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(54) **Ink ribbon feed**

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- **PATENT ABSTRACTS OF JAPAN vol. 010, no. 122 (M-476), 7 May 1986 & JP 60 250976 A (TOSHIBA KK), 11 December 1985**
- **PATENT ABSTRACTS OF JAPAN vol. 012, no. 384 (M-753), 13 October 1988 & JP 63 135276 A (NEC CORP;OTHERS: 01), 7 June 1988**

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Description

1. Field of the Invention

[0001] The present invention relates to an ink ribbon feed mechanism of a thermal recording type printing apparatus such as a facsimile machine and the like, and more particularly, to an ink ribbon feed arrangement that equalizes a ribbon tension over an entire ink ribbon width.

2. Description of Related Art

[0002] In a facsimile apparatus which is one example of a thermal recording type printing apparatus, an ink ribbon for recording is placed in the path of travel of recording paper (generally, a plain paper). The ink ribbon is usually wound on a feed roll, and printing is performed while the ink ribbon is being taken up onto a take-up roll. The ink ribbon is held stretched between the feed roll and the take-up roll. The recording paper and a recording head are provided in confronting relation interposing therebetween the ink ribbon. With heating the recording head, the ink coated on the ink ribbon melts to be transferred onto the recording paper.

[0003] Fig. 14 is a plan view showing an ink ribbon feed mechanism used in a conventional facsimile apparatus. In Fig. 14, an ink ribbon 101 is wound on a feed roll 102, and the leading end of the ink ribbon 101 is wound on a take-up roll 103. The take-up roll 103 rotates in the direction of an arrow Y in the drawing. That is, the ink ribbon 101 advances in the direction of an arrow X in the drawing, while being taken up on the take-up roll 103. The feed roll 102 and the take-up roll 103 are both supported nearly horizontally in relation to a bottom plate (not shown) of the facsimile apparatus by support frames 106A and 106B extending perpendicularly from the bottom plate.

[0004] The take-up operation of the ink ribbon 101 is effected by a friction mechanism 105 which drives the take-up roll 103. The friction mechanism 105 has a driving gear 108 which meshes with a gear 107 coaxially mounted on one end (on the right side in Fig. 14) of a spindle 103A of the take-up roll 103. To this driving gear 108 a controlled driving force is imparted. With the rotation of the driving gear 108, the take-up roll 103 rotates in the direction of the arrow Y, taking up the ink ribbon 101. However, if the rotational speed of the driving gear 108 is fixed, the amount of the ink ribbon 101 taken up on the take-up roll 103 increases (namely, the take-up roll 103 taking up the ink ribbon 101 becomes larger in diameter), increasing the take-up speed of the ink ribbon 101. There occurs, therefore, a difference in rotational speed between the take-up roll 103 and a platen roller (not shown) which carries recording paper. When a frictional force over a specific value is applied to the driving gear 108, or when the amount of the ink ribbon 101 wound on the take-up roll 103 has increased and a load to rotate the take-up roll 103 has increased over a specific value, idle rotation of the driving gear 108 occurs to absorb the speed difference from the platen roller. The other end (the left side in Fig. 14) of the take-up roll 103 is rotatably supported on a bearing section 109 provided on the support frame 106A, but no driving power is imparted to the other end of the take-up roll 103.

[0005] In the meantime, a back tension mechanism 104 is provided on the left end of the feed roll 102. The back tension mechanism 104 has a driving gear 112 which is meshed with a gear 111 coaxially mounted on one end (the left side in Fig. 14) of a spindle 102A of the feed roll 102. A specific driving power is given to the driving gear 112. The end of the feed roller 102 on the opposite side of the back tension mechanism 104 is only rotatably supported on a bearing 110 mounted on the support frame 106B, and is not imparted with the driving power.

[0006] With the impartment of the driving power to the driving gear 112, the back tension mechanism 104 gives a specific rotation force to the spindle 102A of the feed roll 102 in the direction of the arrow Z which is opposite to the direction of rotation Y of the take-up roll 103. Then, a force in the direction of feed (the direction of the arrow X) from the friction mechanism 105 and a force in the reverse direction (the opposite direction of the arrow X) of feed from the back tension mechanism 104 act on the ink ribbon 101.

[0007] As the friction mechanism 105 and the back tension mechanism 104 operate, the ink ribbon 101 is held with a fixed tension between the feed roll 102 and the take-up roll 103, thereby preventing the ink ribbon 101 from being broken and slacking.

[0008] In the conventional ink ribbon feed mechanism, however, the friction mechanism 105 and the back tension mechanism 104 are positioned on the opposite side in the direction of travel (the direction of the arrow X) of the ink ribbon 101. That is, as shown in Fig. 14, the friction mechanism 105 and the back tension mechanism 104 are arranged in diagonal positions of the wide ink ribbon 101. That is, in Fig. 14, the friction mechanism 105 is disposed on the right side, while the back tension mechanism 104 on the left side. Therefore, when the ink ribbon 101 is taken up, the driving power from the friction mechanism 105 for taking up the ink ribbon 101 and the driving power from the back tension mechanism 104 are on the opposite end of the ink ribbon 101. Thus, a twisting force occurs with the ink ribbon 101, producing a crease in the ink ribbon 101. A crease, if any in the ink ribbon 101, will deteriorate or unstabilize printing quality.

[0009] Furthermore, since the driving mechanism and the gear mechanism are disposed at opposite sides of the ink ribbon 101, the ink ribbon feed mechanism itself will increase in width. This has been a disturbance to space saving.

[0010] Further, the conventional ink ribbon feed mechanism includes a separation segment (not shown) provided between the recording head and the take-up

roll 103 for separating the ink ribbon 101 from the recording sheet, the ink ribbon being pressed and heated at a position between the recording head and the platen roller for transferring an inked image onto the recording sheet. The separation segment is formed of a material, such as a resin, the same as that of a bottom side main body cover or a frame and is provided integrally therewith to enhance productivity. The separation segment has an elongated sliding surface extending in parallel with the rotation shaft 103A of the take-up roll 103. The sliding surface is positioned underneath and in contact with the ink ribbon to apply tension thereto, so that the ink ribbon can be separated from the recording sheet fed at an upper side of the ink ribbon. Accordingly, a combination of the friction mechanism 105, the back tension mechanism 104 and the separation segment will provide a given tension to the ink ribbon and separation effect of the ink ribbon from the recording sheet, to thus prevent the ink ribbon from being cut and slacking. Accordingly, it is desirable to provide a separation segment capable of providing a desirable tension of the ink ribbon.

[0011] JP-A-9 193 520 describes a printer capable of preventing the formation of creases in a portion of an ink ribbon corresponding to a print head and of printing characters and images in good print quality without forming streaks attributable to creases in the ink ribbon. A main frame supports a feed spool and a take-up spool so that an ink ribbon extends between the feed spool and the take-up spool. A print head support frame supporting a print head and an ink ribbon guide is supported pivotally at one end thereof on the main frame. When the print head support frame is locked in place on the main frame, the ink ribbon guide depresses the ink ribbon so that the tension of a portion of the ink ribbon on one side of the main frame is higher than that of a portion of the same on the other side of the main frame while the printer is an unoperational state and tension is distributed uniformly across a portion of the ink ribbon corresponding to the print head while the printer is in an operational state.

SUMMARY OF THE INVENTION

[0012] In view of the above-described problems, it is an object of the present invention to provide an ink ribbon feeder of an image forming apparatus which is capable of stabilizing printing quality by eliminating crease and slack of an ink ribbon.

[0013] Another object of the present invention is to provide such ink ribbon feeder having a compact size and produced at a low cost.

[0014] Still another object of the present invention is to provide such ink ribbon feeder having a separation segment capable of producing a desirable tension distribution of the ink ribbon. According to the present invention, there is provided an ink ribbon feeder, comprising:

a feed roll support section for rotatably supporting a feed roll on which an ink ribbon is wound;
a take-up roll support section for rotatably supporting a take-up roll for taking up the ribbon;
a first driving section mounted on a first end of the take-up roll, and turning the take-up roll to take up the ink ribbon in a ribbon take-up direction from the feed roll to the take-up roll;
a second driving section for applying a turning force to the feed roll in an opposite direction of the take-up roll to apply a tension to the ink ribbon, the second driving section being disposed on a first end of the feed roll, the second driving section and the first driving section being on a same side of the ink ribbon in the ribbon take-up direction, the first driving section and the second driving section operating concurrently to drive their respective rolls during feed of the ink ribbon, wherein a length of a feed path of a first side edge of the ink ribbon is shorter than a length of a feed path of a second side edge of the ink ribbon;
a recording unit which contacts the ink ribbon from below, between the feed roll and the take-up roll, the recording unit having first and second ends; and
a fixed support frame for supporting the recording unit, the fixed support frame having a first support section for supporting the first end of the recording unit and on which the first driving section and the second driving section are provided, and a second support section for supporting, at a higher position than the first end of the recording unit, the second end of the recording unit on an opposite side of the ink ribbon in the ribbon take-up direction to the first support section.

[0015] In another aspect of the present invention, there is provided a printing apparatus having an ink ribbon feeder, comprising:

a fixed first support frame;
a fixed second support frame;
a feed roll having a first end and a second end on which an ink ribbon is wound, the feed roll rotatably supported at the first end by the first support frame and at the second end by the second support frame;
a take-up roll having a first end and a second end for taking up the ink ribbon, the take-up roll rotatably supported at the first end by the first support frame and at the second end by the second support frame;
a first drive mechanism for driving the feed roll;
a second drive mechanism for driving the take-up roll, wherein the first drive mechanism and the second drive mechanism respectively link with the first end of the feed roll and the first end of the take-up roll, the take-up roll and the feed roll disposed to provide a feed path distance along a first side edge of the ink ribbon between the rotatable support of the first end of the feed roll and the rotatable support

of the first end of the take-up roll that is shorter than a feed path distance along a second side edge of the ink ribbon between the rotatable support of the second end of the feed roll and the rotatable support of the second end of the take-up roll;
a recording unit which contacts the ink ribbon from below, between the feed roll and the take-up roll, the recording unit having first and second ends, the first support frame supporting the first end of the recording unit, and the second support frame supporting, at a hither position than the first end of the recording unit, the second end of the recording unit on an opposite side of the ink ribbon in the ribbon take-up direction to the support frame, the first drive mechanism and the second drive mechanism being provided on a side of the first support frame.

[0016] In another aspect of the present invention, there is provided an ink ribbon feeder for feeding an ink ribbon in an ink ribbon feeding direction comprising:

a feed roll winding thereover the ink ribbon, the ink ribbon having a first edge and a second edge extending in the ribbon feeding direction and determining a width of the ink ribbon therebetween;
a feed roll support section for rotatably supporting the feed roll;
a take-up roll positioned downstream of the feed roll in the ink ribbon feeding direction for taking up the ink ribbon fed from the feed-roll;
a take-up roll support section for rotatably supporting the take-up roll;
a first driving section drivingly connected the take-up roll for rotating the take-up roll in a ribbon take-up direction;
a second driving section drivingly connected to the feed roll for rotating the feed roll in a direction opposite the ribbon take-up direction;
a recording unit provided between the feed roll and the take-up roll and positioned below the ink ribbon and in contact therewith for forming an inked image on a recording medium while pressing the ink ribbon toward the recording medium;
a tension adjusting member provided between the feed roll and the take-up roll and having an upper portion formed with an elongated sliding surface extending in a direction perpendicular to the ink ribbon feeding direction, the tension adjusting member having a first end at a side of the first edge and a second end at a side of the second edge, and the sliding surface being in sliding contact with a lower surface of the ink ribbon for applying tension thereto;
adjusting means adjusting a height of at least one of the first end and the second end of the tension member relative to the recording unit for equalizing distribution of a tension of the ink ribbon in the width of the ink ribbon; and
a fixed supporting frame supporting the recording unit, the take-up roll support section, the feed roll support section and the tension adjusting member, the adjusting member being provided at the supporting frame, wherein the tension adjusting member is positioned downstream of the recording unit in the ink ribbon feeding direction to also serve as a separation member for separating the ink ribbon from the recording sheet which has been printed by a combination of the ink ribbon and the recording unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] In the drawings:

Fig. 1 is a plan view showing an ink ribbon feeder according to a first embodiment of the present invention;
Fig. 2 is a perspective view of the ink ribbon feeder shown in Fig. 1;
Fig. 3 is a side view of the ink ribbon feeder shown in Fig. 1;
Fig. 4 is a plan view showing an arrangement of a feed roll, a take-up roll, and a recording unit of the ink ribbon feeder shown in Fig. 1;
Fig. 5 is a perspective view showing an ink ribbon feeder according to a second embodiment of the present invention;
Fig. 6 is a front view of the ink ribbon feeder shown in Fig. 5;
Fig. 7 is a front view of showing a modification to the second embodiment;
Fig. 8 is a plan view showing an ink ribbon feeder according to a third embodiment of the present invention;
Fig. 9 is a side view showing an ink ribbon feeder according to a fourth embodiment of the present invention;
Fig. 10 is a perspective view showing a separation segment used in the fourth embodiment;
Fig. 11 is a cross-sectional view showing a fixing arrangement for fixing the separation segment according to the fourth embodiment;
Fig. 12 is a cross-sectional view showing a modification to a fixing arrangement for fixing the separation segment;
Fig. 13 is a cross-sectional view showing a still another modification to a fixing arrangement for fixing the separation segment; and
Fig. 14 is a plan view showing a conventional ink ribbon feed mechanism.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] An ink ribbon feeder 10 in a facsimile apparatus according to a first embodiment of the present in-

vention will be described with reference to Figs. 1 through 4.

