



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 943 573 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
22.09.1999 Bulletin 1999/38

(51) Int. Cl.⁶: **B65H 65/00**, B65H 54/72,
B65H 57/00

(21) Application number: **99102879.6**

(22) Date of filing: **03.03.1999**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: **Kitayama, Futoshi**
Ogura-cho, Uji-shi, Kyoto (JP)

(74) Representative:
Beetz & Partner
Patentanwälte
Steinsdorfstrasse 10
80538 München (DE)

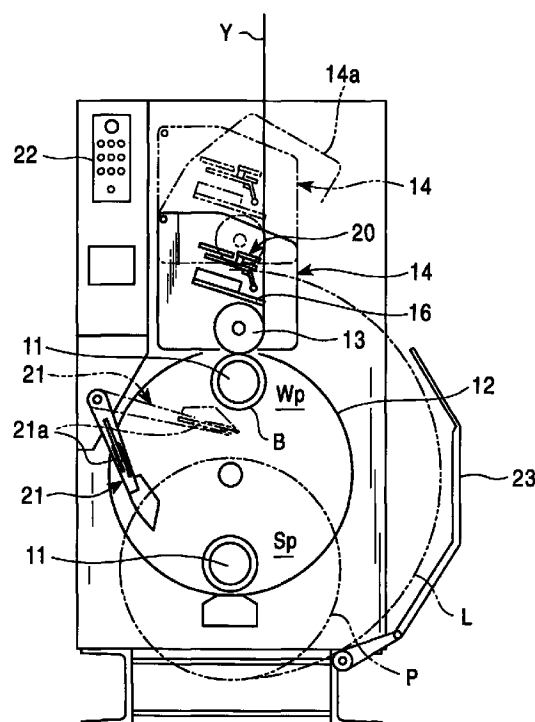
(30) Priority: **20.03.1998 JP 7206898**

(71) Applicant:
Murata Kikai Kabushiki Kaisha
Minami-ku, Kyoto-shi, Kyoto 601 (JP)

(54) **Filament yarn take-up winder**

(57) To provide a filament yarn take-up winder that facilitates threading and maintenance operations. The filament yarn take-up winder comprises a traverse device 16 for traversing a continuously supplied yarn Y, a bobbin B around which the yarn Y traversed by the traverse device 16 is wound, said bobbin B having a yarn engaging portion S outside the winding width, a bobbin holder 11 on which the bobbin B is installed and that rotates the bobbin B, a contact roller 13 for applying a predetermined pressure to the bobbin B, a yarn-removal guide 33 for changing the position of the yarn Y so as to leave the traverse device 16, a yarn-shifting guide 45 for moving to the yarn engaging portion S the yarn Y that has been changed by the yarn-removal guide 33, and a yarn-anchoring guide 44 for temporarily bearing the yarn Y that has been moved by the yarn-shifting guide 45, wherein the traverse device 16, the contact roller 13, the yarn-removal guide 33, the yarn-anchoring guide 44, and the yarn-shifting guide 45 are biased to one side of a yarn path for the yarn Y.

FIG. 1



EP 0 943 573 A2

Description

Field of the Invention

[0001] The present invention relates to a filament yarn take-up winder for winding a filament yarn, and in particular, to an apparatus that operates when an operator guides the yarn onto an empty bobbin of the filament yarn take-up winder and when the yarn is transferred from a full package to an empty bobbin.

Background of the Invention

[0002] In a filament yarn take-up winder, its body includes a turret plate having two bobbin holders protruding therefrom so that the turret plate rotates by 180° to switch the bobbin holders between a winding position and a standby position. A contact roller that contacts a bobbin installed on the bobbin holder is provided above the bobbin holder. A filament yarn spinned and continuously supplied is wound into a package while being traversed by a traverse device.

[0003] When a package becomes full, this filament yarn take-up winder rotates the turret plate to switch an empty bobbin from the standby position to the winding position for winding while removing the full package moved at the standby position from the bobbin holder and passing the empty bobbin on the holder to set it in a standby condition, thereby allowing the yarn to be continuously wound.

[0004] In switching between the winding position and the standby position, the yarn leading to the full package must be transferred to the empty bobbin around which the yarn is to be wound. Accordingly, the winder includes a yarn-removal guide for removing the yarn from the traverse device, a yarn-shifting guide for moving the removed yarn to a yarn-catching grave position in the empty bobbin, and a yarn-anchoring guide for temporarily bearing the moved yarn before transferring it to the traverse device. These guides are used during a threading operation for initially installing the yarn on the empty bobbin, as well as during the operation for transferring the yarn from a full package to an empty package.

