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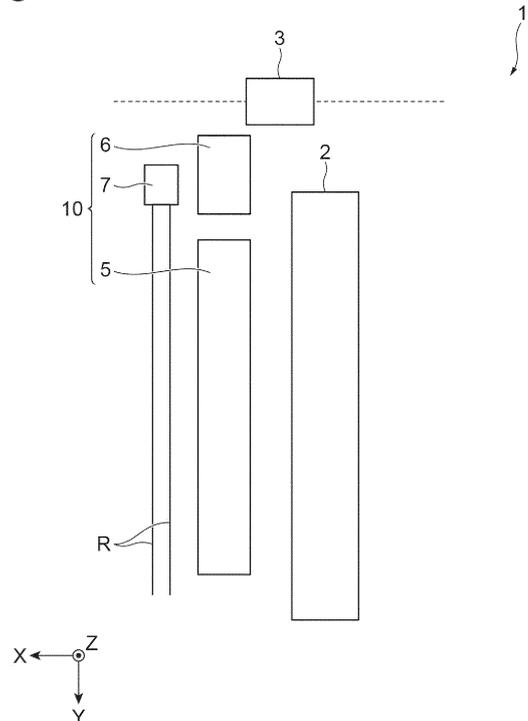
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(54) **YARN SUPPLY PACKAGE REPLACEMENT METHOD FOR CREEL STAND, YARN SUPPLY PACKAGE SUPPLY SYSTEM, AND YARN SUPPLY PACKAGE SUPPLY DEVICE**

(57) A yarn supply package replacement method includes: mounting a bobbin mounting member (11) on a yarn supply package (P) not mounted with the bobbin mounting member (11); extracting a yarn supply package (P) mounted with the bobbin mounting member (11) from a storage unit (6) by a yarn supply package supply device (7); recognizing support portion specifying information held by the bobbin mounting member (11) mounted on the yarn supply package (P) by a recognition mechanism (69, 79); attaching the yarn supply package (P) to a support portion (25) specified based on the support portion specifying information by the yarn supply package supply device (7); extracting a bobbin (B) having run out of yarn of the yarn supply package (P) from the support portion (25); removing the bobbin mounting member (11) from the bobbin (B) extracted from the support portion (25); and mounting the bobbin mounting member (11) on the yarn supply package (P).

Fig. 1



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DescriptionTECHNICAL FIELD

[0001] The invention relates to a yarn supply package replacement method for a creel stand, a yarn supply package supply system, and a yarn supply package supply device.

BACKGROUND

[0002] There is known a false-twist texturing machine which unwinds a yarn from a yarn supply package formed by winding a yarn made of synthetic fiber on a bobbin, subjects the unwound yarn to a false-twist texturing process, and winds the processed yarn in a winding device to form a winding package. The false-twist texturing machine is provided with a creel stand including a plurality of support portions respectively supporting the plurality of yarn supply packages. For example, Patent Literature 1 (Japanese Unexamined Patent Publication No. H7-68010) discloses a yarn supply stand provided with a pair of support portions (pegs) for supporting each of a plurality of yarn supply packages. In such a yarn supply stand, the yarn can be supplied to the false-twist texturing device from the other yarn supply package provided as a spare even if one yarn supply package runs out of the yarn by performing a yarn splicing process (tail splicing process) to connect the yarn of the yarn supply package supported by one of the pair of support portion and the yarn of the yarn supply package supported by the other of the pair of support portions.

[0003] In such a creel stand, when the yarn is continuously unwound from the pair of yarn supply packages and one yarn supply package runs out of the yarn, a bobbin (empty bobbin) that runs out of the yarn needs to be extracted from the support portion and a new yarn supply package needs to be supplied to the support portion. For the supply of such a new yarn supply package, a worker carries the yarn supply package from a storage unit storing a plurality of yarn supply packages to the creel stand and attaches the yarn supply package on the support portion from which the bobbin is extracted. However, there is a problem that the weight of the yarn supply package is heavy and the work burden of the worker is large.

SUMMARY

[0004] Here, as in Patent Literature 1, there is known a yarn supply package replacement system including a yarn supply package replacement device which conveys a yarn supply package to a creel stand, determines whether or not the yarn supply package supported by the creel stand is empty, and replaces the yarn supply package determined to be empty with a full yarn supply package.

[0005] In this yarn supply package replacement sys-

tem, the yarn supply package replacement device is provided with two sensors and an empty state of each yarn supply package supported by the creel stand is determined based on the relationship of the pair of yarn supply packages and two sensors. Specifically, the state of each yarn supply package supported by the creel stand is determined in three stages (full, half, little, or empty) by signals from two sensors obtained by the scanning of the yarn supply package replacement device. After it is determined that one yarn supply package is little or empty, it is determined whether or not the state of one yarn supply package is little or empty according to the state of the pair of yarn supply packages. When the state of the pair of yarn supply packages is full, it cannot be determined that the state of one yarn supply package is empty since it cannot be said that the switching of the yarn between both yarn supply packages is reliably performed. When the state of the pair of yarn supply packages is half, it is determined that the state of one yarn supply package is empty since the switching of the yarn between both yarn supply packages is performed.

[0006] However, in this yarn supply package supply system, since the timing for determining the state of each yarn supply package cannot be detected until the pair of packages changes from the full filled state to the half filled state, this time is wasted. Accordingly, a long time may be taken until one yarn package is determined to be empty from an actually empty state or the determination may be overlooked. As a result, the yarn supply package replacement device may not be able to replace an empty yarn supply package with a full yarn supply package. Thus, in this yarn supply package replacement system, the yarn supply package having run out of the yarn cannot be reliably replaced with a new yarn supply package.

[0007] Further, there is a yarn supply package replacement method in which a worker confirms that a yarn supply package is empty instead of the yarn supply package replacement device when one yarn supply package is empty and the worker removes an empty bobbin of the yarn supply package and attaches a full yarn supply package to the support portion not supported by the yarn supply package by a yarn supply package attachment device.

[0008] However, in this yarn supply package replacement method, the worker needs to input the position information of the support portion not supporting the yarn supply package to the yarn supply package attachment device. However, the position information cannot be accurately input to the yarn supply package attachment device due to an input error of the position information by the worker or a communication error of the position information to the yarn supply package attachment device. Accordingly, the yarn supply package attachment device cannot attach the yarn supply package to a desired support portion. Thus, in this yarn supply package replacement method, the yarn supply package having run out of yarn cannot be reliably replaced with a new yarn supply package.

[0009] Here, an object of an aspect of the invention is to provide a yarn supply package replacement method for a creel stand capable of reducing a work burden of a worker and reliably replacing a yarn supply package having run out of yarn with a new yarn supply package in a support portion when the yarn of the yarn supply package supported by the support portion of the creel stand runs out in the creel stand with a plurality of support portions. Further, an object of an aspect of the invention is to provide a yarn supply package supply device and a yarn supply package supply system for a creel stand for realizing the yarn supply package replacement method for the creel stand.

[0010] A yarn supply package replacement method for a creel stand according to an aspect of the invention is a yarn supply package replacement method for a creel stand using a yarn supply package supply system including a storage unit storing a plurality of yarn supply packages each formed by winding a yarn made of synthetic fiber on a bobbin, a creel stand including a plurality of support portions unwindably supporting the yarn of the yarn supply packages, a yarn supply package supply device extracting the yarn supply package from the storage unit and attaching the yarn supply package to the support portion of the creel stand, a bobbin mounting member provided to correspond to each of the plurality of support portions, being attachable to and detachable from the bobbin, and holding support portion specifying information capable of specifying the corresponding support portion, and a recognition mechanism recognizing the support portion specifying information held by the yarn supply package, the yarn supply package replacement method for the creel stand including: a first step of mounting the bobbin mounting member on the yarn supply package not mounted with the bobbin mounting member among the yarn supply packages stored in the storage unit; a second step of extracting the yarn supply package, mounted with the bobbin mounting member in the first step from the storage unit, by the yarn supply package supply device; a third step of recognizing the support portion specifying information, held by the bobbin mounting member mounted on the yarn supply package extracted by the yarn supply package supply device in the second step, by the recognition mechanism; a fourth step of attaching the yarn supply package to the support portion, specified based on the support portion specifying information recognized by the recognition mechanism in the third step, by the yarn supply package supply device; a fifth step of extracting the bobbin of the yarn supply package having run out of yarn among the yarn supply packages attached to the support portions by the yarn supply package supply device in the fourth step from the support portion; a sixth step of removing the bobbin mounting member from the bobbin extracted from the support portion in the fifth step; and a seventh step of using the bobbin mounting member removed in the sixth step as the bobbin mounting member mounted in the first step.

[0011] In this method, when the yarn of the yarn supply package supported by the support portion of the creel stand runs out, the yarn supply package having run out of yarn from the support portion can be reliably replaced with a new yarn supply package by repeating the first step to the seventh step. Further, since the yarn supply package supply device performs the work of carrying the yarn supply package to the creel stand and attaching the yarn supply package to the support portion, the work burden of the worker can be reduced. That is, it is possible to reduce the work burden of the worker and reliably replace the yarn supply package having run out of yarn with a new yarn supply package in the support portion when the yarn of the yarn supply package supported by the support portion of the creel stand runs out.

[0012] In the fourth step of the yarn supply package replacement method for the creel stand according to an aspect of the invention, in the fourth step, the yarn supply package supply device may move to a position of the support portion specified based on the support portion specifying information recognized by the recognition mechanism in the third step. In this method, even when there is a distance between the storage unit and the creel stand, the work burden of the worker can be further reduced since the yarn supply package supply device performs the work of carrying the yarn supply package from the storage unit to the creel stand and attaching the yarn supply package to the support portion of the creel stand.

[0013] A yarn supply package supply system according to an aspect of the invention includes: a storage unit which stores a plurality of yarn supply packages each formed by winding a yarn made of synthetic fiber on a bobbin; a creel stand which includes a plurality of support portions unwindably supporting the yarn of the yarn supply packages; a yarn supply package supply device which includes a supply mechanism extracting the yarn supply package from the storage unit and attaching the yarn supply package to the support portion of the creel stand; a recognition mechanism which recognizes support portion specifying information held by the yarn supply package; and a control device which controls the yarn supply package supply device and the recognition mechanism. Then, the support portion specifying information is preset information provided corresponding to each of the plurality of support portions and capable of specifying the corresponding support portion, and the control device controls the yarn supply package supply device so that the yarn supply package extracted from the storage unit is attached to the support portion specified based on the support portion specifying information recognized by the recognition mechanism.

[0014] According to this configuration, a new yarn supply package can be attached to the support portion of the creel stand having run out of yarn of the yarn supply package. Further, according to this configuration, since the yarn supply package supply device performs the work of attaching the yarn supply package to the support portion of the creel stand, the work burden of the worker can be

reduced.

