(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 065 163 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
03.01.2001 Bulletin 2001/01

(51) Int. Cl.[7]: **B65H 54/34**

(21) Application number: **00112095.5**

(22) Date of filing: **05.06.2000**

(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

(30) Priority: **01.07.1999 JP 18744799**

(71) Applicant:
MURATA KIKAI KABUSHIKI KAISHA
Kisshoin, Minami-ku Kyoto-shi 601 (JP)

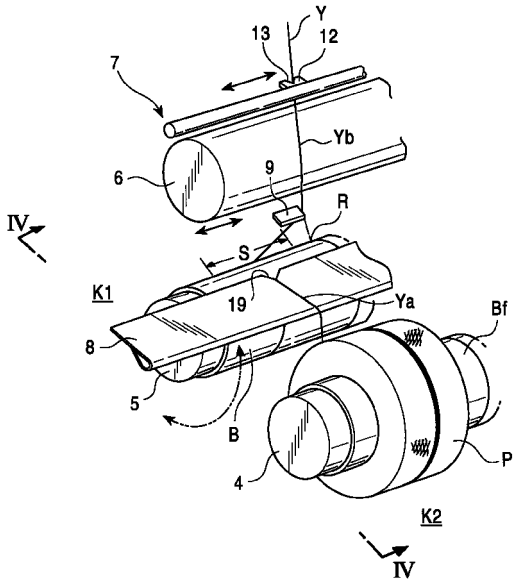
(72) Inventors:
- **Hashimoto, Kinzo**
  Kyoto-shi, Kyoto (JP)
- **Takahashi, Akira**
  Kyotanabe-shi, Kyoto (JP)

(74) Representative:
Liedl, Christine, Dipl.-Chem. et al
Albert-Rosshaupter-Strasse 65
81369 München (DE)

(54) Take-up winder and bunch winding method therefor

(57) The present invention provides a take-up winder and a bunch winding method therefor wherein a yarn can be transfered from a full bobbin to an empty bobbin without being damaged to form a bunch winding. According to the present invention, a contact roller 6 is separated from an empty bobbin B, while a yarn Yb between the contact roller 6 and the empty bobbin B is moved to a bunch winding position R on the empty bobbin B to transfer a yarn Y, thereby forming a bunch on the empty bobbin B.

FIG. 3



EP 1 065 163 A2

Description

Field of the Invention

[0001] The present invention relates to a take-up winder and a bunch winding method therefor wherein transfers a yarn from a full bobbin (a package) to an empty bobbin, where a bunch winding is formed.

Background of the Invention

[0002] A conventional take-up winder is shown in Figure 12. A take-up winder 51, which is shown in Figure 12, rotates a turret 53 to switch two bobbin holders 54, 55 between a winding position M and a standby position T, thereby winding a filament yarn Y1 (a synthetic fiber yarn) around an empty bobbin B at the winding position M. In winding the yarn Y1, a contact roller 56 is brought in pressure contact with the empty bobbin B on the bobbin holder 54 at the winding position M, while a traverse guide 57 of a traverse device 52 traverses the yarn Y1, so that the yarn Y1 passes through the contact roller 56 and is then wound into a package P. In addition, in the take-up winder 51, when the bobbin becomes full bobbin Bf, the turret 53 is rotated to switch the full bobbin Bf to the standby position T while switching the empty bobbin B to the winding position M, and the yarn Y1 is then transfered from the full bobbin Bf to the empty bobbin B.

[0003] During the yarn-transfering operation, a yarn-releasing guide 58 releases the yarn Y1 from the traverse device 52 (the traverse guide 57), while a yarn-moving lever 59 moves the yarn Y1 toward a bunch winding position (a yarn catching) side on the empty bobbin B, as shown in Figure 13. Then, a fixed guide 60 positions the yarn Y1 on a yarn layer on the full bobbin Bf and a slide guide 61 then conveys the yarn Y1 to the bunch winding position in the empty bobbin B to transfer the yarn Y1 from the full bobbin Bf to the empty bobbin B. Then, the yarn Y1 cuts between the empty bobbin B and the full bobbin Bf, thereby forming a bunch winding around the empty bobbin B at the bunch winding position.

[0004] After the formation of the bunch winding, all the guides 58 to 61 recede to cancel the regulation on the yarn Y1. The yarn Y1 then returns to the traverse device 52 (the traverse guide 57), where it is wound around the empty bobbin B while being traversed.

[0005] During the yarn transfering operation, the conventional take-up winder releases the yarn Y1 from the traverse device 52 (the traverse guide 57) to transfer it from the full bobbin Bf to the empty bobbin B where a bunch winding is formed. Consequently, when the traversed yarn Y1 is released from the traverse device 52, it may be damaged when rubbed on the traverse guide 57 or another component. The yarn Y1 may also be damaged for a similar reason when returned to the traverse guide 57. Damage to the yarn Y1 during the yarn transfering may degrade the quality of the package P.

[0006] It is an object of the present invention to provide a take-up winder and a bunch winding method therefor wherein a yarn can be transfered from a full bobbin to an empty bobbin without being damaged.

Summary of the Invention

[0007] A take-up winder and a bunch winding method therefor separate a contact roller from an empty bobbin before moving a length of the yarn between the contact roller and the empty bobbin to a bunch winding position on the empty bobbin outside the winding area of the bobbin. This alows the yarn to be transfered from the full bobbin to the empty bobbin, where a bunch winding is formed.

[0008] That is, according to the take-up winder and the bunch winding method for a take-up winder, a yarn is allowed to pass through a traverse device, a contact roller, and an empty bobbin to a full bobbin, around which it is wound. Subsequently, the contact roller is separated from the empty bobbin, and a length of the yarn between the contact roller and the empty bobbin is moved to a position on the empty bobbin outside its winding area. Then, the yarn is transfered from the full bobbin and the empty bobbin and a bunch winding is formed around the empty bobbin at its bunch winding position.

[0009] According to the take-up winder of the present invention, a yarn guide positions a length of the yarn between the empty bobbin and the full bobbin, on a yarn layer on the full bobbin.

[0010] That is, the yarn guide advances between the empty bobbin and the full bobbin to trap a traversed yarn in order to position it on the yarn layer on the full bobbin constituting a winding width (a traverse width).

Brief Description of the Drawing

[0011]

Figure 1 is a front view showing a take-up winder.
Figure 2 is a perspective view of essential parts of the take-up winder in Figure 1.
Figure 3 is a perspective view showing a yarn guide and a bunch winding guide in the take-up winder in Figure 1.
Figure 4 is a drawing taken along arrow IV-IV in Figure 3.
Figure 5 is a typical drawing for describing a bunch winding method for a take-up winder.
Figure 6 is a typical drawing for describing the bunch winding method for a take-up winder.
Figure 7 is a typical drawing for describing the bunch winding method for a take-up winder.
Figure 8 is a typical drawing for describing the bunch winding method for a take-up winder.

Figure 9 is a typical drawing for describing the bunch winding method for a take-up winder.

Figure 10 is a front view showing a variant of a take-up winder.

Figure 11 is a front view showing a variant of the take-up winder in Figure 10.

Figure 12 is a front view showing a conventional take-up winder.

Figure 13 is a top view showing the conventional take-up winder.

Detailed Description of the Preferred Embodiments

[0012] A take-up winder and a bunch winding method therefor according to the present invention will be described.

[0013] According to the present invention, a contact roller is separated from an empty bobbin, before a length of the yarn between the contact roller and the empty bobbin is moved to a bunch winding position on the empty bobbin outside a winding area of the bobbin, thereby transfering the yarn from a full bobbin to the empty bobbin where a bunch winding is formed.

[0014] The take-up winder and bunch winding method therefor according to the present invention will be described with reference to the drawings.