[0019] An ink ribbon 1 is formed as an elongated medium having a width of about 218 mm which is capable of printing on an A4-size recording paper. One end of the ink ribbon 1 is wound on a feed roll 2, while the other end, on a take-up roll 3. A new ribbon 1 is fed out from the feed roll 2, advancing in the direction of an arrow A in Fig. 1 with a predetermined tension between the feed roll 2 and the take-up roll 3, thus being used in printing. The ink ribbon 1 that has been used in printing is taken up onto the take-up roll 3.

[0020] The feed roll 2 and the take-up roll 3 are both supported approximately horizontally with respect to a bottom plate (not shown) of a facsimile apparatus by support frames 6A and 6B vertically extending from the bottom plate. The support frames 6A and 6B are plate-like members of the same shape. As shown in Fig. 4, bearings 13A and 13B are formed on the support frame 6A, and bearings 13C and 13D are formed on the support frame 6B. A spindle 2A of the feed roll 2 is supported at both ends on the bearings 13A and 13C. The spindle 3A of the take-up roll 3 is supported at both ends on the bearings 13B and 13D.

[0021] As shown in Fig. 4, a bracket 6C is formed on the support frame 6A, and a bracket 6D, on the support frame 6B. Each bracket 6C and 6D is formed with a screw hole. A recording unit 9 is supported by the brackets 6C and 6D. That is, the recording unit 9 has each end 9A and 9B formed with screw holes, and screws 6E and 6F are threadingly engaged with the screw holes of the bracket 6C, 6D and the end portion 9A, 9B to fixedly secure the recording unit 9 to the brackets 6C, 6D. The recording unit 9 includes a thermal head (not shown) formed in a known shape of line, and is arranged such that it faces the ink ribbon 1.

[0022] As shown in Figs. 2 and 3, there is mounted a platen roller 7, above the ink ribbon 1 stretched between the feed roll 2 and the take-up roll 3, for carrying the paper 8 while pressing the paper 8 against the recording unit 9. Between the paper 8 and the recording unit 9 the ink ribbon 1 is present. The ink ribbon 1 is coated with ink on one side, and is wound on the feed roll 2 in such a manner that the ink-coated side will contact the paper 8.

[0023] If the thermal head of the recording unit 9 is heated according to a printing data when the paper 8 is being carried by the platen roller 7 while being pressed against the recording unit 9, the ink coated on the ink ribbon 1 is melted with the heat, and the molten ink is transferred to the paper 8, thus producing an inked image on the paper 8 in accordance with the printing data.

[0024] The operation of taking-up the ink ribbon 1 is effected by a friction mechanism 5 which drives the take-up roll 3. The friction mechanism 5 has a driving gear 17 which meshes with a gear 16 which is coaxially mounted on one end (the right side in Fig. 1) of the spindle 3A of the take-up roll 3. The driving gear 17 receives a specific driving power from a driving motor (not shown). With the rotation of the driving gear 17, the take-up roll 3 rotates in the direction of an arrow B, moving the ink ribbon 1 in the direction of an arrow A to take up the ink ribbon 1 onto the take-up roll 3.

[0025] If, however, the driving gear 17 is driven at a fixed speed of rotation, the amount of the ink ribbon 1 taken up on the take-up roll 3 increases (namely, the diameter of the take-up roll 3 on which the ink ribbon 1 is being taken up increases), thereby increasing the take-up speed of the ink ribbon 1. This, however, will cause a difference between the rotational speed of the platen roller 7 carrying the recording paper and the ink ribbon take-up speed. To avoid this problem, when a friction force exceeding a specific value is exerted to the driving gear 7, or in other words when the amount of the ink ribbon 1 taken up on the take-up roll 3 has increased so much as to increase a load for rotating the take-up roll 3 over a specific value, idle rotation of the driving gear 17 occurs to thereby absorb the difference of the rotational speed between the take-up roller 3 and the platen roller 7. The other end (the left side in Fig. 1) of the take-up roll 3 is rotatably supported on the bearing section 13B provided on the support frame 6A, but no driving power is imparted to the other end.

[0026] In the meantime, there is provided a back tension mechanism 4 on the right end of the feed roll 2, or on the same side as the side where the friction mechanism 5 of the take-up roll 3 is located. The back tension mechanism 4 has a driving gear 19 which meshes with a gear 18 coaxially mounted on the right end of the spindle 2A of the feed roll 2. A specific driving power is given to the driving gear 19 for rotating the feed roll 2 in the direction of an arrow C which is opposite to the direction B of rotation of the take-up roll 3. The end of the feed roller 2 on the opposite side of the back tension mechanism 4 is rotatably supported only on the bearing 13A provided on the support frame 6A, and therefore does not receive the driving power.

[0027] With the driving power being imparted to the driving gear 19, the back tension mechanism 4 gives a specific rotation force to the feed roll 2 in the direction of the arrow C which is opposite to the direction B of rotation of the take-up roll 3. Then, the ink ribbon 1 is applied with both a force from the friction mechanism 5 in the direction of movement (the direction of the arrow A) of the ink ribbon 1 and a force from the back tension mechanism 4 in the opposite direction (the opposite direction of the arrow A) of the ribbon movement.

[0028] Between the feed roll 2 and the take-up roll 3 the ink ribbon 1 is held with a predetermined tension by the friction mechanism 5 and the back tension mechanism 4, thereby preventing breaking and slacking of the ink ribbon 1.

[0029] In the ink ribbon feeder 10 of the first embodiment, as heretofore described, the friction mechanism 5 and the back tension mechanism 4 are arranged on the same side of the ink ribbon 1. Therefore, rotational

driving force for taking up the ink ribbon 1 and the rotation preventive force acting on the feed roll 2 are at the same side (the right side in the example) of the ink ribbon 1 in relation to the direction A of movement of the ink ribbon 1. Therefore. the ink ribbon 1 will not be subjected to a twisting force likely to occur in the conventional feeder, thus enabling to prevent the ink ribbon from being creased, and consequently enabling to stabilize the printing quality.

[0030] Furthermore, since the friction mechanism 5 and the back tension mechanism 4 are arranged on the same side (the right side in the example) in the first embodiment, entire width of the ribbon feeder 10 can be reduced. For example, in Fig. 1, a chain line D shows a left side position of the conventional ribbon feeder where the back tension mechanism is provided at a left side of the ink ribbon. Therefore, it is possible to locate the support frame 6A close to the ink ribbon 1 side. It, therefore, is possible to reduce the width of the ink ribbon feed mechanism 10, thus enabling decrease in size of a ribbon cassette (not shown) for accommodating the ink ribbon 1 and furthermore reducing the production cost of the feeder.

[0031] A ribbon feeder 20 according to a second embodiment of the present invention will next be described with reference to Figs. 5 and 6. In the first embodiment described above, the friction mechanism 5 for operation to take up the ink ribbon 1 and the back tension mechanism 4 for imparting a specific tension to the ink ribbon 1 are arranged on the same side of the ink ribbon 1. In this case, however, there takes place a slight difference in tension applied to the ink ribbon 1 between the side on which the friction mechanism 5 and the back tension mechanism 4 are mounted and the side on which these mechanisms are not mounted. That is, on one side where these two mechanisms are mounted, the ink ribbon 1 is constantly applied with a fixed tension by means of the friction mechanism 5 and the back tension mechanism 4. On the other hand, tension is not positively applied on the other side without these mechanisms, but the tension positively imparted at one side of the ink ribbon is propagated to the other side. Therefore, the tension on the other side without these mechanisms, particularly at the end of the ink ribbon 1, is less than the tension on the side provided with these mechanisms. Therefore, particularly at the end of the ink ribbon 1 on the side without the friction mechanism 5 and the back tension mechanism 4, a lack of tension will occur, which may cause the ink ribbon 1 to crease. To cope with these drawbacks, in the second embodiment, not only the friction mechanism 5 and the back tension mechanism 4 are mounted on the same one side of the ink ribbon 1. but also a compensation arrangement is provided for compensating a lack of tension of the other side of the ink ribbon 1 where the friction mechanism 5 and the back tension mechanism 4 are not provided.

[0032] The ink ribbon feeder 20 is approximately the same in constitution as that of the first embodiment, but is different in the constitution that the recording unit 9 is slantingly provided such that it contacts the ink ribbon 1 at a higher position on the left side than on the right side on which the friction mechanism 5 and the back tension mechanism 4 are provided (The height "h" is shown in Fig. 3)

[0033] Namely, the recording unit 9 is supported on the frames 6A and 6B, higher as it goes leftwards as viewed from the front in Fig. 6. The feed roller 2, the take-up roller 3, and the platen roller 7 are supported on the support frames 6A and 6B in such a manner that, similarly to the first embodiment, these members will be approximately parallel with the bottom plate of the main body of the facsimile apparatus.

[0034] More specifically, a support frame 6A' is so formed that the bracket section 6C of the support frame 6A' on which side the friction mechanism 5 and the back tension mechanism 4 are not mounted is higher than the bracket section 6D of the support frame 6B on which side these mechanisms are mounted.

[0035] Therefore the ink ribbon 1 is supported in a higher position at the left end of the recording unit 9 than at the right end, thereby increasing the ink ribbon tension in the vicinity of the left end. This arrangement can level the tension distribution of the ink ribbon 1 over its entire width, reducing the possibility of occurrence of creases in the vicinity of the left end of the ink ribbon 1.

[0036] Fig. 7 shows a modification 20' to the second embodiment. According to the modification 20', the support frames 6A and 6B of the same type as those of the first embodiment are used in place of changing the shape of the support frame 6A' shown in Fig. 6, and a spacer 14 of suitable thickness is inserted between the bracket section 6C of the support frame 6A and the left end section 9A of the recording unit 9, so that the recording unit 9 can be arranged higher on the left side than on the right side. With this arrangement, it is possible to compensate a lack of tension on the left side where the friction mechanism 5 and the back tension mechanism 4 are not mounted. According to the modification, the tension to be applied to the entire part of the ink ribbon 1 can be brought closer to a uniform tension, thereby enabling largely reducing the possibility of crease occurrence. Furthermore, because the support frames 6A and 6B are plate-like members of the same configuration, the manufacturing cost of the feeder can be decreased.

[0037] According to experiments using an about 218 mm wide ink ribbon 1 which is able to record on the A4-size recording paper 8, it is preferable to increase, by 0.6 mm to 1.2 mm, the height of the side on which the friction mechanism 5 and the back tension mechanism 4 are not provided. That is, the left end 9A is preferably set from 0.6 mm to 1.2 mm higher than the right end 9B.

[0038] A ribbon feeder 30 according to a third embodiment of this invention will next be described with reference to Fig. 8. The third embodiment is similar to the

second embodiment in the respect of such a feeder constitution that a lack of tension of the ink ribbon 1 on the side where the friction mechanism 5 and the back tension mechanism 4 are not mounted is corrected, and that the tension applied to the entire part of the ink ribbon 1 stretched between the feed roll 2 and the take-up roll 3 is brought closer to a uniform tension.

[0039] In the ink ribbon feeder 30 of the third embodiment, the feed roll 2 and the take-up roll 3 are not parallelly arranged as shown in Fig. 8. Concretely, the take-up roll 3 and the recording unit 9 are arranged approximately parallelly in a plan view so that these extend in a direction perpendicular to the ribbon take-up direction A. However, the feed roll 2 does not extend in a direction perpendicular to the feeding direction A. That is, the feed roll 2 is disposed such that a distance L2 between the feed roll 2 and the take-up roll 3 on the side where the friction mechanism 5 and the back tension mechanism 4 are mounted is shorter than a distance L1 between the left end of the feed roll 2 and the left end of the take-up roll 3, i.e., on the side where these mechanisms are not mounted.

[0040] The above-described decrease in the distance L2 can be realized by moving the position of the bearing section 13A supporting the feed roll 2 on a support frame 6A" to the rear of the position of the bearing section 13C supporting the feed roll 2 on a support frame 6B". That is, the left end of the feed roll 2 is moved backwards, and other take-up roll 3, recording unit 9, and platen roll 7 are held nearly in parallel with the bottom plate of the body of the facsimile apparatus similarly to the first embodiment, whereby the distance between the feed roll 2 and the take-up roll 3 increases on the left side of the feeder, enabling to increase the tension of the ink ribbon 1 in the vicinity of the left end and accordingly to correct a lack of tension.

[0041] Thus it becomes possible to bring the tension of the whole area of the ink ribbon 1 stretched between the feed roll 2 and the take-up roll 3 closer to a uniform value, and to largely reduce the possibility of occurrence of creases in the ink ribbon 1.

[0042] In the third embodiment in which the feed roll 2 mounted obliquely is given as an example, the feed roll 2 is supported nearly in parallel with the platen roller 7 and others, while the take-up roll 3 may be arranged diagonally. That is, either of the feed roll 2 and the take-up roll 3 may be arranged diagonally so long as the unwinding of the ink ribbon 1 from the feed roll 2 or the winding of the ink ribbon 1 onto the take-up roll 3 are not disturbed. Further, it should be noted that, in the first to third embodiments, the friction mechanism 5 and the back tension mechanism 4 are arranged on the right side. However, these can be arranged exclusively on the left side instead of the right side.