[0015] In the yarn supply package supply system according to an aspect of the invention, the yarn supply package supply device may include a main body portion which is provided with the supply mechanism and a moving mechanism which moves the main body portion, and the control device may control the moving mechanism so that the main body portion moves to a position of the support portion specified based on the support portion specifying information. According to this configuration, even when there is a distance between the storage unit and the creel stand, the work burden of the worker can be further reduced since the yarn supply package supply device performs the work of carrying the yarn supply package from the storage unit to the creel stand and attaching the yarn supply package to the support portion of the creel stand.

[0016] In the yarn supply package supply system according to an aspect of the invention, the recognition mechanism may be provided in the main body portion together with the supply mechanism, and the control device may control the supply mechanism to extract the yarn supply package holding the support portion specifying information recognized by the recognition mechanism. According to this configuration, the yarn supply package supply device can receive only the yarn supply package mounted with the bobbin mounting member from the storage unit. Accordingly, the extracted yarn supply package can be reliably attached to the support portion of the creel stand.

[0017] In the yarn supply package supply system according to an aspect of the invention, the recognition mechanism may be provided in the storage unit and be attached to each storage support portion supporting each of the plurality of yarn supply packages in the storage unit, and the control device may control the supply mechanism to extract the yarn supply package holding the support portion specifying information recognized by the recognition mechanism. According to this configuration, since the yarn supply package supply device can receive only the yarn supply package mounted with the bobbin mounting member from the storage unit, the extracted yarn supply package can be reliably attached to the support portion of the creel stand.

[0018] In the yarn supply package supply system according to an aspect of the invention, a bobbin mounting member covering one opening portion of the bobbin having a tubular form may be removably mounted to the bobbin, and the support portion specifying information may be held by the bobbin mounting member. According to this configuration, the support portion specifying information can be removably attached to the yarn supply package.

[0019] In the yarn supply package supply system according to an aspect of the invention, the bobbin mounting member may be provided with an IC tag storing the support portion specifying information, and the recognition mechanism may be an IC tag reader capable of reading

the support portion specifying information stored in the IC tag. According to this configuration, the support portion specifying information can be easily held by the bobbin mounting member and the support portion specifying information held by the bobbin mounting member can be easily recognized.

[0020] A yarn supply package supply device according to an aspect of the invention is a yarn supply package supply device for extracting a yarn supply package from a storage unit storing a plurality of yarn supply packages each formed by winding a yarn made of synthetic fiber on a bobbin and attaching the yarn supply package to each support portion among a plurality of support portions including in a creel stand and unwindably supporting the yarn of the yarn supply packages, the yarn supply package supply device including: a supply mechanism which extracts the yarn supply package from the storage unit and attaches the yarn supply package to the support portion; a recognition mechanism which recognizes support portion specifying information held by the yarn supply package; and a control unit which controls the supply mechanism and the recognition mechanism. Then, the support portion specifying information is preset information provided corresponding to each of the plurality of support portions and capable of specifying the corresponding support portion, and the control unit controls the supply mechanism so that the yarn supply package extracted from the storage unit is attached to the support portion specified based on the support portion specifying information recognized by the recognition mechanism.

[0021] According to this configuration, a new yarn supply package can be reliably attached to the support portion having run out of yarn of the yarn supply package supported by the support portion of the creel stand. Further, according to this configuration, since the yarn supply package supply device performs the work of carrying the yarn supply package to the creel stand and attaching the yarn supply package on the support portion, the work burden of the worker can be reduced.

[0022] The yarn supply package supply device according to an aspect of the invention may further include: a main body portion which is provided with the supply mechanism and the recognition mechanism; and a moving mechanism which moves the main body portion. Then, the control unit may control the moving mechanism so that the main body portion moves to a position of the support portion specified based on the support portion specifying information. According to this configuration, even when there is a distance between the storage unit and the creel stand, the work burden of the worker can be further reduced since the yarn supply package supply device performs the work of carrying the yarn supply package from the storage unit to the creel stand and attaching the yarn supply package to the support portion of the creel stand.

[0023] In the yarn supply package supply device according to an aspect of the invention, the control unit may control the supply mechanism to extract the yarn supply

package holding the support portion specifying information recognized by the recognition mechanism when the recognition mechanism recognizes the support portion specifying information held by the yarn supply package located at the storage unit. According to this configuration, since the yarn supply package supply device can receive only the yarn supply package mounted with the bobbin mounting member from the storage unit, the extracted yarn supply package can be reliably attached to the support portion of the creel stand.

[0024] In the yarn supply package supply device according to an aspect of the invention, a bobbin mounting member covering one opening portion of the bobbin having a tubular form may be removably mounted to the bobbin, and the support portion specifying information may be held by the bobbin mounting member. According to this configuration, the support portion specifying information can be easily and removably attached to the yarn supply package.

[0025] In the yarn supply package supply device according to an aspect of the invention, the bobbin mounting member may be provided with an IC tag storing the support portion specifying information, and the recognition mechanism may be an IC tag reader capable of reading the support portion specifying information stored in the IC tag. According to this configuration, the support portion specifying information can be easily held by the bobbin mounting member and the support portion specifying information held by the bobbin mounting member can be easily recognized by the recognition mechanism.

[0026] According to an aspect of the invention, it is possible to reduce the work burden of the worker and reliably replace the yarn supply package having run out of yarn with a new yarn supply package in the support portion when the yarn of the yarn supply package supported by the support portion of the creel stand runs out in the creel stand with a plurality of support portions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027]

FIG. 1 is a diagram showing a configuration of a false-twist texturing system including a yarn supply package supply system according to an embodiment.

FIG. 2 is a perspective view showing a yarn supply package on which a cap is mounted.

FIG. 3 is a perspective view showing a creel stand constituting a yarn supply unit 5.

FIG. 4 is a perspective view showing a yarn supply package storage device included in the yarn supply package supply system.

FIG. 5(A) is a side view showing a yarn supply bobbin on which a cap is mounted. FIG. 5(B) is a side view showing the yarn supply package in a state in which the cap is mounted on the yarn supply bobbin. FIG. 5(C) is a front view showing the cap.

FIG. 6 is a perspective view showing a package supply device included in the yarn supply package supply system.

FIG. 7 is a top view of a state in which the package supply device attaches the yarn supply package to a peg of a creel stand seen from above.

FIG. 8 is a block diagram showing a functional configuration of the yarn supply package supply system.

FIGS. 9(A) and 9(B) are diagrams describing a yarn supply package replacement method using the yarn supply package supply system.

FIGS. 10(A) and 10(B) are diagrams illustrating the yarn supply package replacement method using the yarn supply package supply system.

DETAILED DESCRIPTION

[0028] Hereinafter, a yarn supply package supply system 10 according to an embodiment will be described with reference to the drawings. In the description of the drawings, the same elements are denoted by the same reference numerals, and overlapping descriptions are omitted.

[0029] The yarn supply package supply system 10 according to an embodiment constitutes a part of a false-twist texturing system 1. As shown in FIG. 1, the false-twist texturing system 1 includes a false-twist texturing machine 2, a conveying rack 3, a yarn supply unit 5, a yarn supply package storage device (storage unit) 6, and a yarn supply package supply device 7. The yarn supply package supply system 10 consists of the yarn supply unit 5, the yarn supply package storage device 6, and the yarn supply package supply device 7. In the following description, the "Z direction" in the drawings is the vertical direction (up and down direction), the "X direction" is the horizontal direction, and the "Y direction" is the horizontal direction perpendicular to both the X and Z directions.

[0030] The false-twist texturing system 1 processes a yarn Y supplied from a plurality of yarn supply packages P (see FIG. 2) to manufacture a winding package. The yarn Y is, for example, a synthetic fiber yarn made of thermoplastic synthetic fibers such as polyester and polyamide. The yarn supply package P is formed by winding a partially oriented yarn (POY) around a yarn supply bobbin (bobbin) B. The winding package is formed by winding a draw textured yarn (DTY) on a winding bobbin (not shown).

[0031] The false-twist texturing machine 2 subjects the yarn Y supplied from the plurality of yarn supply packages P to a false-twist texturing process and winds the processed yarn on the winding bobbin to form a winding package.

[0032] The conveying rack 3 conveys the yarn supply package P. The conveying rack 3 is configured to convey the plurality of yarn supply packages P. For example, the conveying rack 3 holds the yarn supply package P by being inserted into the yarn supply bobbin B of the yarn supply package P. The conveying rack 3 is provided with

wheels so that the conveying rack can be easily moved manually. Additionally, the conveying rack 3 may include a drive unit and may be configured to automatically travel. The conveying rack 3 conveys the yarn supply package P between a supply position where the yarn supply package P is supplied and a predetermined yarn supply package storage device 6.

[0033] As described above, the yarn supply package supply system 10 includes the yarn supply unit 5, the yarn supply package storage device 6, and the yarn supply package supply device 7. The yarn supply unit 5 is disposed adjacent to the false-twist texturing machine 2 and supplies a yarn to the false-twist texturing machine 2. The yarn supply unit 5 is disposed at a position facing a winding base 2b of the false-twist texturing machine 2 in the X direction. The yarn supply unit 5 extends in the Y direction. The yarn supply unit 5 includes a plurality of creel stands 20. The creel stand 20 holds the yarn supply package P. A plurality of creel stands 20 are arranged along the Y direction. In the yarn supply unit 5 according to this embodiment, a pair of creel stands 20 is arranged back to back in the X direction.

[0034] As shown in FIGS. 1 and 3, the creel stand 20 includes a creel base portion 21, a first support column 22, a second support column 23, a partition plate 24, and a peg (support portion) 25. The creel base portion 21 is installed on a floor surface or the like, and supports a first support column 22 and a second support column 23. The first support column 22 and the second support column 23 are erected on the creel base portion 21. The first support column 22 extends along the Z direction (vertical direction). The first support columns 22 are arranged at regular intervals in the Y direction. The first support column 22 is disposed at one side F 1 of the creel stand 20 in the X direction. The one side F 1 in the X direction is a side in which the false-twist texturing machine 2 is disposed and is a side in which the yarn Y is sent to the false-twist texturing machine 2 that performs a false-twist texturing process.

[0035] The second support column 23 extends along the Z direction. The second support columns 23 are arranged as a set of two in the Y direction, and a plurality of sets of the second support columns 23 and 23 are arranged in the Y direction. The second support column 23 is disposed on the other side F2 of the creel stand 20 in the X direction. The other side F2 in the X direction is a side in which the yarn supply package supply device 7 to be described in detail later travels and a side in which a worker performs the yarn supply package replacement work, the yarn splicing work, and the like. A group of the first support columns 22 consisting of the plurality of first support columns 22 and a group of the second support columns 23 consisting of the plurality of second support columns 23 are arranged to face each other in the X direction.

