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(54) Process cartridge and image forming apparatus

Prozesskartusche und Bilderzeugungsvorrichtung

Cartouche de traitement et appareil de formation d'images

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a process cartridge and an image forming apparatus using the process cartridge.

2. Description of the Related Art

[0002] In an image forming apparatus such as a copying machine, a printer, a facsimile, and a multifunction product (MFP), a full-color image formation is widely spread. In particular, a tandem-type image forming apparatus having a plurality of image carriers with a high-speed processing is becoming the mainstream of the image forming field. In addition, an apparatus employing a process cartridge including an image carrier and at least one of a charging unit, a developing unit, and a cleaning unit is also known.

[0003] The process cartridge is mounted on the main body of the image forming apparatus in a detachable manner, and can be taken out of the apparatus for its replacing work or maintenance work to avoid a work in a narrow space in the apparatus.

[0004] On the other hand, in a process cartridge including an image carrier and at least a cleaning unit, toners removed by the cleaning unit are conveyed out of the cartridge. In such a process cartridge, it is necessary to arrange a conveying coil spring, a conveying coil, or a conveying screw as a conveying unit for conveying toners in the longitudinal direction of the cleaning member. In this case, because the conveying unit is to be rotated, a gear is provided which engages with a gear of the image carrier.

[0005] In a conventional process cartridge configured as described above, as shown in Fig. 6, a photosensitive drum 101 has a rotating shaft laterally supported between the side walls of the casing of the process cartridge and both axial ends are supported at the side walls of the casing.

[0006] Meanwhile, as the cleaning unit, a cleaning blade (not shown) is fixed to the casing of the process cartridge with screws, the toners removed from the photosensitive drum 101 at the upstream side in the rotating direction of the photosensitive drum 101 are conveyed out by a conveying coil 102 in the longitudinal direction of the cleaning member and contained in a waste toner tank (not shown). The conveying coil 102 is inserted and held by a shaft 103 and rotatably supported at the casing through a sliding bearing 104, a gear 105 applying a driving force is fixed to the shaft 103 and rotatably held at the casing with an E-shaped fitting ring 106.

[0007] However, the conventional process cartridge requires a number of parts, causing a problem of its cost with a bulky size.

[0008] US 2001/026707A1, EP-A-0827049, JP 2004 117696 and JP 2007 133045 all disclose process cartridges. JP2004117696 discloses a process cartridge with a bearing member with a first and second bearing part to support the photoreceptor drum and a residual developer carrying means, respectively.

SUMMARY OF THE INVENTION

[0009] It is an object of the present invention to at least partially solve the problems in the conventional technology.

[0010] According to one aspect of the present invention, there is provided a process cartridge as set out in Claim 1.

[0011] Preferred features of this aspect of the invention are set out in Claims 2 to 9.

[0012] A second aspect of the invention provides an image-forming apparatus as set out in Claim 10.

[0013] The above and other objects, features, advantages and technical and industrial significance of the present invention will be better understood by reading the following detailed description of presently preferred embodiments of the invention, when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

Fig. 1 is a schematic diagram of a color printer as an image forming apparatus according to the present invention;

Fig. 2 is a schematic diagram of a process cartridge in the color printer shown in Fig. 1;

Fig. 3 is a partial exploded perspective view of a process cartridge not according to an embodiment of the present invention;

Fig. 4 is a partial exploded perspective view of a process cartridge according to an embodiment of the

with a driving force from outside; a side wall for supporting the image carrier such that the image carrier can be rotated; an outer cover member having a surface parallel to the side wall; and a holder for supporting the rotary supporting member. The side wall includes a through hole. The holder includes a holding unit that passes through the through hole and is held at the outer cover member in a rotatable manner.