[0005] In conventional filament yarn take-up winder, the traverse device, the contact roller, the yarn-removal guide, the yarn-shifting guide, and the yarn-anchoring guide are arranged on both sides of the yarn path, resulting in difficult threading and maintenance operations.

[0006] It is an object of the present invention to solve this problem in order to provide a filament yarn take-up winder that enables easy threading and maintenance operations.

Summary of the Invention

[0007] In order to attain this object, the present inven-

tion is a filament yarn take-up winder comprising a traverse device for traversing a continuously supplied yarn, a bobbin around which the yarn traversed by the traverse device is wound and that has a yarn engaging portion outside the winding width, a bobbin holder on which the bobbin is installed and that rotates the bobbin, a contact roller for applying a pressure to the bobbin, a yarn-removal guide for changing the position of the yarn so as to leaves the traverse device, a yarn-shifting guide for moving the yarn that has been removed by the yarn-removal guide to the yarn engaging portion, and a yarn-anchoring guide for temporarily bearing the yarn that has been moved by the yarn-shifting guide; the traverse device, the contact roller, the yarn-removal guide, the yarn-shifting guide, and the yarn-anchoring guide are biased to one side of a yarn path, and the yarn-shifting guide and the yarn-anchoring guide move forward and backward crossing the yarn path in the direction orthogonal to the traverse direction, so that each guide moves forward to a position where it engages the yarn.

[0008] The present invention is a filament yarn take-up winder wherein the yarn-shifting guide and the yarn-anchoring guide move forward and backward crossing the yarn path in the direction orthogonal to the traverse direction so as to capture the yarn, which is temporarily borne by the yarn-anchoring guide in a position that the yarn-shifting guide and the yarn-anchoring guide are biased to the traverse device side relative to the yarn path.

[0009] The present invention is a filament yarn take-up winder wherein the yarn-shifting guide and the yarn-anchoring guides are linked with the yarn-removal guide so as to move forward and backward integrally with the yarn-removal guide.

[0010] The present invention is a filament yarn take-up winder wherein the yarn-anchoring guide can adjust its position in the axial direction of the bobbin.

Brief Description of the Drawing

[0011]

Figure 1 is a front view showing one embodiment of the present invention.

Figure 2 is a top view showing the upper yarn guide apparatus of Figure 1 in detail.

Figure 3 is an enlarged front view of the integral part of Figure 1.

Figure 4 is a front view showing a state in which the yarn-removal plate of the upper guide apparatus in Figure 3 has been operated.

Figure 5 is a front view shown a state in which the yarn-shifting guide in Figure 4 has been operated.

Figure 6 is a top view showing the relationship between the yarn-anchoring guide and the package under the conditions shown in Figure 5.

Figure 7 is a perspective view showing the filament yarn take-up winder of Figure 1.

Detailed Description of the Preferred Embodiments

[0012] An embodiment of the present invention is described below in detail with reference to the drawings.

[0013] First, the basic configuration of a filament yarn take-up winder according to the present invention will be described with reference to Figures 1 and 7.

[0014] In Figures 1 and 7, a body 10 includes a rotatable turret plate 12 having two bobbin holders 11 that protrude from the turret plate 12 and that have a plurality of bobbins B passed thereon. The turret plate 12 rotates by 180 ° each time to switch a bobbin holder 11 between a winding position Wp and a standby position Sp.

[0015] Above the winding position Wp, a slide box 14, which ascends simultaneously as the packages P become larger and descends when empty bobbins B are switched from a standby position Sp to a winding position Wp, is arranged so that ascends and descends independently in the body 10. A contact roller 13 that rotates in contact with the bobbins B (the packages P), it is supported within the lower part of the slide box 14 in such a way that it can rotate independently.

[0016] A blade type rotary traverse device 16 comprising two blades that rotate in relatively opposite directions is provided above the contact roller 13 in the slide box 14. The traverse device 16 and the contact roller 13 are arranged to one side of a yarn path for a continuously supplied yarn Y. An upper yarn guide apparatus 20 is located above the traverse device 16 in such a way as to be concentrated on the traverse device 16 side of the yarn Y.

[0017] In addition, the body 10 includes a swinging arm 21 having a lower yarn guide apparatus 21a.

