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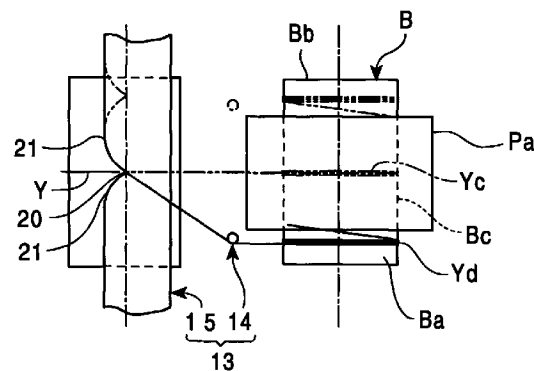
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(54) **Elastic yarn take-up winder and package**

(57) An elastic yarn package which enables the tail-end yarn tip to be easily found and drawn out, and the elastic yarn take-up winder which produces this package are provided. An elastic yarn take-up device provided with a yarn transfer means for transferring yarn that is being wound from a full bobbin FB to an empty bobbin EB comprises a tail-end yarn guide 14 which moves yarn that is lead onto the full bobbin to an end Ba of the bobbin B that is away from the layered yarn section Pa, and further comprising a lead-end yarn guide 15 which moves yarn led onto an empty bobbin to a position outside of the yarn path along which the yarn is being led to the full bobbin, is provided. Further, the elastic yarn package in which the tail-end yarn tip is wound onto an end section of the bobbin away from the layered yarn section of the bobbin is also provided.

FIG. 4



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Description

Field of the Invention

[0001] The present invention relates to an elastic yarn take-up winder comprised of a traverse device provided with two bobbin holders, a contact roller, and a traverse guide, and a position transfer means for switching the positions of a bobbin holder in a winding position and a bobbin holder in a stand-by position, whereby a bobbin holder with an empty bobbin and a bobbin holder with a fully wound package are exchanged, and a yarn is transferred onto the empty bobbin when a package becomes full, and further relates to the elastic yarn package formed by the elastic yarn take-up winder.

Background of the Invention

[0002] A conventional turret-type elastic yarn take-up winder which switches the positions of bobbin holders by rotating a turret to which two bobbin holders are attached such that when a package becomes full, the package is exchanged with the empty bobbin holder, enabling continuous yarn winding, is common in the art. In such a conventional take-up winder, the turret is operated to rotate in the counter-clockwise direction, moving the full bobbin from the winding position to an intermediary position, and the empty bobbin from the stand-by position to the intermediary position, and then stopped. Next, a yarn winding guide which comprises the winding means winds the elastic yarn once around the empty bobbin, a high-speed brake is applied to the full bobbin, the elastic yarn is loosened, and a section of the yarn is adhered onto the surface of the empty bobbin. When the yarn section is taken-up onto the surface of the empty bobbin, the yarn tension generated when the yarn section between the empty bobbin and the full bobbin is wound around the empty bobbin causes the yarn to break between the empty and full bobbins. The yarn which follows the yarn that is adhered onto the empty bobbin is wound on top of the new lead-end yarn tip, fixing it in place. After the yarn winding guide is returned to place, the empty bobbin is returned to the winding position, and actual winding is carried out by the traverse device.

[0003] As is well known in the art, when the yarn that is wound is not elastic yarn, but synthetic yarn such as polyester or nylon, the tail-end yarn tip is placed on the top yarn layer of the layered package wound by the take-up winder upon completion of winding. In the conventional wound package of synthetic yarn, placing the tail-end yarn tip on top of the layered yarn is not a problem, but when the package is a wound package of elastic yarn, the adhesiveness of the elastic yarn may make finding and drawing out the tail-end yarn tip problematic at the next stage of processing.

Summary of the Invention

[0004] Thus, it is an object of the present invention to provide an elastic yarn package in which the wound yarn end can be easily found and drawn out, and to provide the elastic yarn take-up winder which forms such a package.

[0005] In order to accomplish this objective, the present invention is an elastic yarn take-up winder provided with a yarn transfer means for transferring the yarn from a full bobbin to a empty bobbin, comprising a tail-end yarn guide for placing yarn introduced to the full bobbin at the end section of a bobbin, away from the layered yarn section of the bobbin, and a lead-end yarn guide for placing the yarn introduced to the empty bobbin at a position outside the yarn path along which the yarn is lead to the full bobbin.