[0015] As one embodiment of the present invention, a take-up winder for a stretchable elastic yarn and a bunch winding method therefor will be explained with reference to Figures 1 to 9.

[0016] A take-up winder 1, which is shown in Figures 1 and 2, comprises a turret 3, two bobbin holders 4, 5, a contact roller 6, and a traverse device 7 for winding an elastic filament yarn Y (hereafter referred to as a "yarn Y") around an empty bobbin B to form a package P, the yarn Y being supplied by a spinning machine (not shown in the drawings) via a godet roller. The take-up winder 1 also comprises a yarn layer-holding yarn guide 8 and a bunch winding guide 9 for transfering the yarn Y from a full bobbin Bf to the empty bobbin B where a bunch winding is formed. The bobbin around which the yarn has fully been wound into the package P is denoted as Bf, and the empty bobbin is denoted as B.

[0017] The turret 3 of the take-up winder 1 is also used as means for separating the contact roller 6 from the empty bobbin B and is rotatably supported to a turret shaft 10 of a body frame 2. The turret 3 is rotatively controlled by a drive source (not shown in the drawings) connected to the turret shaft 10. The bobbin holders 4, 5 are each rotatably supported to the turret 3 (in a cantilever manner) so as to project from the body frame 2. In addition, each of the bobbin holders 4, 5 has the empty bobbin B installed thereon and around which the yarn Y is wound into the package P. Each bobbin holder 4, 5 is rotatively driven by the drive source (not shown in the drawings) in an auxiliary manner. Each bobbin holder 4, 5 is switched from a winding position M to a standby position T or from the standby position T to the winding position M when the turret 3 is rotated. Each bobbin holder 4, 5 is also switched to yarn-transfering positions K1, K2 located between the winding position M and the standby position T as shown in Figure 5C. Although each bobbin holder 4, 5 typically has a plurality of empty bobbins B, the accompanying drawings will be described in conjunction with the bobbin holders 4, 5 located at the winding position M and the standby position T, respectively, and each having one empty bobbin B.

[0018] The contact roller 6 of the take-up winder 1 is provided on an elevation box 11 that is elevated and lowered above the winding position M. The contact roller 6 is brought into pressure contact with the package P (or the empty bobbin B) at the winding position M by means of the elevation box 11, to guide the yarn Y from a supply side to the package P (or the empty bobbin B). The contact roller 6 is positively driven by the drive source (not shown in the drawings). The traverse device 7 is located closer to the supply side than the contact roller 6 and provided in the elevation box 11. The traverse device 7 comprises a traverse guide 12 for engaging with the yarn Y to traverse it. The traverse guide 12 comprises a yarn groove 13 for trapping the yarn Y as shown in Figure 2, traverse guides 12 are provided in an identical number to the packages P (the empty bobbins B) at the winding position M. Thus, the traverse device 7 traps the yarn Y in the yarn groove 13 and then reciprocates the traverse guide 12 using a traverse width S to traverse the yarn Y from the contact roller 6 to the winding position M (see Figure 2).

[0019] The yarn layer-holding yarn guide 8 of the take-up winder 1 is provided at a yarn-switching position K defined by rotating the winding position M counterclockwise. The yarn guide 8 extends forward the turret 3 side along each of the bobbin holders 4, 5 and is rotatably supported to a guide shaft 18 of the body frame 2. In addition, the yarn guide 8 is swiveled (oscillated) around the guide shaft 18 by the drive source (not shown in the drawings).

[0020] The bunch winding guide 9 of the take-up winder 1 is attached to a tip of the yarn layer-holding yarn guide 8 and swiveled together with the yarn layer-holding yarn guide 8. In addition, the bunch winding guide 9 slides in an axial direction of the bobbin holders 4, 5.

[0021] When the bobbin holders 4, 5 are located at the yarn-transfering positions K1, K2, respectively, as shown in Figures 3 and 4, the yarn layer-holding yarn guide 8 and the bunch winding guide 9 operate to transfer the yarn Y from the full bobbin Bf (the package P) to the empty bobbin B where a bunch winding is formed. Figures 3 and 4 shows a state where the turret 3 has been rotated counterclockwise to move the empty bobbin B at the standby position T from the winding position M to the yarn-transfering position K1, thereby separating the empty bobbin B from the contact roller 6. In addition, in this state, the yarn Y from the traverse device 7

is passed through the contact roller 6 and the empty bobbin B to the full bobbin Bf, around which it is wound. Of course, the contact roller 6 and the bobbin holders 4, 5 are rotatively driven.

[0022] Then, the yarn layer-holding yarn guide 8 is swiveled around the guide shaft 18 and pressed against a length of the yarn Ya between the empty bobbin B and the full bobbin Bf to trap the yarn Ya, which is being traversed, in a guide groove 19 during the swiveling. Guide grooves 19 are formed in an identical number to the empty bobbins B on the bobbin holder 5 and each position the yarn Ya at the center of a winding width of the full bobbin Bf. In addition, the yarn layer-holding yarn guide 8 swivels around the empty bobbin B to bring the yarn Ya in contact (adhesion) with an outer periphery of the empty bobbin B while extending the yarn Ya, thereby winding it around the empty bobbin B.

[0023] Consequently, the yarn Ya is wound around the full bobbin Bf at the center of the winding width (on a yarn layer) of the full bobbin Bf, while being simultaneously wound around the empty bobbin B, thereby it is stretched and cut (see Figures 3 and 4).

[0024] The bunch winding guide 9 advances between the contact roller 6 and the empty bobbin B to engage with a length of the yarn Yb between the contact roller 6 and the empty bobbin B in order to move and regulate the yarn Yb to a bunch winding position R on the empty bobbin B. The bunch winding position R is located at one end portion of the empty bobbin B and outside the traverse width S (winding width) defined by the traverse guide 12. Thus, the yarn Yb is positioned at the bunch winding position R on the empty bobbin B by means of the bunch winding guide 9 (see Figures 3 and 4).

[0025] Then, the yarn Y, which is being regulated by the bunch winding guide 9, is wound around the empty bobbin B at the bunch winding position R when the yarn Ya is cut between the empty bobbin B and the full bobbin Bf.

[0026] Bunch winding guides 9 are provided in an identical number to the empty bobbins B on the bobbin holder 5, and each move the yarn Yb to the bunch winding position R on the empty bobbin B and regulate.

[0027] In this manner, the yarn layer-holding yarn guide 8 and the bunch winding guide 9 cooperate in regulating (positioning) the yarns Ya, Yb relative to the full bobbin Bf and the empty bobbin B to transfer the yarn Y from the traverse device 7, from the full bobbin Bf to the empty bobbin B, thereby forming a bunch winding around the empty bobbin B. In addition, by allowing the bunch winding guide 9 to enter from the same direction as a traverse direction, the yarn Yb can be regulated to the bunch winding position R of the empty bobbin B without the need to release the yarn Y from the traverse device 7 (the traverse guide 12).

[0028] Next, a bunch winding method for a take-up winder will be described.

[0029] The take-up winder 1 drives the contact roller 6 to bring the bobbin holder 4 at the winding position M in pressure contact with the contact roller 6 and also drives the traverse device 7 to start a winding operation. During the winding operation, the man-made-filamnet yarn Y is traversed by means of the stroke of the traverse guide 12 while being guided by the contact roller 6 to form the empty bobbin B at the winding position M into the full package P (see Figure 5A).

[0030] Once the package P at the winding position M has become full, the turret 3 is rotated counterclockwise to switch the empty bobbin B at the standby position T to the yarn-switching position K1 through the winding position M, while switching the full bobbin Bf at the winding position M to the yarn-switching position K2 through the standby position T. At this point, each of the bobbin holders 4, 5 are rotatively driven at a rotation speed corresponding to the yarn speed. Thus, the empty bobbin B is pressed against the yarn Y and separated from the contact roller 6. In addition, the yarn Y remains engaged with the traverse device 7 so as to be traversed, while passing through the contact roller 6 and the empty bobbin B to the full bobbin Bf, around which it is wound (see Figures 5B and 5C).

