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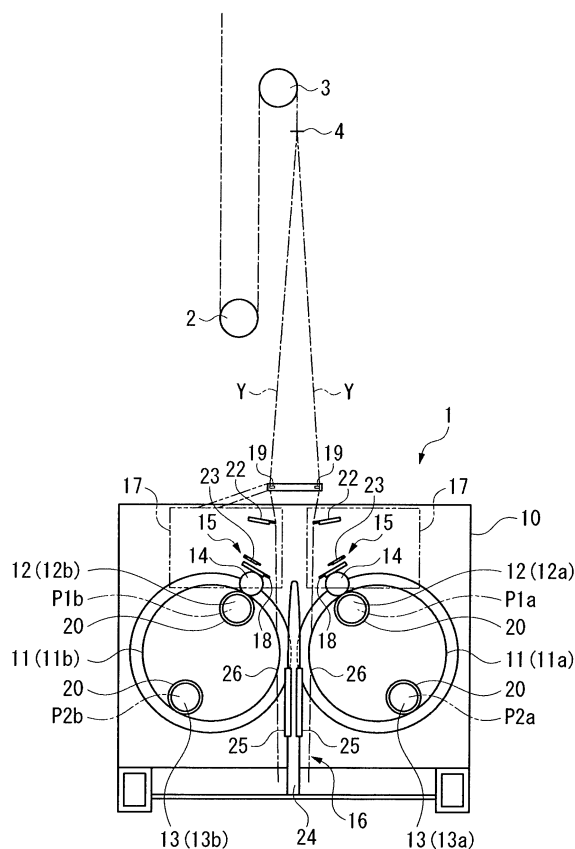
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(54) **Yarn take-up winder**

(57) The present invention provides a yarn take-up winder that can more reliably engage yarns on respective empty bobbins. A yarn take-up winder 1 includes rotatable turrets 11, bobbin holders 12, 13 supported by the turrets 11 and on each of which bobbins 20 are set, a turret driving motor that rotationally drives the turrets 11, and a yarn engaging member 25 that is movable between a retract position where the yarn engaging member 25 is retracted from the bobbins 20 and a yarn pressing position where the yarn engaging member 25 presses the yarns Y against the respective bobbins 20. The yarn take-up winder 1 is configured such that the bobbin holder 12, 13 move from a winding position P1 where the yarns Y are wound around the respective bobbins 20 to a yarn engaging position P3 located at yarn path side than the winding position P1 and then the yarn engaging member 25 moves to the yarn pressing position to engage the yarns Y around the respective bobbins 20 (Fig. 1).

FIGURE 1



## Description

### Field of the Invention

**[0001]** The present invention relates to a yarn take-up winder that winds continuously supplied yarns.

### Background of the Invention

**[0002]** Yarn take-up winders are conventionally known which wind yarns continuously supplied from a spinning machine. Common yarn take-up winders include a turret, a bobbin holder supported by the turret and on which a plurality of bobbins are set, and a traverse device that traverses a yarn being wound around the bobbin. The common yarn take-up winders are further configured such that a plurality of yarns continuously supplied from the spinning machine are wound around the respective bobbins set on the bobbin holder while being traversed by the traverse device.

**[0003]** Moreover, as disclosed in, for example, the Unexamined Japanese Patent Application Publication (Tokkai-Hei) No. 2004-75340, one known yarn take-up winder has two turrets arranged close to each other. In this yarn take-up winder, bobbin holders supported by the two turrets are arranged parallel to one another. A plurality of yarns continuously supplied from the spinning machine can be simultaneously wound around bobbins set on each of the two bobbin holders located at a winding position.

**[0004]** Furthermore, in the yarn take-up winder disclosed in the Unexamined Japanese Patent Application Publication (Tokkai-Hei) No. 2004-75340, a yarn engaging member (initial yarn engaging guide) is provided between the two bobbin holders located at the winding position to engage yarns on respective empty bobbins (initial yarn engaging) before the yarns are wound around the bobbins. The yarn engaging member is movable between a retract position where the yarn engaging member is retracted from the bobbins (bobbin holder) and a yarn pressing position where the yarn engaging member presses the yarns against the respective bobbins. The yarn take-up winder is further configured such that with the plurality of yarns threaded between the two bobbin holders located at the winding position, the yarn engaging member advances from the retract position to the yarn pressing position to engage the yarns on the plurality of bobbins (specifically, in yarn catching grooves formed at ends of the respective bobbins) set on each of the two bobbin holders.

**[0005]** In the conventional yarn take-up winders, each of the yarn engaging members performs yarn engaging with the bobbins (bobbin holder) located at the winding position. However, in this yarn engaging operation, the yarn engaging may fail depending on the positional relationship between the bobbin holder and the yarn engaging member.

**[0006]** In case the distance between the bobbin holder

located at the winding position and the yarn engaging member is relatively long, an angle at which the yarns are wound around the bobbins become small when the yarn engaging member is moved to the yarn pressing position and presses the yarn against the bobbins. As a result, the yarns cannot be easily caught in the respective yarn catching grooves in the corresponding bobbins, resulting in a failure in the yarn engaging. Furthermore, the angle at which the yarns are wound around the respective bobbins can be increased by greatly advancing the yarn engaging member from the retract position towards the yarns during the yarn engaging. However, in this case, a part of each of the yarns gripped by the yarn engaging member has a relatively large curvature. If the rate of curvature of the yarn increases, traveling resistance of the yarn that generates at the curvature increases. As a result, the yarns may not be sufficiently sucked by a suction gun. Furthermore, the increased rate of curvature of the yarn makes the tension of the yarn unstable, increasing the frequency at which the yarn engaging fails.

**[0007]** Meanwhile, if the yarn engaging member is located too close to the bobbin holder located at the winding position, a space for threading each of the yarns to the vicinity of the corresponding bobbin is narrowed. This makes it difficult to thread the yarns before the yarn engaging. In particular, in the yarn take-up winder disclosed in the Unexamined Japanese Patent Application Publication (Tokkai-Hei) No. 2004-75340, the yarn engaging member is located between the two bobbin holders supported by the two turrets, respectively, and located at the winding position. Thus, the space for the yarn threading is limited. If the bobbin holder at the winding position is placed further closer to the yarn engaging member in order to reduce the rate of curvature of the yarn at the initial yarn engaging, the space through which the yarns being sucked by the suction gun are threaded is further narrowed. This makes it extremely difficult to achieve the yarn threading. Furthermore, it is possible to operate the suction gun to move the yarns located between the two bobbin holders closer to one of the bobbin holders to reduce the curvature of each of the yarns with respect to the bobbins set on such bobbin holder. However, the yarns for the other bobbin holder are moved away from such bobbin holder. Consequently, the curvature of the yarn increases with respect to the other bobbin holder.

### Summary of the Invention

**[0008]** An object of the present invention is to provide a yarn take-up winder configured to, in engaging yarns on respective empty bobbins, reduce the curvature of each of the yarns when the yarns are moved closer to the respective bobbins, for reliably engaging to the yarns.