[0015] The above and other objects, features, advantages and technical and industrial significance of the present invention will be better understood by reading the following detailed description of presently preferred embodiments of the invention, when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

Fig. 1 is a schematic diagram of a color printer as an image forming apparatus according to the present invention;

Fig. 2 is a schematic diagram of a process cartridge in the color printer shown in Fig. 1;

Fig. 3 is a partial exploded perspective view of a process cartridge according to a first embodiment of the present invention;

Fig. 4 is a partial exploded perspective view of a process cartridge according to a second embodiment of the present invention;

Fig. 5 is a partial exploded perspective view of the process cartridge shown in Fig. 4 from which a photosensitive drum is removed; and

Fig. 6 is a partial exploded perspective view of a conventional process cartridge.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] Exemplary embodiments of the present invention will be explained in detail below with reference to the accompanying drawings.

[0018] Fig. 1 is a schematic diagram of an example of an image forming apparatus 1 that forms a full-color image employing a process cartridge according to the present invention. The image forming apparatus 1 includes image forming units 2Y, 2C, 2M, and 2K corresponding to four different colors, an intermediate transfer belt 10 arranged in opposition to the image forming units 2Y, 2C, 2M, and 2K, and a sheet feeding unit 20 for feeding a recording sheet.

[0019] The image forming units 2Y, 2C, 2M, and 2K are used for developing yellow, cyan, magenta, and black, respectively. The configuration of the image forming unit 2K will be described as a representing one of the image forming units 2Y, 2C, 2M, and 2K because they have virtually the same configuration.

[0020] Fig. 2 is a schematic diagram of a process cartridge 50k of the image forming apparatus 1. As shown in Figs .1 and 2, the image forming unit 2K includes a photosensitive drum 3K as an image carrier, a charging unit 4K, a developing unit 5K, and a cleaning unit 7K arranged in sequence along a rotating direction of the photosensitive drum 3K. An electrostatic latent image is formed according to image information by a writing light L from a writing unit 8 between the charging unit 4K and the developing unit 5K. As the image carrier, a belt-like carrier may also be used instead of the drum-like carrier. In the case of the present embodiment, the image forming unit 2K is made such that the photosensitive drum 3K, the charging unit 4K, the developing unit 5K, and the cleaning unit 7K arranged around the photosensitive drum 3K are constituted as a process cartridge 50K stored in a single cartridge.

[0021] In the image forming apparatus configured as described above, the photosensitive drum 3K is rotationally driven by a main motor (not shown), and when it is uniformly charged by the charging unit 4K, a writing process is executed.

[0022] A target image is written according to digital image data from a control unit (not shown) to form an electrostatic latent image under application of the writing unit 8. The electrostatic latent image formed on the photosensitive drum 3K is developed by the developing unit 5K. For example, with an application of a DC voltage with an AC bias to a developing sleeve, toners adhere only to image portions of low electric potentials through an irradiation of the writing light, and toners are developed to form a toner image.

[0023] The toner image of each of the colors is electrostatically transferred from the photosensitive drum 3k to the intermediate transfer belt 10 with an application of a bias having a polarity opposite to that of the toners to a primary transfer device constituted as a primary transfer roller 6k oppositely arranged against the photosensitive drums 3k. Then, the toner images of four colors are transferred onto the intermediate transfer belt 10 in a superimposed manner, and collectively transferred onto a recording sheet fed from the sheet feeding unit 20 by a secondary transfer roller 11.

[0024] The sheet feeding unit 20 includes a sheet feeding cassette 21. The recording sheet fed from the sheet feeding cassette 21 is conveyed to a secondary transferring device by a pair of registration rollers 22 at an appropriate timing at which the toner images are transferred onto the intermediate transfer belt 10. The recording sheet passed through the transferring process is separated from a roller 12 and further conveyed toward a fixing unit 13. At the fixing unit 13, the toner images are fixed on the recording sheet when the recording sheet passes through a fixing nip constituted by rollers, and then the recording sheet is discharged to a sheet discharging tray 15 through sheet discharging rollers 14.