[0006] Further, the present invention is an elastic yarn take-up winder in which the tail-end yarn guide is an independently moveable moving guide which moves along the bobbin in the bobbin's axial direction.

[0007] Still further, in the present invention, the lead-end yarn guide is independently moveable along the bobbin in the bobbin's axial direction.

[0008] A second invention of the present invention is an elastic yarn package in which the tails-end yarn tip is wound around the end section of a bobbin, away from the layered yarn section of the bobbin.

[0009] Further still, the present invention is an elastic yarn package in which the lead-end yarn tip is wound at the layered yarn section of the bobbin.

[0010] Still further, the present invention is an elastic yarn package in which the lead-end yarn tip is wound at the end section of a bobbin, away from the layered section of the bobbin, and on the opposite end of the bobbin as the end at which the tail-and yarn tip is wound.

Brief Description of the Drawing

[0011]

Figure 1 is a schematic drawing showing a front view of the winder after winding of a bobbin has been completed in a first embodiment of the elastic yarn take-up winder of the present invention.

Figure 2A ~ Figure 2F are schematic drawings showing front views of the yarn transfer procedure in the elastic yarn take-up winder of the present invention.

Figure 3 is a schematic drawing showing an enlarged front view of the elastic yarn take-up winder of the present invention which is used to explain in detail the operation of the device when yarn is transferred using a tail-end yarn guide and a lead-end yarn guide.

Figure 4 is a schematic drawing showing a planar view of the device of the present invention from the IV-IV plane of Figure 3.

Figure 5A and 5B show different embodiments of the elastic yarn package of the present invention. Figure 5A is a schematic drawing showing a planar view of a formed package in which the tails-end yarn tip is wound at an end section of the bobbin, away from the layered section and the lead-end yarn tip is wound at the layered section of the bobbin. Figure 5B is a schematic drawing showing a planar view of a formed package in which the tail-end yarn tip is wound at an end section of the bobbin, away from the layered section and the lead-end yarn tip is wound around an end section of the bobbin away from the layered section, and on the opposite end of the bobbin as the end at which the tail-end yarn tip is wound.

Detailed Description of the Preferred Embodiments

[0012] Detailed embodiments of the elastic yarn take-up winder and the elastic package of the present invention are now explained in reference to the accompanying drawings.

[0013] First the essential structure of an elastic yarn take-up winder M of the present invention will be explained in reference to Figure 1.

[0014] In Figure 1, M is the elastic yarn take-up winder, comprised of a machine frame 7. The machine frame 7 is provided with an elevating box 1 which is enabled to independently rise and fall, a rotatable turret 2 and a fixed frame 8 on the front of which a control panel 9 is arranged.

[0015] A contact roller 3 and a traverse device 4 are each held in the elevating box 1. The contact roller 3 applies pressure against the yarn layer surface of a bobbin B at a winding position P_1 . The contact roller 3 is rotationally driven by a driving source (not shown in the drawing) such that the bobbin B being wound is rotated in a counter-clockwise direction.

[0016] A traverse guide 5 is arranged in the traverse device 4, and engages with an elastic yarn Y, traversing the elastic yarn Y by running within a traverse range. A yarn separating guide (not shown in the drawing) for separating the yarn from the traverse guide 5 is arranged in the upstream side of the traverse device 4.

[0017] The turret 2 is rotatable via a rotational driving device (not shown in the drawing) centered around a rotary shaft 6. Two bobbin holders 11, 12 are each held so as to jut out, and are independently rotatable in the turret 2. A plurality of bobbins B are inserted in each of the bobbin holders 11, 12, with one of the bobbin holders 11 arranged at the winding position P_1 and the other 12 at the stand-by position P_2 . In Figure 4, in order to simplify the drawing, only one bobbin B is shown.