**[0009]** A yarn take-up winder according to a first aspect of the present invention includes bobbin holders on each of which bobbins are set, two turrets, a turret driving means, a traverse device, and a contact roller. The two turrets rotatably support the at least two bobbin holders,

respectively, and can also be rotated. The turret driving means rotationally drives the two turrets. The traverse device traverses yarns being wound around the respective bobbins. The contact roller is provided so that the contact roller can make contact with the bobbins. Each of the bobbin holders can move to a winding position where the bobbins set on the bobbin holder make contact with the contact roller, and a standby position where the bobbins set on the bobbin holder do not make contact with the contact roller. A yarn engaging member is provided inward with respect to the two bobbin holders located at the winding position. The yarn engaging member engages the yarns on the respective bobbins set on each of the two bobbin holders at the winding position. Each of the two bobbin holders located at the winding position is configured to be movable to a yarn engaging position located inward with respect to the winding position.

**[0010]** According to the present invention, to engage the yarns on the respective bobbins, the bobbin holders can be moved to the yarn engaging position located inward with respect to the winding position. Thus, the yarns can be engaged on the respective bobbins under a state in which the bobbins are located close to the yarns. This makes it possible to ensure a sufficient angle at which the yarns are wound around the respective bobbins, while reducing the curvature of each of the yarns at a part thereof which is gripped by the yarn engaging member. Therefore, during initial yarn engaging, the yarns can be more reliably engaged on the respective bobbins.

**[0011]** Furthermore, in the yarn take-up winder according to the present invention, arrangements such as the traverse device and the contact roller which perform yarn winding are respectively provided for each of the two bobbin holders supported by the two turrets, respectively, and located at the winding position. Therefore, even if an attempt is made to move the winding position itself of the bobbin holders closer to the yarn engaging member in order to provide the bobbin holders and the yarn engaging member close to one another during the initial yarn engaging, there is a space restriction for moving the traverse device and the contact roller or the like. Thus, in the present invention, the winding position of the bobbin holders is set at a relatively outward position where the traverse device and the contact roller are prevented from interfering with each other. For the initial yarn engaging performed by the yarn engaging member, only the bobbin holders are moved to the yarn engaging position located inward with respect to the winding position.

**[0012]** According to a second aspect of the present invention, in the yarn take-up winder, the yarn engaging member is movable to a retract position, a yarn pressing position and a yarn gripping position. The retract position is a position where the yarn engaging member does not make contact with the yarns.

**[0013]** The yarn pressing position is a position located outward with respect to the retract position and at which the yarn engaging member presses the yarns against the respective bobbins. The yarn gripping position is a

position located between the retract position and the yarn pressing position and at which the yarn engaging member grips the yarns.

**[0014]** According to the present invention, the yarn engaging member moves from the retract position to the yarn gripping position, and grips the yarns at the yarn gripping position. The yarn engaging member further moves to the yarn pressing position, where the yarn engaging member can press the gripped yarns against the respective bobbins. Consequently, the yarns can be reliably engaged on the respective bobbins.

**[0015]** According to a third aspect of the present invention, in the yarn take-up winder, before each of the two bobbin holders moves from the winding position to the yarn engaging position, the yarn engaging member moves from the yarn gripping position to the retract position.

**[0016]** According to the present invention, immediately before the yarn engaging, the yarn engaging member is located at the retract position. Therefore, compared with a case in which the yarn engaging member remains at the yarn gripping position where the yarn engaging member has gripped the yarns, a larger space can be obtained for yarn paths at the bobbin holders located at the winding position. Thus, the bobbins can be moved further closer to the respective yarns, reducing the curvature of each of the yarns.

**[0017]** 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

**[0018]**

Figure 1 is a front view of a yarn take-up winder according to an embodiment of the present invention in which yarn threading has been completed.

Figure 2 is a side view of the yarn take-up winder in Figure 1.

Figure 3 is a block diagram schematically showing the electrical configuration of the yarn take-up winder.

Figure 4 is a front view of the yarn take-up winder in which yarns are being gripped.

Figure 5 is a side view of the yarn take-up winder in which the yarns are being regulated.

Figure 6 is a front view of the yarn take-up winder in which yarn engaging is being performed.

Figure 7 is a front view of the yarn take-up winder in which the yarn engaging has been completed.

#### Detailed Description of the Preferred Embodiment

**[0019]** An embodiment of the present invention will be described. As shown in Figure 1, a spinning machine (not

shown in the drawings) continuously supplies a plurality of (in the present embodiment, sixteen) yarns Y via two rollers 2 and 3 to a yarn take-up winder 1. In the present embodiment, the yarns Y are filaments made up of synthetic fibers. A yarn guide 4 is provided between the yarn take-up winder 1 and a downstream-side roller 3 located on a downstream side in a yarn traveling direction, to separate the plurality of yarns Y from one another at predetermined intervals. The yarn take-up winder 1 is configured such that a plurality of yarns Y supplied from the spinning machine via the rollers 2, 3 and the yarn guide 4 are wound around a plurality of bobbins 20.

**[0020]** As shown in Figure 1 and Figure 2, the yarn take-up winder 1 includes two disc-shaped turrets 11, bobbin holders 12 and 13, two contact rollers 14, two traverse devices 15, and a yarn engaging device 16 or the like. Each of the turrets 11 is rotatably provided in a unit frame 10. The bobbin holders 12 and 13 are rotatably supported by the respective turrets 11 and configured such that the plurality of bobbins 20 are set on the bobbin holders 12 and 13. Each of the contact rollers 14 is provided such that the contact rollers 14 can make contact with the bobbins 20 set on the bobbin holders 12 and 13. Each of the traverse devices 15 is a device that traverses the yarn Y being wound around the corresponding bobbin 20. Each of the yarn engaging devices 16 is a device that engages the yarn Y on the empty bobbin 20 (initial yarn engaging).

**[0021]** In the description below, for arrangements that form a pair by right and left such as the turrets 11 and the bobbin holders 12 and 13, an addition of "a" to a reference numeral indicates that the component is positioned in the right in Figure 1. An addition of "b" to a reference numeral indicates that the component is positioned in the left in Figure 1.

**[0022]** The two disc-shaped turrets 11 (11a and 11b), respectively, are rotatably provided in the unit frame 10 in parallel to a vertical plane. Two bobbin holders 12 and 13 are fixed at two respective positions that are symmetric with respect to a rotating center of the respective turrets 11. The two bobbin holders 12 and 13 extend horizontally in a direction that orthogonal to the turrets 11. The bobbin holders 12 and 13, supported by the respective turrets 11, rotate integrally with the turrets 11. A plurality of (in the present embodiment, eight) the bobbins 20 are set on each of a total of four bobbin holders 12a, 13a, 12b, 13b, supported by the two turrets 11, so that the bobbins 20 are arranged in an axial direction of each of the bobbin holders 12 and 13. As shown in Figure 2, a yarn catching groove 21 is formed at an axial end of each of the bobbins 20 to catch the yarn Y when yarn engaging is performed as described below.