[0036] The partition plate 24 is provided to straddle the first support column 22 and the second support column 23. The partition plate 24 is a plate-shaped member and

is arranged at a predetermined interval in the Z direction. The partition plate 24 prevents the yarn supply package P from falling from the peg 25.

[0037] The peg 25 supports the yarn supply package P. The peg 25 is provided in the second support column 23. A plurality of pegs 25 are arranged at predetermined intervals in the Z direction of the second support column 23. The peg 25 is disposed between two partition plates 24 in the Z direction. Further, the pegs 25 are arranged as a set of two corresponding to a set of two second support columns 23 and 23 and a plurality of sets of (a pair of) pegs 25 and 25 are arranged in the Y direction.

[0038] In the peg 25 of this configuration, the yarn Y of the yarn supply package P supported by one of the pair of pegs 25 can be connected to the yarn Y of the yarn supply package P supported by the other of the pair of pegs 25. Specifically, the yarn end on the outer layer side of the yarn Y of the yarn supply package P supported by one of the pair of pegs 25 is connected to the yarn end on the inner layer side of the yarn Y of the yarn supply package P supported by the other of the pair of pegs 25 or the yarn end on the inner layer side of the yarn Y of the yarn supply package P supported by one of the pair of pegs 25 is connected to the yarn end on the outer layer side of the yarn Y of the yarn supply package P supported by the other of the pair of pegs 25. Accordingly, one yarn is supplied from two supply packages P and P respectively supported by the pair of pegs 25 and 25. That is, the yarn Y can be continuously supplied to the false-twist texturing machine 2.

[0039] The peg 25 includes a yarn supply package support member 251 and a peg body portion 252. The yarn supply package support member 251 supports the yarn Y of the yarn supply package P to be unwound. The yarn supply package support member 251 is a pair of bar-shaped members that extends in one direction. The pair of yarn supply package support members 251 extends along one direction and is arranged at predetermined intervals in parallel to each other. The yarn supply package support member 251 supports the yarn supply package P in such a manner that a bar-shaped member extending from a base end portion to a tip portion is inserted into a hole portion formed in the yarn supply bobbin B of the yarn supply package P. The peg 25 supports the yarn supply package P at two points by two yarn supply package support members 251 and 251.

[0040] The peg body portion 252 supports two yarn supply package support members 251. The peg body portion 252 is provided so that the yarn supply package support members 251 and 251 are rotatable around a rotation axis extending in the Z direction. The peg body portion 252 is provided with an insertion hole and the second support column 23 of the creel stand 20 is inserted through the insertion hole.

[0041] In the configuration of the peg 25 including the yarn supply package support member 251 and the peg body portion 252, the worker can manually rotate the peg 25. For example, the worker rotates the peg 25 so that

the tip of the yarn supply package support member 251 faces the side F2 shown in FIG. 3 when extracting the yarn supply bobbin B that has run out of yarn Y in the yarn supply package P or attaching a new yarn supply package P and rotates the peg 25 so that the tip of the yarn supply package support member 251 faces the side F1 shown in FIG. 3 when supplying the yarn Y to the false-twist texturing machine 2.

[0042] The yarn supply package storage device 6 shown in FIGS. 1 and 4 temporarily stores the yarn supply package P delivered from the conveying rack 3 and supplies the yarn supply package P to the yarn supply package supply device 7 which will be described later in detail. Further, the yarn supply package storage device 6 is used as a work table for the worker to mount a cap (bobbin mounting member) 11 to the temporarily stored yarn supply package P. The yarn supply package storage device 6 is installed at a position in which the yarn supply package P can be delivered between the conveying rack 3 and the yarn supply package supply device 7.

[0043] The yarn supply package storage device 6 includes a package holding unit 61, a rotating portion 62, a lower base portion 63, an upper base portion 64, a drive unit 65, and a control unit 66.

[0044] The package holding unit 61 holds the yarn supply package P (see FIG. 2). In this embodiment, a plurality (for example, sixteen) of package holding units 61 are provided, and the yarn supply package storage device 6 is configured to be able to store the plurality of yarn supply packages P. The package holding unit 61 includes a yarn supply package holding member (storage support portion) 611. The yarn supply package holding member 611 is attached to the rotating portion 62. The yarn supply package holding members 611 and 611 are a pair of bar-shaped members extending in one direction. The pair of yarn supply package holding members 611 and 611 extends in one direction and is arranged at a predetermined interval in parallel to each other. The yarn supply package holding members 611 and 611 hold the yarn supply package P in such a manner that a bar-shaped member extending from a base end portion to a tip portion is inserted into a hole portion formed in the yarn supply bobbin B of the yarn supply package P. The tip portions of the yarn supply package holding members 611 and 611 are arranged to face outward when the yarn supply package storage device 6 is viewed from above in a plan view.

[0045] The rotating portion 62 is a member that rotates with respect to the lower base portion 63 and the upper base portion 64. Specifically, the rotating portion 62 is provided so that a roller provided in the rotating portion 62 can roll on the upper surface of the lower base portion 63. The rotating portion 62 moves on the upper surface of the lower base portion 63 along the edge portion of the lower base portion 63. In this embodiment, a plurality (for example, four) of rotating portions 62 are provided and a plurality (for example, four) of yarn supply package holding members 611 are attached. That is, the yarn supply package storage device 6 of this embodiment is con-

figured to be able to store sixteen yarn supply packages P.

[0046] The lower base portion 63 rotatably supports the rotating portion 62. The lower base portion 63 supports the upper base portion 64 through a column member 631. The upper base portion 64 is disposed above the lower base portion 63. The upper base portion 64 has a housing structure and stores a motor 651 and the control unit 66. The drive unit 65 includes the motor 651 and a drive mechanism 652. The motor 651 is stored in the upper base portion 64. The drive mechanism 652 consists of a gear, a shaft, and the like and transmits a driving force generated in the motor 651 to the rotating portion 62.

[0047] The control unit 66 is stored in the upper base portion 64. The control unit 66 controls the driving of the motor 651. The control unit 66 controls the motor 651 to rotate the rotating portion 62 so that the package holding unit 61 not storing the yarn supply package P faces the conveying rack 3 and the package holding unit 61 storing the yarn supply package P faces the yarn supply package supply device 7.

[0048] Here, the yarn supply package P will be described in detail. As shown in FIG. 2, the yarn supply package P is formed by winding a partially oriented yarn (POY) around the yarn supply bobbin B. The yarn supply bobbin B is a tubular member made of a material such as paper. A cap 11 is mounted to the end portion of the yarn supply bobbin B.

[0049] Next, the cap 11 mounted to the yarn supply package P will be described. As shown in FIGS. 2, 5A, and 5B, the cap 11 is a member that is removably provided in an opening portion of the end portion of the yarn supply bobbin B. The cap 11 is made of a material such as resin. The cap 11 mainly includes an annular flange portion 11a and a cylindrical tubular portion 11b erected from the inner edge portion of the flange portion 11a. The cap 11 is mounted to the yarn supply bobbin B in such a manner that the cap is externally inserted so that the inner peripheral surface of the tubular portion 11b contacts the outer peripheral surface of the yarn supply bobbin B.

[0050] The cap 11 is provided to correspond to each of the plurality of pegs 25. For example, when thirty-two pegs 25 are provided in the creel stand 20, thirty-two caps 11 are prepared as many as the pegs 25 and peg specifying information (support portion specifying information) for identifying each corresponding peg 25 is given to each of thirty-two caps 11. That is, the cap 11 holds the peg specifying information that specifies the corresponding peg 25. Furthermore, in this embodiment, one peg 25 is provided with one cap 11 dedicated for one peg 25 and two or more caps 11 holding peg specifying information corresponding to one peg 25 are not prepared for one peg 25. The peg specifying information is configured as an identification unit 13 that can be recognized by a recognition mechanism 79 described in detail later. The identification unit 13 is attached to the flange portion

11a of the cap 11.

[0051] Next, the identification unit 13 will be described in detail. An example of the identification unit 13 is an RF (Radio Frequency) tag (IC tag), which is a known recording medium capable of recording information. Information recorded on the RF tag can be read by an RFID (radio frequency identifier) reader (IC tag reader) as the recognition mechanism 79 to be described later. That is, the RF tag as the identification unit 13 is recognized as the peg specifying information by the RFID reader as the recognition mechanism 79.

[0052] The yarn supply package supply device 7 shown in FIGS. 1 and 6 extracts the yarn supply package P from the yarn supply package storage device 6 and attaches the extracted yarn supply package P to the creel stand 20. More specifically, the yarn supply package supply device 7 attaches the yarn supply package P extracted from the yarn supply package storage device 6 to the peg 25 to which the yarn supply package P is not attached. The yarn supply package supply device 7 is provided to be movable along the extension direction (Y direction) of the rail R installed on a floor surface along the extension direction of the yarn supply unit 5 (creel stand 20).

[0053] The yarn supply package supply device 7 includes a package holding unit 71, a first support portion 72, a main body portion 73, a base portion 74, a second support portion 75, a first drive unit 76, a second drive unit 77, a third drive unit 78, the recognition mechanism 79, and a control unit (control device) 80A. The package holding unit 71, the first support portion 72, the main body portion 73, the second support portion 75, the first drive unit 76, and the second drive unit 77 constitute a supply mechanism mentioned in the invention. The base portion 74 and the third drive unit 78 constitute a moving mechanism mentioned in the invention.

[0054] The package holding unit 71 holds the yarn supply package P (see FIG. 2). The package holding unit 71 includes a yarn supply package holding member 711. The yarn supply package holding members 711 and 711 are a pair of bar-shaped member extending in one direction. The pair of yarn supply package holding members 711 and 711 extends in one direction and is arranged at a predetermined interval in parallel to each other. The yarn supply package holding members 711 and 711 hold the yarn supply package P in such a manner that a bar-shaped member extending from a base end portion to a tip portion is inserted into a hole portion formed in the yarn supply bobbin B of the yarn supply package P.

[0055] The first support portion 72 is provided to be movable in the Y direction along the main body portion 73 extending in the vertical direction. The first support portion 72 slidably supports the package holding unit 71 in the X direction through a guide member 72A. The first support portion 72 is movably attached to the main body portion 73 through a linear guide or the like. The main body portion 73 is erected on the base portion 74. The first support portion 72 moves in the Z direction along the

main body portion 73 by the driving force of the first drive unit 76.

[0056] The second support portion 75 is movably provided in the X direction with respect to the first support portion 72. The second support portion 75 suspends and supports the package holding unit 71. The second support portion 75 moves in the X direction with respect to the first support portion 72 so that the package holding unit 71 moves in the X direction with respect to the first support portion 72. The second support portion 75 moves in the X direction by the driving force of the second drive unit 77.