[0025] The sheet discharging rollers 14 are used as switch-back conveying members when a duplex image formation is performed. That is, the image forming apparatus 1 is constructed to perform not only a single-sided image formation but also a duplex image formation. Therefore, in the case of the duplex image formation, the recording sheet after fixing the image formed thereon is once conveyed to the sheet discharging tray 15 by the sheet discharging rollers 14, and then the sheet discharging rollers 14 are rotated in the reverse direction with the trailing edge of the recording sheet being held between the rollers. With this arrangement, the recording sheet is conveyed from the sheet discharging tray 15 to a reverse feeding path and fed toward the registration rollers 22 positioned at a merging part between the reverse feeding path and a feeding path from the sheet feeding cassette 21. A changing-over of the conveying paths for the recording sheet at the time of forming images at the single

and the both sides is carried out by a conveying path changing-over claw arranged at the rear side of the fixing unit 13.

[0026] Fig. 3 is a partial exploded perspective view of a process cartridge 50 not according to an embodiment of the present invention. As shown in Fig. 3, a cleaning unit 7 arranged inside the process cartridge 50 includes a cleaning blade 70 and a conveying coil spring 71 for conveying toners removed from a photosensitive drum 3 by the cleaning blade 70 outside the process cartridge 50. The cleaning blade 70 is fixed with a screw 73 to a side wall 72.

[0027] On one end of the conveying coil spring 71, a rotary supporting member 74 is provided. The rotary supporting member 74 includes a connecting part 75 formed into a split pin shape that is inserted and connected to be contacted with the inner peripheral part of the conveying coil spring 71, a shaft part 76 subsequent to the connecting part 75 so as to hold a cylindrical seal member (not shown), a driving shaft 78 inserted into a shaft hole 77 formed at the side wall 72 of the cleaning unit 7 and rotatably supporting a position setting hole 80, and a gear 79 for transmitting a driving action of the conveying coil spring 71 arranged at the driving shaft 78. Further, the gear 79 directly receives a rotary driving force from a gear 31 of the photosensitive drum 3.

[0028] The process cartridge 50 further includes an outer cover member 51, and the outer cover member 51 is provided with a pin 52 for use in position setting and supporting the rotary supporting member 74. The pin 52 oppositely faces against the driving shaft 78 at the extremity end of the rotary supporting member 74 and the surface of the driving shaft 78 opposing against the pin 52 is formed with the position setting hole 80 into which the pin 52 is rotatably fitted. The holding unit according to the first embodiment is constituted by the pin 52 and the position setting hole 80, the pin 52 is fitted into the position setting hole 80 at the time of assembling operation, thereby the conveying coil spring 71 can be positively supported and rotated in a high precision. Further, it may also be applicable that the holding unit has a configuration opposite to the aforesaid one, where the outer cover member 51 is provided with the position setting hole 80 and the rotary supporting member 74 is provided with the pin 52 inserted into the position setting hole 80.

[0029] The cleaning unit 7 constituted as described above is operated such that the toners removed from the photosensitive drum 3 by the cleaning blade 70 are temporarily stored in a space where the conveying coil spring 71 is arranged, and the removed toners are transported in a direction in parallel with a longitudinal direction of the cleaning blade 70 under a rotation of the conveying coil spring 71. Then, the toners are transported out of the process cartridge 50 and stored in a waste toner tank not shown. Further, as means for conveying toners, either the conveying coil or a conveying screw may be used in place of the conveying coil spring 71.

[0030] It is preferable that the rotary supporting member 74 is integrally molded through an injection molding process with polyacetal resin for the connecting part 75, the shaft part 76, the driving shaft 78, the gear 79 and the position setting hole 80 and the number of component parts is substantially reduced. Further, in place of polyacetal resin, the rotary supporting member 74 may be made of polyamide resin, fluorine resin, polyimide resin, polyamide-imide resin, polyphenylene sulfide resin, polyethylene resin, polypropylene resin and these alloy resins and the like. Additionally, as a reinforcing member, either single or more of glass, potassium titanate, talc, mica, lewistonite and natural ores may be added and it is a general process to add these reinforcing members by 5% to 50%.