**[0023]** Each of the two turrets 11 is driven and rotated by a turret driving motor 42 (see Figure 3: turret driving means). By rotating the turrets 11 by turret driving motors 42, the two bobbin holders 12 and 13 supported by the respective turrets 11 are moved to a winding position P1 (P1a, P1b) and a standby position P2 (P2a, P2b). The

winding position P1 (P1a, P1b) is a position where the bobbins 20 are made contact with the contact roller 14 to wind the yarns Y around the respective bobbins 20. The standby position P2 (P2a, P2b) is a position in a point symmetry with the winding position P1 (P1a, P1b) with respect to a rotating center of each of the turrets 11. That is, it is possible to alternately switch the bobbin holder 12 located at the winding position P1 in Figure 1 and the bobbin holder 13 located at the standby position P2 in Figure 1. Further, when switching the bobbin holders 12 and 13, the two turrets 11 are rotated in opposite directions. Specifically, the right turret 11a rotates clockwise in Figure 1, while the left turret 11b rotates counterclockwise in Figure 1.

**[0024]** A total of four bobbin holders 12a, 13a, 12b, 13b supported by the two turrets 11 are each driven and rotated by a bobbin driving motor 43 (see Figure 3). The two bobbin holders 12, that is, the right and left bobbin holders 12, located at the winding position P1, rotate to wind the yarns Y around the respective bobbins 20 set on each of the bobbin holders 12.

**[0025]** The two contact rollers 14 and the two traverse devices 15 are supported by respective elevating and lowering frames 17 arranged capable of elevating and lowering with respect to the unit frame 10. The two contact rollers 14 and the two traverse devices 15 are movable integrally with the respective elevating and lowering frames 17 in a vertical direction.

**[0026]** When winding the yarns Y around the respective bobbins 20 on the bobbin holder 12 located at the winding position P1, each of the contact rollers 14 directly makes contact with a surface of each of the bobbins 20 or with a surface of a yarn layer (package) formed around each of the bobbins 20. Accordingly, when the yarns are wound around the respective bobbins 20, the yarn layer formed around each of the bobbins 20 is pressed to adjust the shape of the package and to increase the hardness of the package.

**[0027]** The traverse devices 15 have a plurality of traverse guides 18 arranged in two lines in the axial direction of the two bobbin holders 12 located at the winding position P1, in association with the plurality of bobbins 20 respectively, set on each of the bobbin holders 12. The traverse guides 18 are driven and reciprocated in the axial direction of the bobbin holders 12 by a driving mechanism (not shown in the drawings) in order to wind the yarns Y around the respective bobbins 20 while traversing the yarns Y within a predetermined traverse range.

**[0028]** The elevating and lowering frames 17 have a plurality of traverse support point guides 19 arranged in two lines in the axial direction of the two bobbin holders 12 located at the winding position P1, in association with the plurality of bobbins 20 set on each of the bobbin holders 12. When winding the yarns Y around the respective bobbins 20, each of the traverse support point guides 19 is fixed at an axially central position of the corresponding bobbin 20. Meanwhile, for initial yarn engaging in which

the yarns Y are engaged on the respective empty bobbins 20, the traverse support point guides 19 are moved toward an axially leading end (left in Figure 2: operator side) of each of the bobbin holders 12 by a fluid cylinder or the like (see Figure 2).

**[0029]** With each of the traverse support point guides 19 located at the axially central position of the corresponding bobbin 20 and each of the yarns Y held by the corresponding traverse support point guide 19, the traverse guides 18 reciprocates in the axial direction of the bobbin holders 12 located at the winding position P1. Accordingly, the yarns Y are wound around the respective bobbins 20 while being traversed within the predetermined traverse range.

**[0030]** Furthermore, the elevating and lowering frames 17 have two yarn disengaging guides 22, that is, a right yarn disengaging guide and a left yarn disengaging guide 22. Each of the yarn disengaging guides 22 can advance and recede with respect to yarn paths (traveling paths for the yarns Y before yarn engaging) in order to disengage the yarns Y from the respective traverse guides 18 when the yarn engaging devices 16, described below, engage the yarns on the respective empty bobbins 20. Moreover, the elevating and lowering frames 17 have two yarn regulating guides 23, that is, a right yarn regulating guide and a left yarn regulating guide, which regulate the yarns Y supplied from above to the positions corresponding to the yarn catching grooves 21 on the bobbins 20, on which the respective yarns Y are to be caught during the initial yarn engaging.

**[0031]** Next, the yarn engaging device 16 will be described. The yarn engaging device 16 includes a guide support 24 and the yarn engaging members 25 movably coupled to the guide support 24.

**[0032]** The guide support 24 is located between the two bobbin holders 12a and 12b, that is, the right bobbin holder 12a and the left bobbin holder 12b, located at the winding positions P1a and P1b. The guide support 24 is provided upright from the bottom of the unit frame 10. A plurality of (in the present embodiment, eight) yarn engaging members 25 are provided on both right and left side edges of the guide support 24, and arranged in an axial direction of the bobbin holders 12. Further, the yarn engaging members 25 are provided for each of the plurality of the bobbins 20 set on each of the bobbin holders 12.

**[0033]** Each of the yarn engaging members 25 is a member that is elongate in one direction and has gripping portions 26 at a leading end thereof. The yarn engaging member 25 can be moved in the axial direction of the bobbin holders 12 by being driven by driving means such as a fluid cylinder.

**[0034]** Each of the yarn engaging members 25 is coupled to the guide support 24 via a link mechanism (not shown in the drawings). The yarn engaging member 25 is movable via the link mechanism to a retract position (see Figure 1), a yarn gripping position (see Figure 4) and a yarn pressing position (see Figures 6 and 7). The

yarn gripping position is a position where the yarn engaging member 25 is retracted from the corresponding bobbin 20. The yarn gripping position is a position where the yarn engaging member 25 is located slightly outward (yarn path side) with respect to position to grip the yarn Y. The yarn pressing position is a position where the yarn engaging member 25 is located further outward with respect to the yarn gripping position to press the yarn Y against the corresponding bobbin 20.

**[0035]** In the present embodiment, the right and left yarn engaging members 25 are arranged between the two bobbin holders 12a and 12b; the yarn engaging members 25 perform a yarn engaging operation on the bobbins 20 set on each of the two bobbin holders 12a and 12b located at the winding position P1. Consequently, the yarn take-up winder 1 can be made compact to reduce the overall dimensions thereof.

**[0036]** Next, the electrical configuration of the yarn take-up winder 1 will be briefly described with reference to a block diagram of Figure 3. As shown in Figure 3, a control device 40 that controls the whole yarn take-up winder 1 includes a central processing unit (CPU) that is an arithmetic processing device, a read-only memory (ROM) that stores programs to be executed by the CPU and data to be used for the programs, a random access memory (RAM) that temporarily stores data during the execution of the programs, and the like. In accordance with instructions input via an operation box 41 on the yarn take-up winder 1, the control device 40 controls the operations of appropriate portions of the yarn take-up winder 1 such as the turret driving motor 42 that drives and rotates the turrets 11, a bobbin driving motor 43 that drives and rotates the bobbin holders 12 and 13, and the fluid cylinders or the like which drive the traverse devices 15, the yarn engaging devices 16, and the various guides including the yarn traverse support guides 19, the yarn disengaging guides 22, and the yarn regulating guides 23.

**[0037]** The operation (particularly during initial yarn engaging) of the yarn take-up winder 1 will be described with reference to Figures 1, 2 and Figures 4 to 7.