[0043] A ribbon feeder 40 according to a fourth embodiment will be described with reference to Figs. 9 through 11. The fourth embodiment pertains to an improvement on a separation segment 70 for separating the ink ribbon 1 from the recording paper 8.

[0044] As shown in Fig. 9, the ribbon feeder 40 has a separation segment 70 provided to a support frame 60 at a position between the platen roller 7 and the take-up roll 3 in the sheet feeding direction A for applying a given tension to the ink ribbon 1 and for separating the ink ribbon 1 from the image carrying recording paper 8. The support frame 60 is adapted to support the take-up roll 3 and the feed roll 2 similar to the support frames 6A, 6B, etc. of the foregoing embodiments. The support frame 60 has a rib 60A extending upwardly at a position between the feed roll 2 and the platen roller 7 in the sheet feed direction A and in contact with the ink ribbon 1 for applying tension to the ink ribbon 1. The rib 60A is provided integrally with the support frame 60 made of a resin material. A recording unit 19 including a recording head 19A is not fixedly secured to the support frame 60 but is supported on a support plate 19B movably fixed to the rib 60A. Further, a biasing spring 19C is provided between the support frame 60 and the support plate 19B for urging the recording head 19A toward the platen roller 7. The support frame 60 also has a pair of positioning projections (not shown) for positioning the separation segment 70.

[0045] The separation segment 70 has a lower horizontal section 70A, an intermediate vertical section 70B, and an upper horizontal section 70C. The lower horizontal section 70A is formed with a pair of thread holes 70a, 70a and a pair of positioning holes 70b,70b engageable with the positioning projections. The pair of thread holes 70a, 70a are positioned adjacent end portion of the lower horizontal section 70A. An upper surface of the upper horizontal section 70C serves as an elongated sliding surface 70c extending in a direction perpendicular to the ribbon take-up direction A. The sliding surface 70c is in contact with a lower surface of the ink ribbon 1 to apply tension thereto as well as to separate the ink ribbon 1 from the recording paper 8.

[0046] Adjusting segments including a spacer 90 and a screw 80 are provided for adjusting height of one end of the separation segment 70 with respect to the recording unit 19. As shown in Fig. 11, the spacer 90 having a predetermined thickness is interposed between the one end portion of the lower horizontal section 70A of the separation segment 70 and the support frame 60. Further, the screw 60 is threadingly engaged with the screw hole 70a of the lower horizontal section 70A and is also threadingly engaged with the support frame 60. On the other hand, the spacer 90 is not interposed between the other end portion of the lower horizontal section 70A and the support frame 60. The other end portion of the lower horizontal section 70A is merely fixed to the support frame 60 by engaging another screw 80 with the other screw hole 70a and with the support frame 60. By selecting a thickness of the spacer 90, the sliding surface 70c of the separation segment 70 can provide an optimum inclination to provide an optimum tension to the ink ribbon I and suitable separation effect. Alternatively,

two spacers having thickness different from each other can be used for the inclination adjustment. That is. one of the spacers is set at one end portion of the lower horizontal section 70A, whereas the other spacer is set at the other end portion of the lower horizontal section 70A, and each end portion of the lower horizontal section 70A is respectively fixed by the screw 80.

[0047] Thickness of the spacer 90 is determined by investigation of the printing quality during production of the facsimile machine. That is, spacers having various thickness are prepared, and printing is performed each time each spacer is set to the facsimile machine. A specific spacer which provided lesser slack and wrinkles of the ink ribbon or which provided sufficient printing quality is selected in a subsequent production line.

[0048] Fig. 12 shows a modification to an adjusting arrangement. A separation segment 71 has an upstanding intermediate section 71B formed with a thread hole 71a at each end thereof. On the other hand, a lower horizontal section 71A is not formed with any thread hole. A support frame 61 has an upstanding rib 61A at a position between the platen roller 7 and the take-up roll 3. At one end portion of the upstanding rib 61A, a vertically extending slot 61a is formed at a position confrontable with one thread hole 71a. Another end portion of the upstanding rib 61A is formed with a screw hole (not shown). A screw 81 extends through the vertically extending slot 61a with interposing a washer 82 between a head of the screw 81 and the upstanding rib 61A. The screw 81 is threadingly engaged with the thread hole 71a, to thus fix the separation segment 71 to the support frame 61. By controlling the relative position between the screw 81 and the vertically extending slot 61a, the fixing position of the separation segment 71 can be adjusted. On the other hand, at the other end portion of the separation segment 71, another screw (not shown) is threadingly engaged with the thread holes of the upstanding rib 61A and the intermediate vertical section 71B to fix the other end of the separation segment 71 to the support frame 61. Accordingly, a desirable inclination of a sliding surface 71c can be provided.

[0049] Alternatively, instead of the thread hole at the other end portion of the rib 61A, a vertically extending slot similar to the slot 61a can be formed for performing adjustment of the fixing positions at both end portions of the separation segment 71.

[0050] Fig. 13 shows another modification to an adjusting arrangement. A separation segment 72 has a lower horizontal section 72A formed with a pair of thread holes 72a, 72b at one end thereof and a single thread hole 72a (not shown) at the other end thereof. A support frame 62 has thread holes 62a at positions in confrontation with the thread holes 72a. At one end portion of the lower horizontal section 72A, a fixing screw 83 is threadingly engaged with the thread hole 72a and 62a for fixing the one end portion of the separation segment 72 to the support frame 62. On the other hand, an adjusting screw 84 is threadingly engaged with the thread hole 72b, whereas an end face of the adjusting screw 84 is merely seated on the upper surface of the support frame 62.

[0051] For adjusting the inclination of a sliding surface 72c, the threading rotation of the adjusting screw 84 is adjusted for adjusting a distance between the lower surface of the lower horizontal section 72A and the upper surface of the support frame 62. Then, the fixing screw 83 is threadingly engaged with the thread hole 72a and 62a to fix the one end of the lower horizontal section 72A to the support frame 62. If necessary, further adjustment is made by rotating the adjusting screw 84. On the other hand, at the other end portion of the lower horizontal section 72A, the screw 83 is merely threadingly engaged with the corresponding thread holes to fix the other end of the lower horizontal section 72A to the support frame 62.

[0052] Alternatively, additional thread hole can be formed at the other end of the lower horizontal section to allow a corresponding adjusting screw to be engaged therewith, so that both end portions of the lower horizontal section 72A can perform adjustment of the inclination.

[0053] In the fourth embodiment, the rib 60A (Fig. 9) is provided integrally with the support frame 60. However, the rib 60A can be provided separately from the support frame 60, and can be fixed thereto by a screw. In the latter case, the above-described adjusting arrangements for the separation segment 70, 71, 72 are available for adjusting the height of each end portion of the top surface of the rib 60A to adjust inclination of the top surface thereof. In this case, adjusting arrangements can be applied to both the separation segment and the rib. Alternatively, the adjusting arrangement can only be applied to the rib, while the separation segment is merely fixed to the support frame without the adjusting arrangement. In this instance, the separation segment can be provided integrally with the support frame.

[0054] According to experiments conducted by the present inventors, height control of the separation segment in the order of 0.1 mm (for example, height difference by 0.5 mm between the right and left top ends of the sliding surface) could provide improvement on elimination of slack and wrinkle of the ink ribbon, and height control of the rib 60A in the order of 1 mm (for example, height difference by 5 to 10 mm between the right and left top ends of the rib 60A could provide the relevant improvement. Accordingly, it could be understood that the control to the separation segment can provide greater change in slack and wrinkles of the ink ribbon rather than control to the rib 60A.

[0055] In view of the above, according to the fourth embodiment, the height adjustment of the right and left top ends of the separation segment 70, 71, 72 can be easily performed to level tension distribution over a width of the ink ribbon with a simple construction and by a simple adjusting labor. Further, the adjusting arrangement can be produced at a low production cost. This is

advantageous over the height adjustment of the recording unit 9 as is done in the second embodiment, and over an arrangement where a separation segment is provided integrally with the support frame made of a resin. In the latter case, various kinds of integral product must be produced so as to provide various inclination of the separation segment.

[0056] While the invention has been described in detail and with reference to the specific embodiments thereof, it would be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the scope of the claims. For example, the fourth embodiment can be combined with one of the first to third embodiments.

Claims

1. An ink ribbon feeder (10), comprising:

a feed roll support section for rotatably supporting a feed roll (2) on which an ink ribbon (1) is wound;
a take-up roll support section for rotatably supporting a take-up roll (3) for taking up the ribbon;
a first driving section (5) mounted on a first end of the take-up roll, and turning the take-up roll to take up the ink ribbon in a ribbon take-up direction from the feed roll to the take-up roll;
a second driving section (4) for applying a turning force to the feed roll in an opposite direction of the take-up roll to apply a tension to the ink ribbon, the second driving section being disposed on a first end of the feed roll, the second driving section and the first driving section being on a same side of the ink ribbon in the ribbon take-up direction, the first driving section and the second driving section operating concurrently to drive their respective rolls during feed of the ink ribbon, wherein a length of a feed path of a first side edge of the ink ribbon is shorter than a length of a feed path of a second side edge of the ink ribbon;
a recording unit (9) which contacts the ink ribbon from below, between the feed roll and the take-up roll, the recording unit having first and second ends; and
a fixed support frame (6B,6A) for supporting the recording unit, the fixed support frame having a first support section for supporting the first end of the recording unit and on which the first driving section and the second driving section are provided, and a second support section for supporting, at a higher position than the first end of the recording unit, the second end of the recording unit on an opposite side of the ink ribbon in the ribbon take-up direction to the first support section.

2. An ink ribbon feeder according to claim 1, wherein the take-up roll support section and the feed roll support section are integrally mounted on the support frame.

3. An ink ribbon feeder according to claim 1 or 2, wherein the first support section is a vertical plate-like member supporting the first end of the recording unit at a first level, and the second support section is a vertical plate-like member supporting the second end of the recording unit at a second level which is higher than the first level.

4. An ink ribbon feeder according to claim 1 or 2, wherein the first support section is a first plate-like member having a screw hole for securing by a screw the first end of the recording unit at a first level, and the second support section comprises a plate-like member having a screw hole and a spacer disposed between the second plate-like member and the second end of the recording unit, for securing by a screw the second end of the recording unit at a second level.

5. An ink ribbon feeder according to claim 1, wherein the feed roll support section has a first support section for supporting the first end of the feed roll on the second driving section side, and a second support section for supporting the second end of the feed roll, the take-up roll support section has a third support section for supporting the first end of the take-up roll on the first driving section side, and a fourth support section for supporting the second end of the take-up roll, and a distance between the second support section and the fourth support section is longer than the distance between the first support section and the third support section.

6. A printing apparatus having an ink ribbon feeder, comprising:

a fixed first support frame (6B);
a fixed second support frame (6A);
a feed roll (2) having a first end and a second end on which an ink ribbon is wound, the feed roll rotatably supported at the first end by the first support frame (6B) and at the second end by the second support frame (6A);
a take-up roll (3) having a first end and a second end for taking up the ink ribbon, the take-up roll rotatably supported at the first end by the first support frame (6B) and at the second end by the second support frame (6A);
a first drive mechanism (4) for driving the feed roll;
a second drive mechanism (5) for driving the

take-up roll, wherein the *first* drive mechanism and the second drive mechanism respectively link with the first end of the feed roll and the first end of the take-up roll, the take-up roll (3) and the feed roll (2) disposed to provide a feed path distance along a first side edge of the ink ribbon between the rotatable support of the first end of the feed roll and the rotatable support of the first end of the take-up roll that is shorter than a feed path distance along a second side edge of the ink ribbon between the rotatable support of the second end of the feed roll and the rotatable support of the second end of the take-up roll;

a recording unit (9) which contacts the ink ribbon from below, between the feed roll (2) and the take-up roll (3), the recording unit (9) having first and second ends, the first support frame supporting the first end of the recording unit, and the second support frame supporting, at a higher position than the first end of the recording unit, the second end of the recording unit on an opposite side of the ink ribbon in the ribbon take-up direction to the first support frame, the first drive mechanism (4) and the second drive mechanism (5) being provided on a same side of the first support frame.

7. The printing apparatus according to claim 6, wherein said first drive mechanism comprises a gear mounted to the first end of the feed roll and a driving gear engaging the gear.

8. The printing apparatus according to claim 6 or 7, wherein the second drive mechanism comprises a gear mounted to the first end of the take-up roll and a driving gear engaging the gear.

9. The printing apparatus according to claim 6, 7 or 8 wherein a first distance between the support of the first end

of the feed roll and the first end of the take-up roll in the first support frame equals a second distance between the support of the second end of the feed roll and the second end of the take-up roll in the second support frame.

10. The printing apparatus according to claim 9, further comprising a recording unit having a first end and a second end mounted at the first end to the first support frame and at the second end to the second support frame. wherein the ink ribbon is fed from the feed roll, past the recording unit and the taken up on the take-up roll.

11. The printing apparatus according to claim 10, wherein the second end of the recording unit is at a greater height than the first end of the recording unit to create the shorter feed path for the first side edge of the ink ribbon.

12. The printing apparatus according to claim 11, wherein an increased height of the second support frame at least at a mount point of the second end of the recording unit relative to the first support frame provides the greater height.

13. The printing apparatus according to claim 11, wherein a spacer between a mounting point of the second end of the recording unit and the second support frame provides the greater height than at a mounting point of the first end of the recording unit to the first support frame.