[0057] The first drive unit 76 and the second drive unit 77 are controlled by a control unit 80A. The first drive unit 76 and the second drive unit 77 are connected to the control unit 80A through a cable 80B. The control unit 80A is stored in the housing 80 attached to the main body portion 73. Further, electric power is supplied to the first drive unit 76 and the second drive unit 77 through a cable connected to an external power supply (not shown) and the cable 80B.

[0058] The base portion 74 is provided with a drive wheel 74a. The drive wheel 74a rolls on the rail R. The drive wheel 74a is driven by the third drive unit 78 to travel on the rail R. That is, the yarn supply package supply device 7 moves along the Y direction by the driving of the third drive unit 78. The third drive unit 78 is controlled by the control unit 80A. The third drive unit 78 is connected to the control unit 80A through the cable (not shown). Further, electric power is supplied to the third drive unit 78 through the cable (not shown) connected to the external power supply and the cable 80B.

[0059] The recognition mechanism 79 is a mechanism which recognizes an RF tag as the identification unit 13 fixed to the cap 11 attached to the yarn supply package P. The recognition mechanism 79 of this embodiment is an RFID reader capable of reading information stored in the RF tag. The information recognized by the recognition mechanism 79 is acquired by the control unit 80A. The information recognized by the recognition mechanism 79 is acquired by the control unit 80A through, for example, the cable 80B. The recognition mechanism 79 is configured to read the identification unit 13 when the yarn supply package P is inserted into the yarn supply package holding members 711 and 711.

[0060] Specifically, when the yarn supply package P is inserted into the yarn supply package holding members 711 and 711, the RF tag generates electricity when the magnetic field emitted by the RFID reader acts on the RF tag. Accordingly, the RF tag externally transmits the peg specifying information stored in the RF tag and the RFID reader acquires the information. By appropriately adjusting the strength of the magnetic field output by the RFID reader in this way, only the RF tag attached to the yarn supply package P inserted into the yarn supply package holding members 711 and 711 is read. That is, the RFID reader is configured not to read unintended peg specifying information.

[0061] The control unit 80A controls the first drive unit 76, the second drive unit 77, the third drive unit 78, and the recognition mechanism 79. The control unit 80A is stored in the housing 80 attached to the main body portion 73. The control unit 80A is communicably connected to the first drive unit 76, the second drive unit 77, the third drive unit 78, and the recognition mechanism 79 through the above-described cable 80B and the like.

[0062] The control unit 80A controls the first drive unit 76, the second drive unit 77, and the third drive unit 78 so that the yarn supply package supply device 7 extracts the yarn supply package P from the package holding unit 61 of the yarn supply package storage device 6. The control unit 80A controls the first drive unit 76 and the second drive unit 77 so that the extracting of the yarn supply package P which was about to be extracted is stopped if the recognition mechanism 79 does not recognize the identification unit 13 when the package holding unit 71 extracts the yarn supply package P from the package holding unit 61. In other words, the control unit 80A controls the first drive unit 76 and the second drive unit 77 so that the yarn supply package P holding the peg specifying information recognized by the recognition mechanism 79 is extracted only when the recognition mechanism 79 recognizes the peg specifying information held by the yarn supply package P at the yarn supply package storage device 6.

[0063] The control unit 80A controls the first drive unit 76 and the second drive unit 77 so that the yarn supply package P extracted from the yarn supply package storage device 6 is attached to the peg 25 specified based on the peg specifying information recognized by the recognition mechanism 79. The control unit 80A controls the third drive unit 78 so that the main body portion 73 moves to an existing position of the peg 25 specified based on the peg specifying information. By the control of such a control unit 80A, the yarn supply package P extracted from the yarn supply package storage device 6 is attached to the peg 25 specified based on the peg specifying information recognized by the recognition mechanism 79.

[0064] Next, the yarn supply package replacement method for the creel stand 20 using the yarn supply package supply system 10 will be mainly described with reference to FIGS. 9(A), 9(B), 10(A), and 10(B). In the yarn supply package replacement method for the creel stand 20, the cap 11 is provided as many as the peg 25 provided in the creel stand 20 and the peg specifying information which is the information specifying the corresponding peg 25 is held in each cap 11 in advance. A method of holding the peg specifying information in the cap 11 is performed by attaching the identification unit 13 storing the peg specifying information to the cap 11.

[0065] Here, an example of the peg specifying information will be described. For example, as shown in FIG. 9(A), the peg specifying information can be composed of a combination of a column number, a row number, and left and right symbols. The column number is a number

given to each pair of pegs 25 and 25 from one side in the extension direction of the creel stand 20 and numbers such as I, II, III, ... are given. In the row number, numbers such as 1, 2, 3, ..., N are given to the pair of pegs 25 and 25 of the same column number sequentially from below. In left and right symbols, symbols such as L and R are given to the pair of pegs 25 and 25 specified by the column number and the row number based on the right side or the left side when viewed from the work side of the creel stand 20 (the side F2 shown in FIG. 3). In this way, for example, the peg specifying information such as "I.2.L" and "II.1.R" can be constructed.

[0066] Then, the yarn supply package replacement method of this embodiment includes first to seventh steps as below. Here, a description will be made on the assumption that the false-twist texturing system 1 is operated from a state in which the yarn supply package P is attached to all pegs 25 of the creel stand 20 and the cap 11 having the peg specifying information corresponding to the attached peg 25 held (given) thereto is mounted to all yarn supply packages P.

[0067] After starting the operation of the false-twist texturing system 1, for example, as shown in FIG. 9(A), the yarn of two yarn supply packages P supported at the peg specifying information "I-2-L" and "II-1-R" runs out. The worker visually confirms that the yarn Y of two yarn supply packages P supported at the peg specifying information "I-2-L" and "II-1-R" runs out and extracts the yarn supply package P (that is, the yarn supply bobbin B) having run out of the yarn Y from the peg 25 specified by "I-2-L" and "II-1-R". Next, the worker removes the cap 11 from the extracted yarn supply bobbin B. Next, the worker mounts the cap 11 on the yarn supply package P not mounted with the cap 11 among the yarn supply packages P stored in the yarn supply package storage device 6 (first step).

[0068] The yarn supply package storage device 6 temporarily stores the yarn supply package P until the yarn supply package P is delivered from the conveying rack 3 and is extracted to the yarn supply package supply device 7 as described above. The worker visually confirms the yarn supply package P not mounted with the cap 11 and mounts the cap 11 to the yarn supply bobbin B of the yarn supply package P not mounted with the cap 11 as shown in FIG. 9(B). Additionally, since an example of mounting the cap 11 of the yarn supply package P having run out of the yarn Y first after the start of the operation of the false-twist texturing system 1 is shown at this time, there may be the yarn supply package P mounted with the cap 11 waiting to be extracted by the yarn supply package supply device 7 as time passes by although the yarn supply package P mounted with the cap 11 does not exist in the yarn supply package storage device 6.

[0069] Next, as shown in FIG. 10(A), the yarn supply package supply device 7 extracts the yarn supply package P mounted with the cap 11 in the first step from the yarn supply package storage device 6 (second step). Additionally, it is determined whether or not the cap 11 exists

in the yarn supply package P depending on whether or not the recognition mechanism 79 can recognize the identification unit 13 when the yarn supply package holding member 711 is inserted into the yarn supply bobbin B of the yarn supply package P in order for the package holding unit 71 of the yarn supply package supply device 7 to extract the yarn supply package P held by the package holding unit 61 of the yarn supply package storage device 6. Additionally, the recognition mechanism 79 may not recognize the peg specifying information stored in the identification unit 13 and may confirm only the existence of the identification unit 13 at the stage of confirming whether or not the cap 11 exists.

[0070] The control unit 80A controls the yarn supply package supply device 7 so that the yarn supply package P is extracted when the recognition mechanism 79 recognizes the identification unit 13 and the yarn supply package P held by the other package holding unit 61 is extracted without extracting the yarn supply package P when the recognition mechanism 79 does not recognize the identification unit 13. In the second step, the yarn supply package supply device 7 extracts the yarn supply package P attached with the identification unit 13 storing the peg specifying information of "I·2·L" and "II·1·R" from the yarn supply package storage device 6.

[0071] Next, the recognition mechanism 79 recognizes the peg specifying information held by the cap 11 mounted on the yarn supply package P extracted by the yarn supply package supply device 7 in the second step (third step). More specifically, the RFID reader which is the recognition mechanism 79 reads the peg specifying information stored in the RF tag. Next, as shown in FIG. 10(B), the yarn supply package supply device 7 moves to the arrangement position of the peg 25 specified based on the peg specifying information recognized by the recognition mechanism 79 in the third step and attaches the yarn supply package P to the specified peg 25 (fourth step). More specifically, the control unit 80A drives the third drive unit 78 to move in the Y direction to the position of the peg 25 specified based on the peg specifying information and drives the first drive unit 76 and the second drive unit 77 to move in the Z direction and the X direction to the position of the peg 25.

[0072] Next, the worker extracts the yarn supply bobbin B of the yarn supply package P having run out of the yarn Y among the yarn supply package P attached to the peg 25 by the yarn supply package supply device 7 in the fourth step from the peg 25 (fifth step). Next, the worker removes the cap 11 from the yarn supply bobbin B extracted from the peg 25 in the fifth step (sixth step). Next, the worker uses the cap 11 removed in the sixth step as the cap 11 to be mounted in the first step (seventh step). That is, the worker mounts the cap 11 removed in the sixth step to the yarn supply package P not mounted with the cap 11 in the yarn supply package P stored in the yarn supply package storage device 6.

[0073] Next, the operation and effect of the yarn supply package replacement method and the yarn supply pack-

age supply system 10 for the creel stand 20 using the yarn supply package supply system 10 of the above-described embodiment will be described.

[0074] In the above-described embodiment, when the yarn Y of the yarn supply package P supported by the peg 25 of the creel stand 20 runs out, the yarn supply package P having run out of the yarn Y from the peg 25 can be reliably replaced with a new yarn supply package P by repeating the first step to the seventh step. Further, since the yarn supply package supply device 7 performs the work of carrying the yarn supply package P to the creel stand 20 and attaching the yarn supply package P to the peg 25, the work burden of the worker can be reduced. That is, it is possible to reduce the work burden of the worker and reliably replace the yarn supply package P having run out of the yarn Y in the peg 25 with a new yarn supply package P when the yarn Y of the yarn supply package P supported by the peg 25 of the creel stand 20 runs out.