**[0038]** When an operator inputs a predetermined instruction to the yarn take-up winder 1 via the operation box 41, the control device 40 controls the appropriate portions of the yarn take-up winder 1 in accordance with the input instruction. Accordingly, the yarn engaging operation and winding operation of the yarns Y are simultaneously performed on the plurality of bobbins 20 set on each of the two bobbin holders 12a and 12b located at the winding positions P1a and P1b.

**[0039]** First, as shown in Figures 1 and 2, before the yarns are engaged on the respective empty bobbins 20 set on each of the two bobbin holders 12a and 12b located at the winding position P1, the plurality of traverse support point guides 19 corresponding to the plurality of bobbins 20 set on each of the bobbin holders 12a and 12b are gathered toward the leading end side (the left side in Figure 2) of the elevating and lowering frame 17. Furthermore,

under a state in which the yarn engaging members 25 of the yarn engaging device 16 are respectively retracted to the retract position between the two bobbin holders 12a and 12b located at the winding position P1, the yarn engaging members 16 are gathered toward the leading end (that is, operator side) of the guide support 24.

**[0040]** Under such a state, while being sucked by the suction gun 50, a plurality of yarns Y continuously fed from a spinning machine (not shown in the drawings) via the rollers 2, 3 and the yarn guide 4 are engaged on the plurality of traverse support point guides 19, respectively, which have been gathered toward the leading end side of the elevating and lowering frame 17 as described above.

**[0041]** Moreover, as shown in Figure 2, a position where the suction gun 50 performs suction is fixed to the leading end side of the unit frame 10, and the plurality of yarns Y engaged on the respective traverse support point guides 19 are gathered toward the leading end side. Then, under such a state, as shown in Figure 1, the yarns Y are threaded through the space between each of the two bobbin holders 12a and 12b located at the winding positions P1a and P1b and the yarn engaging members 25 located at the retract position. Furthermore, at this time, the yarn disengaging guide 22 is moved forward to prevent the threaded yarns Y from being engaged on the traverse guide 18 of the traverse device 15.

**[0042]** Next, as shown in Figure 4, the right and left yarn engaging members 25 are slightly opened and moved to the yarn gripping position, located slightly outward (yarn path side) with respect to the retract position shown in Figure 1. At this time, the yarns Y are gripped by the gripping portions 26 provided at the leading end of the corresponding yarn engaging members 25.

**[0043]** Subsequently, as shown in Figure 5, the plurality of traverse support point guides 19 with the yarns Y engaged thereon and the plurality of yarn engaging members 25 gripping the respective yarns Y are moved towards a base end side (the right side in Figure 5) of each of the bobbin holders 12. Then, each of the yarn engaging members 25 is positioned so as to face the yarn catching groove 21 formed at an end portion of the corresponding bobbin 20. Furthermore, at this time, each of the yarn regulating guides 23 is moved forward to regulate the yarns Y with respect to the axial direction of the bobbin holder 12 so as to prevent the yarns Y gripped by the respective yarn engaging members 25 from being displaced from a position where the yarns Y lie along the respective yarn catching grooves 21.

**[0044]** Next, as shown in Figure 6, the turret driving motor 42 rotates (backward rotation) the two turrets 11 in the directions opposite to the direction in which the turrets 11 are rotated to switch the bobbin holders 12 and 13 (forward rotation). That is, as shown by arrows in Figure 6, the right side turret 11 is rotated counterclockwise while the left side turret 11 is rotated clockwise.

**[0045]** Then, the two bobbin holders 12a and 12b located at the winding positions P1a and P1b are moved

to the yarn engaging positions P3a and P3b located inward with respect to the winding positions P1a and P1b (yarn engaging members 25 side). Accordingly, the bobbins 20 set on the two bobbin holders 12a and 12b are moved closer to the respective yarn paths (traveling paths for the yarns Y) than when the bobbin holders 12a and 12b are respectively located at the winding positions P1a and P1b.

**[0046]** Next, as shown in Figure 7, the right and left yarn engaging members 25 are further opened and moved to the yarn pressing position where the yarn engaging members 25 are located further outward with respect to the yarn gripping position (yarn path side) shown in Figure 4. Accordingly, the plurality of yarns Y gripped by the gripping portions 26 of the plurality of yarn engaging members 25 are pressed against the corresponding bobbins 20. The yarns Y are thus engaged on the respective yarn catching grooves 21 of the corresponding bobbins 20.

**[0047]** As described above, the two bobbin holders 12a and 12b located at the winding positions P1a and P1b are moved to the yarn engaging positions P3a and P3b, respectively, located inward with respect to the winding positions P1a and P1b (yarn engaging member 25 side). Then, with the empty bobbins 20 located close to the yarns Y, the right and left yarn engaging members 25 move forward to the yarn pressing position to engage the yarns Y on the respective bobbins 20. As a result, it possible to obtain a sufficient angle at which the yarns Y are wound around the respective bobbins 20, while reducing the curvature of each of the yarns Y at a part thereof gripped by the gripping portion 26. Thus, during the initial yarn engaging, the yarns Y can be more reliably engaged on the respective bobbins 20.

**[0048]** Furthermore, each of the yarn engaging members 25 moves from the retract position (see Figure 1) to the yarn gripping position (see Figure 4) to reliably grip the yarns Y, and then moves to the yarn pressing position (see Figure 6) to press the gripped yarns Y against the respective bobbins 20. As a result, the yarns Y can be more reliably engaged on the respective bobbins 20.

**[0049]** In the yarn engaging operation performed by each of the yarn engaging members 25 as described above, after the yarn engaging member 25 moves to the yarn gripping position to allow the gripping portion 26 to grip the yarns Y as shown in Figure 4, the yarn engaging member 25 may be returned to the retract position shown in Figure 1 again. Then, for the yarn engaging shown in Figure 6, the yarn engaging member 25 may be advanced from the retract position to the yarn pressing position. In this case, immediately before the yarn engaging (before the yarn engaging member 25 advances to the yarn pressing position), a larger space can be obtained inward with respect to the winding position P1 (yarn path side) than in a case in which the yarn engaging member 25 remains at the yarn gripping position where the yarn engaging member 25 has moved to grip the yarns Y. As a result, the bobbin holders 12a and 12b can be moved

to the yarn engaging position located more inward (yarn path side). That is, during the yarn engaging, the bobbins 20 can be moved closer to the respective yarns Y to reduce the curvature of each of the yarns Y.

**[0050]** Once the yarns Y are engaged on the respective bobbins 20 set on each of the two bobbin holders 12a and 12b as described above, the yarn regulating guide 23 and the yarn disengaging guide 22 are retracted as shown in Figure 7. Accordingly, the regulation of the positions of the yarns Y in the axial direction of the bobbin holders 12 by the yarn regulating guide 23 is canceled. In addition, a state in which the yarns Y are disengaged from the traverse guide 18 by the yarn disengaging guide 22 is also canceled. Accordingly, the yarns Y are caught by the traverse guide 18.

**[0051]** Moreover, the turret driving motor 42 rotates (forward rotation) the two turrets 11 in directions opposite to the directions in which the turrets 11 are rotated during the yarn engaging. That is, in Figure 7, the right turret 11a is rotated clockwise, while the left turret 11b is rotated counterclockwise.