[0031] When the empty bobbin B and the full bobbin Bf are placed at the yarn-switching positions K1, K2, respectively, the take-up winder 1 starts a yarn-transfering operation.

[0032] During the yarn-transfering operation, the yarn layer-holding yarn guide 8 is swiveled to press the yarn Ya between the empty bobbin B and the full bobbin Bf (the package P). Then, the yarn Ya is trapped in the guide groove 19 during the traversing and positioned at the center of the winding width of the full bobbin Bf (see Figure 6).

[0033] Subsequently, the bunch winding guide 9 advances between the contact roller 6 and the empty bobbin B to shift and regulate the yarn Yb therebetween to the bunch winding position R on the empty bobbin B. Then, the yarn Yb is regulated from the same direction as the traverse direction and thus prevented from slipping out from the traverse device 7 (the traverse guide 12) (see Figure 7).

[0034] Thus, the guides 8, 9 regulate the yarns Ya, Yb relative to the empty bobbin B and the full bobbin Bf, respectively, to transfer the yarn from the full bobbin Bf to the empty bobbin B, thereby enabling a bunch winding to be formed on the empty bobbin B. In addition, the yarn layer-holding yarn guide 8 prevents the yarn Ya from being released from the winding width (the traverse width S) of the full bobbin Bf in order to form a straight winding (winding the yarn at the same position) on the yarn layer of the full bobbin Bf.

[0035] Subsequently, the yarn layer-holding yarn guide 8 is further swiveled to wind the yarn Ya around the empty bobbin B while stretching the yarn Ya (see Figure 8). Then, the yarn Ya, which has been wound around the empty bobbin B, is cut due to tension to finish the yarn transfering from the full bobbin Bf to the

empty bobbin B.

[0036] When the yarn Ya cuts during the yarn-switching operation, the yarn Yb, which is regulated by the bunch winding guide 9, is wound around the empty bobbin B at the bunch winding position R to form a bunch winding thereat (see Figure 9).

[0037] After formation of the bunch winding, the guides 8, 9 recede from the bobbin holders 4, 5 and the contact roller 6, and the turret 3 is then rotated clockwise to switch the empty bobbin B to the winding position M while switching the full bobbin Bf (the package P) to the standby position T (see Figure 5B). Thus, the yarn Y is released from the regulation provided by the guides 8, 9 and is then wound around the empty bobbin B at the winding position M into the package P while being traversed. In addition, at the standby position T, the full bobbin Bf (the package P) is removed from the bobbin holder 4.

[0038] According to the take-up winder and bunch winding method therefor according to the present invention, the bunch winding guide 9 engages with the yarn Yb between the contact roller 6 and the empty bobbin B to move the yarn Yb to the bunch winding position R on the empty bobbin located outside the traverse width. Consequently, the yarn Y can be switched from the full bobbin Bf to the empty bobbin B without the need to release it from the traverse device 7 (the traverse guide 12) so that a bunch winding can be formed around the empty bobbin B at the bunch winding position R.

[0039] Therefore, high-quality packages P can be obtained without causing damage to the yarn Y which may associated with its release from or return to the traverse device 7 (the traverse guide 12).

[0040] In addition, due to the omission of the release or return of the yarn Y from or to the traverse device 7, the success rate of yarn transfering from the full bobbin Bf to the empty bobbin B can be increased.

[0041] Further, since the bunch winding guide 9 located near the empty bobbin B forms a bunch winding around the empty bobbin B at the bunch winding position R, a regular and well-defined bunch winding can be formed. Besides, in winding the elastic yarn, the yarn is directly guided to the traverse device 7 from the godet roller, so that the yarn Y is difficult to return to the traverse device 7 after being released therefrom. The present invention, however, solves this problem.

[0042] Although the take-up winder 1 and the bunch winding method therefor have been explained in conjunction with the case where a straight winding is formed at the center of the winding width of the full bobbin Bf, a bunch winding may be formed at any position within the winding width of the full bobbin Bf. Further, the traverse device 7 is not limited to the one reciprocating the traverse guide 12, but it may traverse the yarn Y by, for example, rotating two traverse wings.

[0043] Next, a variant of a take-up winder preferable for filament yarns (synthetic fiber yarns) such as polyester as well as elastic yarns will be described with reference to Figures 10 and 11.

[0044] In Figures 10 and 11, the same reference numerals as in Figures 1 to 9 denote the same members and their description is omitted.

[0045] In transfering a filament yarn Y1 (hereafter referred to as a "yarn Y1") from the full bobbin Bf to the empty bobbin B, a take-up winder 31, which is shown in Figures 10 and 11, switches the empty bobbin B to the winding position M while switching the full bobbin Bf to the standby position T. Then, an elevation box 11 elevates the contact roller 6 to separate the contact roller 6 from the empty bobbin B.

[0046] In addition, the take-up winder 31 has a bunch winding guide 9 similar to the one in Figures 1 to 9 which can advance and recede so as to engage with a yarn Y1b between the contact roller 6 and the empty bobbin B. The bunch winding guide 9 shifts and regulates the yarn Y1b between the contact roller 6 and the empty bobbin B to the bunch winding position R (a yarn catching slit 34) on the empty bobbin B outside its traverse width. The take-up winder 31 further comprises a yarn layer-holding fixed yarn guide 32 for trapping a yarn Y1a between the empty bobbin B and the full bobbin Bf, and a slide guide 33 (a yarn-trapping yarn guide).

[0047] During a yarn-transfering operation performed by the take-up winder 31, the empty bobbin B is switched to the winding position M, while the full bobbin Bf is switched to the standby position T. Subsequently, the elevation box 11 elevates the contact roller 6 to separate it from the empty bobbin B.

[0048] Then, the bunch winding guide 9 advances between the contact roller 6 and the empty bobbin B to shift the yarn Y1b to a position on the empty bobbin B close to an end of the traverse width. At this point, the yarn Y1b remains engaged with the traverse device 7 (the traverse guide 12). Then, the fixed yarn guide 32 and the slide guide 33 advance between the empty bobbin B and the full bobbin Bf. The bunch winding guide 9 then shifts the yarn Y1b to the bunch winding position R on the empty bobbin B. The yarn Y1a is regulated by the fixed yarn guide 32. In this case, the yarn Y1 also remains engaged with the traverse device 7 (the traverse guide 12). Consequently, the yarn Y1 from the traverse device 7 is passed through the contact roller 6 and the empty bobbin B to the full bobbin Bf, around which a straight winding is formed.

[0049] Then, the slide guide 33 is slid to guide the yarn Y1 to the yarn catching slit 34. When the guides 8, 32, 33 regulate the yarns Y1a, Y1b as described above, the yarn Y1a is cut under tension, thereby finishing the yarn transfering. Then, the yarn Y1 from the traverse device 7 is wound around the empty bobbin B at the bunch winding position R to form a bunch winding thereat.

[0050] After the guides 8, 32, 33 have receded from the bobbin holders 4, 5 and the contact roller 6, the contact roller 6 is brought in pressure contact with the empty bobbin B (the bobbin holder 5) at the winding

position M to enable the yarn Y1, which is being traversed, to be wound around the empty bobbin B. In addition, at the standby position T, the full bobbin Bf (the package P) can be removed.

[0051] According to the take-up winder and the bunch winding method for a take-up winder, the yarn can be transfered from the full bobbin to the empty bobbin to form a bunch winding around the empty bobbin without the need to release the yarn from the traverse device. Consequently, high-quality packages can be obtained without causing damage to the yarn which may be associated with its release from or return to the traverse device.