14. The printing apparatus according to claim 6, wherein a first distance between the support of the first end of the feed roll and the first end of the take-up roll in the first support frame is less than a second distance between the support of the second end of the feed roll and the second end of the take-up roll in the second support frame to create the shortened feed path distance for the first side edge of the ink ribbon.

15. The printing apparatus according to claim 6 to 14, wherein the first drive mechanism drives the feed roll in a direction to resist feed of the ink ribbon and the second drive mechanism drives the take-up roll in a feed direction.

16. The printing apparatus according to any one of claims 6 to 15, wherein the first drive mechanism and the second drive mechanism operate simultaneously during feed of the ink ribbon.

17. An ink ribbon feeder for feeding an ink ribbon in an ink ribbon feeding direction comprising:

a feed roll (2) winding thereover the ink ribbon, the ink ribbon having a fir edge and a second edge extending in the ribbon feeding direction and determining width of the ink ribbon therebetween;

a feed roll support section for rotatably supporting the feed roll;

a take-up roll (3) positioned downstream of the feed roll in the ink ribbon feeding direction for taking up the ink ribbon fed from the feed-roll;

a take-up roll support section'for rotatably supporting the take-up roll;

a first driving section (5) drivingly connected the take-up roll for rotating th take-up roll in a ribbon take-up direction;

a second driving section (4) drivingly connected to the feed roll (2) for rotating the feed roll in a

direction opposite the ribbon take-up direction;
a recording unit (9) provided between the feed roll (2) and the take-up roll (3) and positioned below the ink ribbon and in contact therewith for forming an inked image on a recording medium while pressing the ink ribbon toward the recording medium;
a tension adjusting member (70) provided between the feed roll (2) and the take-up roll (3) and having an upper portion formed with an elongated sliding surface extending in a direction perpendicular to the ink ribbon feeding direction, the tension adjusting member having a first end at a side of the first edge and a second end at a side of the second edge, and the sliding surface being in sliding contact with a lower surface of the ink ribbon for applying tension thereto;
adjusting means (90) adjusting a height of at least one of the first end and the second end of the tension adjusting member relative to the recording unit for equalizing distribution of a tension of the ink ribbon in the width of the ink ribbon; and
a fixed supporting frame (6B,6A) supporting the recording unit, the take-up roll support section, the feed roll support section and the tension adjusting member, the adjusting means being provided at the supporting frame, wherein the tension adjusting member is positioned downstream of the recording unit in the ink ribbon feeding direction to also serve as a separation member for separating the ink ribbon from the recording medium which has been printed by a combination of the ink ribbon and the recording unit.

18. The ink ribbon feeder as claimed in claim 17 wherein the support frame has an upwardly projecting rib at a position between the recording unit and the feed roll, and the upwardly projecting rib having a top end surface in contact with the ink ribbon.

19. The ink ribbon feeder as claimed in claim 17 or 18, wherein the first end of the tension adjusting means has a first upper end and a first lower end, and the second end of the tension adjusting means has a second upper end and a second lower end,
and wherein the adjusting means comprises:

a spacer provided between the first lower end and the support frame for increasing a height of the first upper end to change a height between the first and second upper ends;
a first screw engaged with the first lower end and with the support frame interposing the spacer therebetween; and
a second screw engaged with the second lower end with the support frame.

20. The ink ribbon feeder as claimed in claim 19, wherein the adjusting means further comprises a second spacer provided between the second lower end and the support frame, the second spacer having a width different from a width of the first spacer, the second screw being engaged with the second lower end and with the support frame interposing therebetween the second spacer.

21. The ink ribbon feeder as claimed in any one of claims 17 to 20,
wherein the support frame has an upwardly extending rib formed with a vertically extending slot;
and wherein the adjusting means comprises:

a first screw extending through the vertically extending slot and engaged with the one end of the tension adjusting member for fixing the one end of the tension adjusting member to the upwardly extending rib, a fixing position of the first screw relative to the slot determining a height of the one end of the tension adjusting member; and
a second screw engaged with the rib and the other end of the tension adjusting member.

22. The ink ribbon feeder as claimed in claim 21, wherein the rib is formed with a second vertically extending slot, the second screw extending through the second vertically extending slot and engaged with the other end of the tension adjusting member for fixing the other end of the tension adjusting member to the upwardly extending rib, a fixing position of the second screw relative to the second slot determining a height of the other end of the tension adjusting member.

23. The ink ribbon feeder as claimed in any one of claims 17 to 22,
wherein the first end of the tension adjusting means nas a first upper end and a first lower end, and the second end of the tension adjusting means has a second upper end and a second lower end;
and wherein the adjusting means comprises:

a first fixing screw for fixing the first lower end to the support frame;
a first adjusting screw engaged with the first lower end and seated on the support frame for adjusting a distance between the first lower end and the support frame by the rotation of the first adjusting screw, so that a height of the first upper end is adjustable; and
a second fixing screw for fixing the second lower end to the support frame.

24. The ink ribbon feeder as claimed in claim 23, wherein the adjusting means further comprises a second adjusting screw engaged with the second lower end and seated on the support frame for adjusting a distance between the second lower end and the support frame by the rotation of the second adjusting screw, so that a height of the second upper end is adjustable.

Patentansprüche

1. Farbbandvorschieber (10) mit:

einem Vorschubrollentragabschnitt zum drehbaren Tragen einer Vorschubrolle (2), auf der ein Farbband (1) gewikkelt ist;
einem Aufnahmerollentragabschnitt zum drehbaren Tragen einer Aufnahmerolle (3) zum Aufnehmen des Farbbandes; einem ersten Antriebsabschnitt (5), der auf einem Ende der Aufnahmerolle angebracht ist und die Aufnahmerolle zum Aufnehmen des Farbbandes in einer Farbbandaufnahmerichtung von der Vorschubrolle zu der Aufnahmerolle dreht;
einem zweiten Antriebsabschnitt (4) zum Anlegen einer Drehkraft an die Vorschubrolle in eine entgegengesetzte Richtung der Aufnahmerolle zum Anlegen einer Spannung an das Farbband,
wobei der zweite Antriebsabschnitt auf einem ersten Ende der Vorschubrolle vorgesehen ist, der zweite Antriebsabschnitt und der ersten Antriebsabschnitt auf der gleichen Seite des Farbbandes in der Farbbandaufnahmerichtung vorgesehen sind, der erste Antriebsabschnitt und der zweite Antriebsabschnitt im Parallelbetrieb tätig sind zum Antreiben ihrer jeweiligen Rollen während des Vorschubes des Farbbandes, worin eine Länge eines Vorschubpfades einer ersten Seitenkante des Farbbandes kürzer als eine Länge eines Vorschubpfades einer zweiten Seitenkante des Farbbandes ist;
einer Aufzeichnungseinheit (9), die das Farbband von unten zwischen der Vorschubrolle und der Aufnahmerolle kontaktiert, wobei die Aufzeichnungseinheit ein erstes und ein zweites Ende äufweist; und
einem festen Tragrahmen (6B, 6A) zum Tragen der Aufzeichnungseinheit, wobei der feste Tragrahmen einen ersten Tragabschnitt zum Tragen des ersten Endes der Aufzeichnungseinheit und auf dem der erste Antriebsabschnitt und der zweite Antriebsabschnitt vorgesehen sind und einen zweiten Tragabschnitt zum Tragen an einer höheren Position als das erste Ende der Aufzeichnungseinheit des zweiten Endes der Aufzeichnungseinheit auf einer entgegengesetzten Seite des Farbbandes in der Farbbandaufnahmerichtung zu dem ersten Tragabschnitt aufweist.

2. Farbbandvorschieber nach Anspruch 1, bei dem der Aufnahmerollentragabschnitt und der Vorschubrollentragabschnitt integral auf dem Tragrahmen angebracht sind.

3. Farbbandvorschieber nach Anspruch 1 oder 2, bei dem der erste Tragabschnitt ein vertikales plattenartiges Teil ist, das das erste Ende der Aufzeichnungseinheit auf einem ersten Niveau trägt, und der zweite Tragabschnitt ein vertikales plattenartiges Teil ist, das das zweite Ende der Aufzeichnungseinheit auf einem zweiten Niveau trägt, das höher als das erste Niveau ist.

4. Farbbandvorschieber nach Anspruch 1 oder 2, bei dem der erste Tragabschnitt ein erstes plattenartiges Teil ist, das ein Schraubenloch zum Sichern des ersten Endes der Aufzeichnungseinheit auf einem ersten Niveau durch eine Schraube aufweist, und der zweite Tragabschnitt ein plattenartiges Teil mit einem Schraubenloch und einem Abstandshalter aufweist, der zwischen dem zweiten plattenartigen Teil und dem zweiten Ende der Aufzeichnungseinheit zum Sichern des zweiten Endes der Aufzeichnungseinheit auf einem zweiten Niveau durch eine Schraube vorgesehen ist.

5. Farbbandvorschieber nach Anspruch 1, bei dem der Vorschubrollentragabschnitt einen ersten Tragabschnitt zum Tragen des ersten Endes der Vorschubrolle auf der zweiten Antriebsabschnittsseite und einen zweiten Tragabschnitt zum Tragen des zweiten Endes der Vorschubrolle aufweist, der Aufnahmerollentragabschnitt einen dritten Tragabschnitt zum Tragen des ersten Endes der Aufnahmerolle auf der ersten Antriebsabschnittsseite und einen vierten Tragabschnitt zum Tragen des zweiten Endes der Aufnahmerolle aufweist und ein Abstand zwischen dem zweiten Tragabschnitt und dem vierten Tragabschnitt länger als der Abstand zwischen dem ersten Tragabschnitt und dem dritten Tragabschnitt ist.

6. Druckgerät mit einem Farbbandvorschieber mit:

einem festen ersten Tragrahmen (6B) ;
einem festen zweiten Tragrahmen (6A) ;
einer Vorschubrolle (2) mit einem ersten Ende und einem zweiten Ende, auf der ein Farbband gewickelt ist, wobei die Vorschubrolle drehbar an dem ersten Ende durch den ersten Tragrahmen (6B) und an dem zweiten Ende durch den zweiten Tragrahmen (6A) gelagert ist;
einer Aufnahmerolle (3) mit einem ersten Ende

und einem zweiten Ende zum Aufnehmen des Farbbandes, wobei die Aufnahmerolle drehbar an dem ersten Ende durch den ersten Tragrahmen (6B) und an dem zweiten Ende durch den zweiten Tragrahmen (6A) gelagert ist;
einem ersten Antriebsmechanismus (4) zum Antreiben der Vorschubrolle;
einem zweiten Antriebsmechanismus (4) zum Antreiben der Vorschubrolle;
einen zweiten Antriebsmechanismus (5) zum Antreiben der Aufnahmerolle, worin der erste Antriebsmechanismus und der zweite Antriebsmechanismus mit dem ersten Ende der Vorschubrolle bzw. dem ersten Ende der Aufnahmerolle verbunden sind, die Aufnahmerolle (3) und die Vorschubrolle (2) vorgesehen sind zum Vorsehen eines Vorschubpfadabstandes entlang einer ersten Seitenkante des Farbbandes zwischen der drehbaren Lagerung des ersten Endes der Vorschubrolle und der drehbaren Lagerung des ersten Endes der Aufnahmerolle, der kürzer ist als ein Vorschubpfadabstand entlang einer zweiten Seitenkante des Farbbandes zwischen der drehbaren Lagerung des zweiten Endes der Vorschubrolle und der drehbaren Lagerung des zweiten Endes der Aufnahmerolle;
einer Aufzeichnungseinheit (9), die das Farbband zwischen der Vorschubrolle (2) und der Aufnahmerolle (3) von unten kontaktiert, wobei die Aufzeichnungseinheit (9) ein erstes und ein zweites Ende aufweist, der erste Tragrahmen das erste Ende der Aufzeichnungseinheit trägt und der zweite Tragrahmen an einer höheren Position als das erste Ende der Aufzeichnungseinheit das zweite Ende der Aufzeichnungseinheit auf einer entgegengesetzten Seite des Farbbandes in der Farbbandaufnahmerichtung zu dem ersten Tragrahmen trägt, wobei der erste Antriebsmechanismus (4) und der zweite Antriebsmechanismus (5) auf der gleichen Seite des ersten Tragrahmens vorgesehen sind.

7. Druckgerät nach Anspruch 6,
bei dem der erste Antriebsmechanismus ein Zahnrad, das an dem ersten Ende der Vorschubrolle angebracht ist, und ein treibendes Zahnrad, das in Eingriff mit dem Zahnrad steht, aufweist.

8. Druckgerät nach Anspruch 6 oder 7,
bei dem der zweite Antriebsmechanismus ein Zahnrad, das an dem ersten Ende der Aufnahmerolle angebracht ist, und ein treibendes Zahnrad, das mit dem Zahnrad in Eingriff steht, aufweist.

9. Druckgerät nach Anspruch 6, 7 oder 8,
bei dem ein erster Abstand zwischen der Lagerung des ersten Endes der Vorschubrolle und des ersten Endes der Aufnahmerolle in dem ersten Tragrahmen gleich einem zweiten Abstand zwischen der Lagerung des zweiten Endes der Vorschubrolle und des zweiten Endes der Aufnahmerolle in dem zweiten Tragrahmen ist.