**[0052]** Accordingly, the two bobbin holders 12a and 12b located at the yarn engaging positions P3a and P3b respectively return to the winding positions P1a and P1b located outward with respect to the yarn engaging positions P3a and P3b. Under this state, the traverse guides 18 are reciprocated in the axial direction of each of the bobbin holders 12 to traverse the yarns Y with the respective traverse support point guides 19 as a traverse center. At the same time, the bobbin driving motor 43 rotates the bobbin holders 12 to wind the yarns Y around the plurality of the bobbins 20 set on the bobbin holders 12.

**[0053]** Furthermore, when a predetermined amount of yarn Y is wound around each of the bobbins 20 set on each of the bobbin holders 12 located at the winding position P1 and a fully wound package is formed, the turret driving motor 42 rotates the two turrets 11 forward to switch the bobbin holder 12 located at the winding position P1 and the bobbin holder 13 placed at the standby position P2.

**[0054]** Then, the yarns Y are wound around the plurality of bobbins 20 set on the bobbin holder 13 that have newly arrived at the winding position P1.

**[0055]** The embodiment of the present invention has been described. However, the present invention is not limited to the above-described embodiment. Many variations may be made to the embodiment without departing from the spirit of the present invention. An example of such a variation will be described below.

**[0056]** In the yarn take-up winder according to the above-described embodiment, the bobbin driving motor 43 directly drives and rotates the bobbin holders 12 and 13 to wind the yarns Y around the respective bobbins 20. However, the yarn take-up winder may be a winder adopting a friction drive method in which the contact roller 14, which makes contact with the bobbins 20, is driven and rotated by a motor or the like to rotate the bobbins 20 by

the contact friction between the contact roller 14 and the bobbins 20.

## 5 Claims

### 1. A yarn take-up winder **characterized by** comprising:

bobbin holders (12, 13) on each of which bobbins are set;  
two turrets (11) each of which rotatably supports at least two said bobbin holders (12, 13) and which can also be rotated;  
a turret driving means (42) for driving and rotating said two turrets (11) ;  
a traverse device (15) which traverses yarns being wound around the respective bobbins; and  
a contact roller (14) provided capable of making contact with said bobbins, and  
in that each of said bobbin holders (12, 13) is movable to a winding position where the bobbins set on the bobbin holder (12, 13) makes contact with said contact roller (14) and a standby position where the bobbins set on the bobbin holder (12, 13) do not make contact with said contact roller (14), and in that a yarn engaging member (25) for engaging the yarns on the bobbins set on said two bobbin holders (12, 13), which are supported by said two turrets (11) and located at the winding position, is arranged inward with respect to said two bobbin holders (12, 13), and in that said two bobbin holders (12, 13) located at the winding position are movable to a yarn engaging position located inward with respect to the winding position.

2. The yarn take-up winder according to Claim 1, **characterized in that** said yarn engaging member (25) is movable to a retract position where said yarn engaging member (25) does not make contact with the yarns, a yarn pressing position located outward with respect to said retract position and at which said yarn engaging member presses the yarns against said respective bobbins, and a yarn gripping position located between said retract position and said yarn pressing position and at which said yarn engaging member grips the yarns.

3. The yarn take-up winder according to Claim 2, **characterized in that** before each of said two bobbin holders (12, 13) moves from said winding position to said yarn engaging position, said yarn engaging member (25) moves from said yarn gripping position to said retract position.