[0052] In addition, due to the omission of the release or return of the yarn from or to the traverse device, the success rate of yarn transfering from the full bobbin to the empty bobbin can be increased.

[0053] Further, since the bunch winding guide located near the empty bobbin can form a bunch winding around the empty bobbin, a regular and well-defined bunch winding can be formed.

[0054] The take-up winder can simply be constructed by omitting a yarn releasing guide for the traverse device.

[0055] In addition, since the take-up winder positions the yarn portion between the empty bobbin and the full bobbin, above the yarn layer on the full bobbin by the yarn guide, yarn transfering can be carried out to form a bunch winding without releasing the yarn from the winding width of the full bobbin. A straight winding can be formed around the full bobbin at its winding end.

Claims

1. A take-up winder for allowing a yarn to pass through a traverse device, a contact roller and an empty bobbin to a full bobbin, around which it is wound, and then transfering the yarn from the full bobbin to the empty bobbin to form a bunch winding around the empty bobbin, characterized in that the take-up winder comprises means for separating said contact roller from the empty bobbin during said yarn transfering and a bunch winding guide for moving a yarn portion between said contact roller and the empty bobbin to a bunch winding position on said empty bobbin outside its winding area.

2. A take-up winder as in Claim 1 including a yarn guide for positioning a yarn portion between said empty bobbin and said full bobbin, on a yarn layer on the full bobbin.

3. A bunch winding method for a take-up winder for passing a yarn through a traverse device and a contact roller, winding it around an empty bobbin until the bobbin becomes full, and then transfering the yarn from the full bobbin to the empty bobbin to form a bunch winding around the empty bobbin, characterized in that during said yarn transfering, said contact roller is separated from the empty bobbin, while a yarn portion between the contact roller and the empty bobbin is moved to a bunch winding position on said empty bobbin outside its winding area to form a bunch winding around the empty bobbin.