10. Druckgerät nach Anspruch 9,
weiter mit einer Aufzeichnungseinheit mit einem ersten Ende und einem zweiten Ende, die mit dem ersten Ende an dem ersten Tragrahmen und an dem zweiten Ende an dem zweiten Tragrahmen angebracht ist, worin das Farbband von der Vorschubrolle entlang der Aufzeichnungseinheit vorgeschoben wird und von der Aufnahmerolle aufgenommen wird.

11. Druckgerät nach Anspruch 10,
bei der das zweite Ende der Aufzeichnungseinheit an einer größeren Höhe als das erste Ende der Aufzeichnungseinheit zum Erzeugen eines kürzeren Vorschubpfades für die erste Seitenkante des Farbbandes vorgesehen ist.

12. Druckgerät nach Anspruch 11,
bei dem eine vergrößerte Höhe des zweiten Tragrahmens an mindestens einem Anbringungspunkt des zweiten Endes der Aufzeichnungseinheit relativ zu dem ersten Tragrahmen die größere Höhe vorsieht.

13. Druckgerät nach Anspruch 11,
bei dem ein Abstandshalter zwischen einem Anbringungspunkt des zweiten Endes der Aufzeichnungseinheit und dem zweiten Tragrahmen die größere Höhe als ein Anbringungspunkt des ersten Endes der Aufzeichnungseinheit zum ersten Tragrahmen vorsieht.

14. Druckgerät nach Anspruch 6,
bei dem ein erster Abstand zwischen der Lagerung des ersten Endes der Vorschubrolle und dem ersten Ende der Aufnahmerolle in dem ersten Tragrahmen geringer als ein zweiter Abstand zwischen der Lagerung des zweiten Endes der Vorschubrolle und des zweiten Endes der Aufnahmerolle in dem zweiten Tragrahmen ist zum Erzeugen des verkürzten Vorschubpfadabstandes für die erste Seitenkante des Farbbandes.

15. Druckgerät nach Anspruch 6 bis 14,
bei dem der erste Antriebsmechanismus die Vorschubrolle in einer Richtung zum Widerstehen des Vorschubes des Farbbandes antreibt und der zweite Antriebsmechanismus die Aufnahmerolle in einer Vorschubrichtung antreibt.

16. Druckgerät nach einem der Ansprüche 6 bis 15,
bei dem der erste Antriebsmechanismus und der

zweite Antriebsmechanismus simultan während des Vorschubes des Farbbandes tätig sind.

17. Farbbandvorschieber zum Vorschieben eines Farbbandes in einer Farbbandvorschubrichtung, mit:

einer Vorschubrolle (2), über die das Farbband gewickelt ist, wobei das Farbband eine erste Kante und eine zweite Kante aufweist, die sich in der Farbbandvorschubrichtung erstrecken und eine Breite des Farbbandes dazwischen bestimmen;
einem Vorschubrollentragabschnitt zum drehbaren Tragen der Vorschubrolle;
einer Aufnahmerolle (3), die stromabwärts von der Vorschubrolle in der Farbbandvorschubrichtung positioniert ist, zum Aufnehmen des von der Vorschubrolle vorgeschobenen Farbbandes;
einem Aufnahmerollentragabschnitt zum drehbaren Tragen der Aufnahmerolle;
einem ersten Antriebsabschnitt (5), der antriebsmäßig mit der Aufnahmerolle zum Drehen der Aufnahmerolle in einer Farbbandaufnahmerichtung verbunden ist;
einem zweiten Antriebsabschnitt (4), der antriebsmäßig mit der Vorschubrolle (2) zum Drehen der Vorschubrolle in eine Richtung entgegengesetzt zu der Farbbandaufnahmerichtung verbunden ist;
einer Aufzeichnungseinheit (9), die zwischen der Vorschubrolle (2) und der Aufnahmerolle (3) vorgesehen ist und unter dem Farbband und in Kontakt damit positioniert ist zum Bilden eines gefärbten Bildes auf einem Aufzeichnungsmedium, während das Farbband zu dem Aufzeichnungsmedium gepresst wird;
einem Spannungseinstellteil (70), das zwischen der Vorschubrolle (2) und der Aufnahmerolle (3) vorgesehen ist und einen oberen Abschnitt aufweist, der mit einer länglichen Gleitoberfläche gebildet ist, die sich in eine Richtung senkrecht zu der Farbbandvorschubrichtung erstreckt, wobei das Spannungseinstellteil ein erstes Ende an einer Seite der ersten Kante und ein zweites Ende an einer Seite der zweiten Kante aufweist und die Gleitoberfläche in Gleitkontakt mit einer unteren Oberfläche des Farbbandes zum Anlegen von Spannung daran steht;
einem Einstellmittel (90), das die Höhe von mindestens einem des ersten Endes und des zweiten Endes des Spannungseinstellteiles relativ zu der Aufzeichnungseinheit einstellt, zum Ausgleichen der Verteilung einer Spannung des Farbbandes in der Breitenrichtung des Farbbandes; und
einem festen Tragrahmen (6B, 6A), der die Aufzeichnungseinheit, den Aufnahmespulentragabschnitt, den Vorschubrollentragabschnitt und das Spannungseinstellteil trägt, wobei das Einstellmittel an dem Tragrahmen vorgesehen ist, worin das Spannungseinstellteil stromabwärts von der Aufzeichnungseinheit in der Farbbandvorschubrichtung positioniert ist, so dass es auch als Trennteil zum Trennen des Farbbandes von dem Aufzeichnungsmedium dient, auf das durch eine Kombination des Farbbandes und der Aufzeichnungseinheit gedruckt worden ist.

18. Farbbandvorschieber nach Anspruch 17, bei dem der Tragrahmen eine nach oben vorstehende Rippe an einer Position zwischen der Aufzeichnungseinheit und der Vorschubrolle aufweist, wobei die nach oben vorstehende Rippe eine obere Endoberfläche in Kontakt mit dem Farbband aufweist.

19. Farbbandvorschieber nach Anspruch 17 oder 18, bei dem das erste Ende des Spannungseinstellmittels ein erstes oberes Ende und ein erstes unteres Ende aufweist und das zweite Ende des Spannungseinstellmittels ein zweites oberes Ende und ein zweites unteres Ende aufweist,
und worin das Einstellmittel aufweist:

einen Abstandshalter, der zwischen dem ersten unteren Ende und dem Tragrahmen vorgesehen ist, zum Vergrößern einer Höhe des ersten oberen Endes zum Ändern einer Höhe zwischen dem ersten und dem zweiten oberen Ende;
eine erste Schraube, die mit dem ersten unteren Ende und
mit dem Tragrahmen in Eingriff steht, wodurch der Abstandshalter dazwischen vorgesehen wird; und
eine zweite Schraube, die mit dem zweiten unteren Ende mit dem Tragrahmen in Eingriff steht.

20. Farbbandvorschieber nach Anspruch 19, bei dem das Einstellmittel weiter einen zweiten Abstandshalter aufweist, der zwischen dem zweiten unteren Ende und dem Tragrahmen vorgesehen ist, wobei der zweite Abstandshalter eine Breite unterschiedlich von einer Breite des ersten Abstandhalters aufweist, die.zweite Schraube in Eingriff mit dem zweiten unteren Ende und mit dem Tragrahmen steht, wodurch dazwischen der zweite Abstandshalter eingefügt ist.

21. Farbbandvorschieber nach einem der Ansprüche 17 bis 20, bei dem der Tragrahmen eine sich nach oben erstreckende Rippe aufweist, die mit einem

sich vertikal erstreckenden Schlitz gebildet ist; und worin das Einstellmittel aufweist:

eine erste Schraube, die sich durch den sich vertikal erstreckenden Schlitz erstreckt und in Eingriff mit dem einen Ende des Spannungseinstellteiles steht zum Befestigen des einen Endes des Spannungseinstellteiles an der sich nach oben erstreckenden Rippe, wobei eine Befestigungsposition der ersten Schraube relativ zu dem Schlitz eine Höhe des einen Endes des Spannungseinstellteiles bestimmt; und
eine zweite Schraube, die mit der Rippe und dem anderen Ende des Spannungseinstellteiles in Eingriff steht.

22. Farbbandvorschieber nach Anspruch 21, bei dem die Rippe mit einem zweiten sich vertikal erstreckenden Schlitz gebildet ist, wobei die zweite Schraube sich durch den zweiten sich vertikal erstreckenden Schlitz erstreckt und in Eingriff mit dem anderen Ende des Spannungseinstellteiles steht zum Fixieren des anderen Endes des Spannungseinstellteiles an der sich nach oben erstreckenden Rippe, eine Befestigungsposition der zweiten Schraube relativ zu dem zweiten Schlitz eine Höhe des anderen Endes des Spannungseinstellteiles bestimmt.

23. Farbbandvorschieber nach einem der Ansprüche 17 bis 22, bei dem das erste Ende des Spannungseinstellmittels ein erstes oberes Ende und ein erstes unteres Ende aufweist und das zweite Ende des Spannungseinstellmittels ein zweites oberes Ende und ein zweites unteres Ende aufweist; und worin das Einstellmittel aufweist:

eine erste Befestigungsschraube zum Befestigen des ersten unteren Endes an dem Tragrahmen;
eine erste Einstellschraube, die mit dem ersten unteren Ende in Eingriff steht und auf dem Tragrahmen sitzt zum Einstellen eines Abstandes zwischen dem ersten unteren Ende und dem Tragrahmen durch die Drehung der ersten Einstellschraube, so dass eine Höhe des ersten oberen Endes einstellbar ist; und
eine zweite Befestigungsschraube zum Befestigen des zweiten unteren Endes an dem Tragrahmen.

24. Farbbandvorschieber nach Anspruch 23, bei dem das Einstellmittel weiter eine zweite Einstellschraube aufweist, die in Eingriff mit dem zweiten unteren Ende steht und auf dem Tragrahmen sitzt zum Einstellen eines Abstandes zwischen dem zweiten unteren Ende und dem Tragrahmen durch die Drehung der zweiten Einstellschraube, so dass eine Höhe des zweiten oberen Endes einstellbar ist.

Revendications

1. Dispositif d'avance de ruban encreur (10) comprenant :

une section de support de rouleau débiteur destinée à supporter avec possibilité de rotation un rouleau débiteur (2) sur lequel un ruban encreur (1) est enroulé,
une section de support de rouleau récepteur destinée à supporter avec possibilité de rotation un rouleau récepteur (3) destiné à recevoir le ruban,
une première section d'entraînement (5) montée sur une première extrémité du rouleau récepteur, et tournant le rouleau récepteur afin de recevoir le rouleau encreur dans une direction de réception de ruban depuis le rouleau débiteur vers le rouleau récepteur,
une seconde section d'entraînement (4) destinée à appliquer une force de rotation au rouleau débiteur dans une direction opposée au rouleau récepteur afin d'appliquer une tension au ruban encreur, la seconde section d'entraînement étant disposée sur une première extrémité du rouleau débiteur, la seconde section d'entraînement et la première section d'entraînement se trouvant du même côté du ruban encreur dans la direction de réception de ruban, la première section d'entraînement et la seconde section d'entraînement fonctionnant simultanément pour entraîner leurs rouleaux respectifs durant l'avance du ruban encreur, où une longueur d'un trajet d'avance d'un premier bord latéral du ruban encreur est plus courte qu'une longueur d'un trajet d'avance d'un second bord latéral du ruban encreur,
une unité d'enregistrement (9) qui vient en contact avec le ruban encreur depuis le dessous, entre le rouleau débiteur et le rouleau récepteur, l'unité d'enregistrement comportant des première et seconde extrémités, et
une structure de support fixe (6B, 6A) destinée à supporter l'unité d'enregistrement, la structure de support fixe comportant une première section de support destinée à supporter la première extrémité de l'unité d'enregistrement et sur laquelle la première section d'entraînement et la seconde section d'entraînement sont disposées, et une seconde section de support destinées à supporter, à une position plus élevée que la première extrémité de l'unité d'enregistrement, la seconde extrémité de l'unité d'enregistrement sur un côté opposé du ruban encreur dans la direction de réception du ruban

par rapport à la première section de support.

2. Dispositif d'avance de ruban encreur selon la revendication 1, dans lequel la section de support de rouleau récepteur et la section de support de rouleau débiteur sont montées en une seule pièce sur la structure de support.

3. Dispositif d'avance de ruban encreur selon la revendication 1 ou 2, dans lequel la première section de support est un élément semblable à une plaque verticale supportant la première extrémité de l'unité d'enregistrement à un premier niveau, et la seconde section de support est un élément semblable à une plaque verticale supportant la seconde extrémité de l'unité d'enregistrement à un second niveau qui est plus élevé que le premier niveau.

4. Dispositif d'avance de ruban encreur selon la revendication 1 ou 2, dans lequel la première section de support est un premier élément semblable à une plaque comportant un trou pour vis destiné à fixer par une vis la première extrémité de l'unité d'enregistrement à un premier niveau, et la seconde section de support comprend un élément semblable à une plaque comportant un trou pour vis et un élément d'espacement disposé entre le second élément semblable à une plaque et la seconde extrémité de l'unité d'enregistrement, en vue de fixer par une vis la seconde extrémité de l'unité d'enregistrement à un second niveau.

5. Dispositif d'avance de ruban encreur selon la revendication 1, dans lequel la section de support de rouleau débiteur comporte une première section de support destinée à supporter la première extrémité du rouleau débiteur du côté de la seconde section d'entraînement, et une seconde section de support destinée à supporter la seconde extrémité du rouleau débiteur, la section de support de rouleau récepteur comporte une troisième section de support destinée à supporter la première extrémité du rouleau récepteur du côté de la première section d'entraînement, et une quatrième section de support destinée à supporter la seconde extrémité du rouleau récepteur, et la distance entre la seconde section de support et la quatrième section de support est plus longue que la distance entre la première section de support et la troisième section de support.