[0075] In the above-described embodiment, even when there is a distance between the yarn supply package storage device 6 and the creel stand 20, the work burden of the worker can be further reduced since the yarn supply package supply device 7 performs the work of carrying the yarn supply package P from the yarn supply package storage device 6 to the creel stand 20 and attaching the yarn supply package P to the peg 25 of the creel stand 20.

[0076] In the above-described embodiment, the recognition mechanism 79 is provided in the main body portion 73 of the yarn supply package supply device 7 and the control unit 80A controls the first drive unit 76 and the second drive unit 77 so that only the yarn supply package P holding the peg specifying information recognized by the recognition mechanism 79 is extracted. According to this configuration, since the yarn supply package supply device 7 can receive only the yarn supply package P mounted with the cap 11 from the yarn supply package storage device 6, the extracted yarn supply package P can be reliably attached to the peg 25 of the creel stand 20.

[0077] In the above-described embodiment, the cap 11 covering one opening portion of the tubular yarn supply bobbin B is removably mounted to the yarn supply bobbin B and the peg specifying information is held in the cap 11. Accordingly, the peg specifying information can be easily given to the yarn supply package P.

[0078] In the above-described embodiment, the cap 11 is provided with the IC tag storing the peg specifying information and the recognition mechanism 79 is applied with the IC tag reader capable of reading the peg specifying information stored in the IC tag. Accordingly, the peg specifying information can be easily held in the cap 11 and the peg specifying information held in the cap 11 can be easily recognized by the recognition mechanism 79.

[0079] Although an embodiment has been described above, the invention is not limited to the above-described

embodiment. Various modifications can be made without departing from the gist of the invention.

[0080] In the above-described embodiment, an example in which the mount state of the cap 11 is determined based on whether or not the recognition mechanism 79 recognizes the peg specifying information has been described, but the invention is not limited thereto. For example, it is determined whether or not the cap 11 exists based on the detection of the sensor, the image of the camera, or the like separately provided in the yarn supply package storage device 6 or the yarn supply package supply device 7. Further, the yarn supply package supply device 7 may be provided with an input unit that inputs information of the package holding unit 61 corresponding to an extraction object and may extract the yarn supply package P among the plurality of package holding units 61 based on the information input to the input unit by the worker or the like.

[0081] Further, in the above-described embodiment and modified example, an example in which the recognition mechanism 79 is provided in the yarn supply package supply device 7 has been described, but the recognition mechanism 79 may be provided in the yarn supply package storage device 6. For example, as shown in FIG. 4, the recognition mechanism 69 may be provided to correspond to each yarn supply package holding member 611 and may be provided to recognize only the yarn supply package P attached to the corresponding yarn supply package holding member 611. Even in this configuration, the yarn supply package supply device 7 can extract only the yarn supply package P mounted with the cap 11 from the yarn supply package storage device 6. Accordingly, the extracted yarn supply package P can be reliably attached to the peg 25 of the creel stand 20.

[0082] In the above-described embodiment and modified example, the RF tag has been described as an example of the identification unit 13 and the RFID reader capable of reading information stored in the RF tag by a radio communication has been described as an example of the recognition mechanism 79 (69). However, the invention is not limited thereto. For example, a one-dimensional code, two-dimensional code, symbol, pattern, color, color tone, or a combination thereof may be used as an example of the identification unit 13 and a camera or the like may be used as an example of the recognition mechanism 79 (69). Even in this case, the recognition mechanism 79 (69) can specify the corresponding peg 25 based on the display of the identification unit 13.

[0083] In the above-described embodiment and modified example, an example in which the cap 11 attached with the identification unit 13 is attached to the yarn supply package P has been described, but the identification unit 13 may be directly attached to the yarn supply bobbin B of the yarn supply package P. In addition to the above-described identification unit 13, the cap 11 or the yarn supply package P may be provided with peg specifying information in a display method that can be recognized by humans.

[0084] In the above-described embodiment and modified example, an example in which the yarn supply package supply device 7 only attaches the yarn supply package P and does not have a function of extracting the empty yarn supply package P (that is, the yarn supply bobbin B) has been described, but the invention is not limited thereto. For example, the yarn supply package supply device 7 may have a supply function of conveying the yarn supply package P from the yarn supply package storage device 6 to a predetermined peg 25 of the creel stand 20 and attaching the yarn supply package P to the peg 25 and a collection function of extracting the empty yarn supply package P (that is, the yarn supply bobbin B) from the peg 25 of the creel stand 20 and conveying the empty yarn supply package P to, for example, the yarn supply package storage device 6.

[0085] In the above-described embodiment and modified example, an example in which the yarn supply package supply device 7 is movable in the horizontal direction along the extension direction (the Y direction) of the creel stand 20 has been described. However, for example, the package holding unit 71 may be movable only in the up and down direction. For example, the package holding unit 71 may be attached to the tip of the arm portion and the package holding unit 71 may be movable in the X direction, the Y direction, and the Z direction even when the main body portion 73 and the base portion 74 of the yarn supply package supply device 7 do not move in the horizontal direction.

REFERENCE SIGNS LIST

[0086] 1: false-twist texturing system, 2: false-twist texturing machine, 6: yarn supply package storage device (storage unit), 7: yarn supply package supply device, 10: yarn supply package supply system, 11: cap (bobbin mounting member), 13: identification unit, 20: creel stand, 25: peg (support portion), 61: package holding unit (storage support portion), 69: recognition mechanism, 71: package holding unit, 76: first drive unit, 77: second drive unit, 78: third drive unit, 79: recognition mechanism, 80A: control unit (control device), B: yarn supply bobbin (bobbin), P: yarn supply package.

Claims

1. A yarn supply package replacement method for a creel stand (20) using a yarn supply package supply system (10) including a storage unit (6) storing a plurality of yarn supply packages (P) each formed by winding a yarn (Y) made of synthetic fiber on a bobbin (B), a creel stand (20) including a plurality of support portions (25) unwindably supporting the yarn (Y) of the yarn supply packages (P), a yarn supply package supply device (7) extracting the yarn supply package (P) from the storage unit (6) and attaching the yarn supply package (P) to the support portion (25) of the

creel stand (20), a bobbin mounting member (11) provided to correspond to each of the plurality of support portions (25), being attachable to and detachable from the bobbin (B), and holding support portion specifying information capable of specifying the corresponding support portion (25), and a recognition mechanism (69,79) recognizing the support portion specifying information held by the yarn supply package (P), the yarn supply package replacement method for the creel stand (20) comprising:

- a first step of mounting the bobbin mounting member (11) on the yarn supply package (P) not mounted with the bobbin mounting member (11) among the yarn supply packages (P) stored in the storage unit (6);
- a second step of extracting the yarn supply package (P), mounted with the bobbin mounting member (11) in the first step from the storage unit (6), by the yarn supply package supply device (7);
- a third step of recognizing the support portion specifying information, held by the bobbin mounting member (11) mounted on the yarn supply package (P) extracted by the yarn supply package supply device (7) in the second step, by the recognition mechanism (69,79);
- a fourth step of attaching the yarn supply package (P) to the support portion (25), specified based on the support portion specifying information recognized by the recognition mechanism (69,79) in the third step, by the yarn supply package supply device (7);
- a fifth step of extracting the bobbin (B) of the yarn supply package (P) having run out of yarn (Y) among the yarn supply packages (P) attached to the support portions (25) by the yarn supply package supply device (7) in the fourth step from the support portion (25);
- a sixth step of removing the bobbin mounting member (11) from the bobbin (B) extracted from the support portion (25) in the fifth step; and
- a seventh step of using the bobbin mounting member (11) removed in the sixth step as the bobbin mounting member (11) mounted in the first step.

2. The yarn supply package replacement method for the creel stand (20) according to claim 1, wherein in the fourth step, the yarn supply package supply device (7) moves to a position of the support portion (25) specified based on the support portion specifying information recognized by the recognition mechanism (69,79) in the third step.
3. A yarn supply package supply system (10) comprising:

a storage unit (6) which stores a plurality of yarn supply packages (P) each formed by winding a yarn (Y) made of synthetic fiber on a bobbin (B); a creel stand (20) which includes a plurality of support portions (25) unwindably supporting the yarn (Y) of the yarn supply packages (P); a yarn supply package supply device (7) which includes a supply mechanism (71,72,73,75,76,77) extracting the yarn supply package (P) from the storage unit (6) and attaching the yarn supply package (P) to the support portion (25) of the creel stand (20); a recognition mechanism (69,79) which recognizes support portion specifying information held by the yarn supply package (P); and a control device (80A) which controls the yarn supply package supply device (7) and the recognition mechanism (69,79), wherein the support portion specifying information is preset information provided corresponding to each of the plurality of support portions (25) and capable of specifying the corresponding support portion (25), and wherein the control device (80A) controls the yarn supply package supply device (7) so that the yarn supply package (P) extracted from the storage unit (6) is attached to the support portion (25) specified based on the support portion specifying information recognized by the recognition mechanism (69,79).

4. The yarn supply package supply system (10) according to claim 3, wherein the yarn supply package supply device (7) includes a main body portion (73) which is provided with the supply mechanism (71,72,73,75,76,77) and a moving mechanism (74,78) which moves the main body portion (73), and wherein the control device (80A) controls the moving mechanism (74,78) so that the main body portion (73) moves to a position of the support portion (25) specified based on the support portion specifying information.

5. The yarn supply package supply system (10) according to claim 4, wherein the recognition mechanism (79) is provided in the main body portion (73) together with the supply mechanism (71,72,73,75,76,77), and wherein the control device (80A) controls the supply mechanism (71,72,73,75,76,77) to extract the yarn supply package (P) holding the support portion specifying information recognized by the recognition mechanism (79).

6. The yarn supply package supply system (10) according to claim 3,

wherein the recognition mechanism (69) is provided in the storage unit (6) and is attached to each storage support portion (25) supporting each of the plurality of yarn supply packages (P) in the storage unit (6), and wherein the control device (80A) controls the supply mechanism (71,72,73,75,76,77) to extract the yarn supply package (P) holding the support portion specifying information recognized by the recognition mechanism (69).

7. The yarn supply package supply system (10) according to any one of claims 3 to 6,

wherein a bobbin mounting member (11) covering one opening portion of the bobbin (B) having a tubular form is removably mounted to the bobbin (B), and wherein the support portion specifying information is held by the bobbin mounting member (11).

8. The yarn supply package supply system (10) according to claim 7,

wherein the bobbin mounting member (11) is provided with an IC tag storing the support portion specifying information, and wherein the recognition mechanism (69,79) is an IC tag reader capable of reading the support portion specifying information stored in the IC tag.

