from one yarn supplying bobbin 3. Figure 5 shows the tension measured value obtained using a tension sensor that detects the tension via a piezoelectric element. Figure 6 shows the tension measured value obtained using a tension sensor that detects the tension via a piezo element. Figure 7 shows the tension measured value obtained using a tension sensor that detects the tension via a micro-distance sensor. In Figures 4 to 6, a portion T1 shows a change in tension measured value observed when pieces of the tension applying portion 6 are opened (tension applying portion open). A portion T2 shows a change in tension measured value observed when the pieces of the tension applying portion 6 are pressed the yarn Y (tension applying portion press). A portion T3 shows a change in tension measured value observed when the yarn supplying bobbin 3 comes into contact with the yarn unwinding assisting device 5 (bobbin contact).

[0033] As shown in Figures 4 to 6, the change in tension measured value varies slightly depending on a difference in the measurement principle of the tension sensor 18. However, the tension measured value changes similarly when malfunctioning such as "tension applying portion open", "tension applying portion press", or "bobbin contact" occurs. That is, based on the change in the tension measured value from the tension sensor 18, defects in the tension applying portion 6 and the yarn unwinding assisting device 5, components provided in the winding unit 1, can be detected.

[0034] Where the yarn supplying bobbin 3 falls down, the tension measured value from the tension sensor 18 exhibits a change in a particular waveform as shown in Figure 7. Thus, when the tension measured value exhibits a change in the particular waveform, the component malfunction detecting section 22 can determine that the yarn supplying bobbin 3 has fallen down. The yarn unwinding assisting device 5 may malfunction and fail to control the balloon. In this case, as shown in Figure 8, the tension measured value increases as the unwinding of the yarn supplying bobbin 3 progresses (time elapses). When the tension measured value increases above a predetermined value, the component malfunction detecting section 22 can determine that the yarn unwinding assisting device 5 is malfunctioning.

[0035] As described above, the condition of a change in tension measured value from the tension sensor 18 resulting from the malfunctioning of any of the components of the winding unit 1 varies among the components. Thus, a change in tension measured value observed when each component malfunctions is patterned and pre-stored in the storage section 22a of the component malfunction detecting section 22. Then, when an abnormal change occurs in the tension measured value from the tension sensor 18, the measured value is compared with the data stored in the storage section to allow the malfunctioning component to be detected (determined).

[0036] As described above, the component malfunction detecting section 22 can detect when any of the components provided in the winding unit 1 malfunctions, based on the tension measured value signal S1 from the tension sensor 18. That is, the component malfunction detecting section 22 can detect when the yarn unwinding assisting device 5, the tension applying portion 6, or the yarn winding device 4 malfunctions. Moreover, the component malfunction detecting section 22 can detect when the yarn supplying bobbin 3 insertingly installed upright on the tray 2 has fallen down. The component malfunction detecting section 22 allows the name of the malfunctioning component, the occurrence time of the malfunctioning, and the like to be displayed on the display section 25. This enables the malfunctioning to be dealt with immediately after the malfunction has occurred. A record of past improper tensions is stored in the storage section 22a of the component malfunction detecting section 22. Thus, checking the record allows estimation of the winding length of the yarn on the package P corresponding to the occurrence of the malfunctioning. This enables the corresponding part of the yarn to be unwound and removed.

[0037] The embodiment of the present invention has been described. However, the present invention is not limited to the above-described embodiment. The embodiment of the present invention can be varied without departing from the technical scope described in the claims, the specification, and the drawings. In the above-described embodiment, the controller 20 and the component malfunction detecting section 22 are separate from

each other. However, the present invention is not limited to this aspect. For example, the functions of the controller 20 and the functions of the component malfunction detecting section 22 can be provided by, for example, one personal computer. This enables one personal computer to implement both the controller 20 and the component malfunction detecting section 22.

[0038] Although not shown in the drawings, when the automatic winder includes a plurality of winding units, one component malfunction detecting section 22 is provided. The one component malfunction detecting section 22 detects which of the components is malfunctioning and to which of the winding units the malfunctioning component belongs, to display the detection result on the display section. The component malfunction detecting section 22 may further store a record of past improper tensions in the storage section.