6. Dispositif d'impression comportant un dispositif d'avance de ruban encreur, comprenant :

une première structure de support fixe (6B),
une seconde structure de support fixe (6A),
un rouleau débiteur (2) comportant une première extrémité et une seconde extrémité, sur lequel un ruban encreur est enroulé, le rouleau débiteur étant supporté avec possibilité de rotation au niveau de la première extrémité par la première structure de support (6B) et au niveau de la seconde extrémité par la seconde structure de support (6A),
un rouleau récepteur (3) comportant une première extrémité et une seconde extrémité, destiné à recevoir le ruban encreur, le rouleau récepteur étant supporté avec possibilité de rotation au niveau de la première extrémité par la première structure de support (6B) et au niveau de la seconde extrémité par la seconde structure de support (6B),
un premier mécanisme d'entraînement (4) destiné à entraîner le rouleau débiteur,
un second mécanisme d'entraînement (5) destiné à entraîner le rouleau récepteur, où le premier mécanisme d'entraînement et le second mécanisme d'entraînement se lient respectivement à la première extrémité du rouleau débiteur et à la première extrémité du rouleau récepteur, le rouleau récepteur (3) et le rouleau débiteur (2) étant disposés pour fournir une distance de trajet d'avance le long d'un premier bord latéral du ruban encreur entre le support pouvant être entraîné en rotation de la première extrémité du rouleau débiteur et le support pouvant être entraîné en rotation de la première extrémité du rouleau récepteur qui est plus courte qu'une distance de trajet d'avance le long d'un second bord latéral du ruban encreur entre le support pouvant être entraîné en rotation de la seconde extrémité du rouleau débiteur et le support pouvant être entraîné en rotation de la seconde extrémité du rouleau récepteur,
une unité d'enregistrement (9) qui vient en contact avec le ruban encreur depuis le dessous, entre le rouleau débiteur (2) et le rouleau récepteur (3), l'unité d'enregistrement (9) comportant des première et seconde extrémités, la première structure de support supportant la première extrémité de l'unité d'enregistrement, et la seconde structure de support supportant, au niveau d'une position plus élevée que la première extrémité de l'unité d'enregistrement, la seconde extrémité de l'unité d'enregistrement sur un côté opposé du ruban encreur dans la direction de réception de ruban par rapport à la première structure de support, le premier mécanisme d'entraînement (4) et le second mécanisme d'entraînement (5) étant disposés du même côté que la première structure de support.

7. Dispositif d'impression selon la revendication 6, dans lequel ledit premier mécanisme d'entraînement comprend un élément d'engrenage monté

sur la première extrémité du rouleau débiteur et un élément d'engrenage d'entraînement venant en prise avec l'élément d'engrenage.

8. Dispositif d'impression selon la revendication 6 ou 7,

dans lequel le second mécanisme d'entraînement comprend un élément d'engrenage monté sur la première extrémité du rouleau récepteur et un élément d'engrenage d'entraînement venant en prise avec l'élément d'engrenage.

9. Dispositif d'impression selon la revendication 6, 7 ou 8,

dans lequel une première distance entre le support de la première extrémité du rouleau débiteur et la première extrémité du rouleau récepteur dans la première structure de support est égale à une seconde distance entre le support de la seconde extrémité du rouleau débiteur et la seconde extrémité du rouleau récepteur dans la seconde structure de support.

10. Dispositif d'impression selon la revendication 9,

comprenant en outre une unité d'enregistrement comportant une première extrémité et une seconde extrémité montée au niveau de la première extrémité sur la première structure de support et au niveau de la seconde extrémité sur la seconde structure de support, où le ruban encreur est avancé depuis le rouleau débiteur, au-delà de l'unité d'enregistrement et est reçu sur le rouleau récepteur.

11. Dispositif d'impression selon la revendication 10,

dans lequel la seconde extrémité de l'unité d'enregistrement est à une hauteur supérieure à la première extrémité de l'unité d'enregistrement afin de créer le trajet d'avance plus court pour le premier bord latéral du ruban encreur.

12. Dispositif d'impression selon la revendication 11,

dans lequel une hauteur accrue de la seconde structure de support au moins au niveau d'un point de montage de la seconde extrémité de l'unité d'enregistrement par rapport à la première structure de support fournit une hauteur plus importante.

13. Dispositif d'impression selon la revendication 11,

dans lequel un élément d'espacement entre un point de montage de la seconde extrémité de l'unité d'enregistrement et la seconde structure de support fournit la hauteur plus importante qu'au niveau d'un point de montage de la première extrémité de l'unité d'enregistrement par rapport à la première structure de support.

14. Dispositif d'impression selon la revendication 6,

dans lequel une première distance entre le support de la première extrémité du rouleau débiteur et la première extrémité du rouleau récepteur dans la première structure de support est inférieure à une seconde distance entre le support de la seconde extrémité du rouleau débiteur et la seconde extrémité du rouleau récepteur dans la seconde structure de support afin de créer la distance de trajet d'avance raccourcie pour le premier bord latéral du ruban encreur.

15. Dispositif d'impression selon les revendications 6 à 14,

dans lequel le premier mécanisme d'entraînement entraîne le rouleau débiteur dans une direction pouvant s'opposer à l'avance du ruban encreur et le second mécanisme d'entraînement entraîne le rouleau récepteur dans une direction d'avance.

16. Dispositif d'impression selon l'une quelconque des revendications 6 à 15,

dans lequel le premier mécanisme d'entraînement et le second mécanisme d'entraînement fonctionnent simultanément durant l'avance du ruban encreur.

17. Dispositif d'avance de ruban encreur destiné à faire avancer un ruban encreur dans une direction d'avance du ruban encreur comprenant :

un rouleau débiteur (2) enroulant sur celui-ci le ruban encreur, le ruban encreur comportant un premier bord et un second bord s'étendant dans la direction d'avance du ruban et déterminant une largeur du ruban encreur entre ceux-ci et,
une section de support de rouleau débiteur destinée à supporter avec possibilité de rotation le rouleau débiteur,
un rouleau récepteur (3) positionné en aval sur le rouleau débiteur dans la direction d'avance du ruban encreur, destiné à recevoir le ruban encreur avancé depuis le rouleau débiteur,
une section de support de rouleau récepteur destinée à supporter avec possibilité de rotation le rouleau récepteur,
une première section d'entraînement (5) reliée avec entraînement au rouleau récepteur en vue d'entraîner en rotation le rouleau récepteur dans une direction de réception de ruban,
une seconde section d'entraînement (4) reliée avec entraînement au rouleau débiteur (2) en vue d'entraîner en rotation le rouleau débiteur dans une direction opposée à la direction de réception de ruban,
une unité d'enregistrement (9) disposée entre le rouleau débiteur (2) et le rouleau récepteur (3) et positionnée entre le ruban encreur et en

contact avec celui-ci en vue de former une image encrée sur un support d'enregistrement tout en pressant le ruban encreur vers le support d'enregistrement,

un élément d'ajustement de tension (70) disposé entre le rouleau débiteur (2) et le rouleau récepteur (3) et comportant une partie supérieure munie d'une surface de glissement allongée s'étendant dans une direction perpendiculaire à la direction d'avance du ruban encreur, l'élément d'ajustement de tension comportant une première extrémité à un côté du premier bord et une seconde extrémité à un côté du second bord, et la surface de glissement étant en contact glissant avec une surface inférieure du ruban encreur en vue de lui appliquer une tension,

un moyen d'ajustement (90) ajustant une hauteur d'au moins l'une de la première extrémité et de la seconde extrémité de l'élément d'ajustement de tension par rapport à l'unité d'enregistrement en vue d'équilibrer la répartition de la tension du ruban encreur dans la largeur du ruban encreur, et

une structure de support fixe (6A, 6B) supportant l'unité d'enregistrement, la section de support de rouleau récepteur, la section de support de rouleau débiteur et l'élément d'ajustement de tension, le moyen d'ajustement étant disposé au niveau de la structure de support, où l'élément d'ajustement de tension est positionné en aval de l'unité d'enregistrement dans la direction d'avance du ruban encreur pour servir également d'élément de séparation en vue de séparer le ruban encreur du support d'enregistrement qui a été imprimé par une combinaison du ruban encreur et de l'unité d'enregistrement.

18. Dispositif d'avance de ruban encreur selon la revendication 17, dans lequel la structure de support comporte une nervure faisant saillie vers le haut à une position entre l'unité d'enregistrement et le rouleau débiteur, et la nervure faisant saillie vers le haut comportant une surface d'extrémité supérieure en contact avec le ruban encreur.

19. Dispositif d'avance de ruban encreur selon la revendication 17 ou 18, dans lequel la première extrémité du moyen d'ajustement de tension comporte une première extrémité supérieure et une première extrémité inférieure, et la seconde extrémité du moyen d'ajustement de tension présente une seconde extrémité supérieure et une seconde extrémité inférieure,

et dans lequel le moyen d'ajustement comprend :

un élément d'espacement disposé entre la première extrémité inférieure et la structure de support en vue d'augmenter la hauteur de la première extrémité supérieure afin de modifier la hauteur entre les première et seconde extrémités supérieures,

une première vis mise en prise avec la première extrémité inférieure et avec la structure de support interposant l'élément d'espacement entre celles-ci , et

une seconde vis mise en prise avec la seconde extrémité inférieure et avec la structure de support.

20. Dispositif d'avance de ruban encreur selon la revendication 19, dans lequel le moyen d'ajustement comprend en outre un second élément d'espacement disposé entre la seconde extrémité inférieure et la structure de support, le second élément d'espacement présentant une largeur différente de la largeur du premier élément d'espacement, la seconde vis étant mise en prise avec la seconde extrémité inférieure et avec la structure de support interposant entre celles-ci le second élément d'espacement.

21. Dispositif d'avance de ruban encreur selon l'une quelconque des revendications 17 à 20, dans lequel la structure de support comporte une nervure s'étendant vers le haut munie d'une fente s'étendant verticalement,

et dans lequel le moyen d'ajustement comprend :

une première vis s'étendant à travers la fente s'étendant verticalement et mise en prise avec la première extrémité de l'élément d'ajustement de tension en vue de fixer la première extrémité de l'élément d'ajustement de tension à la nervure s'étendant vers le haut, une position de fixation de la première vis par rapport à la fente déterminant la hauteur de la première extrémité de l'élément d'ajustement de tension, et

une seconde vis mise en prise avec la nervure et l'autre extrémité de l'élément d'ajustement de tension.

22. Dispositif d'avance de ruban encreur selon la revendication 21,

dans lequel la nervure est munie d'une seconde fente s'étendant verticalement, la seconde vis s'étendant à travers la seconde fente s'étendant verticalement et mise en prise avec l'autre extrémité de l'élément d'ajustement de tension en vue de fixer l'autre extrémité de l'élément d'ajustement de tension à la nervure s'étendant vers le haut, une position de fixation de la seconde vis par rapport à la seconde fente déterminant une hauteur de l'autre extrémité de l'élément d'ajustement de tension.

23. Dispositif d'avance de ruban encreur selon l'une quelconque des revendications 17 à 22,

dans lequel la première extrémité du moyen d'ajustement de tension comporte une première extrémité supérieure et une première extrémité inférieure, et la seconde extrémité du moyen d'ajustement de tension comporte une seconde extrémité supérieure et une seconde extrémité inférieure,

et dans lequel le moyen d'ajustement comprend :

une première vis de fixation destinée à fixer la première extrémité inférieure à la structure de support,

une première vis d'ajustement mise en prise avec la première extrémité inférieure et reposant sur la structure de support en vue d'ajuster une distance entre la première extrémité inférieure et la structure de support par la rotation de la première vis d'ajustement, de sorte que la hauteur de la première extrémité supérieure soit ajustable, et

une seconde vis de fixation destinée à fixer la seconde extrémité inférieure à la structure de support.

24. Dispositif d'avance de ruban encreur selon la revendication 23,

dans lequel le moyen d'ajustement comprend en outre une seconde vis d'ajustement mise en prise avec la seconde extrémité inférieure et reposant sur la structure de support en vue d'ajuster une distance entre la seconde extrémité inférieure et la structure de support par la rotation de la seconde vis d'ajustement, de sorte que la hauteur de la seconde extrémité supérieure soit ajustable.