9. A yarn supply package supply device (7) for extracting a yarn supply package (P) from a storage unit (6) storing a plurality of yarn supply packages (P) each formed by winding a yarn (Y) made of synthetic fiber on a bobbin (B) and attaching the yarn supply package (P) to each support portion (25) among a plurality of support portions (25) included in a creel stand (20) and unwindably supporting the yarn (Y) of the yarn supply packages (P), the yarn supply package supply device (7) comprising:

a supply mechanism (71,72,73,75,76,77) which extracts the yarn supply package (P) from the storage unit (6) and attaches the yarn supply package (P) to the support portion (25); a recognition mechanism (69,79) which recognizes support portion specifying information held by the yarn supply package (P); and a control unit (80A) which controls the supply mechanism (71,72,73,75,76,77) and the recognition mechanism (69,79), wherein the support portion specifying information is preset information provided correspond-

ing to each of the plurality of support portions (25) and capable of specifying the corresponding support portion (25), and wherein the control unit (80A) controls the supply mechanism (71,72,73,75,76,77) so that the yarn supply package (P) extracted from the storage unit (6) is attached to the support portion (25) specified based on the support portion specifying information recognized by the recognition mechanism (69,79).

10. The yarn supply package supply device (7) according to claim 9, further comprising:

a main body portion (73) which is provided with the supply mechanism (71,72,73,75,76,77) and the recognition mechanism (79); and a moving mechanism (74,78) which moves the main body portion (73), wherein the control unit (80A) controls the moving mechanism (74,78) so that the main body portion (73) moves to a position of the support portion (25) specified based on the support portion specifying information.

11. The yarn supply package supply device (7) according to claim 9 or 10,

wherein the control unit (80A) controls the supply mechanism (71,72,73,75,76,77) to extract the yarn supply package (P) holding the support portion specifying information recognized by the recognition mechanism (69) when the recognition mechanism (69) recognizes the support portion specifying information held by the yarn supply package (P) located at the storage unit (6).

12. The yarn supply package supply device (7) according to any one of claims 9 to 11,

wherein a bobbin mounting member (11) covering one opening portion of the bobbin (B) having a tubular form is removably mounted to the bobbin (B), and wherein the support portion specifying information is held by the bobbin mounting member.

13. The yarn supply package supply device (7) according to claim 12,

wherein the bobbin mounting member (11) is provided with an IC tag storing the support portion specifying information, and wherein the recognition mechanism (69,79) is an IC tag reader capable of reading the support portion specifying information stored in the IC tag.