[0039] While the present invention has been described with respect to preferred embodiments thereof, it will be apparent to those skilled in the art that the disclosed invention may be modified in numerous ways and may assume many embodiments other than those specifically set out and described above. Accordingly, it is intended by the appended claims to cover all modifications of the present invention that falls within the true spirit and scope of the present invention.

Claims

1. An automatic winder including a winding unit (1) guiding a yarn unwound from a yarn supplying bobbin through a yarn path to a yarn winding device (4) and winding the yarn into a package in the yarn winding device to manufacture the package, the automatic winder being **characterized by** including a tension sensor (18) measuring tension of the yarn passing through the yarn path, and a component malfunction detecting section (22) detecting any of a plurality of components of the winding unit (1) which is malfunctioning, based on a tension measured value detected by the tension sensor (18).
2. The automatic winder according to Claim 1, **characterized in that** the component malfunction detecting section (22) has a storage section (22a) in which a plurality of tension patterns are stored, the plurality tension patterns are an optimum winding tension and tension patterns obtained when the respective components malfunction, and when a tension measured value obtained by the tension sensor (18) deviates from the optimum tension pattern, the tension measured value is compared with each of the tension patterns obtained when the respective components malfunction, to determine a malfunctioning component.
3. The automatic winder according to Claim 1 or Claim

- 2, further comprising a tension applying portion (6) applying tension to the yarn passing through the yarn path and a tension applying portion driving section driving the tension applying portion (6), the tension measured value obtained by the tension sensor (18) being fed back to a controller (20) which then controls the tension applied by the tension applying portion (6), the automatic winder being **characterized in that** the component malfunction detecting section (22) determines that the tension applying portion (6) is malfunctioning when the tension remains unchanged even through the controller (20) transmits an appropriate tension applying portion control signal to the tension applying portion driving section based on the tension measured value.
4. The automatic winder according to Claim 1 or Claim 2, further comprising a controller (20) controlling rotation number of a motor (21) driving the yarn winding device (4) to control the tension of the yarn passing through the yarn path, the tension measured value obtained by the tension sensor (18) being fed back to the controller (20) which then controls the tension, the automatic winder being **characterized in that** when the tension remains unchanged even though the controller (20) transmits an appropriate motor control signal to the motor based on the tension measured value, the component malfunction detecting section (22) determines that the yarn winding device (4) is malfunctioning.
5. The automatic winder according to Claim 1, **characterized in that** the component malfunction detecting section (22) determines that the yarn supplying bobbin has fallen down when a tension change in a particular waveform is observed in the tension measured value obtained by the tension sensor (18).
6. The automatic winder according to Claim 1 or Claim 2, **characterized in that** when the tension increases in proportion to unwinding of the yarn from the yarn supplying bobbin, the component malfunction detecting section (22) determines that the yarn unwinding assisting device controlling an unwinding balloon from the yarn supplying bobbin is malfunctioning.
7. A method of detecting malfunctioning in an automatic winder including a winding unit (1) guiding a yarn unwound from a yarn supplying bobbin through a yarn path to a yarn winding device (4) and winding the yarn into a package in the yarn winding device (4) to manufacture the package, the method detecting any malfunctioning component of the winding unit in the automatic winder, the method being **characterized by** using a tension sensor (18) measuring tension of a yarn passing through a yarn path and a tension measured value detected by the tension sensor (18) to detect any of components of the winding unit (1) which is malfunctioning.