FIG. 1

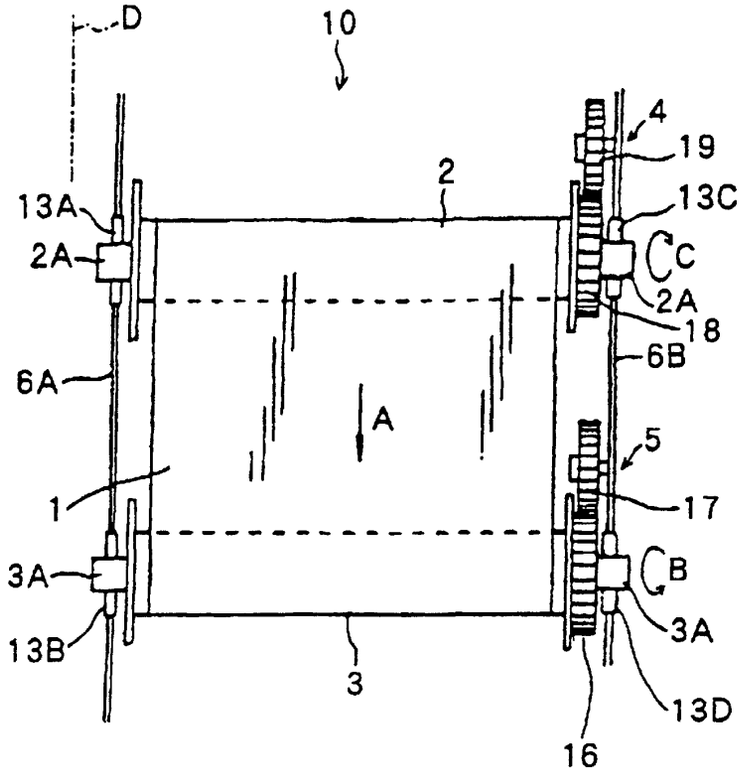

D
10
4
19
2
13A
13C
2A
C
2A
18
6B
6A
A
5
1
17
3A
B
3A
13B
3
13D
16

FIG. 2

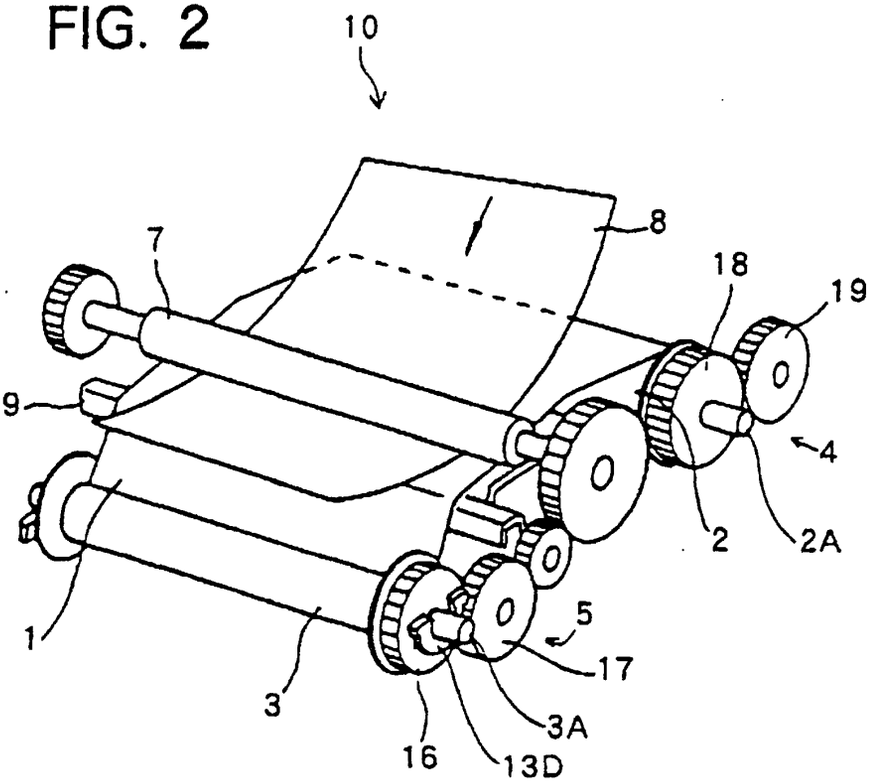

10
8
7
18
19
9
4
2
2A
5
1
17
3
3A
16
13D

FIG. 3

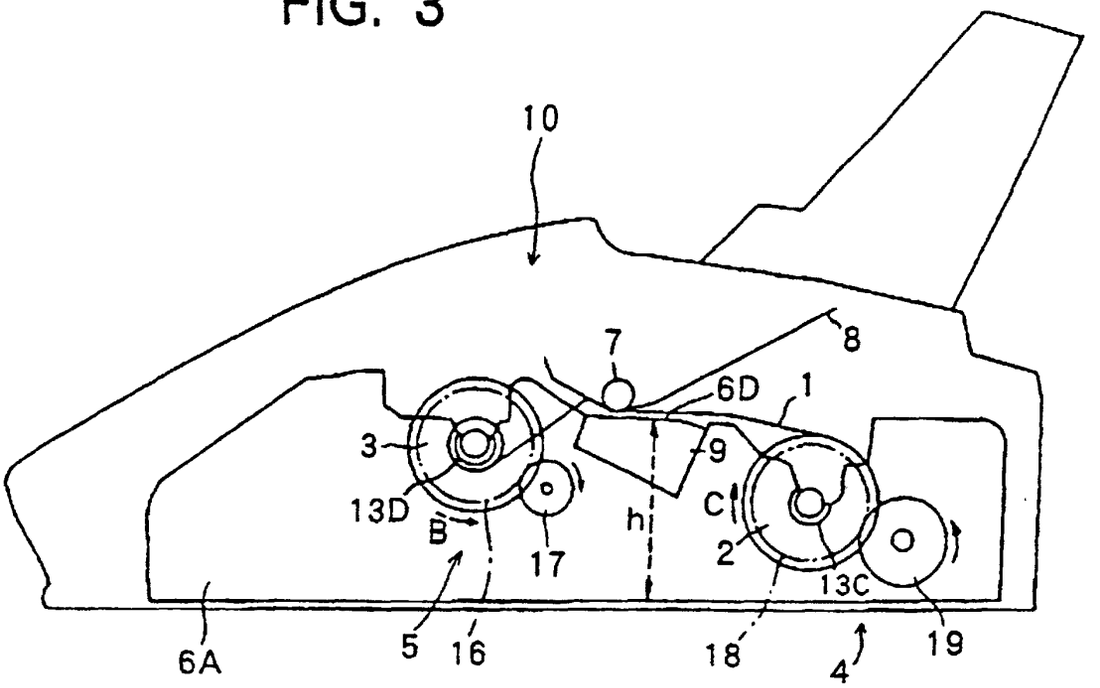

10
7
8
6D
1
3
9
13D
B
17
h
C
2
13C
6A
5
16
18
4
19

FIG. 4

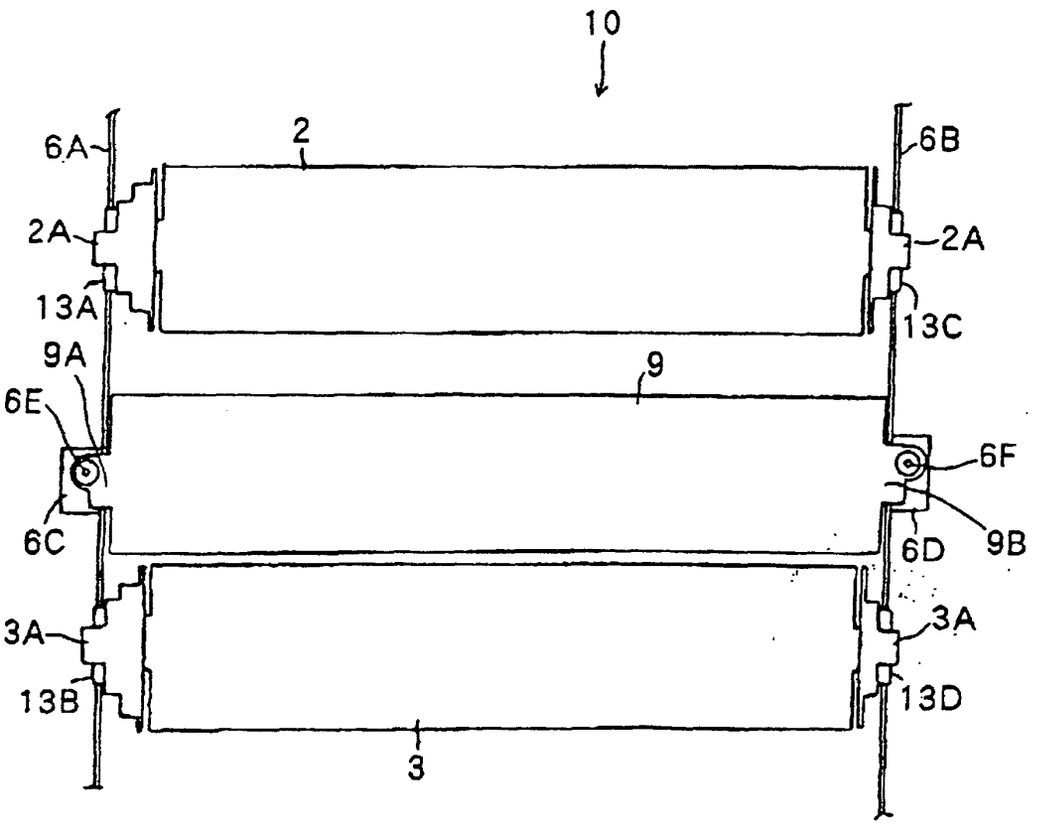

10
6A
2
6B
2A
2A
13A
13C
9A
9
6E
6F
6C
6D
9B
3A
3A
13B
13D
3

FIG. 5

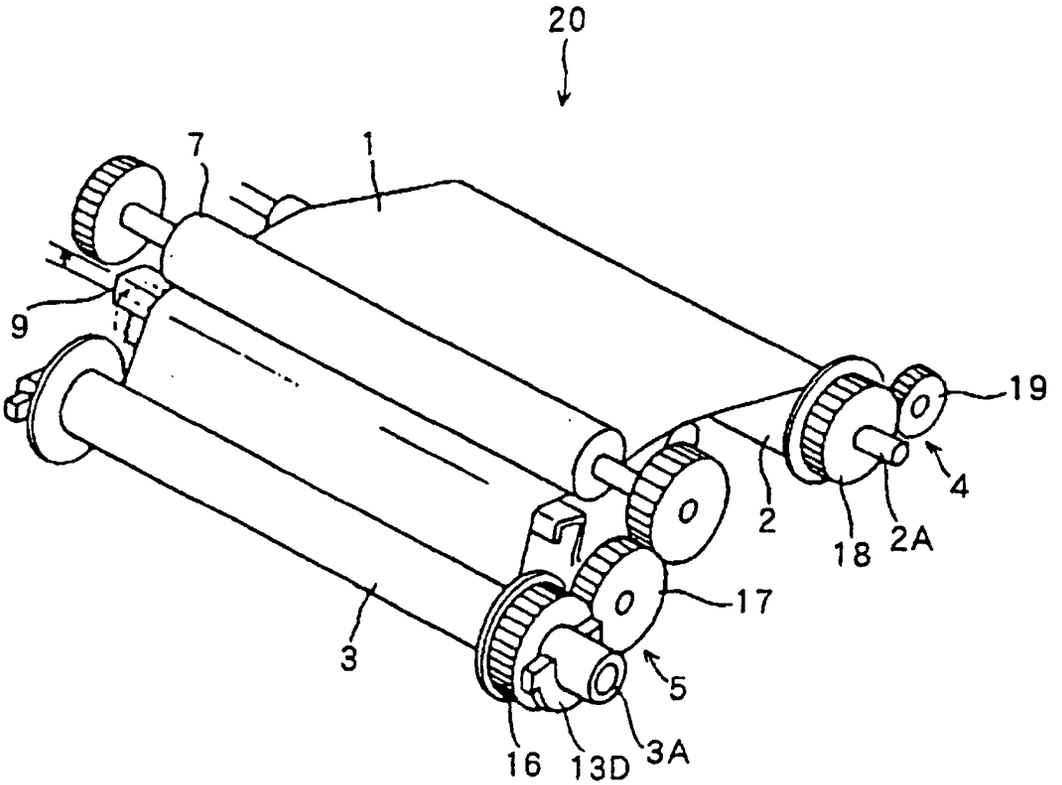


FIG. 6

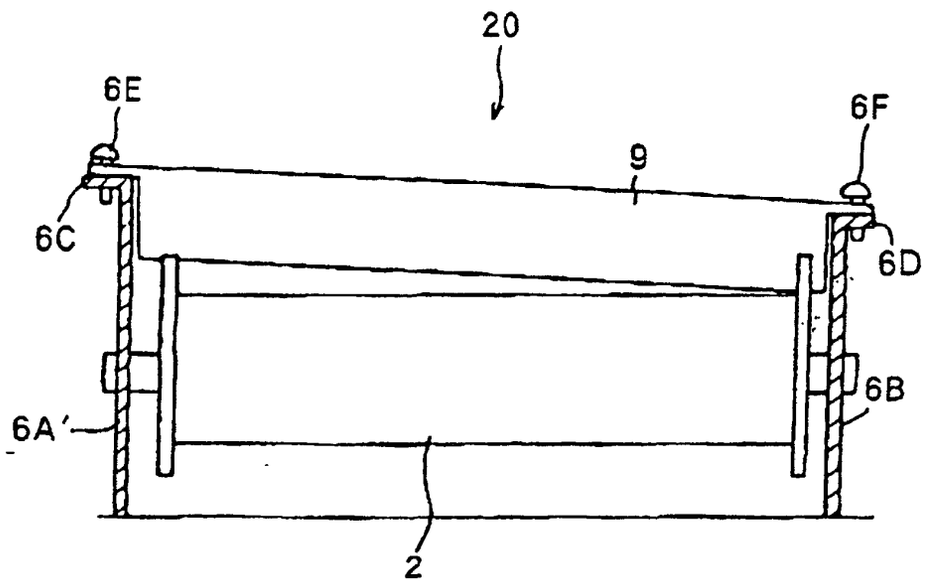


FIG. 7

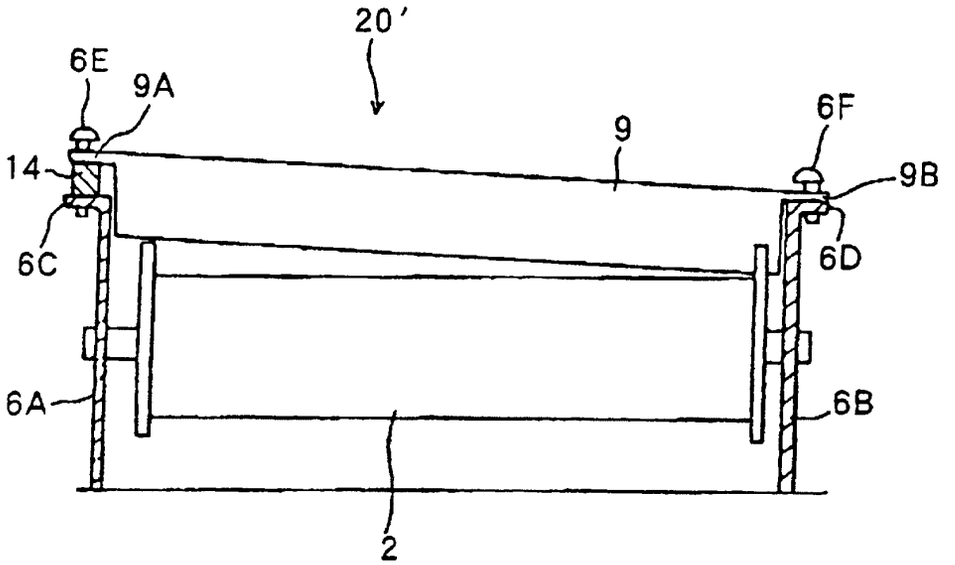

20'
6E