FIG. 1

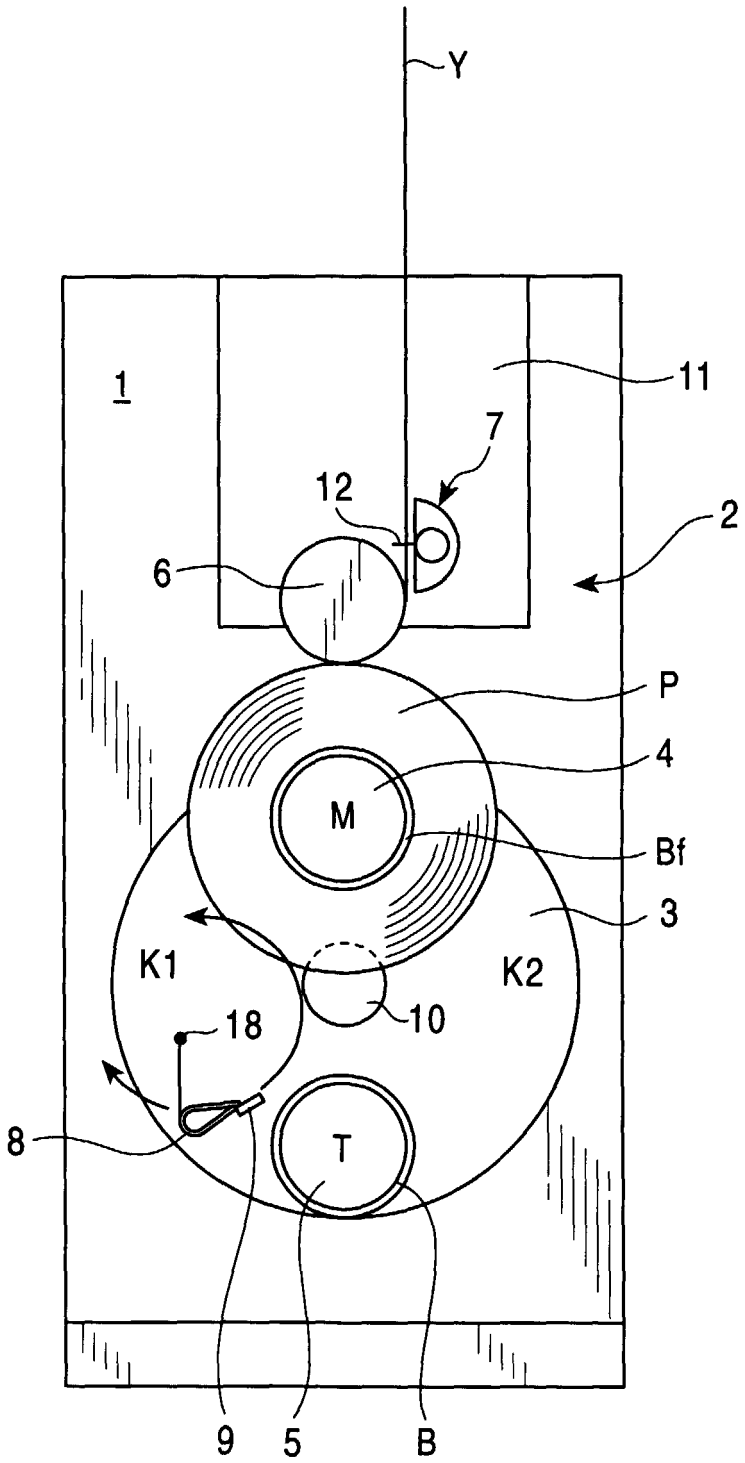


FIG. 2

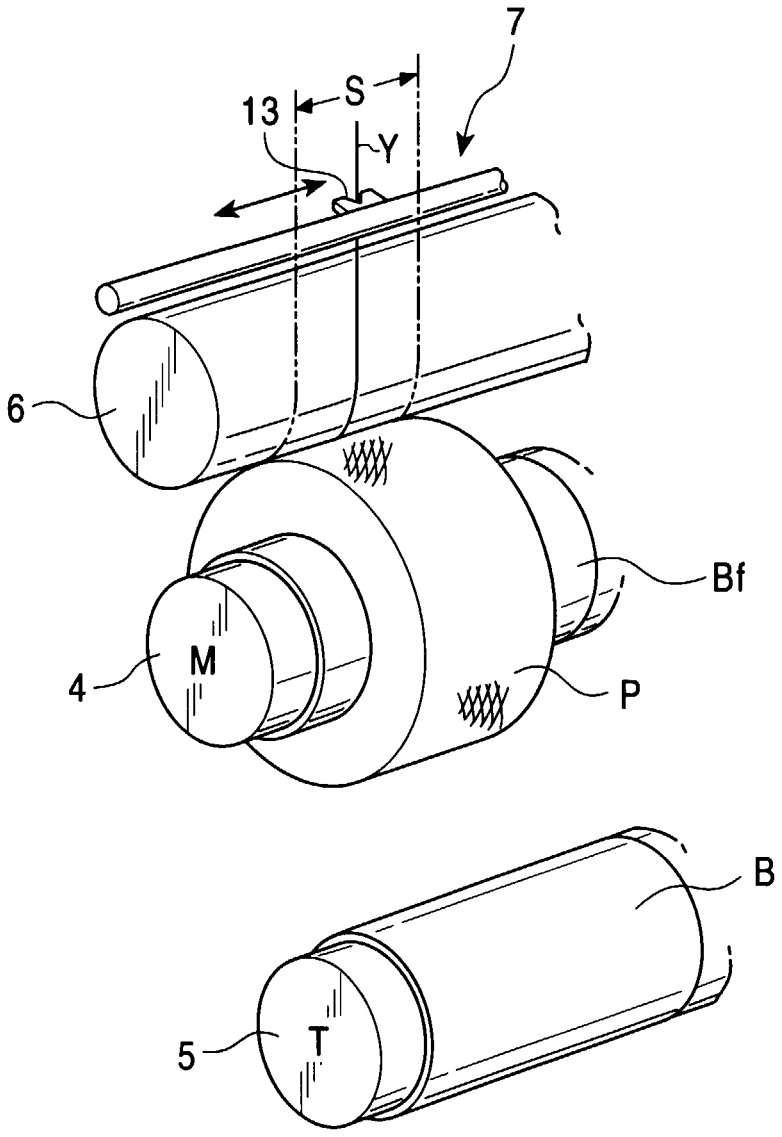


FIG. 3

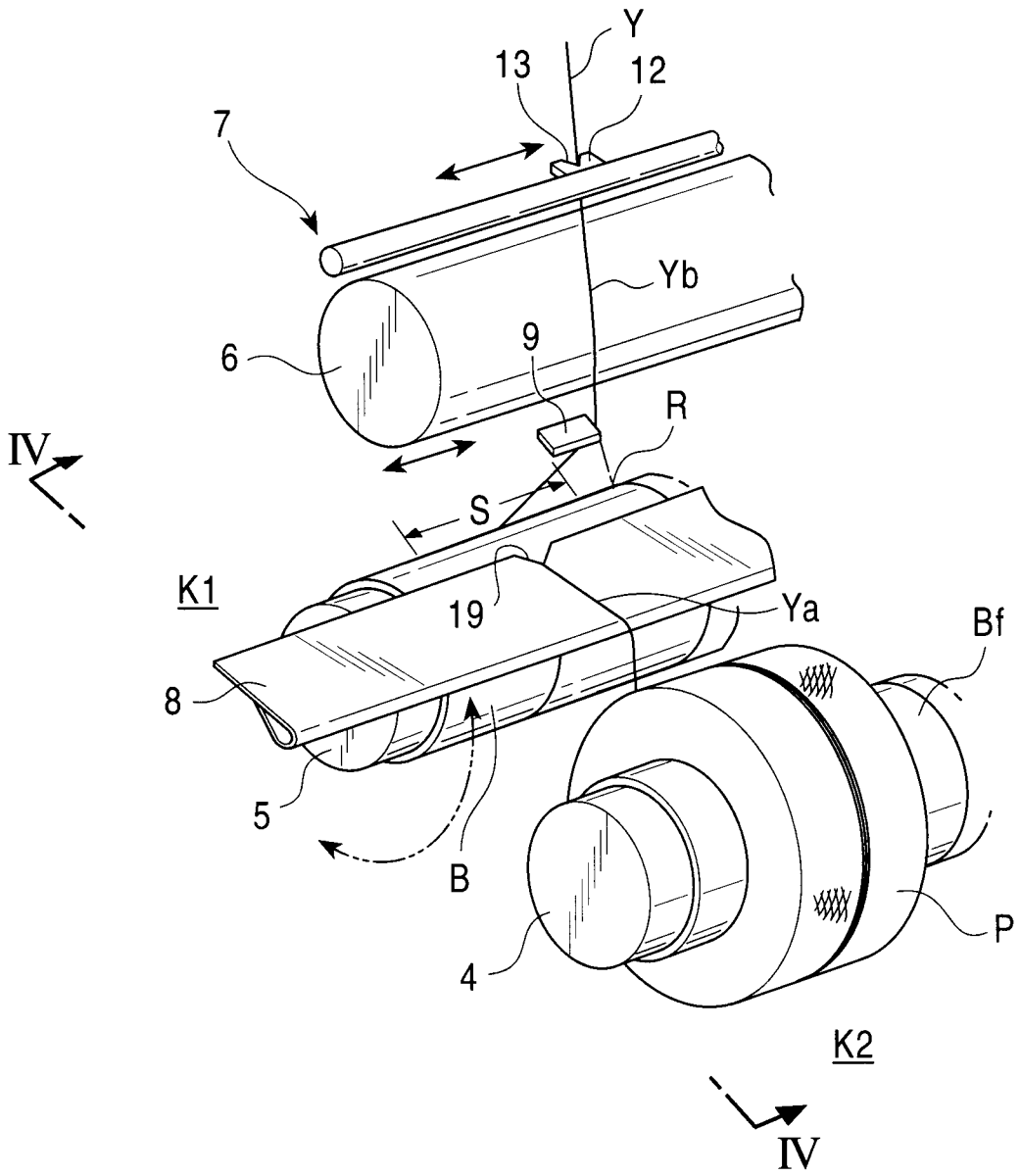


FIG. 4

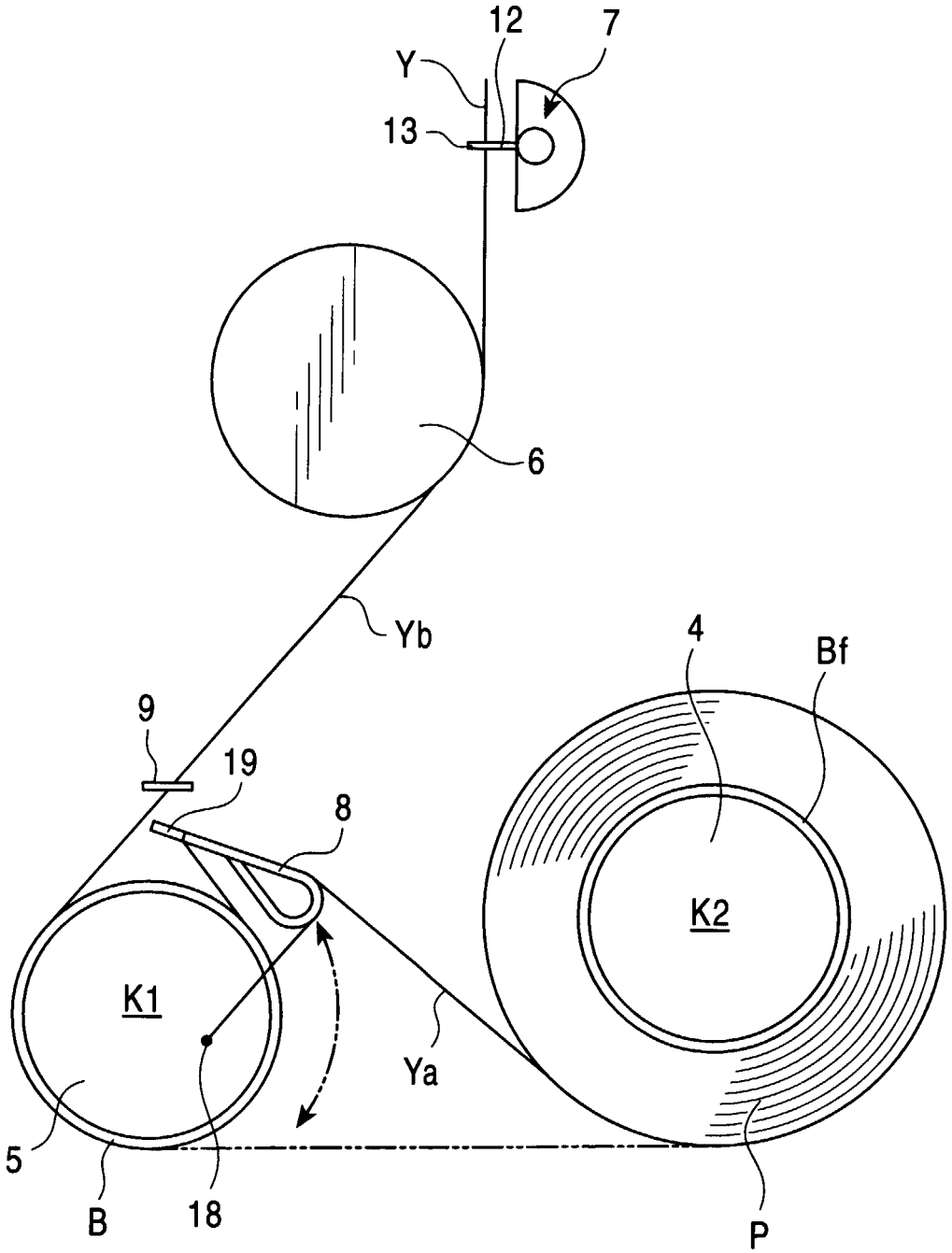


FIG. 5A

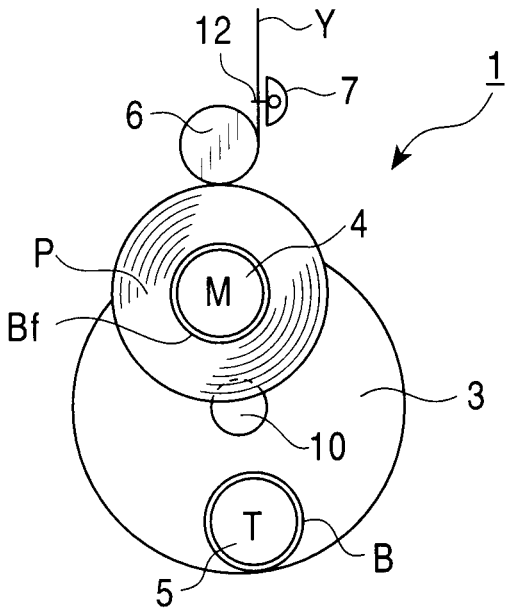


FIG. 5B

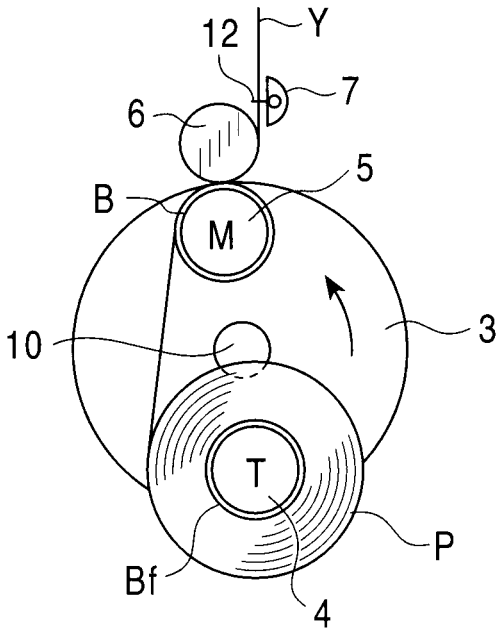