FIGURE 1

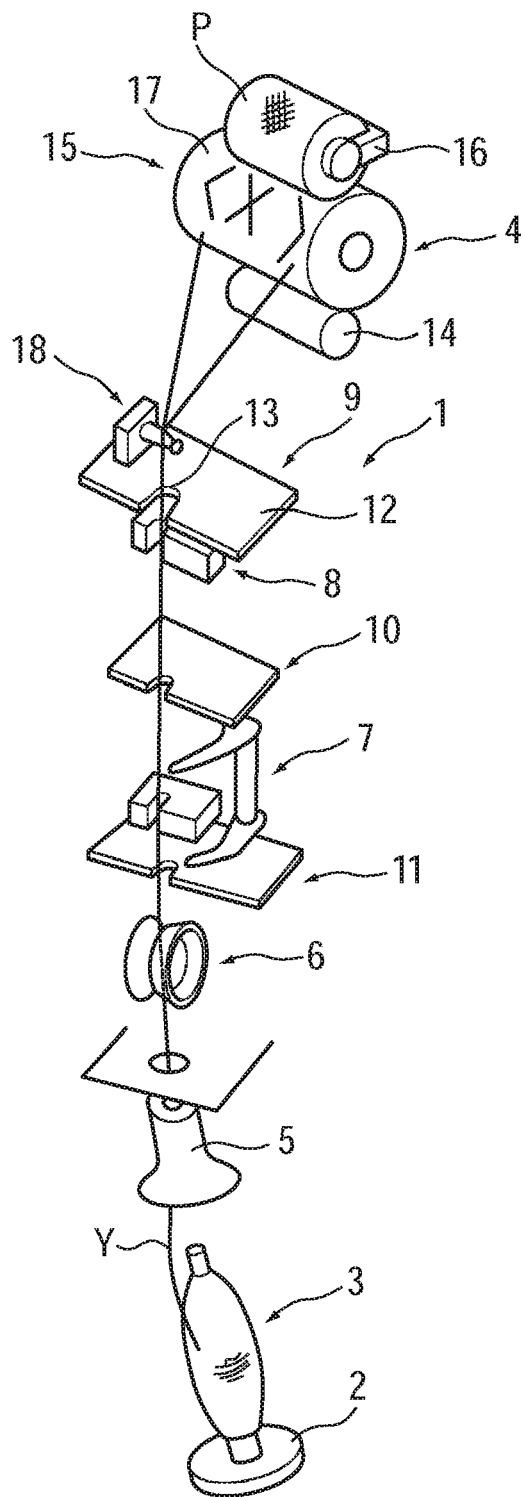


FIGURE 2

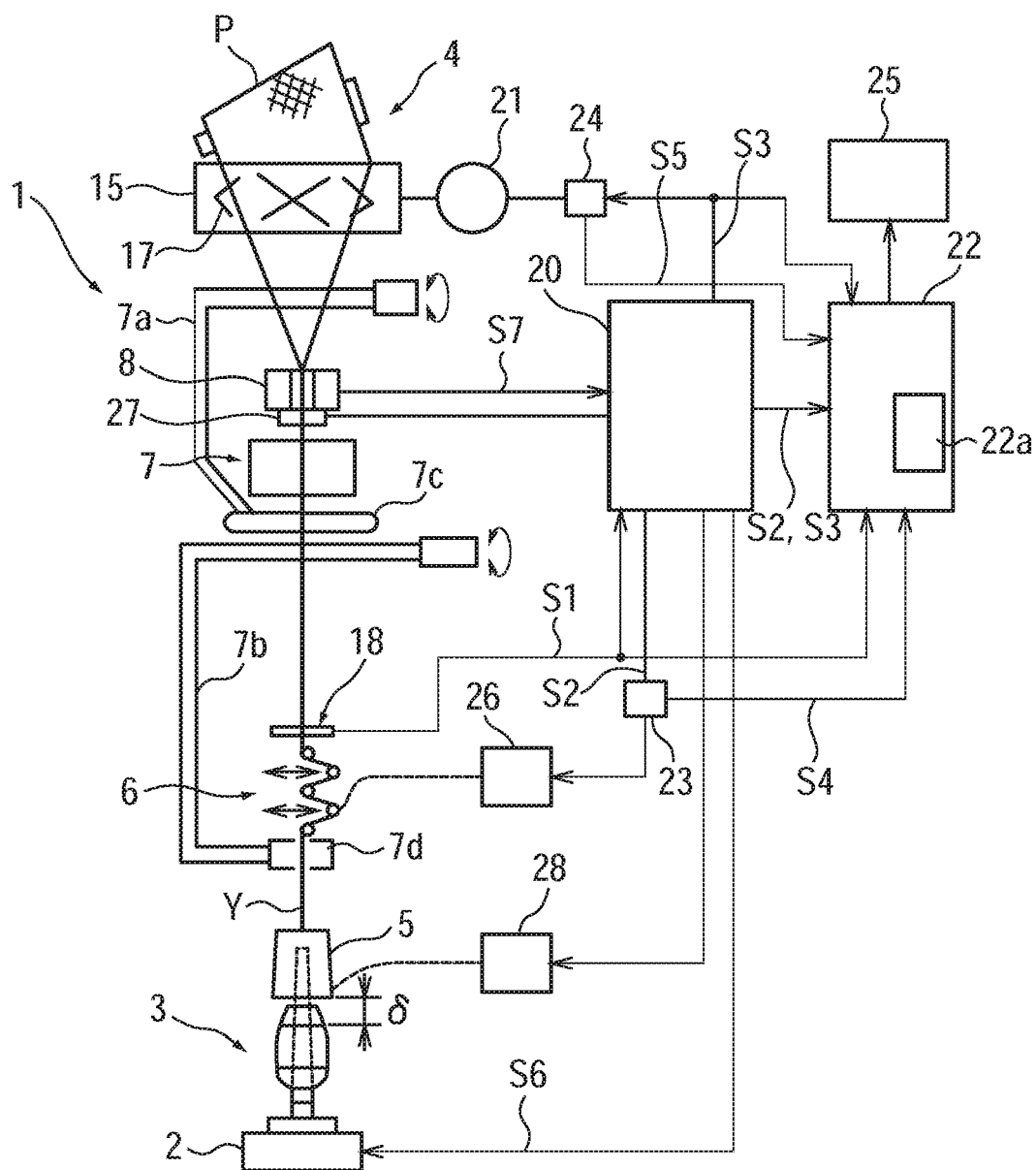