[0018] The elastic yarn Y on the bobbin B of the bob-

bin holder 11 positioned at the winding position P_1 is wound, and when it becomes a full bobbin FB, the turret 2 is rotated. The full bobbin FB is moved from the winding position P_1 to the stand-by position P_2 , and the pre-arranged empty bobbin EB at the stand-by position P_2 is moved from the stand-by position P_2 to the winding position P_1 . While they are moving, the elastic yarn Y is transferred from the full bobbin FB to the empty bobbin EB via a yarn exchange guide means 13, allowing yarn winding to continue uninterruptedly.

[0019] In the present invention, the yarn exchange guide means 13 is comprised of tail-end yarn guide 14 and the lead-end yarn guide 15. The tails-end yarn guide 14 positions the yarn Y introduced to the full bobbin FB at an end section Ba of the bobbin B, away from the layered yarn section Pa. It may be comprised of a rod-shaped moving guide 16 with comb-like structures, and arranged so as to be independently moveable along the central axis of the bobbin B. The tail-end yarn guide 14 is attached to the turret 2 such that the rod-shaped moving guide 16 extends along the rotational axis of the turret 2, dividing the winding position bobbin holder and the stand-by position bobbin holder. However, in order to make the large diameter portion of the full bobbin FB bigger, attaching the tail-end yarn guide 14 on the side of the frame 7 instead of to the turret 2, such that when necessary, it can advance between the full bobbin FB and the empty bobbin EB, is preferable. In the present embodiment, the rod-shaped living guide 16 may move between the stand-by position at the far end Bb of the bobbin B shown by the double dotted chain line in Figure 4, and the near end Ba of the bobbin B indicated by the continuous line.

[0020] The lead-end yarn guide 15 is comprised of a swinging arm 17 axially supported in the lower portion of the frame 7 and a guide bar 18 attached to the tip of the swinging arm 17. The swinging arm 17 is arranged on the side of the front ends of the bobbin holders 11, 12, and guide bar 18 is cantilevered from the front ends of the bobbin holders 11, 12 towards the base end of the bobbin holders 11, 12. The rotary shaft 19 of the swinging arm 17 is arranged such that the elastic yarn Y can be wound around the empty bobbin EB by the guide bar 18 when the empty bobbin EB is at the yarn exchange position, or in other words, when it is at the intermediary position P_4 indicated by the double dotted chain line in Figure 1. The swinging arm 17 is normally set such that the guide bar 18 and other elements do not come into contact with the full bobbin FB when the turret 2 is rotated.

[0021] In the present invention, the swinging arm 17 of the lead-end yarn guide 15 is arranged such that it can swing roughly 180 degrees around the center of the rotary axis 19 via a driving means such as a rotary actuator or the like (not shown in the drawing). The guide bar 18 of the lead-end yarn guide 15 is attached to the end of swinging arm 17, and is provided with a guiding groove 20 shown in Figure 4, into which slides the elas-

tic yarn Y. The guiding groove 20 is provided with two curved portions 21, 21 that taper in towards each other 21, 21. These curved portions 21, 21 help guide the elastic yarn Y along a curved path. By guiding the elastic yarn Y along the curved portions 21, 21, the yarn Y can be reliably guided to the bottom of the guiding groove 20.

[0022] Still further, the lead-end yarn guide 15 may also be arranged so as to be independently moveable along the axial direction of the bobbin B, as indicated by the double dotted chain line in Figure 4. When the lead-end yarn guide 15 moves in the axial direction of the bobbin B, the lead-end yarn tip is wound at the end section Bb of the bobbin B, away from the layered yarn section Pa of the bobbin B, and on the opposite end of the bobbin B from the end at which the tail-end yarn section is wound.

[0023] The operation of the device when the yarn is transferred will now be briefly explained using Figure 2A ~ Figure 2F.

[0024] At Figure 2A the winding of the bobbin B has been completed, and the full bobbin FB is at the winding position P₁. At this stage, by rotating the turret 2 in the counter-clockwise direction, the empty bobbin EB is brought to the winding side, and brought into contact with the elastic yarn Y which is drawn by the full bobbin FB (Figure 2B). Further rotation of the turret 2 moves the full bobbin FB from the winding position P₁ to the intermediary position P₃, and the empty bobbin EB from the stand-by position P₂ to the intermediary position P₄. At this point, the rotation of the turret 2 is stopped (Figure 2C). The yarn Y is removed from the traverse device 4 by a yarn separating guide (not shown in the drawing).