[0031] As the cylindrical seal member supported by the shaft part 76, it is possible to use members made of foamed material, non-woven fabric and woven-fabric and the like.

[0032] The outer cover member 51 has a hole for holding the rotating shaft inserted into the photosensitive drum 3 and a hole for holding the rotating shaft inserted into the developing unit 5 and an inter-shaft distance between the photosensitive drum 3 and the developing unit 5 is restricted by both holding holes. Then, the rotary supporting member 74 supporting the conveying coil spring 71 passes through a through hole 54 formed at a side wall 53 of the process cartridge 50, the pin 52 of the outer cover member 51 is fitted to the position setting hole 80, thereby assembled into the process cartridge 50.

[0033] In addition, in view of productivity, the outer cover member 51 and the side wall 53 of the process cartridge 50 are constituted by resin formed through an injection molding, polycarbonate resin, acrylonitrile-butadienestyrene resin, styrene resin, polyphenylene-ether resin, polyphenylene-oxide resin, polyether-terephthalate resin and these alloy resins and the like can be used, and additionally, either single or more of glass, potassium titanate, talc, mica, lewistonite and natural ores may be added to these resins and it is a general process to add these reinforcing members by 5% to 50%.

[0034] The process cartridge 50 constructed in such a way as above can be assembled only by fitting the pin 52 of the outer cover member 51 into the position setting hole 80 of the rotary supporting member 74 supporting the conveying coil spring 71. Accordingly, as found in the prior art cartridge shown in Fig. 6, comparing the present invention with the prior art assembling method in which the E-shaped fixing rings are applied to hold the cartridge at both sides of a casing shows that it has a less number of component parts and a small-sized formation can be realized and their assembling operation also becomes quite easy. Further, the conveying coil spring 71 is positively supported by the rotary supporting member 74 and a removal of the gear 79 and the like is also prevented.

[0035] Fig. 4 is a partial exploded perspective view of a process cartridge 50 according to an embodiment of the present invention; and Fig. 5 is a partial exploded perspective view of the process cartridge 50 shown in

Fig. 4 from which a photosensitive drum 3 is removed.

[0036] As shown in Figs. 4 and 5, a cleaning unit 7 arranged in the process cartridge 50 includes a cleaning blade 70 acting as a cleaning member and a conveying coil spring 71 for conveying toners removed from the photosensitive drum 3 by the cleaning blade 70 out of the process cartridge 50, the cleaning blade 70 is fixed to a side wall 72 of the cleaning unit 7 with a screw 73.

[0037] On one end of the conveying coil spring 71, a rotary supporting member 74 is provided. The rotary supporting member 74 includes a connecting part 75 formed like a split-pin shape inserted to be contacted with an inner periphery of the conveying coil spring 71 and connected to it, a shaft part 76 subsequent to the connecting part 75 to hold the cylindrical seal member not shown, a driving shaft 78 inserted into a shaft hole 77 formed at the side wall 72 of the cleaning unit 7 and rotatably supporting a position setting hole 80, and a gear 79 for transmitting a driving action of the conveying coil spring 71 arranged at the driving shaft 78.

[0038] The rotary supporting member 74 is made such that the position setting hole 80 is formed at the extremity end of the driving shaft 78 and a pin 82 arranged at a holder 81 is fitted into the position setting hole 80. The holder 81 is arranged between the rotary supporting member 74 and the outer cover member 51 as described later in detail, and the rotary supporting member 74 is rotatably supported at the holder 81 supported by the outer cover member 51. An idler gear 83 for use in transmitting a rotation of the photosensitive drum 3 to the gear 79 is rotatably supported at the holder 81.