FIGURE 3

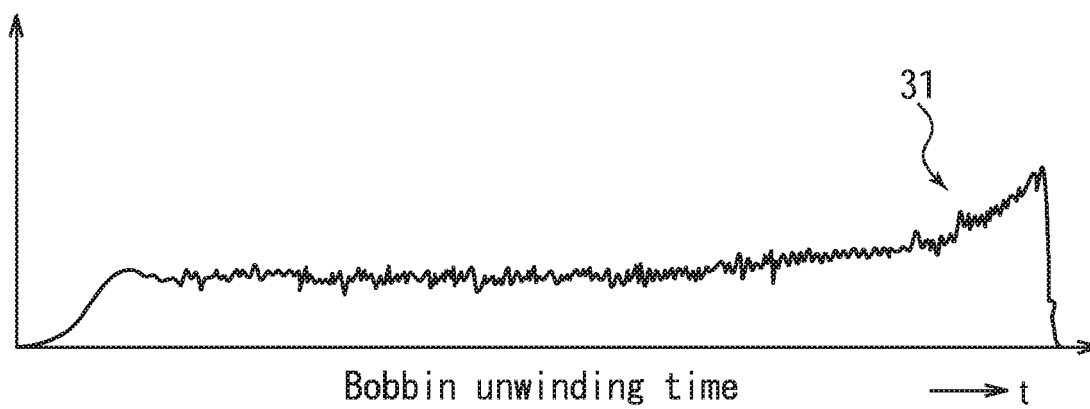


FIGURE 4

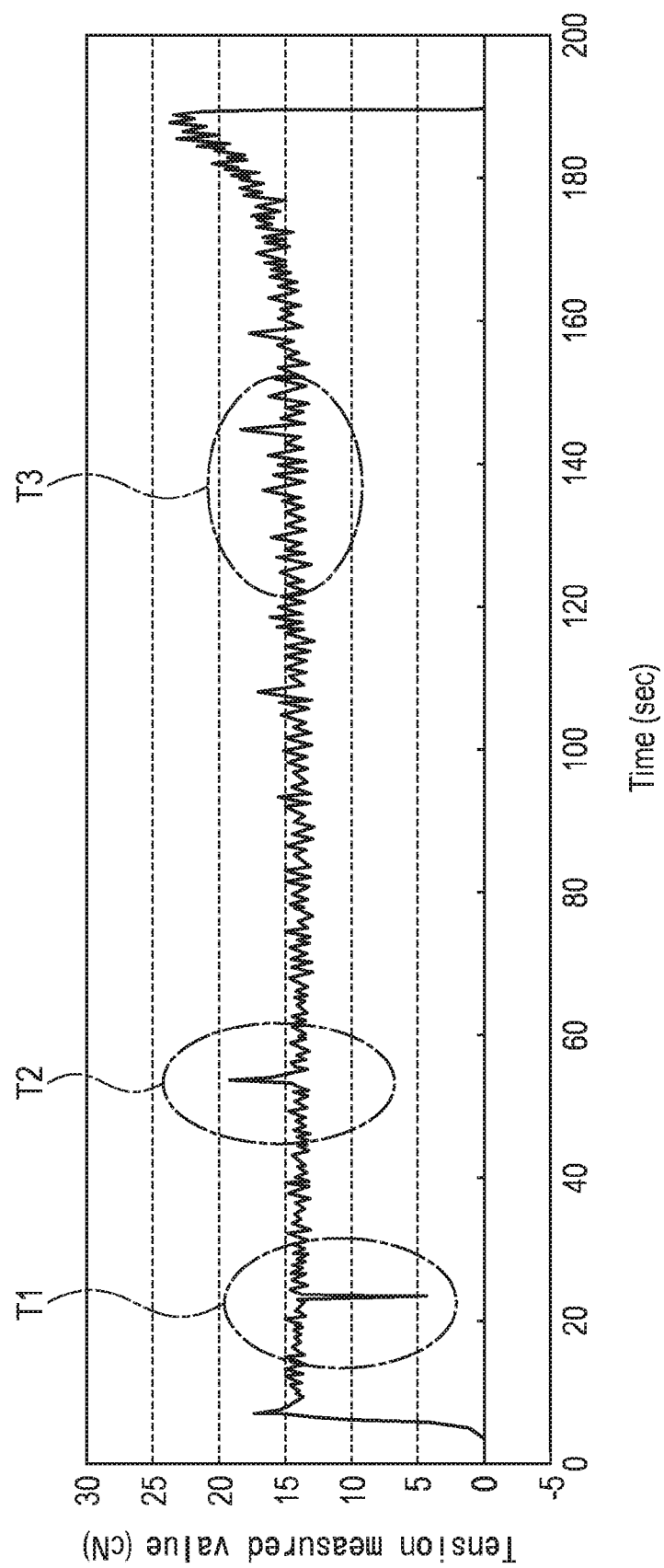