FIGURE 1

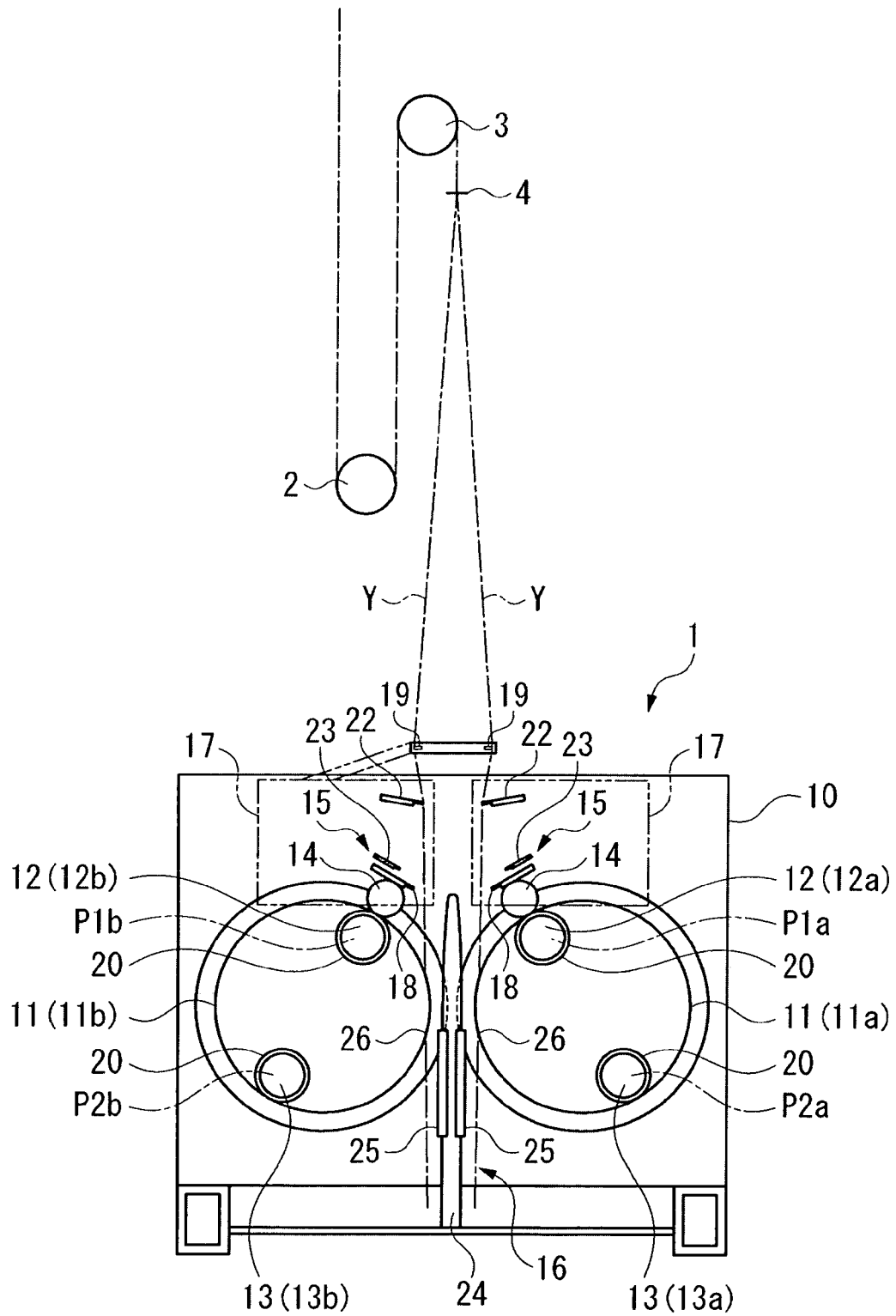
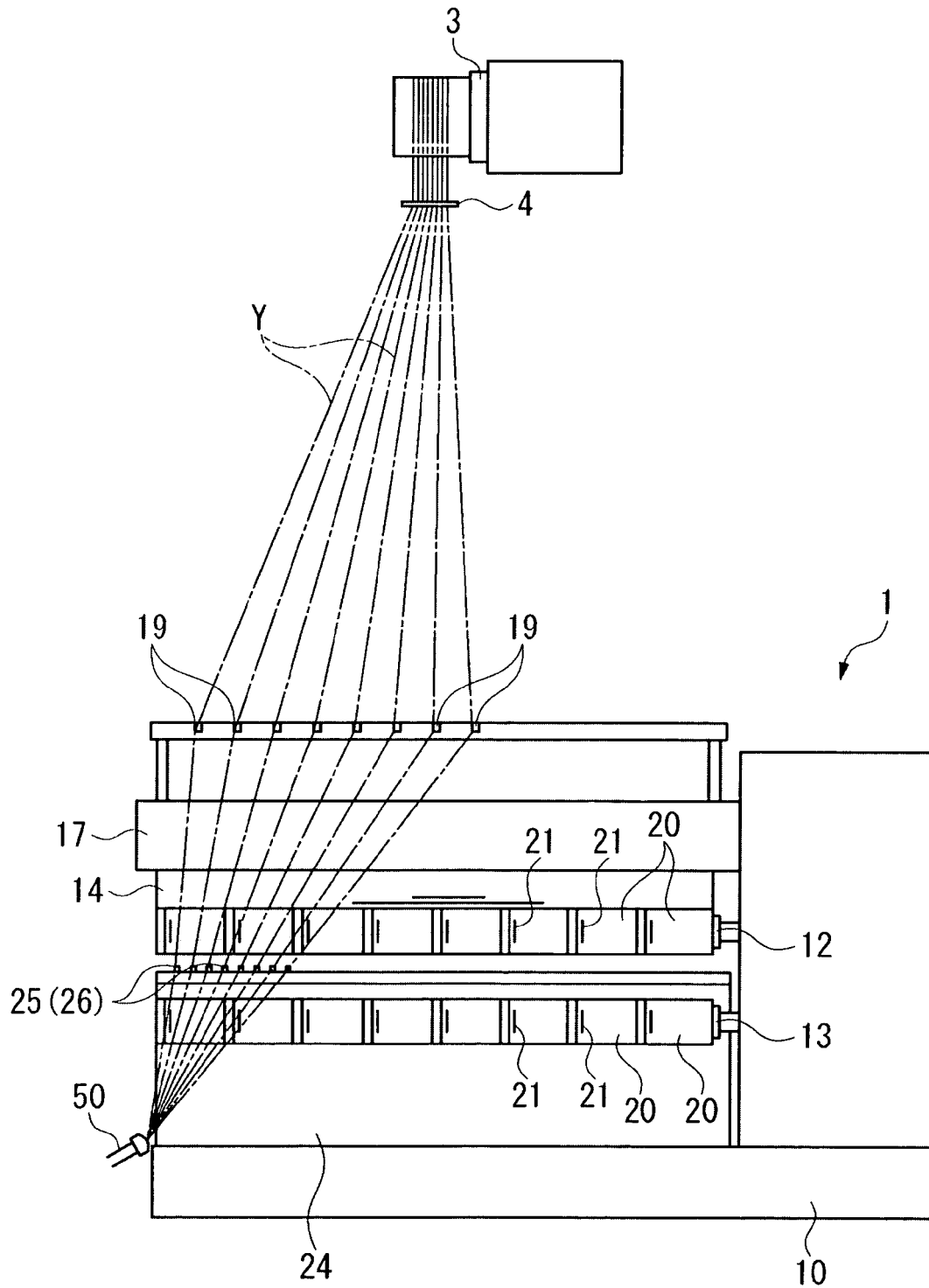