[0039] Although the cleaning unit 7 according to the second embodiment is operated such that the conveying coil spring 71 is driven by the photosensitive drum 3, rotation of the photosensitive drum 3 is transmitted through the idler gear 83 to cause its rotating direction to be the same as that of the photosensitive drum 3. Rotating direction of the conveying coil spring 71 is set to be the same direction as that of the photosensitive drum 3 to enable the conveying coil spring 71 to transport the removed toners in an opposite direction to that of the photosensitive drum 3, i.e., while they are being displaced to a side separate from the peripheral surface of the photosensitive drum 3.

[0040] A connecting shaft 84 having its axial center coincided with that of the driving shaft 78 is formed at the holder 81 and the extremity end of the connecting shaft 84, i.e., an end part oppositely facing against the outer cover member 51 of the process cartridge 50 is provided with a fitting hole 85. In turn, the outer cover member 51 is provided with the pin 52, the pin 52 oppositely faces against the connecting shaft 84 at the extremity end of the holder 81 and the pin 52 is fitted into the fitting hole 85 formed at the connecting shaft 84.

[0041] In this way, the process cartridge 50 according to the second embodiment is made such that the rotary supporting member 74 for supporting the conveying coil spring 71 is held indirectly through the holder 81 to hold the conveying coil spring 71 positively and at the same time to enable the conveying coil spring to be rotated in a high precise manner.

[0042] The cleaning unit 7 constituted in this way is operated such that the toners removed from the photosensitive drum 3 by the cleaning blade 70 are temporarily stored in a space having the conveying coil spring 71 arranged therein, and rotation of the conveying coil spring 71 causes the removed toners to be transported in a direction parallel with a longitudinal direction of the cleaning blade 70. At this time, since the rotating direction of the conveying coil spring 71 is the same as that of the photosensitive drum 3, the conveying coil spring 71 transports the removed toners while they are being displaced to a side spaced apart from the peripheral surface of the photosensitive drum 3. Then, the removed toners are transported out of the process cartridge 50 and stored in a waste toner tank not shown.

[0043] The rotary supporting member 74 and the holder 81 are preferably molded integrally through an injection molding process using polyacetal resin, thereby the number of component parts is substantially reduced. Further, in place of polyacetal resin, the rotary supporting member 74 and the holder 81 may be made of polyamide resin, fluorine resin, polyimide resin, polyamide-imide resin, polyphenyl-sulfide resin, polyethylene resin, polyprene resin and these alloy resins and the like. In addition, as a reinforcing member, either single or more of glass, potassium titanate, talc, mica, lewistonite and natural ores may be added and it is a general process to add these reinforcing members by 5% to 50%.

[0044] In Figs. 4 and 5, reference numeral 53 denotes a side wall of the process cartridge 50 and reference numeral 54 denotes a through hole formed at the side wall 53, and the outer cover member 51 and the side wall 53 in the preferred embodiment are also made of the same materials as those of the aforesaid preferred embodiment.

[0045] The process cartridge 50 constituted in this way also has an advantage that the number of component parts is less as compared with that of the assembling process for holding both sides of the casing under application of an E-shape fixing ring, further a small-sized formation through concentration of the functions of the component parts may also become possible and its assembling process may also become quite easy.

[0046] According to one aspect of the present invention, the toner conveying member is rotatably supported at the predetermined position and at the same time the toner conveying member has a rotary supporting member rotated upon receiving a driving force from outside and the rotary supporting member is rotatably held at the outer cover member by the holding unit, so that the number of component parts is reduced and further a small-sized formation can be realized by concentrating the functions of the component parts and their assembling work can be carried out quite easily.

[0047] Although the invention has been described with

respect to specific embodiments for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art that fairly fall within the scope of the invention as defined by the appended claims.