[0018] The lower yarn guide apparatus 21a slides on the arm 21 and is composed of a yarn-drop prevention guide for preventing yarn being wound in a full package transferred to the standby position Sp from dropping onto the end of the layered yarn section of the full package when transferring the yarn, and a yarn-shift guide for aligning the yarn with a yarn-catching groove (a yarn-engaging section) formed in the empty bobbin. The traverse device 16, the upper yarn guide apparatus 20 and the lower yarn guide apparatus 21a are provided at every each yarn Y.

[0019] 22 is a control board that allows take-up winding operation conditions to be set, and 23 is a partitioning cover.

[0020] In this filament yarn take-up winder, the turret plate 12 rotates by 180° to switch the bobbin holders 11 between the winding position Wp and the standby posi-

tion Sp. When the yarns Y are wound, the bobbin holder 11 at the winding position Wp is rotated while the contact roller 13 located above the bobbin holder 11 rotates in contact with the bobbins B (the packages P) to apply a predetermined pressure to the bobbins B. Thus, the traverse devices traverse a plurality of yarns Y spinned and continuously supplied as shown in Figure 7, while the yarns are wound into the packages P.

[0021] In this filament yarn take-up winder, when the package P becomes full, the turret plate 12 is rotated to switch the empty bobbin B at the standby position Sp to the winding position Wp for continuously winding. Moreover, when the full package P moved at the standby position Sp is removed from the bobbin holder 11, an empty bobbin B is then passed on the holder 11 to enter the standby condition Sp. In this manner, the yarn can be wound continuously.

[0022] In switching between the winding position Wp and the standby position Sp, the yarn Y leading to the full package P must be transferred to an empty bobbin B around which the yarn is to be wound. Accordingly, the upper yarn guide apparatus 20 guides the yarn in such a way as to remove the yarn Y from the traverse device 16, move the removed yarn to a yarn-catching groove position in the empty bobbin B, and temporarily bear the yarn until it transfers to the traverse device 16 again.

[0023] The upper yarn guide apparatus 20 will be described below.

[0024] The upper yarn guide apparatus 20 according to the present invention is located in the slide box 14 in such a way as to be concentrated on one side of a yarn path (during package formation) together with the blade type rotary traverse device 16. This configuration precludes a relevant member from being located opposite to the yarn path (opposite to the side on which the traverse device 16 is installed, that is, the closing cover 14a side) when a closing cover 14a that covers the traverse device 16 in the slide box 14 is opened.

[0025] As shown in the enlarged view in Figure 3, the upper yarn guide apparatus 20 is composed of an inverse-V-shaped yarn-removal plate 25 which is provided so that can moved forward and backward on a supporting plate 24, a yarn-anchoring guide 44 that is provided on the yarn-removal plate 25 at a position corresponding to a yarn engaging portion S (Figure 6) for the bobbin B and that is moved forward to a position where it can capture the yarn Y while the yarn-removal plate 25 is moving forward, and a yarn-shifting guide 45 that is provided on the yarn-removal guide 25 opposite to the yarn-anchoring guide 44 so as to move forward and backward in the traverse direction and that biases the yarn Y to the yarn engaging portion S of the bobbin B to engage it with the yarn-anchoring guide 44.

[0026] The upper yarn guide apparatus 20 will be described in detail with reference to Figure 2.

[0027] The supporting plate 24 is supported on a frame 30 of the slide box 14, and a yarn-removal plate 25 is provided below the supporting plate 24 so as to

move on a pair of rails 32 forward and backward relative to the yarn path.

[0028] The yarn-removal plate 25 has at its tip a yarn-removal guide 33 that has a circular cross section and that removes the yarn from the traverse device 16 (changing the position of the yarn path Y in such a way as to leave the traverse device 16). The yarn-removal plate 25 also has an opening 34 located at a position corresponding to the blade type rotary traverse device 16, which is described below.

[0029] The yarn-removal plate 25 is linked with the supporting plate 24 via a pair of linking mechanisms 35, which are linked with a coupling rod 36, to which a moving cylinder 37 is coupled. Thus, a rod 38 extends from the cylinder 37 to move the yarn-removal plate 25 forward, via the coupling rod 36 and the linking mechanisms 35, from the position shown by the continuous line in Figure 2 to a position 25P shown by the double chain-dotted line. In addition, the coupling rod 36 and the supporting plate 24 are coupled together via a spring 39 so that the spring force of the spring 39 returns the yarn-removal guide 25 from its extended position to its retracted position, which is shown by the continuous line in Figure 2.

[0030] The yarn-removal guide 33 is configured as a bar common to all yarns and extending in the traverse direction. The yarn-removal guide 33 is located on the traverse device 16 side of the yarn Y at its standby position, and since it is coupled to the yarn-removal plate 25, when the yarn-removal plate 25 moves forward, the yarn-removal guide 33 is moved together with the yarn-removal plate 25 crossing the yarn in the direction orthogonal to the traverse direction, thereby separating the yarn Y from the traverse device 16.