FIG. 5C

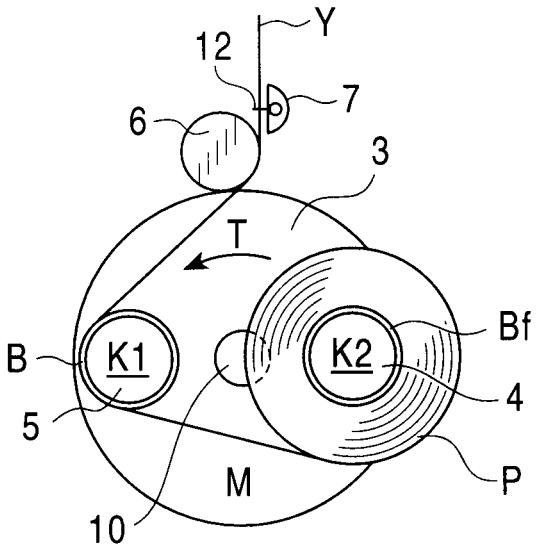
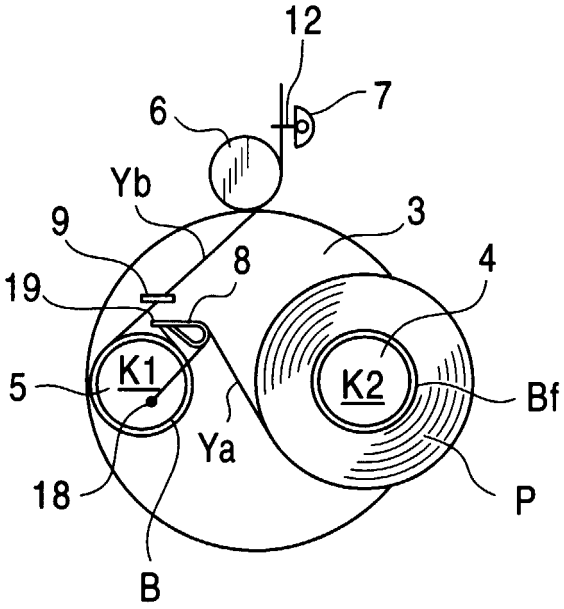


FIG. 6A


12
7
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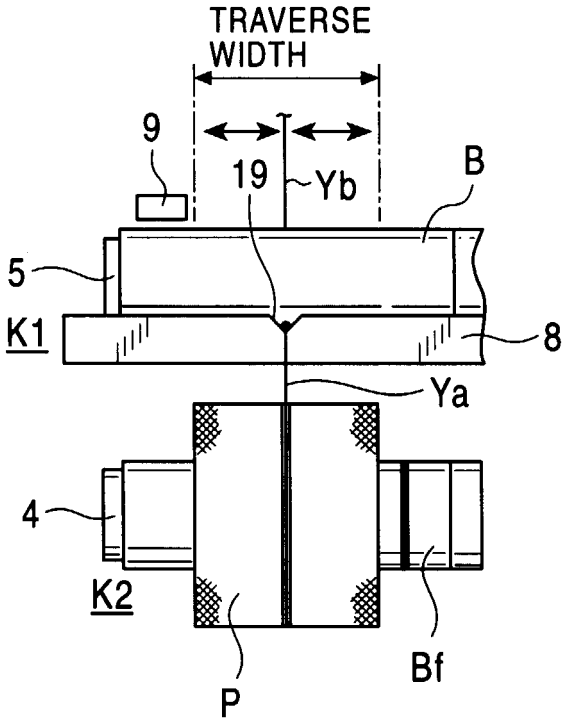
Bf
Ya
18
P
B

FIG. 6B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B
5
K1
8
Ya
4
K2
Bf
P