Claims

1. A process cartridge (50) configured to be mounted on a main body of an image forming apparatus (1) in a detachable manner,
the process cartridge (50) including a side wall (53) on a lateral side thereof, the side wall (53) including a through hole (54) and the process cartridge further including an outer cover member (51) that encloses the side wall (53), the outer cover member (51) having a surface substantially parallel to the side wall (53),
the process cartridge (50) including an image carrier (3) configured to carry a toner image on a surface thereof;
a cleaning unit (7) adapted to clean the image carrier (3) ;
a cleaning member (70) configured to remove a residual toner from the image carrier (3) remaining after transference of the toner image from the image carrier (3) to a transfer medium; and
a toner conveying unit (71, 74) configured to convey the residual toner removed by the cleaning member (70), wherein:

the toner conveying unit comprises a toner conveying member (71) configured to rotate along a rotation axis in order to convey the residual toner along the rotation axis in a predetermined direction; and
a rotary supporting member (74) configured to receive a rotational driving force through the image carrier (3) so as to be rotatable along the rotation axis, one end of the rotary supporting member (74) being directly coupled to the toner conveying member (71) so as to convey the rotational driving force to the toner conveying member (71), other end of the rotary supporting member (74) being provided with a shaft portion (78), the shaft portion (78) being provided with a first positioning member (80) at a first end thereof integrally formed with the shaft portion (78); and
the outer cover member (51) is provided with a second positioning member (52) held at the outer cover member (51);
the process cartridge (50) further comprising a holder (81) including a holding unit (52, 80) configured to pass through the through hole (54) and held at the outer cover member in a rotatable manner, and the holder (81) being provided with a third positioning member (82) at one end and a fourth positioning member (85) at other end thereof; wherein the first positioning member (80) and the third positioning member (82) engage with each other in a rotatable manner and the second positioning member (52) and the fourth positioning member (85) engage with each other in a rotatable manner;
wherein the rotary supporting member (74) includes a gear (79) for rotationally driving the toner conveying member (71), the gear (79) of the rotary supporting member is drivingly connected to a gear (31) arranged at the image carrier (3) through an idler gear (83) arranged on the holder (81).

2. A process cartridge (50) according to Claim 1, wherein
the first positioning member (80) is a convex part and the second positioning member (52) is a concave part, wherein the convex part and the concave part engage with each other in a rotatable manner.

3. A process cartridge (50) according to claim 1, wherein
the first positioning member (80) is a concave part and the second positioning member (52) is a convex part, wherein the convex part and the concave part engage with each other in a rotatable manner.

4. A process cartridge (50) according to any one of claims 1 to 3, wherein the rotary supporting member (74) includes
the shaft portion (78);
a shaft part (76) attached to a second end of the shaft portion (78);
a connecting part (75) attached to the shaft part (76) and connected to the toner conveying member (71); and
the gear (79) provided around the shaft portion (78) and configured to receive the rotational driving force from the image carrier (3);
one or more of the shaft part (76), the linking part (75), and the gear (79) being integrally formed with the shaft portion (78) with resin by way of injection molding.

5. A process cartridge (50) according to claim 4, wherein
the resin is any one of polyscetal resin, polyamide resin, fluorine resin, polyimide resin, polyamide-imide resin, polyphenylene-sulfide resin, polyethylene resin, polyprene resin, and an alloy resin of above resins.

6. A process cartridge (50) according to any one of claims 1 to 5, wherein the toner conveying member

(71) is a coil-spring type member.

7. A process cartridge (50) according to any one of claims 1 to 6, wherein the cleaning member (70) is a blade type member.

8. A process cartridge (50) according to any one of claims 1 to 7, wherein the image carrier (3) is a drum-shaped member.

9. A process cartridge (50) according to any one of claims 1 to 8, wherein the image carrier (3) is a belt-shaped member.