FIGURE 2



*FIGURE 3*

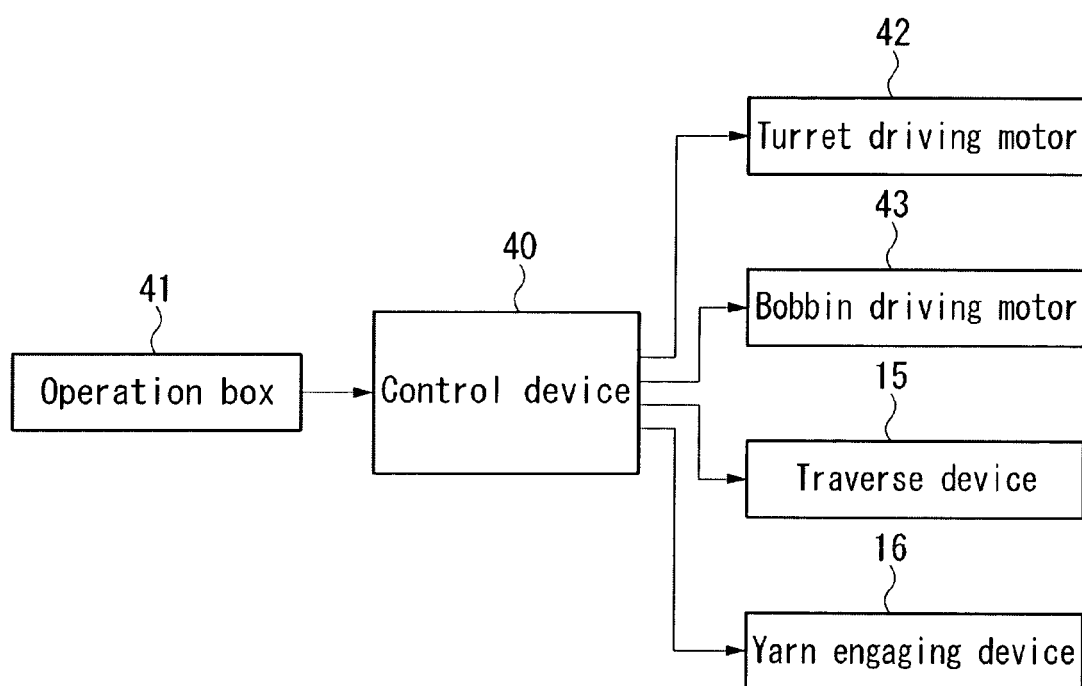


FIGURE 4

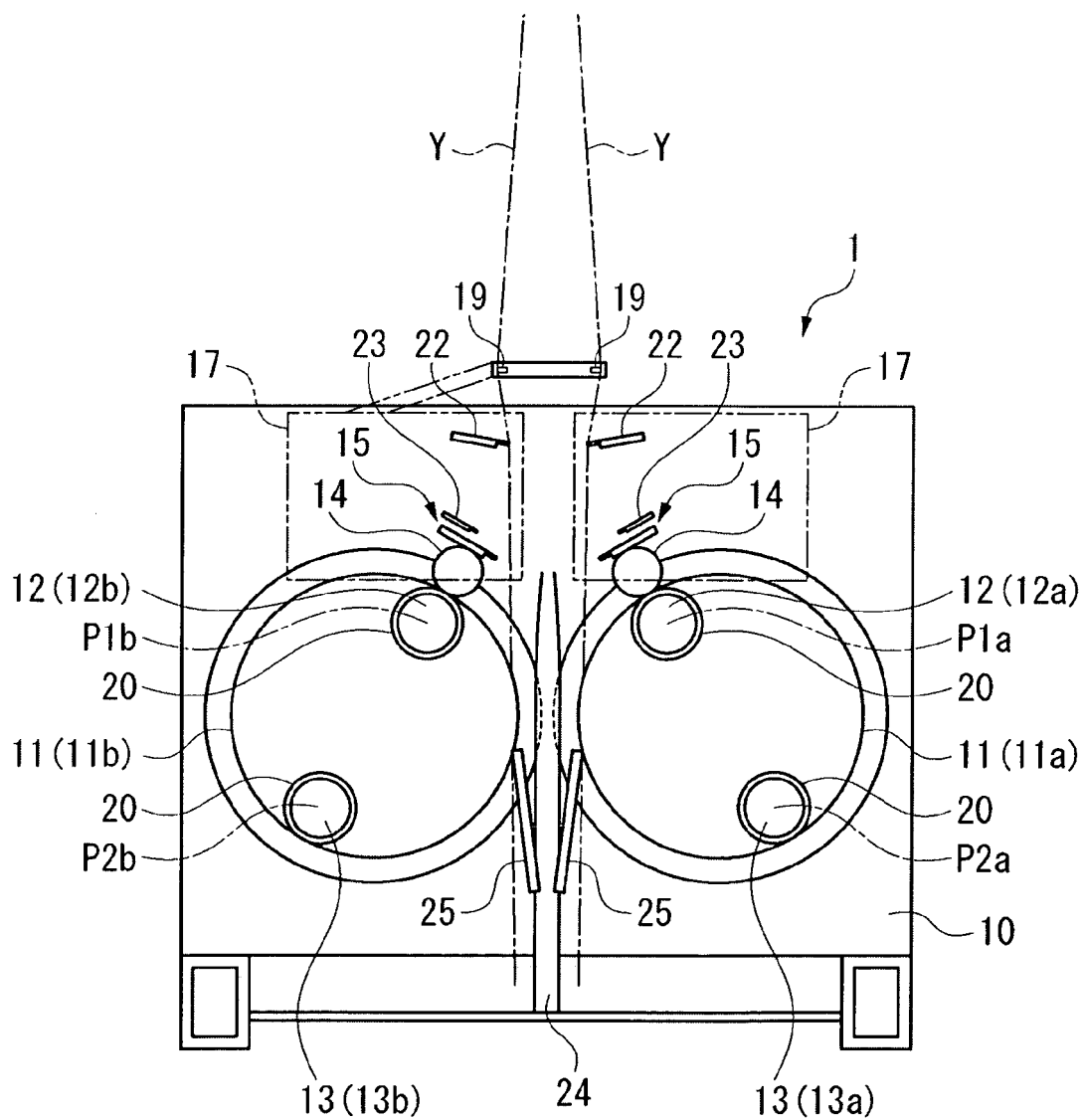


FIGURE 5

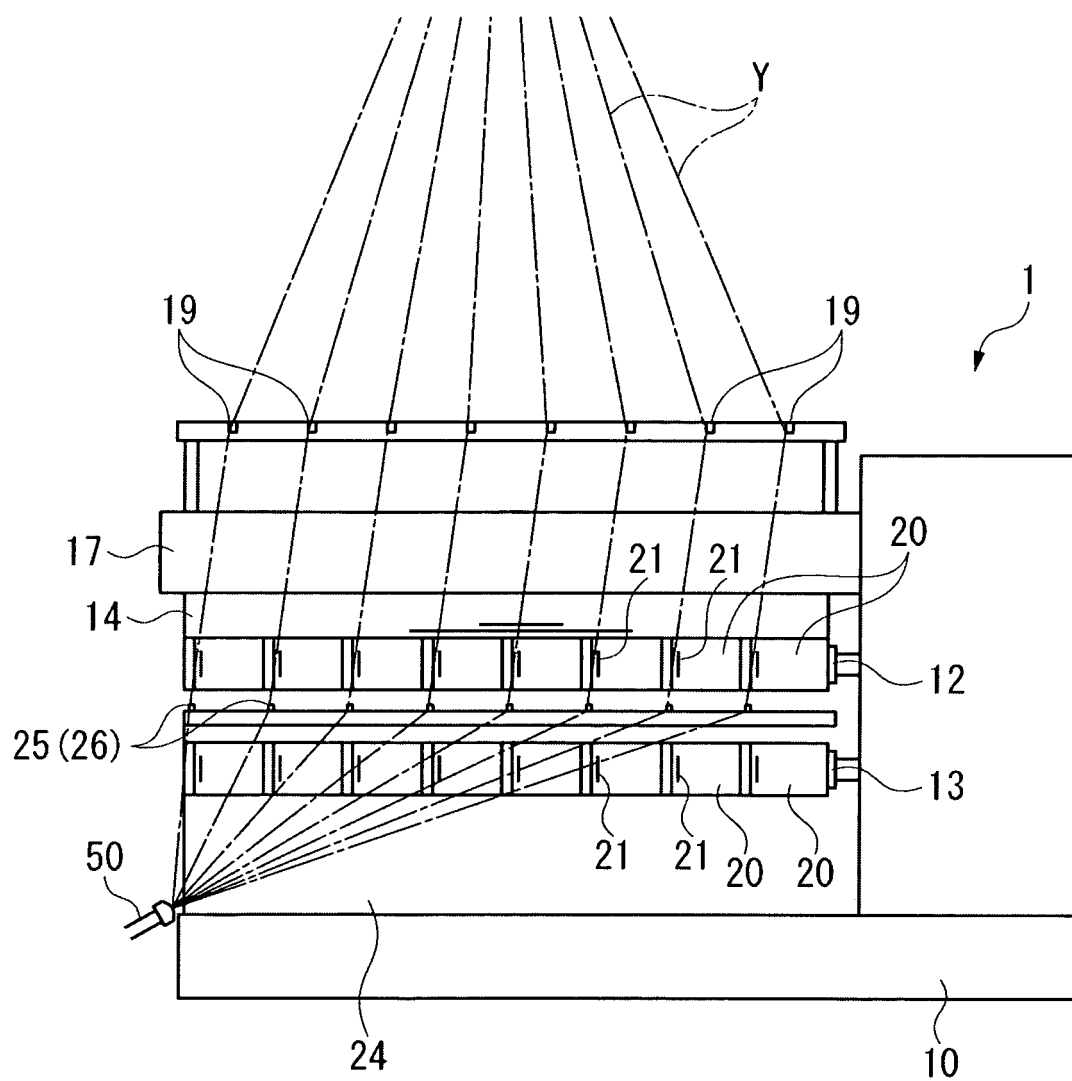


FIGURE 6