FIG. 7A

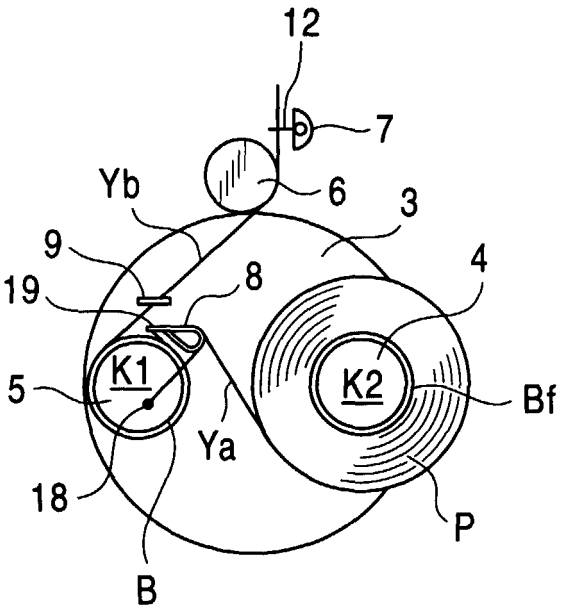

FIG. 7B

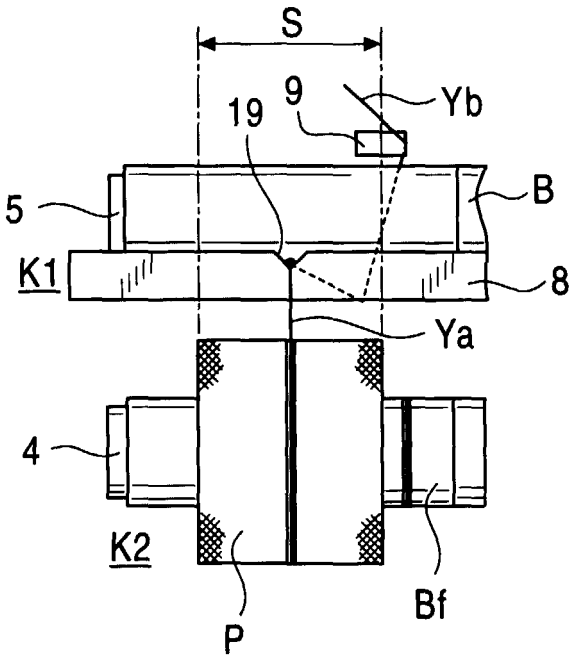

FIG. 8A

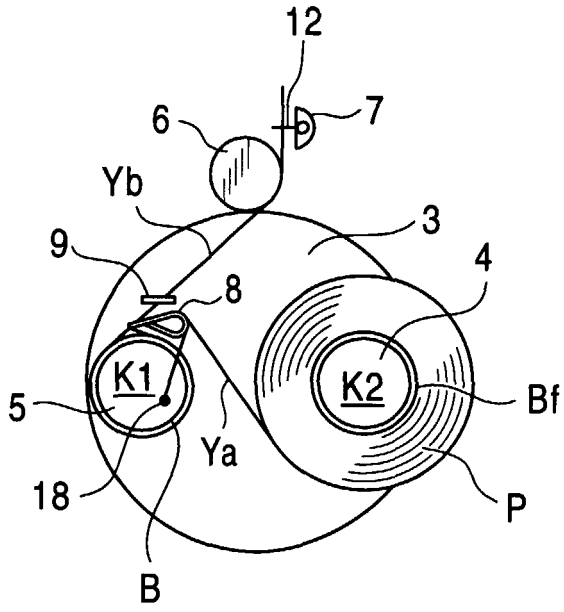
12
6
7
Yb
3
9
4
8
K1
K2
Bf
5
Ya
18
P
B

FIG. 8B

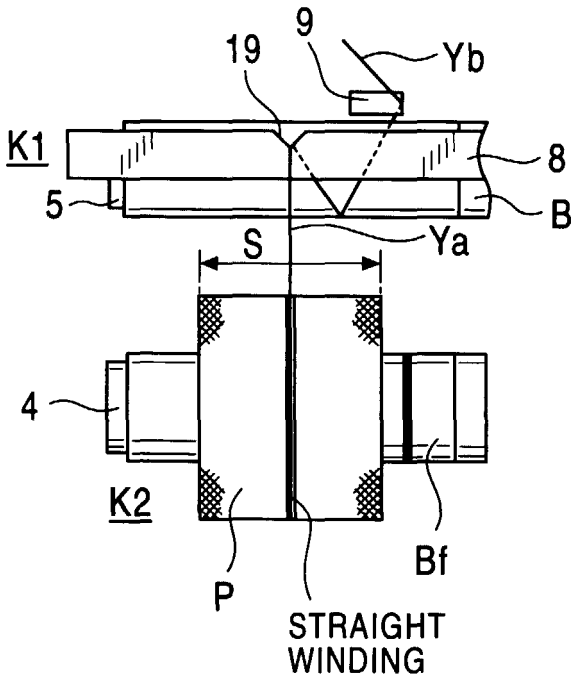
9
19
Yb
K1
8
5
B
S
Ya
4
K2
Bf
P
STRAIGHT
WINDING

FIG. 9A

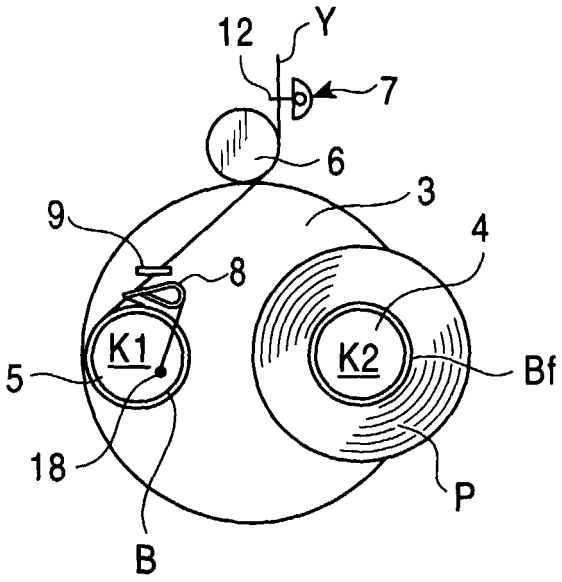
12
Y
7
6
3
9
4
8
K1
K2
Bf
5
18
P
B

FIG. 9B

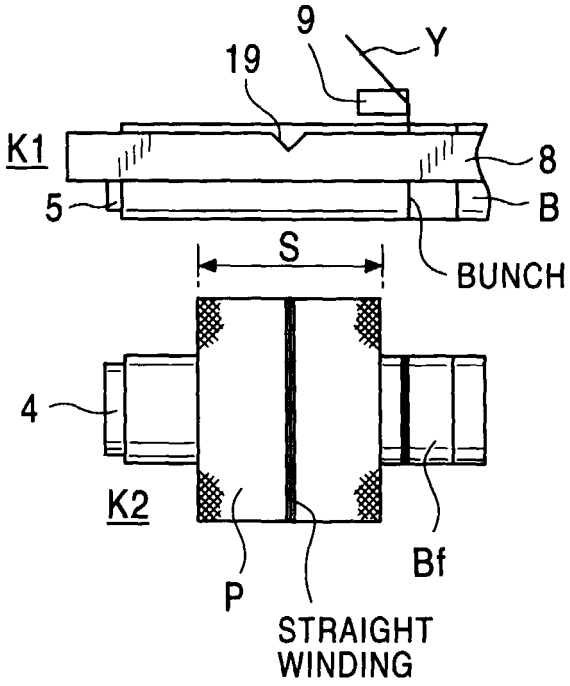
9
Y
19
K1
8
5
B
S
BUNCH
4
K2
Bf
P
STRAIGHT
WINDING