[0031] The blade type rotary traverse device 16 is arranged below the yarn-removal plate 25 and mounted on the frame 30 of the slide box 14. The traverse device 16 comprises a traverse guide member 40 that guides the yarn and defines a traverse range T, and two blades 42a and 42b that frequently appear on a yarn moving surface 41 of the traverse guide member 40 to move the yarn in the lateral direction. One blade 42a rotates counterclockwise in Figure 2, whereas the other blade 42b rotates clockwise, and the two blades 42a and 42b cross each other at the respective traverse ends to switch the traverse direction of the yarn.

[0032] The yarn-removal plate 25 has L-shaped yarn-anchoring guides 44 at positions located out of the traverse range T and corresponding to the slits in the yarn engaging portions S in the bobbins B, wherein the number of guides are installed corresponds to the number of packages on which the yarn is wound. The yarn-anchoring guide 44 is located on the traverse device 16 side of the yarn Y at its standby position, and since it is coupled to the yarn-removal plate 25, when the yarn-removal plate 25 moves forward, the yarn-anchoring guide 44 is moved together with the yarn-removal plate 25 to move to a position where a yarn-

engaging portion 44a (see Figure 6) beyond the yarn removed from the traverse device 16 by the yarn-removal guide 33.

[0033] The position of the yarn-anchoring guide 44 can be fine-tuned in the axial direction of the bobbin B using a long hole 55, which is shown in Figure 6, and the tip of the yarn-engaging portion 44a is aligned with the traverse end. The yarn-engaging portion 44a temporarily bears the yarn Y.

[0034] A yarn-shifting guide 45 is provided on the yarn-removal plate 25. The yarn-shifting guide 45 is opposed to the yarn-anchoring guide 44 and is normally located another outside of the traverse range T, while, in operation, moving toward the yarn-anchoring guide 44 to shift the yarn to a position of the yarn engaging portion S. The yarn-shifting guide 45 is provided on a rod-shaped upper guide 46 common to all yarns. The upper guide 46 can be moved in the axial direction of the bobbin using a guide rail 47 and can be moved back and forth in the traverse direction using a yarn-shifting cylinder 48 provided on the yarn-removal plate 25.

[0035] The yarn-shifting guide 45 is located on the traverse device 16 side of the yarn Y at its standby position so as not to contact the yarn. Since, however, it is coupled to the yarn-removal plate 25, when the yarn-removal plate 25 moves forward, the guide 45 is moved together with the yarn-removal plate 25 to move to a position where it engages the yarn removed from the traverse device 16 by the yarn-removal guide 33.

[0036] In addition, the yarn-removal plate 25 includes a proximity switch 50 for detecting the movement of the yarn-shifting guide 45 to the yarn-anchoring guide 44, and a detector 51 is mounted on the upper guide 46.

[0037] The operation of the present invention will now be described.

[0038] First, the yarn Y spinned and continuously supplied as shown in Figures 1 and 7 is wound around the bobbin B at the winding position Wp into the package P while being traversed by the blade type rotary traverse device 16. During winding, the bobbin holder 11 at the winding position Wp is rotated, and the contact roller 13 is rotated while contacting the package P around which the yarn is being wound, thereby controlling the rotation of the bobbin holder 11 while elevating the slide box 14 as the winding diameter increases.

[0039] During winding, when the package P becomes full as shown in Figure 3, the turret plate 12 shown in Figure 1 is rotated to move the empty bobbin B at the standby position Sp to the winding position Wp while moving the full package P to the standby position Sp, as shown by a locus L. Then, the slide box 14 lowers to allow the contact roller 13 and the empty bobbin B to contact each other. Subsequently, the yarn-removal guide 33 moves forward to the yarn Y side to remove the yarn Y from the traverse device 16, as shown in Figure 4.

[0040] That is, as shown in Figure 2, the rod 38 of the moving cylinder 37 extends to move the coupling rod 36

leftward in Figure 2, thereby moving forwardly the yarn-removal guide 33 via the linking mechanisms 35 to the position 25P shown by the double chain-dotted line.

[0041] Until the forward movement of the yarn-removal guide 33 causes the yarn Y to be separated from the traverse device 16, the yarn Y remains within the traverse range T and between the yarn-anchoring guide 44 and the yarn-shifting guide 45.