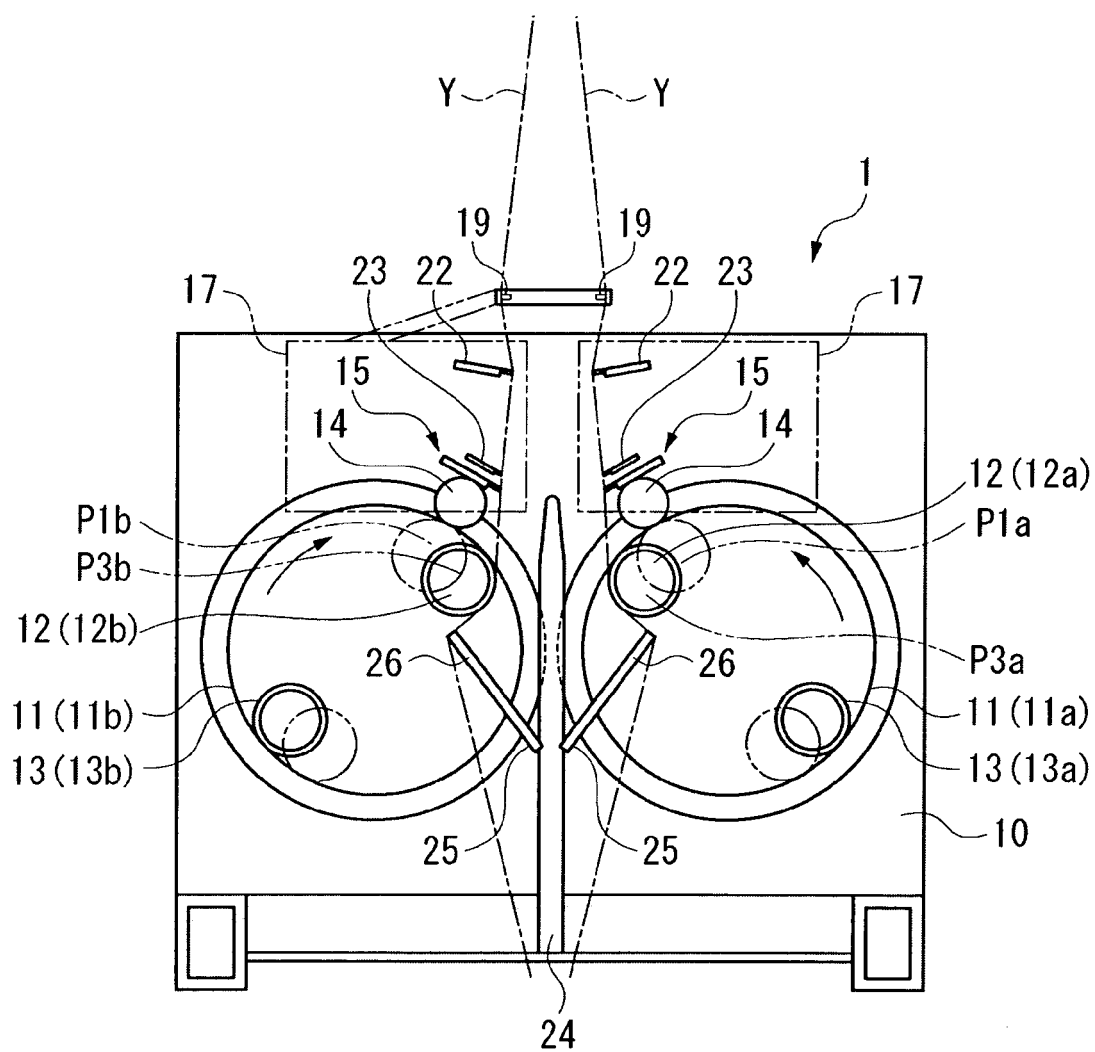
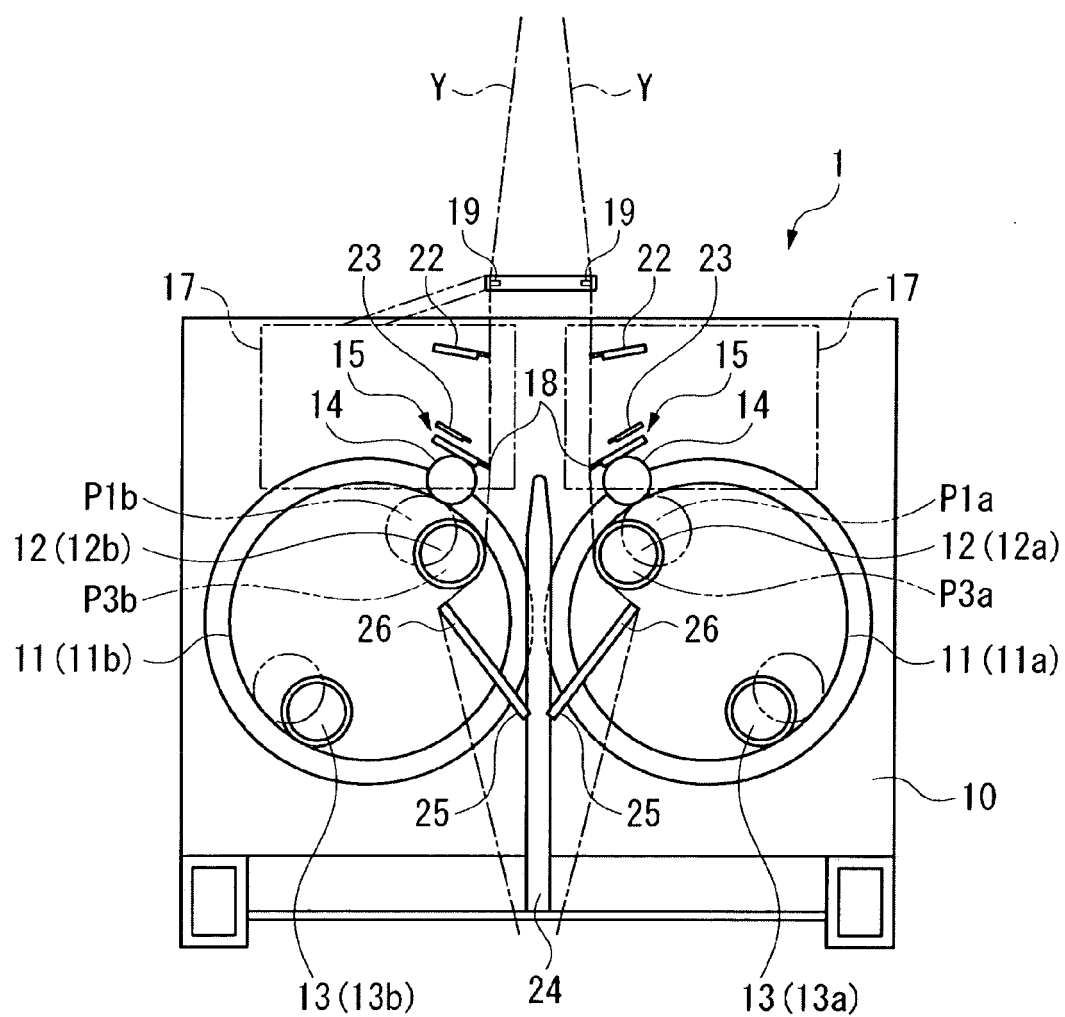


FIGURE 7



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- JP 2004075340 A [0003] [0004] [0007]