FIGURE 5

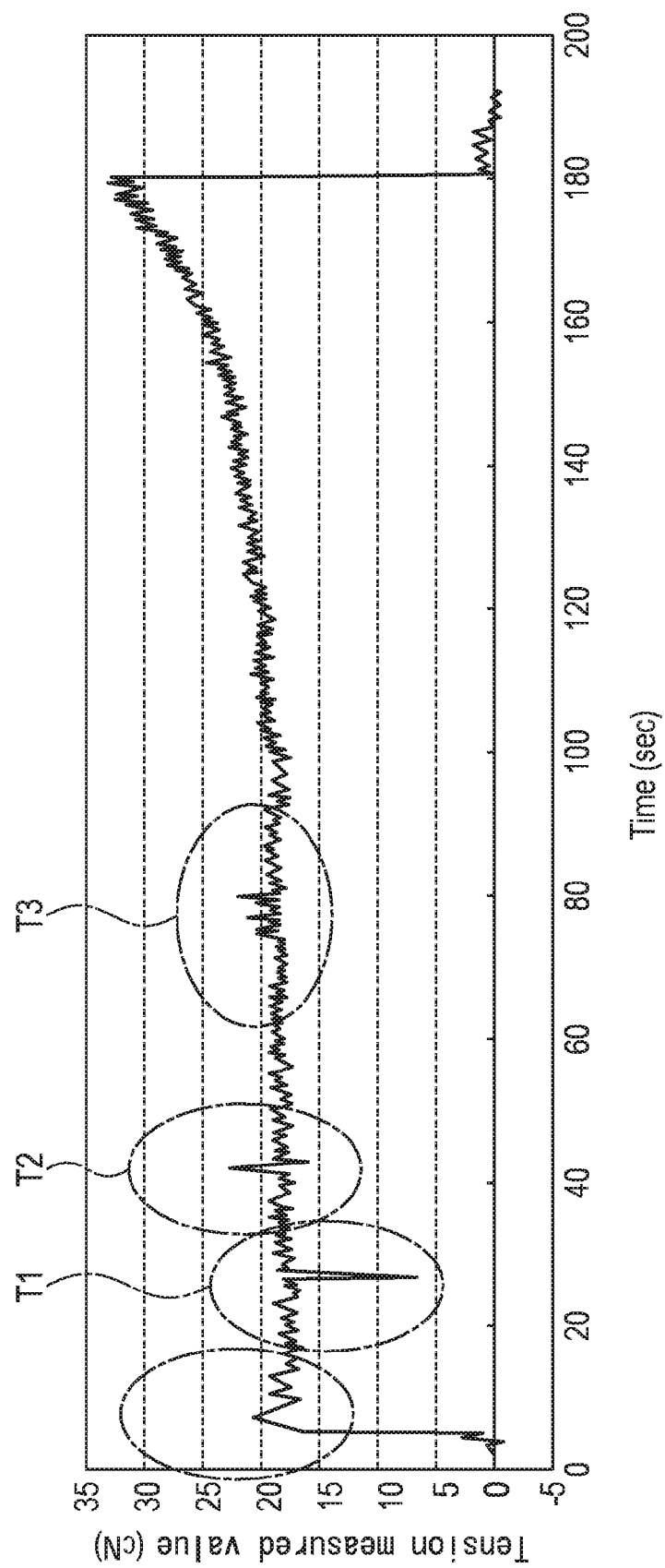


FIGURE 6

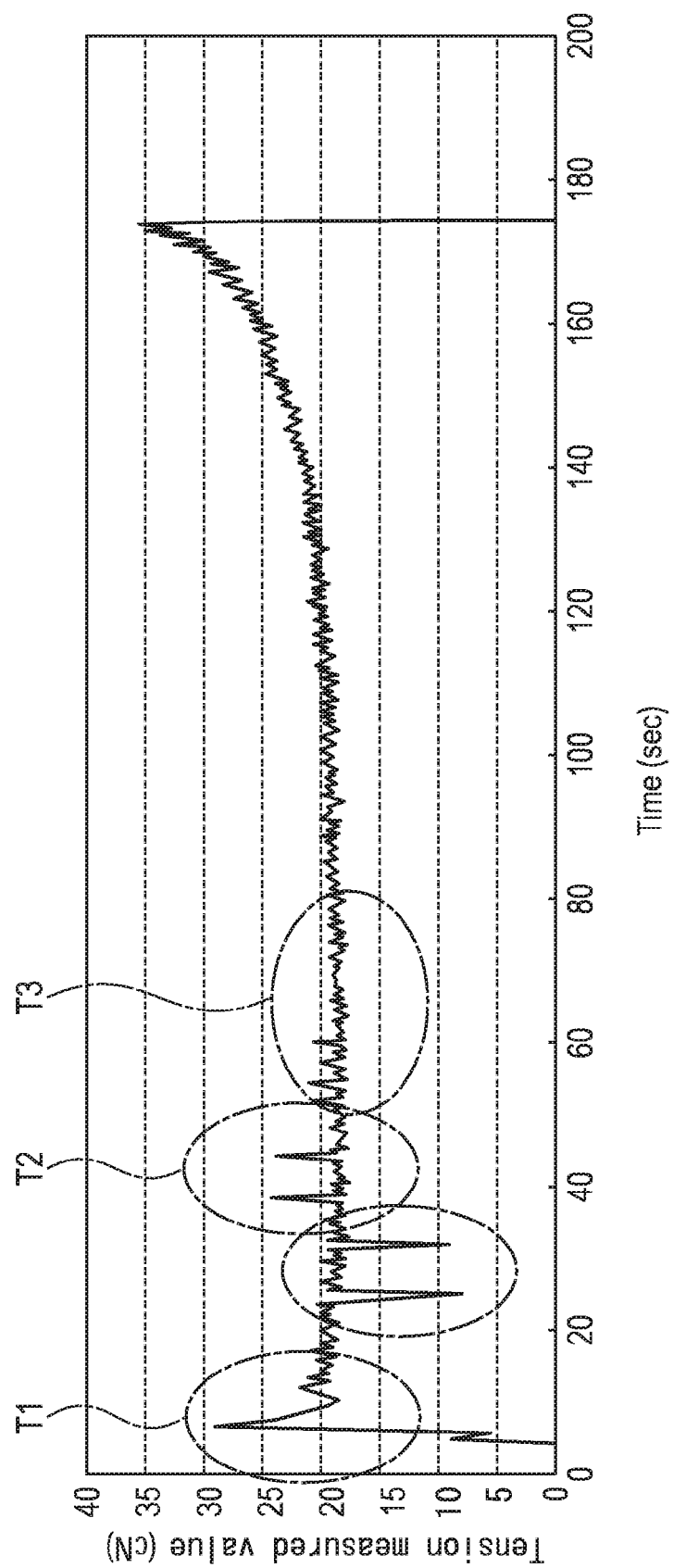