Fig.1

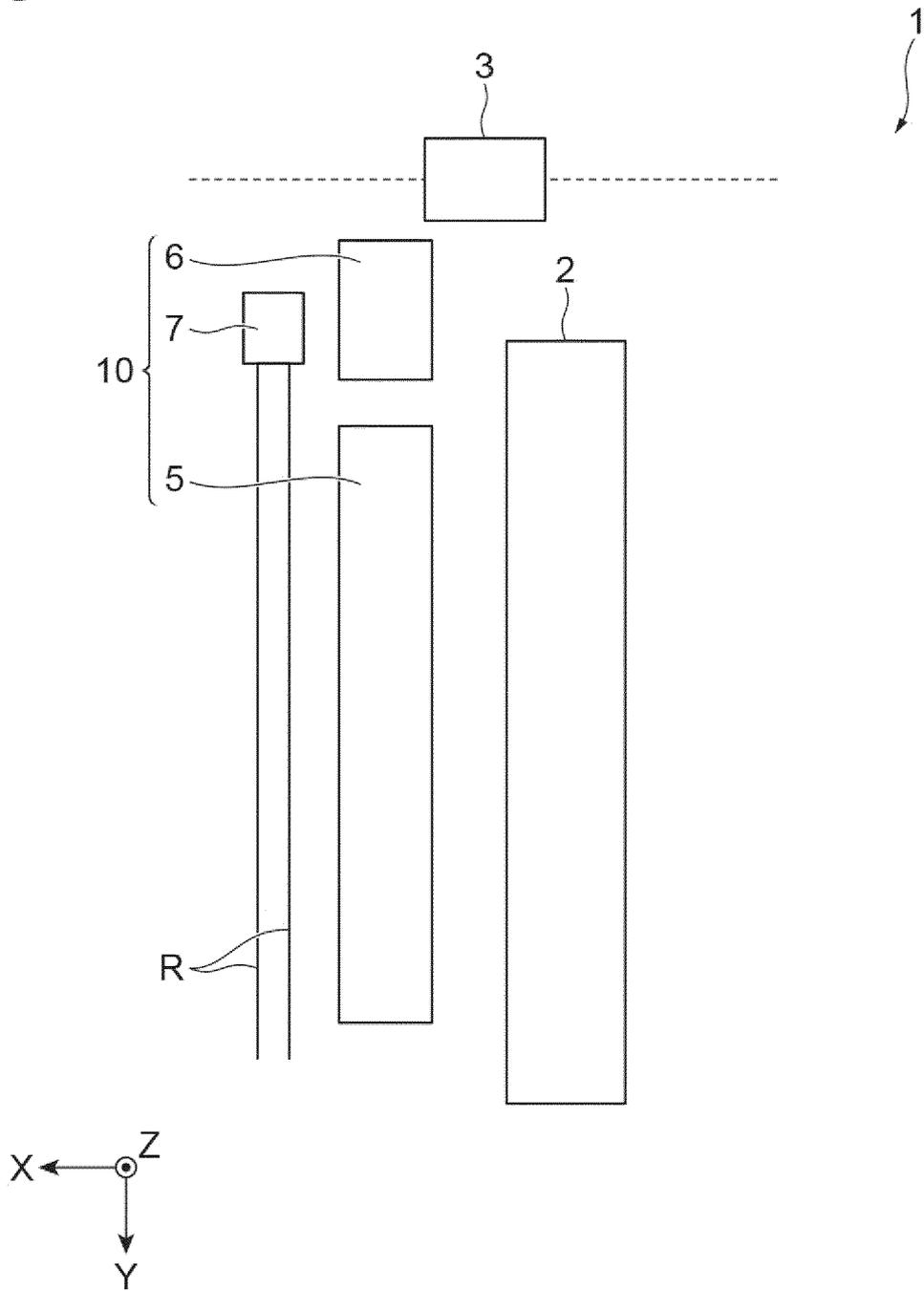


Fig.2

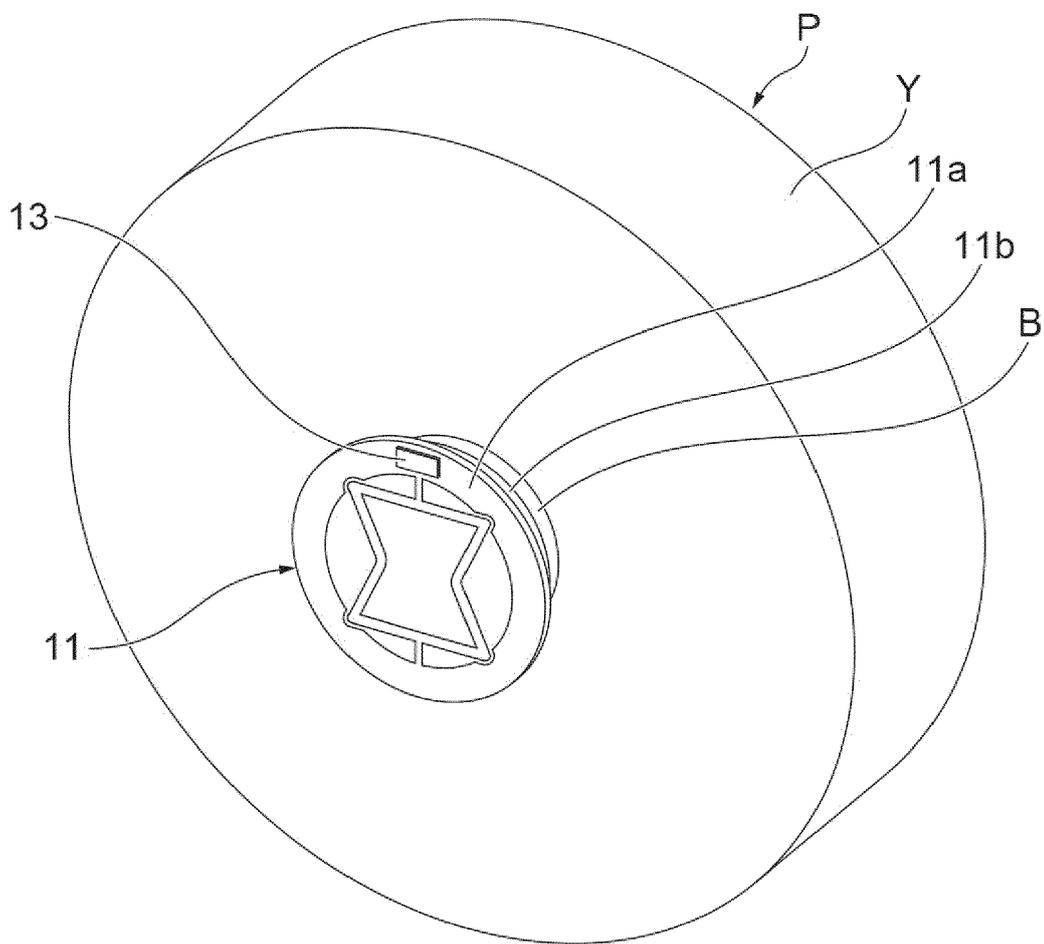


Fig.3

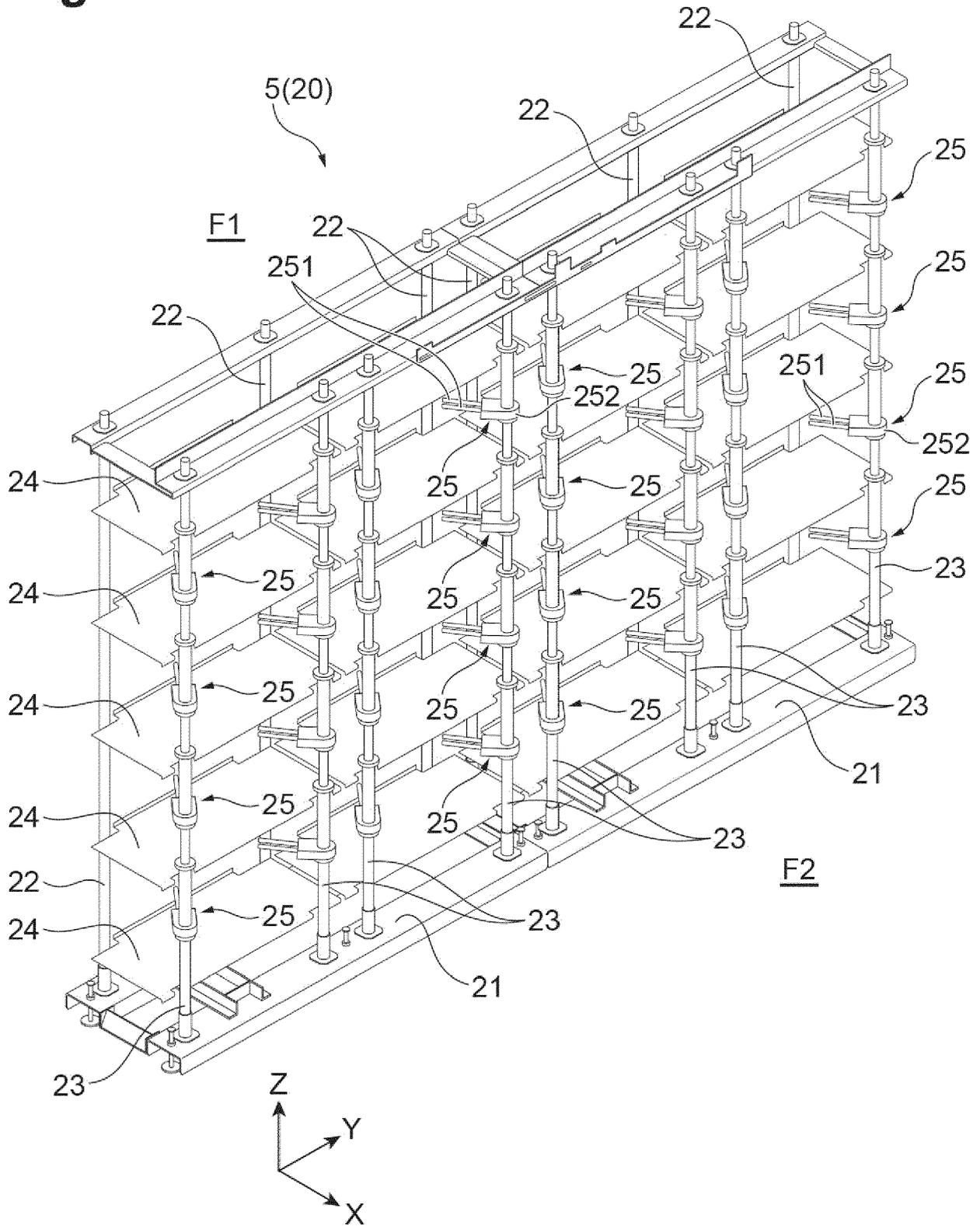


Fig.5

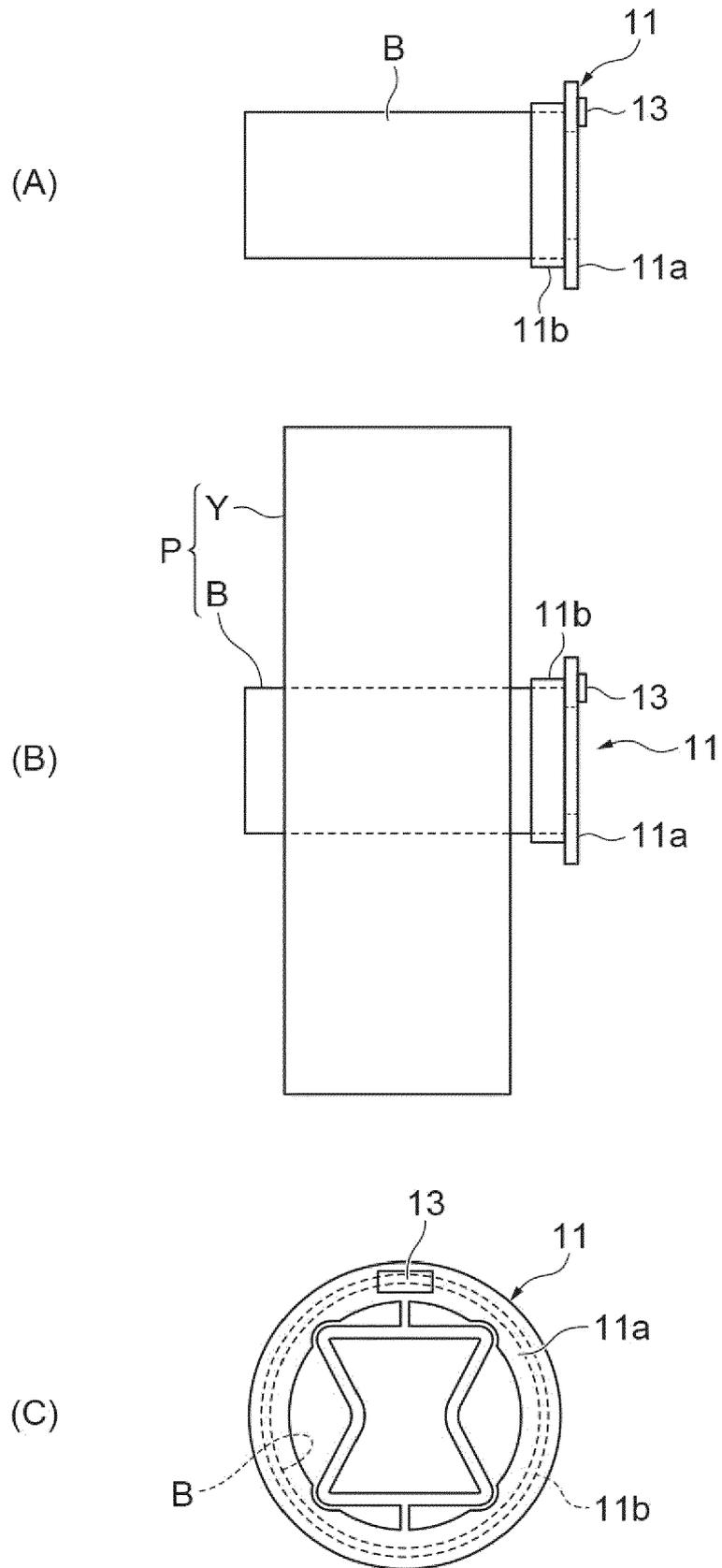


Fig.6

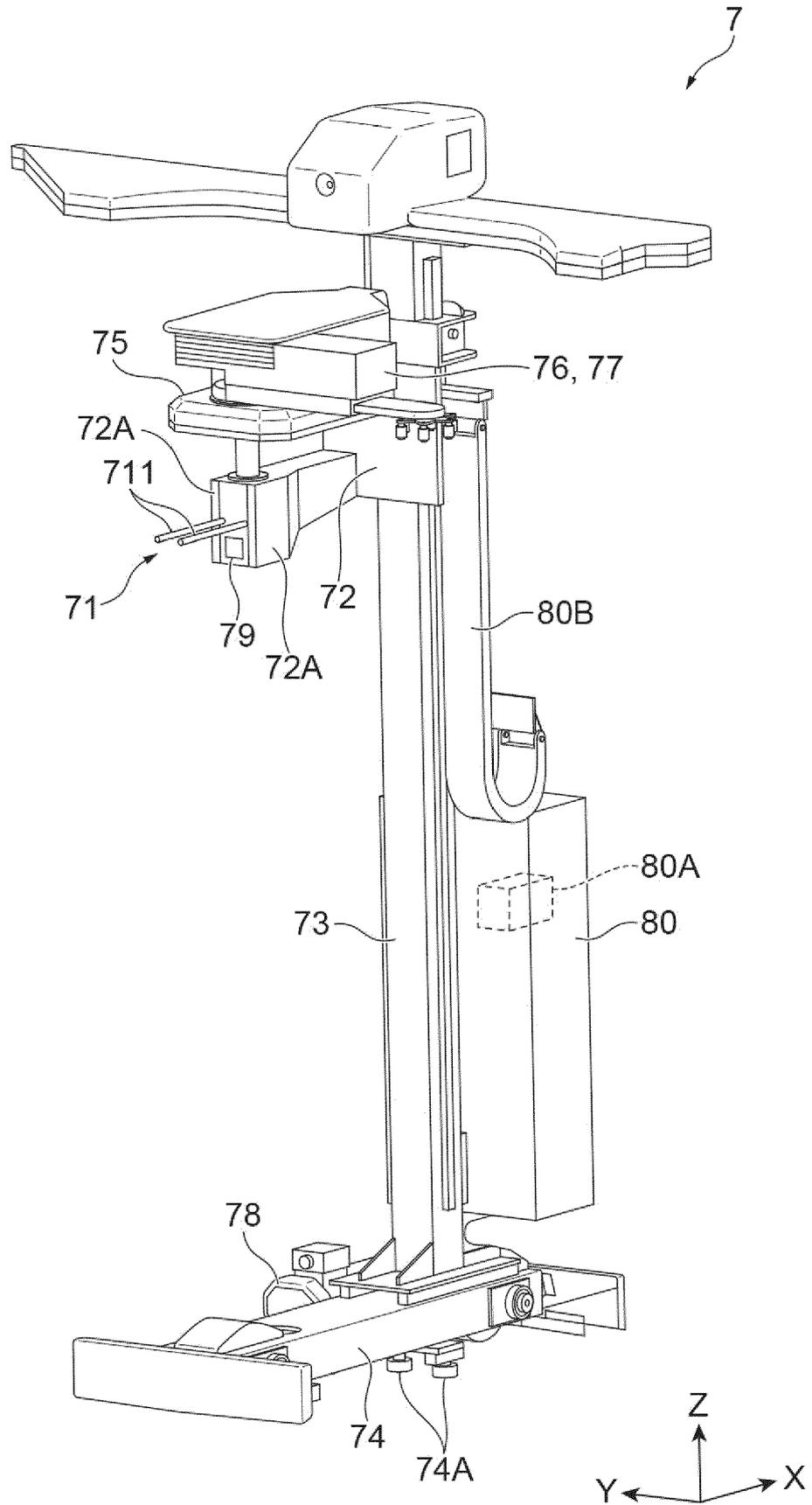


Fig.7

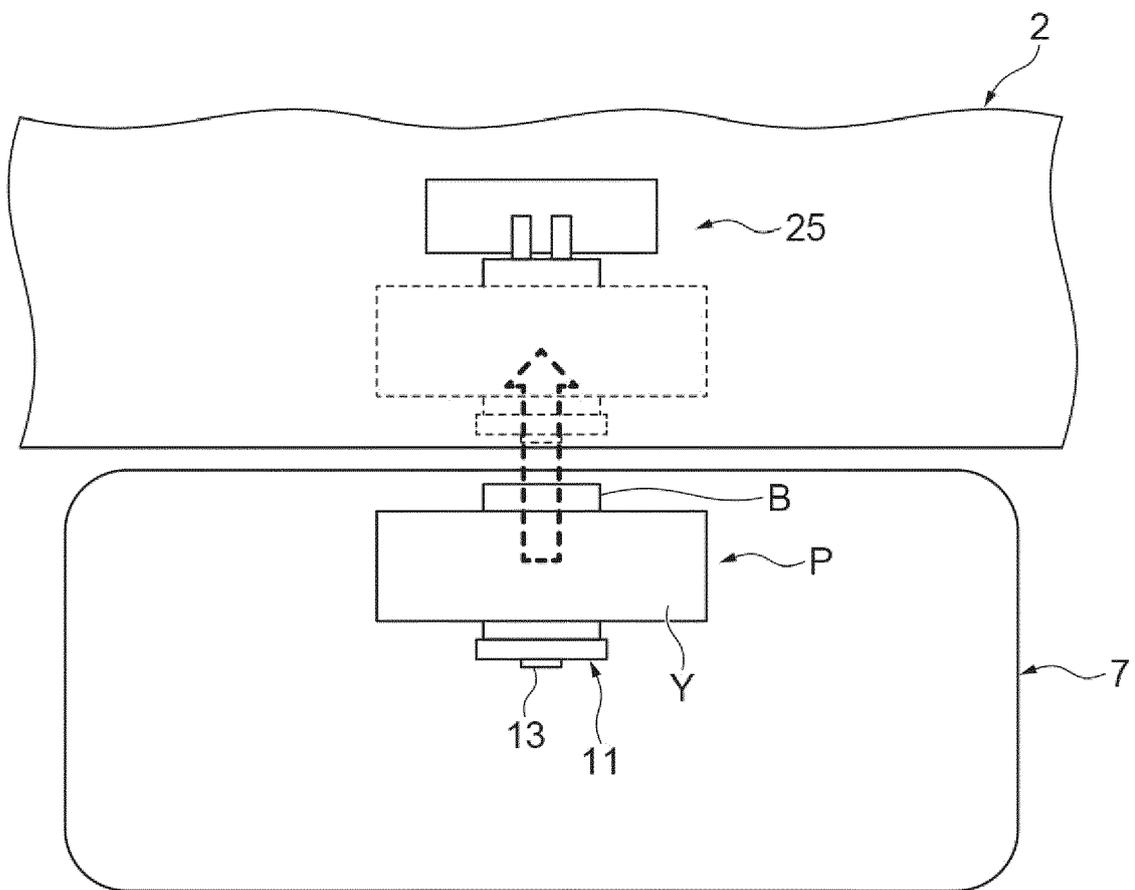


Fig.8

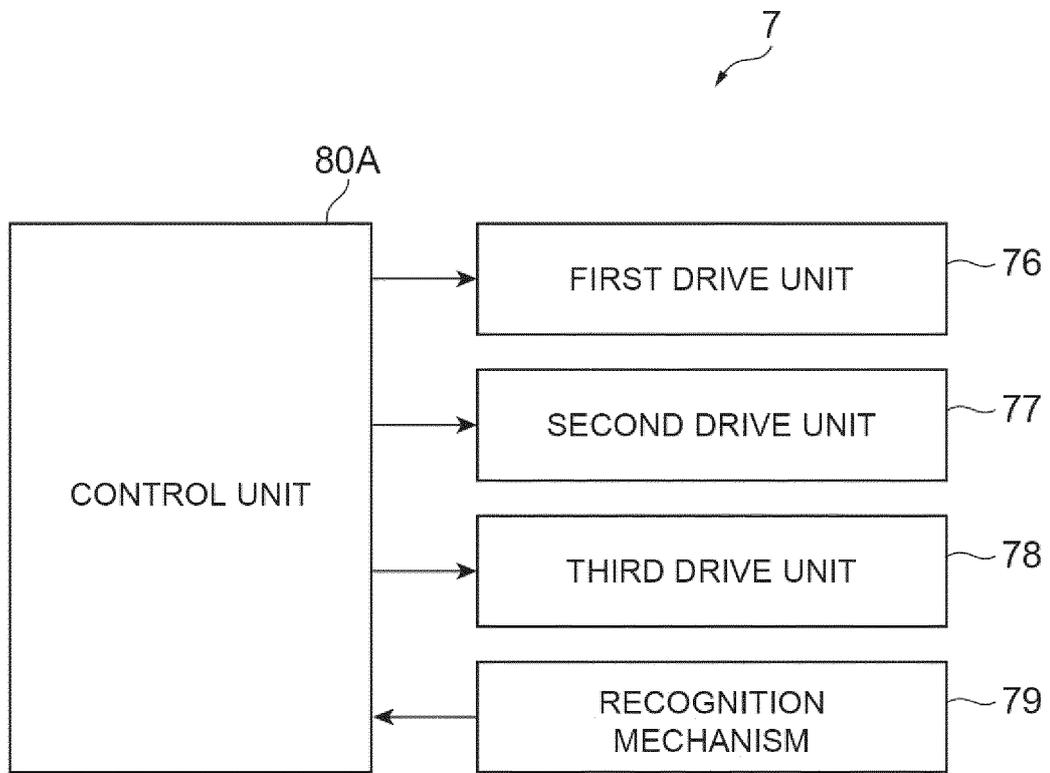
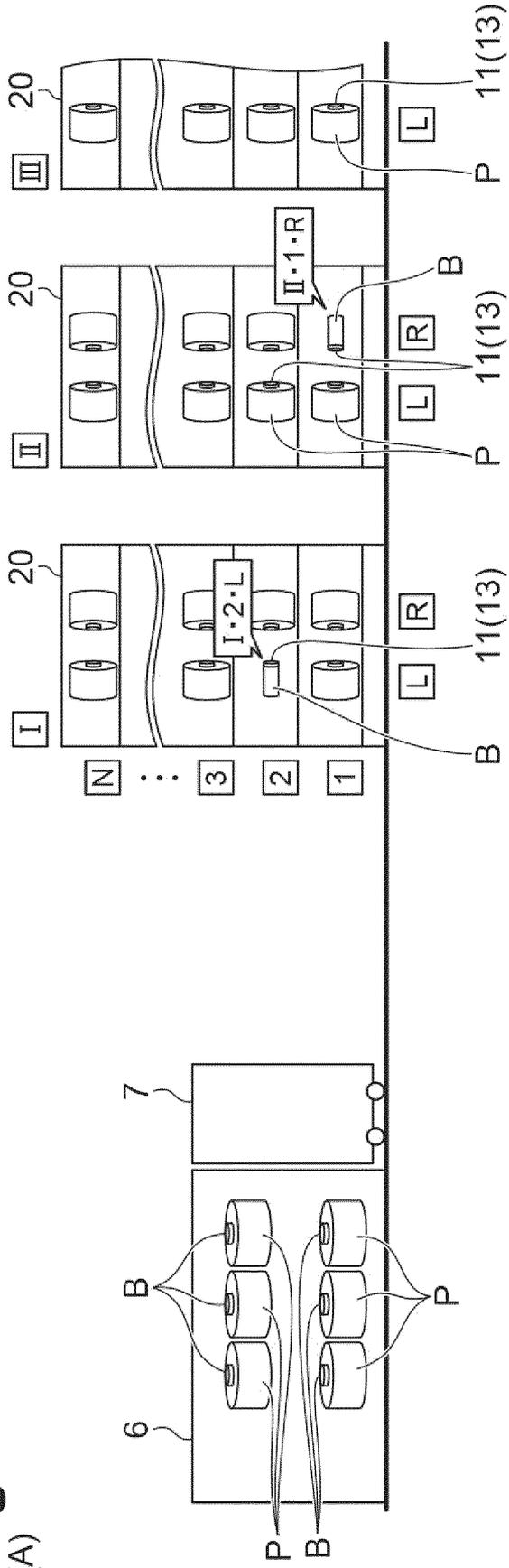
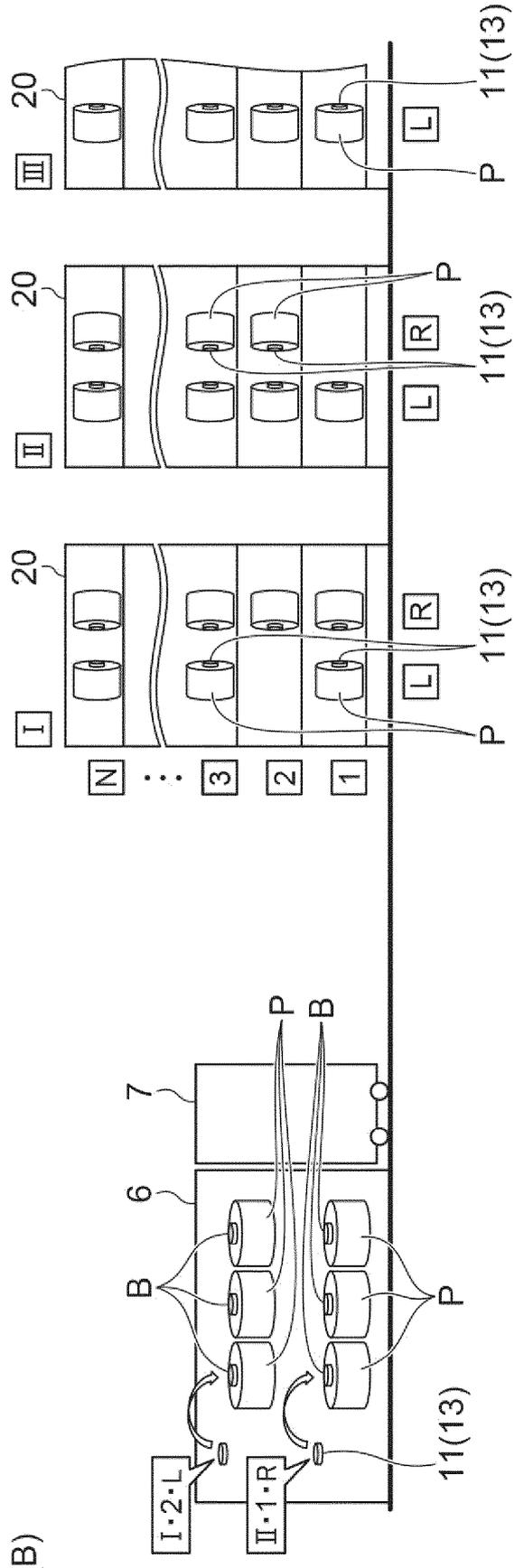


Fig. 9
(A)



(B)





EUROPEAN SEARCH REPORT

Application Number

EP 23 16 7538

5

DOCUMENTS CONSIDERED TO BE RELEVANT

10

15

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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|----------|---|-------------------|---|
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| Place of search The Hague | Date of completion of the search 5 September 2023 | Examiner Pussemier, Bart |
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