[0025] At the stage shown in Figure 2C, the lead-end yarn guide 15 is operated. The lead-end yarn guide 15 catches the yarn section Ya of elastic yarn Y between the empty bobbin EB in the intermediary position P₄ and the full bobbin FB in the intermediary position P₃, and moves it from the path indicated by the double dotted chain line in Figure 2C to the path indicated by the continuous line (changing the yarn path to that indicated by ① in Figure 3), in order to form the bunch winding in the middle section of the empty bobbin EB.

[0026] In Figure 2D, the tail-end yarn guide 14 is operated from back to front in a direction perpendicular to the plane of the page, catching the yarn section Ya of the elastic yarn Y, and moving it from the path indicated by the double dotted chain line to the path indicated by the continuous line (changing the yarn path to that indicated by ② in Figure 3). In other words, the yarn section Ya is moved from the layered section Pa to the end section Ba of the full bobbin Fb. As a result, the tail end yarn tip is wound at the end section B of the full bobbin Fb.

[0027] By moving the yarn section Ya from the layered yarn section Pa to the end section Ba of the full bobbin FB, the tension of the yarn section Ya is reduced. Thus, the yarn section Ya is wound onto the surface of the

empty bobbin EB. the yarn tension created when the yarn section Ya between the empty bobbin Eb and the full bobbin Fb causes the yarn to break between the empty bobbin EB and the full bobbin FB, and the yarn which follows the elastic yarn Y from the tail-end tip wound onto the empty bobbin EB is wound on top of the new lead-end yarn tip. After the lead-end yarn guide 15 moves back to its original position, the empty bobbin EB is returned to the winding position P₁, as shown in Figure 2E and Figure 2F, and the actual winding is carried out with the traverse device 4.

[0028] Next, the structure of the new package of the present invention processed by the above-described elastic yarn take-up winder will be described in reference to Figure 5.

[0029] In the first embodiment of the package P according to the present invention, shown in Figure 5A, the lead-end yarn tip Yc is formed as a bunch winding in the middle section in the axial direction of the bobbin B (the middle section in the axial direction of the layered yarn section Pa), and the tail-end yarn tip Yd is moved from the layered yarn section Pa and wound around one end Ba of the bobbin B.

[0030] In the second embodiment of the package P according to the present invention, shown in Figure 5B, the lead-end yarn tip Yc is moved from the layered yarn section Pa and wound at one end Bb of the bobbin B. The tail-end yarn tip Yd, is moved from the layered yarn section Pa to the other end Ba of the bobbin B. In either of these two embodiments, the tail-end yarn tip Yd is wound onto one end of the bobbin Ba away from the layered yarn section Pa, and therefore the tail-end yarn tip Yd is very easy to find and draw out. Further, in the second embodiment of the present invention, the lead-end yarn tip Yc is wound onto a different end Bb of the bobbin B as the tail-end yarn tip Yd, and thus not only is the lead-end yarn tip Yc easy to find and draw out, but the lead-end yarn tip Yc and the tail-end yarn tip Yd do not overlap.

[0031] As comprised above, according to the present invention, the elastic yarn take-up winder which, by winding the tail-end yarn tip with the tail-end yarn guide which moves the yarn being led onto the full bobbin towards an end of the bobbin away from the layered yarn section of the bobbin, produces an elastic yarn package in which the tail-end yarn section can be easily found and drawn out, is provided. Further, the elastic yarn take-up winder for producing the elastic yarn package operates extremely effectively.

Claims

1. An elastic yarn take-up winder provided with a yarn transfer means for transferring yarn from a full bobbin to an empty bobbin comprising;

a tail-end yarn guide for guiding yarn which is led towards a full bobbin onto an end section of

the bobbin away from the layered yarn section of the full bobbin, and
a lead-end yarn guide for guiding yarn which is led onto an empty bobbin to a position outside of the yarn path to the full bobbin.

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2. The elastic yarn take-up winder as in claim 1 wherein the tail-end yarn guide is an independently moveable moving guide which moves along the bobbin in the bobbin's axial direction.