[0042] Then, when the yarn-shifting cylinder 48 is extended, the upper guide 46 moves to engage the yarn Y, which is located within the traverse range T, with the yarn-shifting guide 45. Finally, the yarn Y is caught between the yarn-anchoring guide 44 and the yarn-shifting guide 45.

[0043] Then, the yarn Y moves out from the traverse range T to the yarn engaging portion S of the bobbin B.

[0044] Then, the proximity switch 50 described in Figure 2 operates to move the yarn-removal guide 33 backward to bend the yarn Y toward the traverse device 16 as shown in Figure 5. Then as shown in Figure 6, while being caught between the yarn-shifting guide 45 and the yarn-anchoring guide 44, the yarn Y is pressed against and borne by the yarn-engaging portion 44a of the yarn-anchoring guide 44.

[0045] Subsequently, a yarn-shift guide of the lower yarn guide apparatus 21a operates to catch the yarn Y in the yarn engaging portion S of the bobbin B, and the yarn leading to the full package P is cut by tension so as to be separated from the yarn Y leading to the empty bobbin B.

[0046] Subsequently, when the yarn-shifting cylinder 48 contracts to move the yarn-shifting guide 45 backward, the yarn Y moves simultaneously with the backward movement of the yarn-shifting guide 45 while sliding down the yarn-engaging portion 44a of the yarn-anchoring guide 44. Once the yarn-shifting guide 45 has been separated from the yarn-anchoring guide 44, the yarn is removed from the yarn-engaging portion 44a. Then, the traverse device 16 immediately catches and traverses the yarn Y to wind it around the new bobbin B.

[0047] The yarn-removal guide 33, the yarn-anchoring guide 44, and the yarn-shifting guide 45 are located on one side of the yarn path through normal winding process which the yarn is being wound normally (the yarn path shown in Figure 1), that is, the rear side of yarn path closer to the traverse device 16, whereas the opposite side, that is, the front side of the yarn path is an open space. Thus, maintenance and threading operations are easy to perform.

[0048] In addition, after the yarn engaging portion S of the empty bobbin has caught the yarn, when the yarn is moved to within the traverse range, the yarn-anchoring guide 44 has biased the yarn the traverse device 16 side relative to the yarn path through normal winding process, and the yarn-shifting guide 45 has been moved closer to the device 16 than to the yarn path. Consequently, when the yarn is removed from the yarn-

anchoring guide 44 and traversed by the traverse device 16, the yarn and the yarn-shifting guide 45 are prevented from interfering with each other, thereby preventing the wound yarn from being damaged. In addition, as shown in Figure 6, the mounting position of the yarn-anchoring guide 44 can be fine-tuned in the axial direction of the yarn-removal guide 25 using the long hole 55, thereby enabling the forward and backward movements of the yarn-shifting guide 45 to be fine-tuned in the traverse direction. As a result, the range of a spiral portion can be fine-tuned that is formed when the process transfers to production winding after a bunch winding has been formed at the yarn engaging portion S. The spiral portion can thus be formed in such a way that it is easily cut later on.

[0049] Since the yarn-anchoring guide 44 and the yarn-shifting guide 45 are adapted to move forward and backward together with the yarn-removal guide 33 in the direction orthogonal to the traverse direction, no means for driving the yarn-anchoring 44 or yarn-shifting guide 45 in this direction needs to be provided, thereby simplifying the control of the guide operations. The above embodiment provides the yarn-removal guide 33 in proximity to the traverse device 16, and this proximity helps make the machine more compact and makes it easier to fine-tune the yarn path.

[0050] Although the above embodiment references the example in which the slide box including the contact roller ascends as the diameter of the package increases, this box may be fixed in position while the turret plate rotates, which occurs as the diameter of the package increases.

[0051] Since this apparatus is used not only to transfer the yarn from the full package to the empty bobbin as illustrated in the above embodiment but also to thread the yarn, it is applicable to a filament yarn take-up winder that are not based on the automatic switching method.

[0052] In summary, according to the present invention, the traverse device and the yarn-removal guide, etc. are concentrated on one side of the yarn path, and the other side is an open space. Thus, the present invention facilitates maintenance and threading operations.

[0053] Moreover, because the yarn-shifting guide and the yarn-anchoring guide, etc. are located in such a way as to be completely biased to one side of the yarn path without crossing the yarn path, these guides, etc. are prevented from interfering with threading operations.