10. An image forming apparatus comprising a process cartridge (50) according to any one of claims 1 to 9.

Patentansprüche

1. Prozesskartusche (50), konfiguriert zur abnehmbaren Montage an einem Hauptgehäuse einer Bilderzeugungsvorrichtung (1),
wobei die Prozesskartusche (50) an einer lateralen Seite eine Seitenwand (53) enthält, die Seitenwand (53) ein Durchgangsloch (54) enthält, und die Prozesskartusche weiterhin ein Außenabdeckungsbauteil (51) enthält, das die Seitenwand (53) umschließt, wobei das Außenabdeckungsbauteil (51) eine Oberfläche hat, die im Wesentlichen parallel zu der Seitenwand (53) verläuft,
die Prozesskartusche (50) einschließlich eines Bildträgers (3), der konfiguriert ist, um ein Tonerbild auf einer Oberfläche aufzunehmen;
eine zur Reinigung des Bildträgers (3) adaptierte Reinigungseinheit (7);
ein zum Entfernen eines verbleibenden Toners, der nach der Übertragung des Tonerbilds von dem Bildträger (3) auf ein Transfermedium zurückbleibt, von dem Bildträger (3) konfiguriertes Reinigungsbauteil (70); und
eine zum Fördern des vom Reinigungsbauteil (70) entfernten verbleibenden Toners konfigurierte Tonerfördereinheit (71, 74), wobei:

die Tonerfördereinheit ein Tonerförderbauteil (71) umfasst, das konfiguriert ist, entlang einer Rotationsachse zu rotieren, um den verbleibenden Toner entlang der Rotationsachse in eine vorbestimmte Richtung zu fördern;
und
ein rotierendes Trägerbauteil (74), das konfiguriert ist, um eine Rotationsantriebskraft durch den Bildträger (3) aufzunehmen, damit es entlang der Rotationsachse rotierbar ist, wobei ein Ende des rotierenden Trägerbauteils (74) direkt an das Tonerförderbauteil (71) gekoppelt ist, damit es die Rotationsantriebskraft an das Tonerförderbauteil (71) überträgt, wobei das andere Ende des rotierenden Trägerbauteils (74) mit einem Wellenabschnitt (78) ausgestattet ist, wobei der Wellenabschnitt (78) mit einem ersten Positionierungsbauteil (80) an einem ersten Ende davon ausgestattet ist, das in den Wellenabschnitt (78) integriert ist; und
das Außenabdeckungsbauteil (51) mit einem zweiten Positionierungsbauteil (52) ausgestattet ist, das im Außenabdeckungsbauteil (51) enthalten ist;
wobei die Prozesskartusche (50) weiterhin einen Halter (81) umfasst, einschließlich einer Halteeinheit (52, 80), die konfiguriert ist, um das Durchgangsloch (54) zu passieren und am Außenabdeckungsbauteil rotierbar befestigt ist, und der Halter (81) mit einem dritten Positionierungsbauteil (82) an einem Ende und einem vierten Positionierungsbauteil (85) am anderen Ende davon ausgestattet ist; wobei das erste Positionierungsbauteil (80) und das dritte Positionierungsbauteil (82) ineinander rotierend eingreifen und das zweite Positionierungsbauteil (52) und das vierte Positionierungsbauteil (85) ineinander rotierend eingreifen;
wobei das rotierende Trägerbauteil (74) ein Zahnrad (79) für den Rotationsantrieb des Tonerförderbauteils (71) enthält, und das Zahnrad (79) des rotierenden Trägerbauteils treibend mit einem Zahnrad (31) am Bildträger (3) durch ein Leerlaufzahnrad (83) am Halter (81) verbunden ist.

2. Prozesskartusche (50) nach Anspruch 1,
wobei das erste Positionierungsbauteil (80) ein konvexes Teil und das zweite Positionierungsbauteil (52) ein konkaves Teil ist, wobei das konvexe Teil und das konkave Teil rotierbar ineinander eingreifen.