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3. The elastic yarn take-up winder as in claim 2 wherein

the lead-end yarn guide is provided with a swinging arm which swings around the center of a rotary axis, and a guide bar attached to the swinging arm, and
wherein a yarn guide groove is formed in the guide bar.

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4. The elastic yarn take-up winder as in claim 1 wherein the lead-end yarn guide moves independently along the axial direction of the bobbin.

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5. An elastic yarn package in which a tail-end yarn tip is wound onto an end section of the bobbin away from the layered yarn section of the bobbin.

6. The elastic yarn package as in claim 5 wherein the lead end yarn tip is wound at the layered yarn section of the bobbin.

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7. The elastic yarn package as in claim 5 wherein the lead end yarn tip is wound onto an end section of the bobbin away from the layered yarn section of the bobbin, and at the opposite end of the bobbin from the end at which the tail-end yarn tip is wound.

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FIG. 1

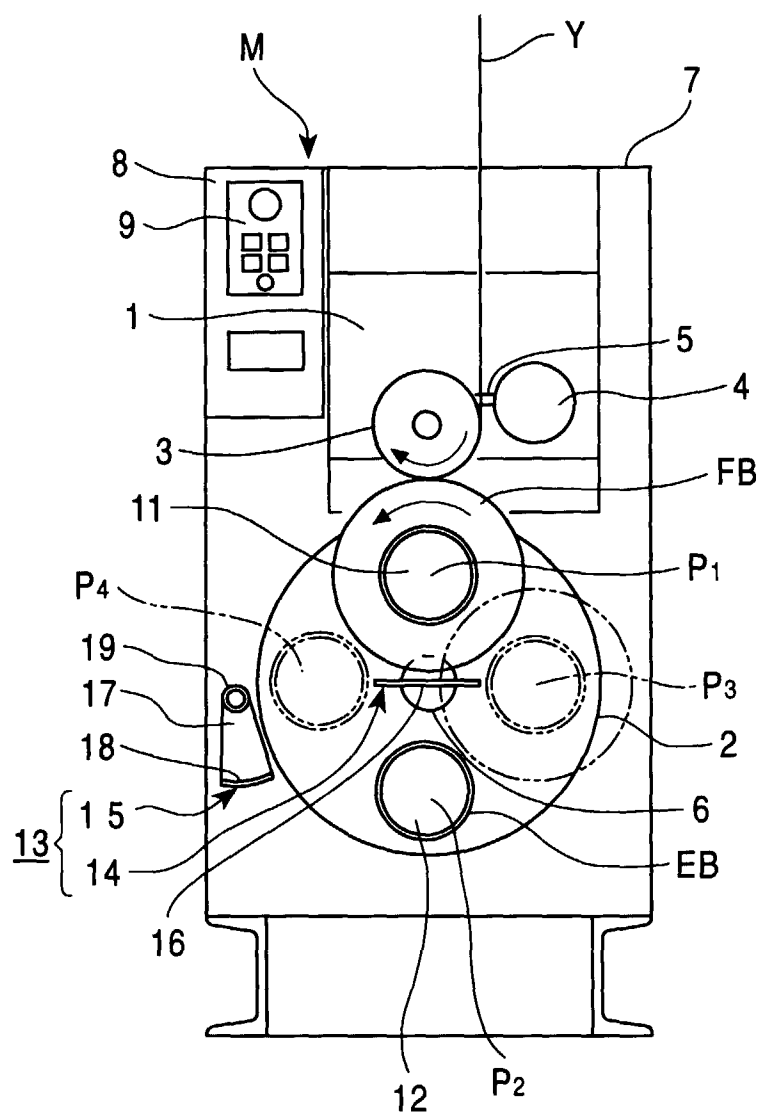


FIG. 2A

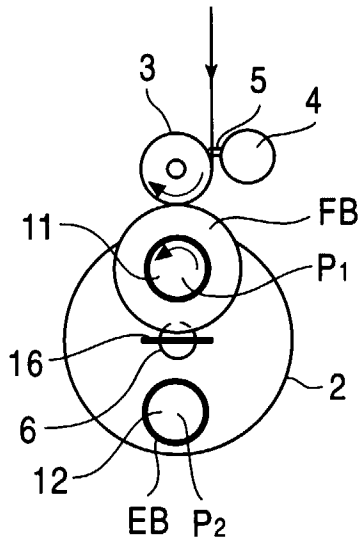


FIG. 2B

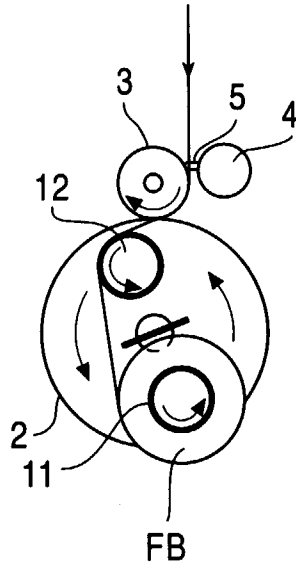


FIG. 2C

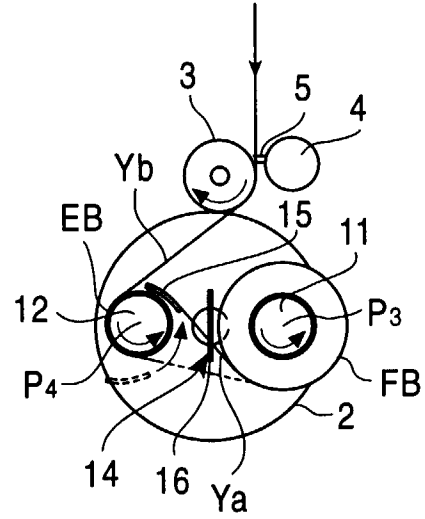


FIG. 2D

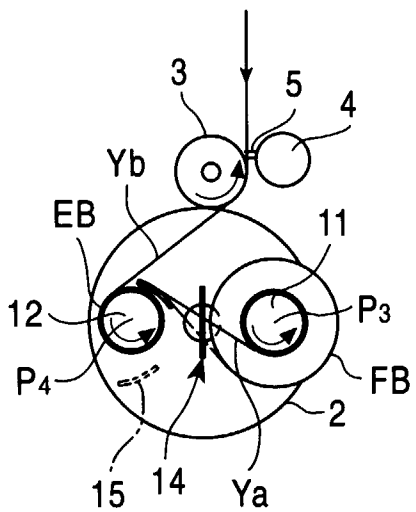


FIG. 2E

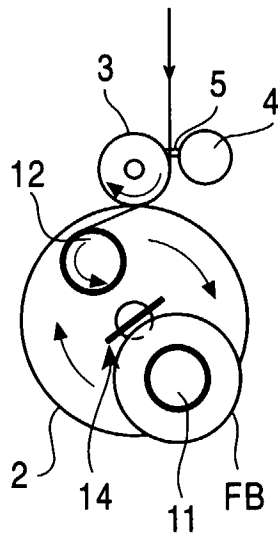


FIG. 2F

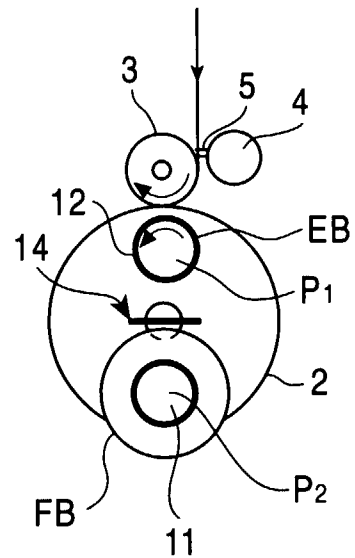


FIG. 3

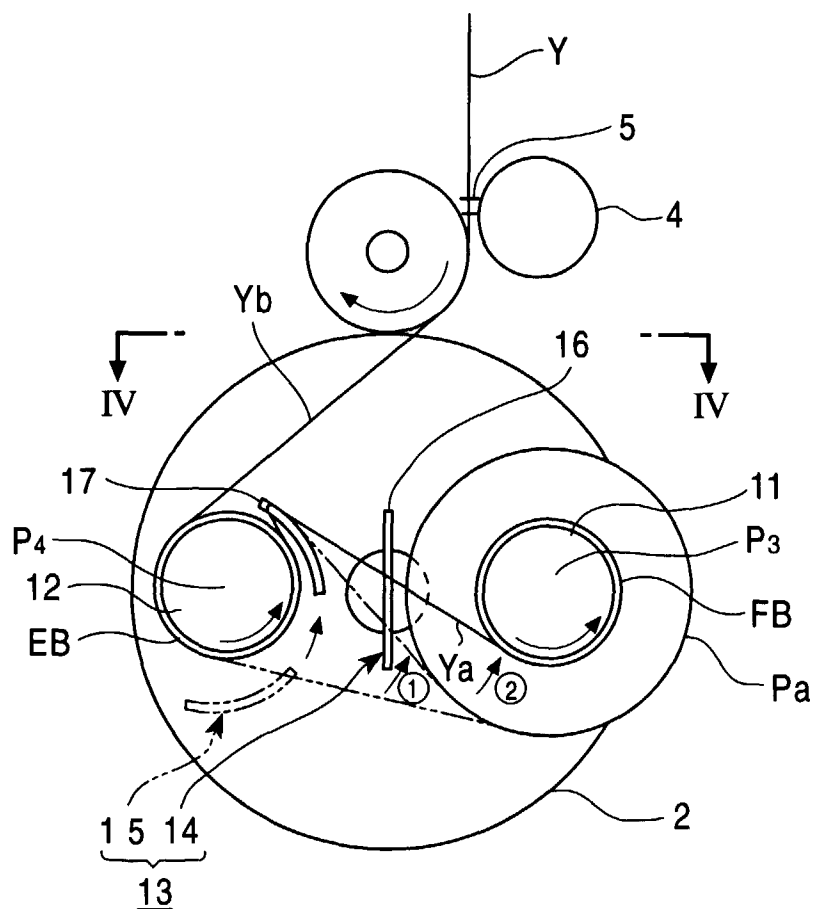


FIG. 4

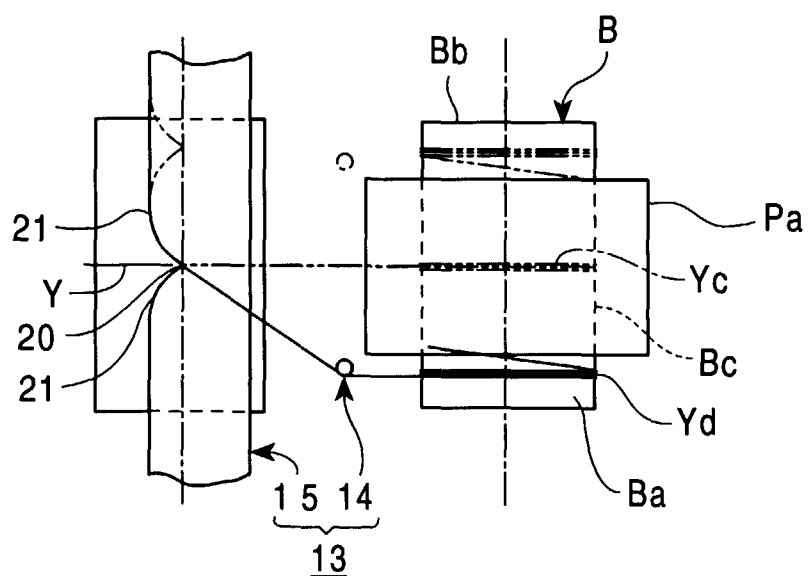


FIG. 5A

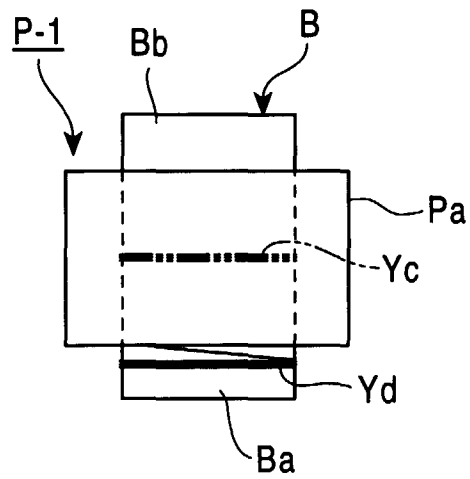


FIG. 5B