Claims

1. A filament yarn take-up winder characterized in that the winder comprises a traverse device (16) for traversing a continuously supplied yarn (Y), a bobbin (B) around which the yarn traversed by the traverse device is wound and that has a yarn engaging portion (S) outside the winding width, a bobbin holder (11) on which the bobbin is installed and that

rotates the bobbin, a contact roller (13) for applying a pressure to the bobbin, a yarn-removal guide (33) for changing the position of the yarn so as to leave the traverse device, a yarn-shifting guide (45) for moving the yarn that has been removed by the yarn-removal guide toward the yarn engaging portion, and a yarn-anchoring guide (44) for temporarily bearing the yarn that has been moved by the yarn-shifting guide; the traverse device, the contact roller, the yarn-removal guide, the yarn-shifting guide, and the yarn-anchoring guide are arranged to one side of the yarn path, and the yarn-shifting guide and the yarn-anchoring guide move forward and backward crossing the yarn path in the direction orthogonal to the traverse direction, so that each guide moves forward to a position where it engages the yarn.

2. A filament yarn take-up winder according to Claim 1 characterized in that the yarn-shifting guide and the yarn-anchoring guide move forward and backward crossing the yarn path in the direction orthogonal to the traverse direction so as to capture the yarn, which is temporarily borne by the yarn-anchoring guide in a position that the yarn-shifting guide and the yarn-anchoring guide are biased to the traverse device side relative to the yarn path.
3. A filament yarn take-up winder according to Claim 1 or Claim 2 characterized in that the yarn-shifting guide and the yarn-anchoring guide are linked with the yarn-removal guide so as to move forward and backward integrally with the yarn-removal guide.
4. A filament yarn take-up winder according to Claim 3 characterized in that the yarn-anchoring guide can adjust its position in with the axial direction of the bobbin.