9A
9
6F
14
9B
6C
6D
6A
6B
2

FIG. 8

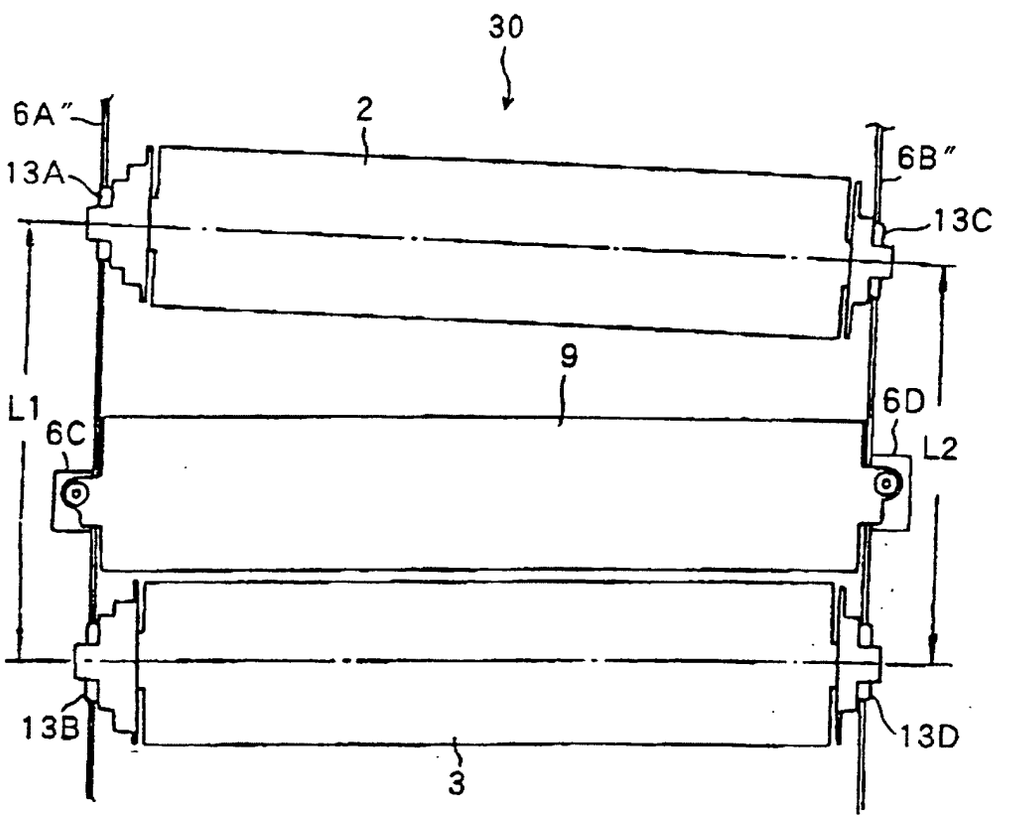

30
6A"
2
6B"
13A
13C
9
L1
6C
6D
L2
13B
13D
3

FIG. 9

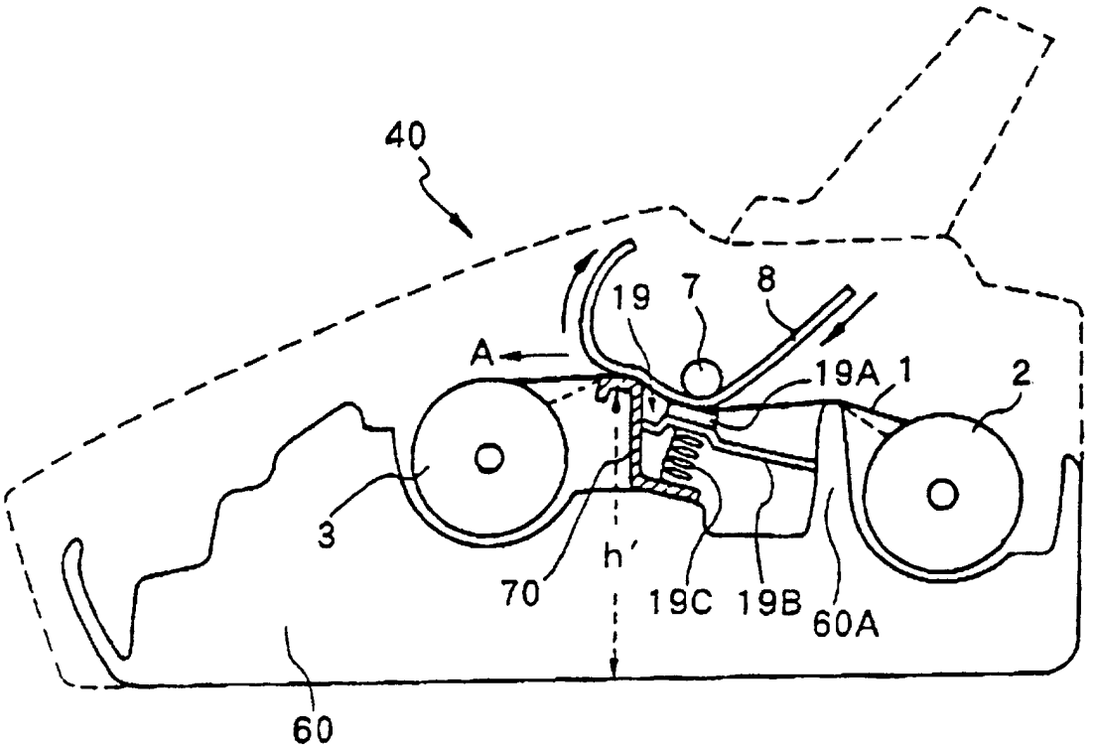

40
19
7
8
A
19A
1
2
3
h'
70
19C
19B
60A
60

FIG. 10

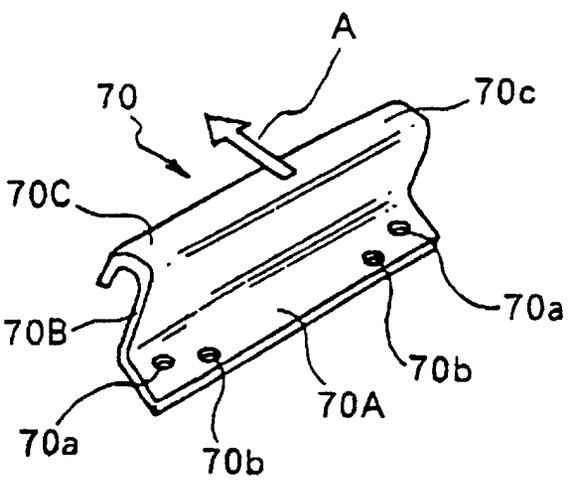

A
70
70c
70C
70a
70B
70b
70A
70a
70b

FIG. 11

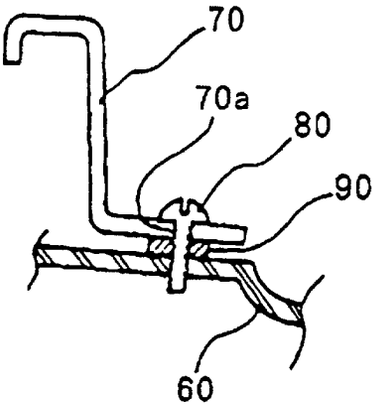


FIG. 12

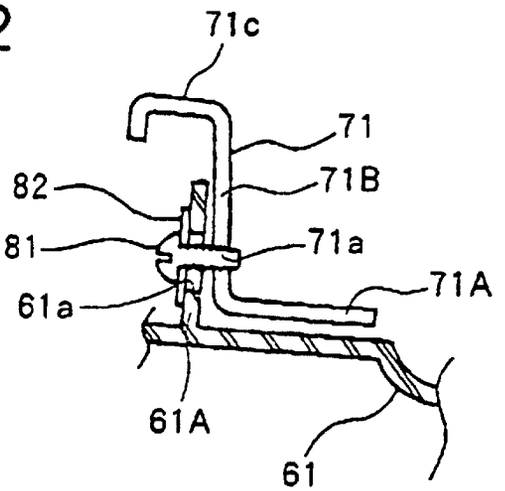


FIG. 13

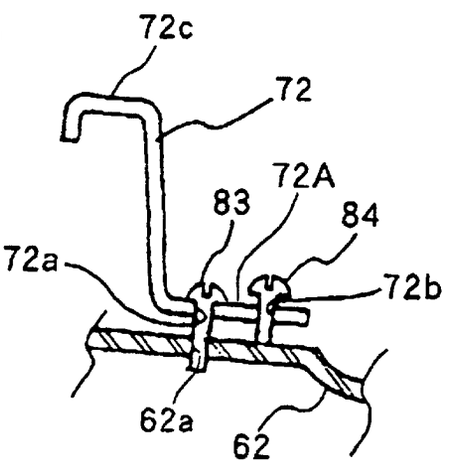
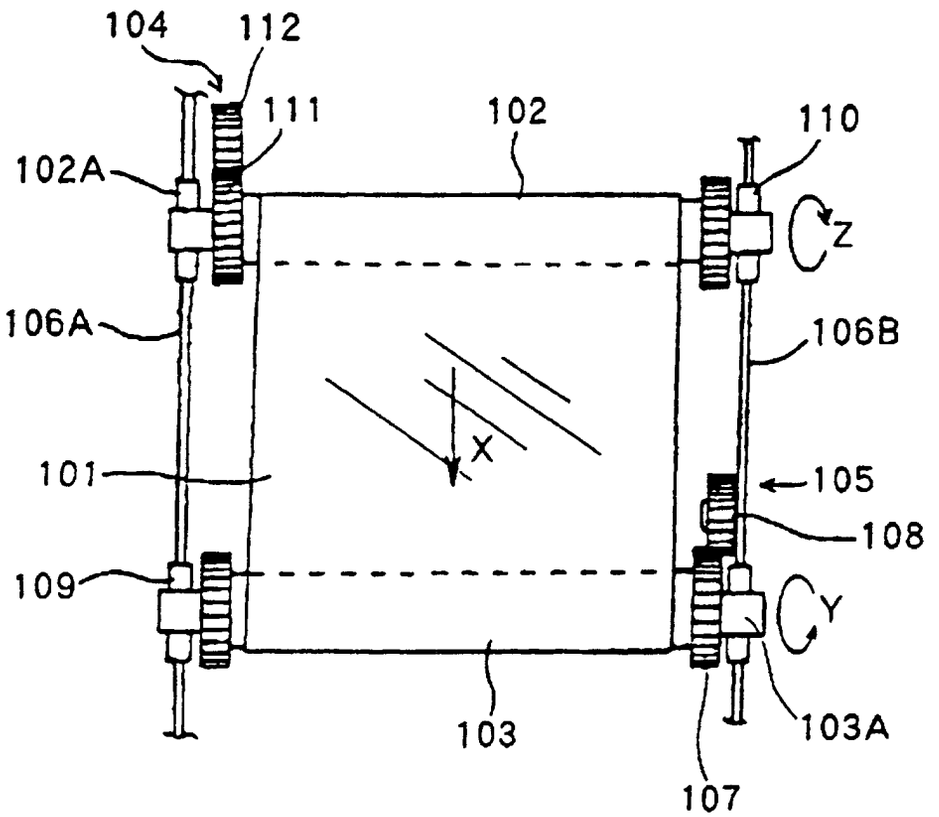


FIG. 14


104
112
111
102
110
102A
Z
106A
106B
X
101
105
108
109
Y
103
103A
107