FIG. 10

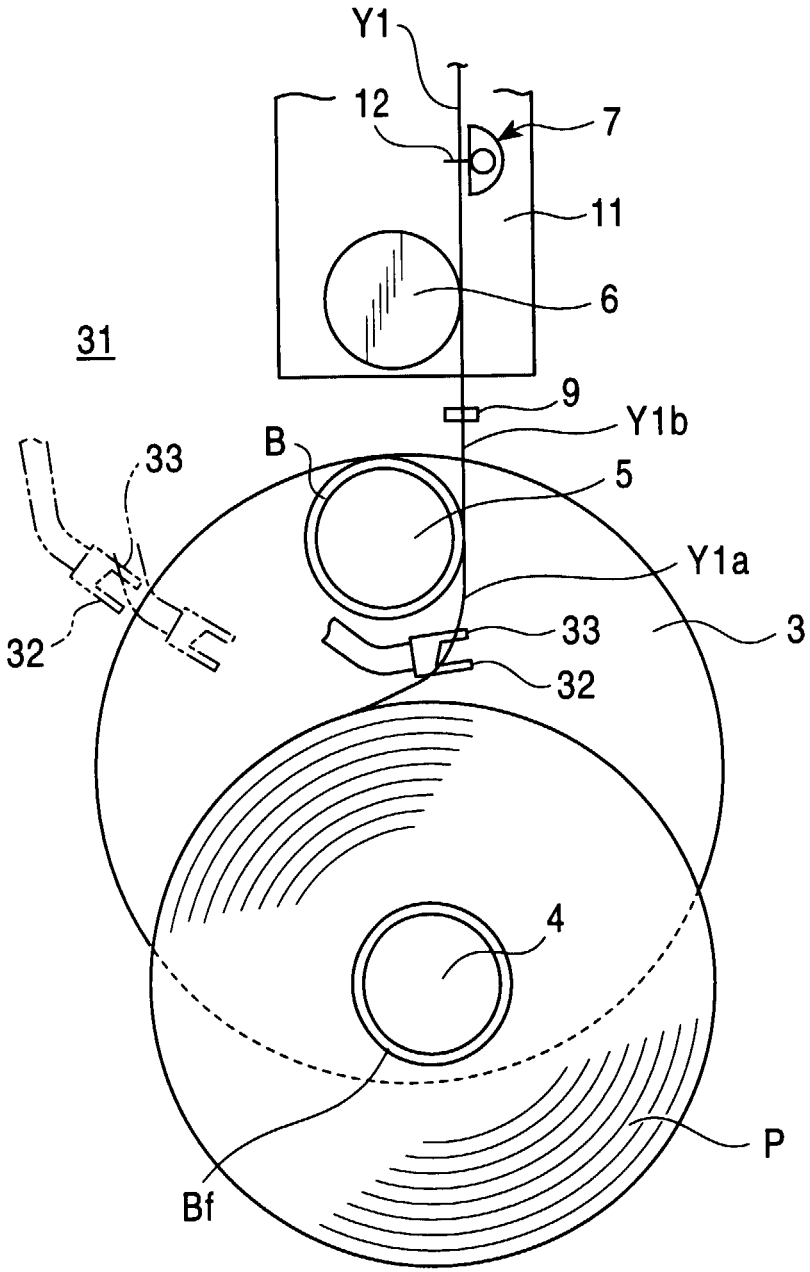

FIG. 11

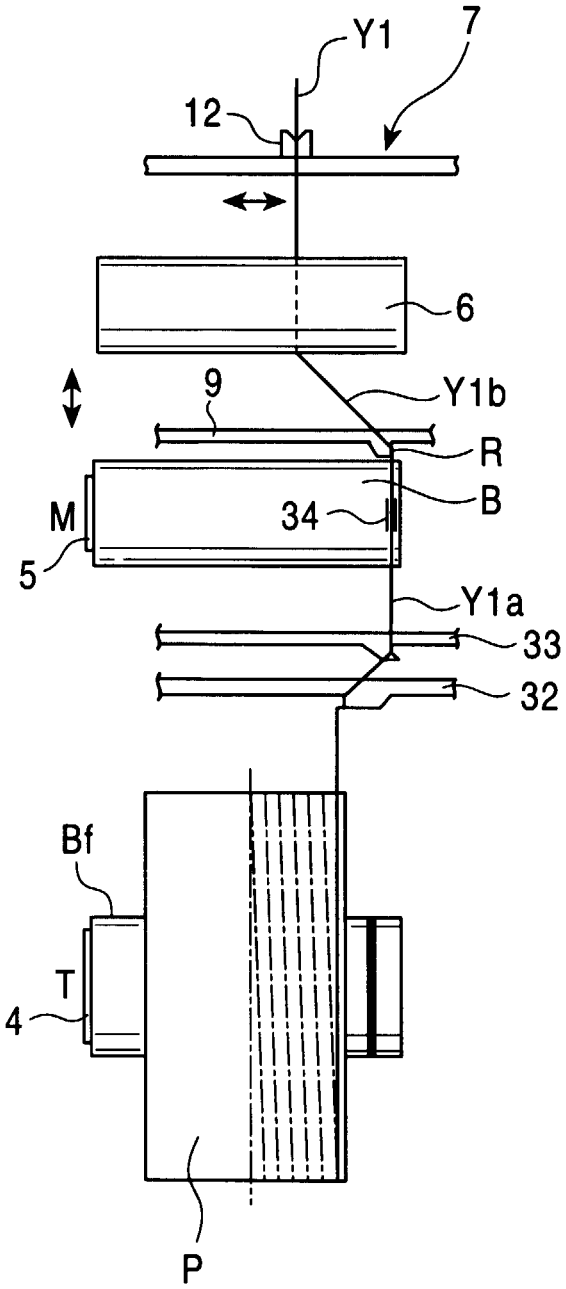

FIG. 12
PRIOR ART

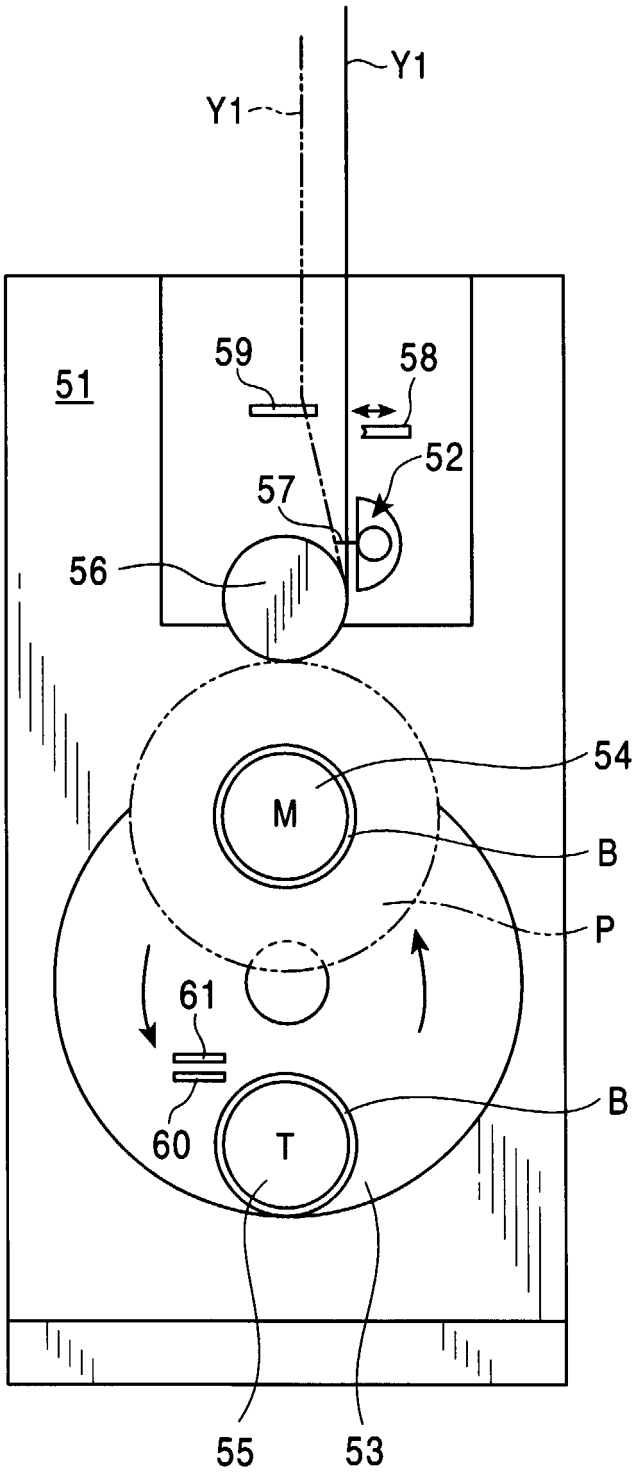

FIG. 13
PRIOR ART