40

45

50

55

FIG. 1

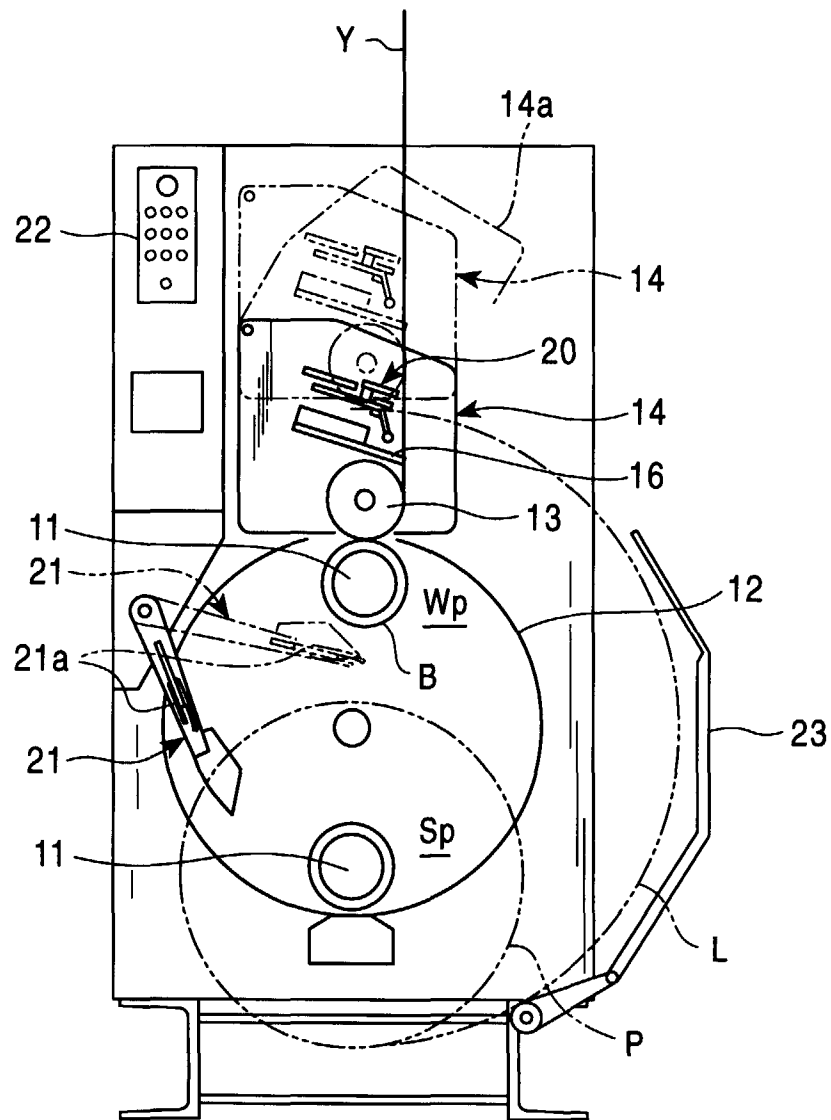


FIG. 2

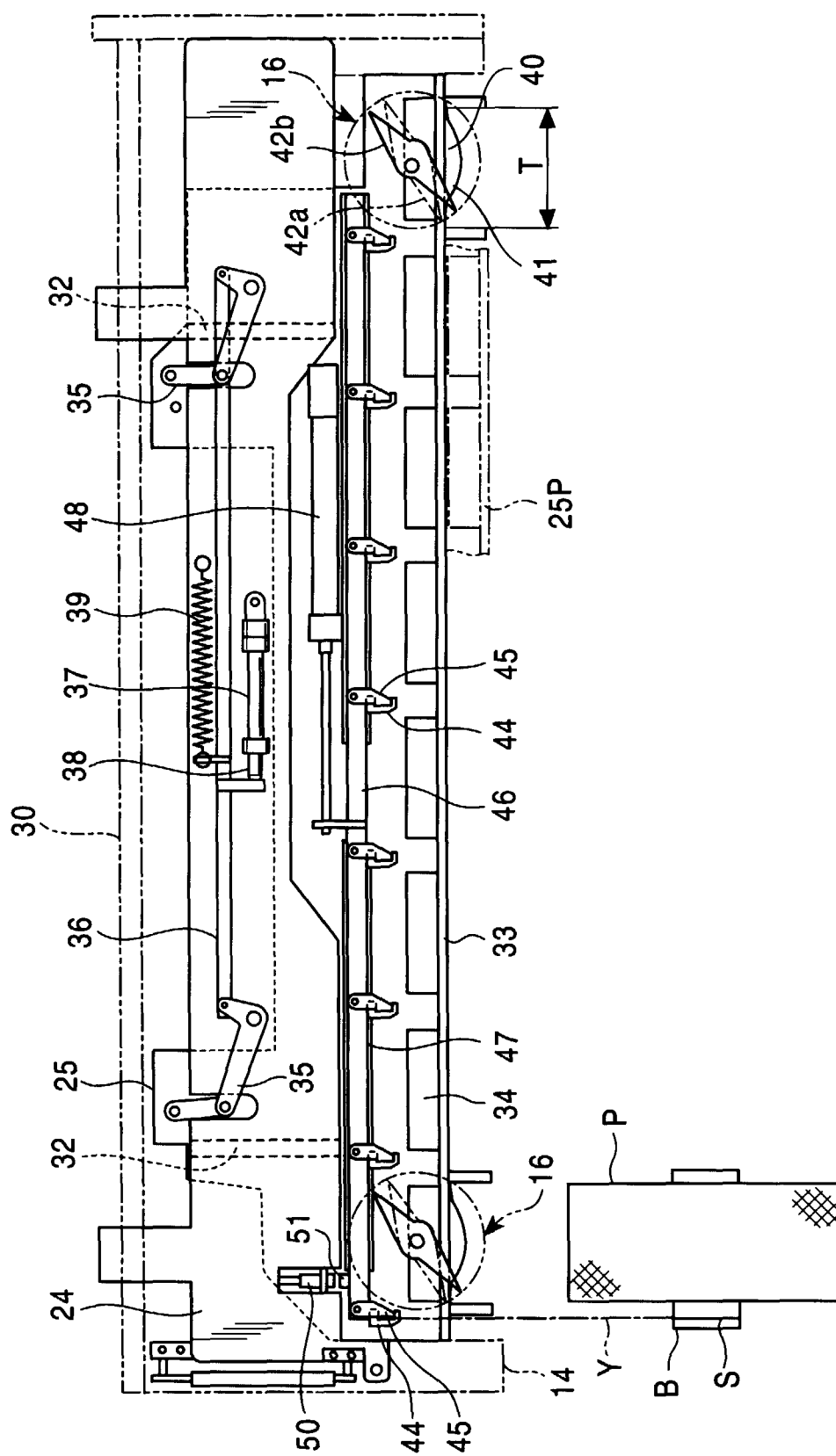


FIG. 3

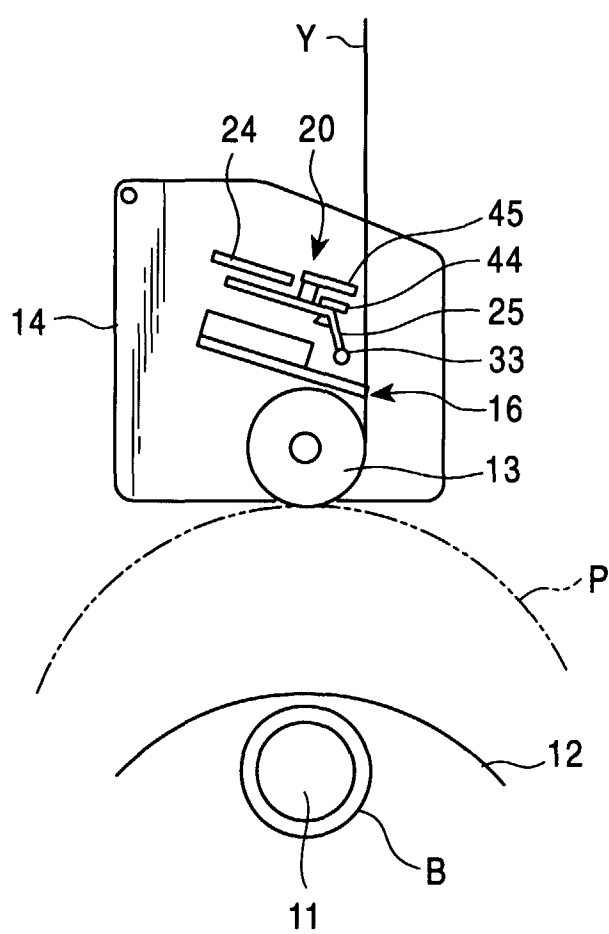