FIGURE 7

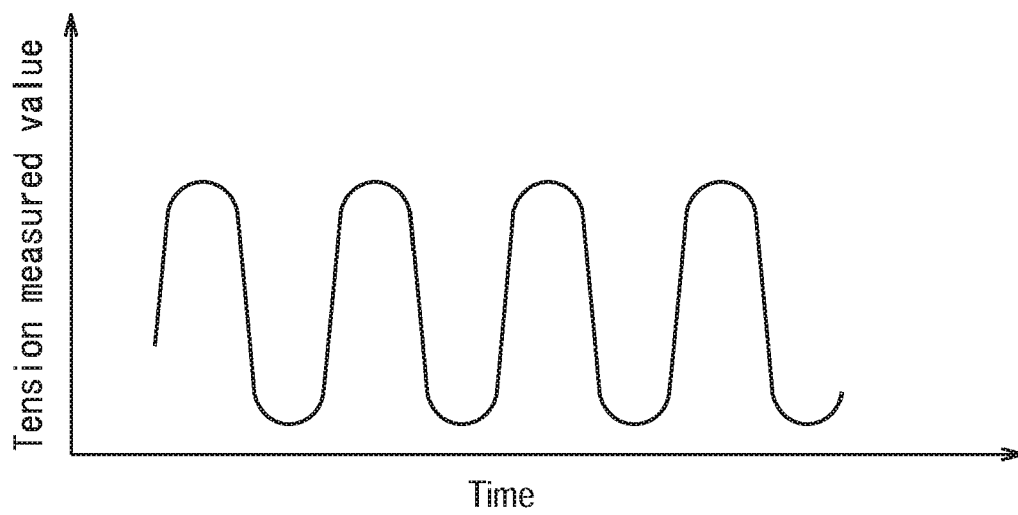
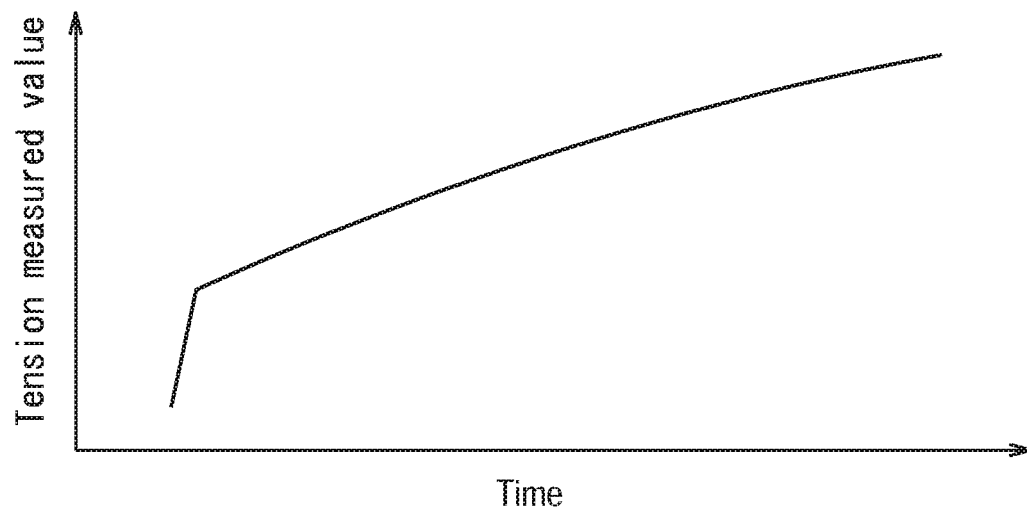


FIGURE 8



REFERENCES CITED IN THE DESCRIPTION

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