FIG. 4

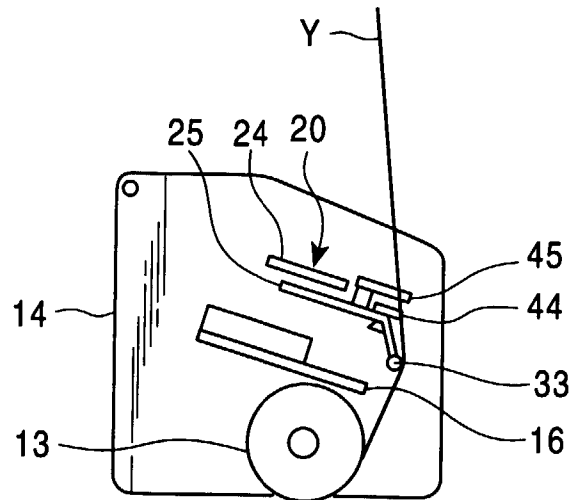


FIG. 5

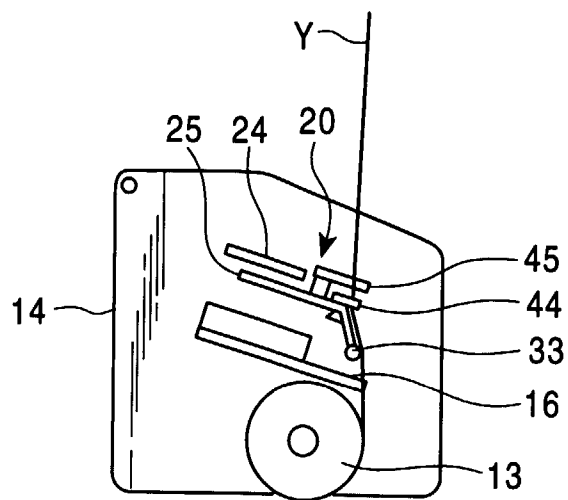


FIG. 6

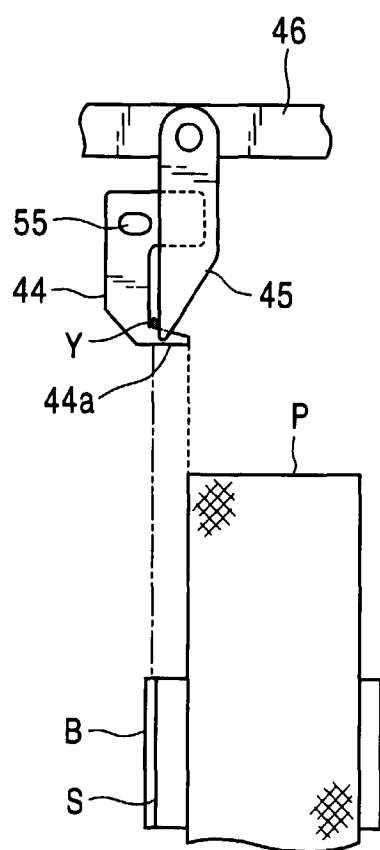


FIG. 7