3. Prozesskartusche (50) nach Anspruch 1,
wobei das erste Positionierungsbauteil (80) ein konkaves Teil und das zweite Positionierungsbauteil (52) ein konvexes Teil ist, wobei das konvexe Teil und das konkave Teil rotierbar ineinander eingreifen.

4. Prozesskartusche (50) nach einem der Ansprüche 1 bis 3, wobei das rotierende Trägerbauteil (74) Folgendes umfasst:

den Wellenabschnitt (78);
einen Wellenteil (76), der an einem zweiten Ende des Wellenabschnitts (78) befestigt ist;
ein Verbindungsteil (75), das an dem Wellenteil (76) befestigt und mit dem Tonerförderbauteil (71) verbunden ist; und
das Zahnrad (79), das um den Wellenabschnitt (78) bereitgestellt wird und konfiguriert ist, um die Rotationsantriebskraft von dem Bildträger

(3) aufzunehmen;
ein oder mehrere des Wellenteils (76), das Verbindungsteil (75) und das Zahnrad (79) enthält, das durch Spritzguss in den Wellenabschnitt (78) integriert ist/sind.

5. Prozesskartusche (50) nach Anspruch 4, wobei der Harz entweder ein Polyacetalharz, Polyamidharz, Fluorharz, Polyimidharz, Polyamid-Imidharz, Polyphenylsulfidharz, Polyethylenharz, Polyprenharz oder ein Legierungsharz aus den oben genannten Harzen ist.

6. Prozesskartusche (50) nach einem der Ansprüche 1 bis 5, wobei das Tonerförderbauteil (71) ein Spulen-Feder-förmiges Bauteil ist.

7. Prozesskartusche (50) nach einem der Ansprüche 1 bis 6, wobei das Reinigungsbauteil (70) ein klingenförmiges Bauteil ist.

8. Prozesskartusche (50) nach einem der Ansprüche 1 bis 7, wobei der Bildträger (3) ein trommelförmiges Bauteil ist.

9. Prozesskartusche (50) nach einem der Ansprüche 1 bis 8, wobei der Bildträger (3) ein gürtelförmiges Bauteil ist.

10. Bilderzeugungsvornchtung, das eine Prozesskartusche (50) nach einem der Ansprüche 1 bis 9 umfasst.

Revendications

1. Cartouche de traitement (50) configurée pour être montée sur un corps principal d'un appareil de formation d'image (1) de manière détachable,
la cartouche de traitement (50) comprenant une paroi latérale (53) sur un côté latéral de celle-ci, la paroi latérale (53) comprenant un trou traversant (54) et la cartouche de traitement comprenant en outre un élément de couverture extérieur (51) qui entoure la paroi latérale (53), l'élément de couverture extérieur (51) présentant une surface essentiellement parallèle à la paroi latérale (53),
la cartouche de traitement (50) comprenant une forme d'impression (3) configurée pour être porteuse d'une image d'encre en poudre sur une surface de celle-ci ;
une unité de nettoyage (7) conçue pour nettoyer la forme d'impression (3) ;
un élément de nettoyage (70) configuré pour retirer de l'encre en poudre résiduelle restant sur la forme d'impression (3) après un transfert de l'image d'encre en poudre à partir de la forme d'impression (3) vers un support de transfert ; et
une unité d'acheminement d'encre en poudre (71, 74) configurée pour acheminer l'encre en poudre résiduelle retirée grâce à l'élément de nettoyage (70), dans laquelle :

l'unité d'acheminement d'encre en poudre comprend un élément d'acheminement d'encre en poudre (71) configuré pour tourner le long d'un axe de rotation afin d'acheminer l'encre en poudre résiduelle le long de l'axe de rotation dans une direction prédéterminée ;
et
un élément de support rotatif (74) configuré pour recevoir une force d'entraînement en rotation par l'intermédiaire de la forme d'impression (3) de manière à être rotatif le long de l'axe de rotation, une extrémité de l'élément de support rotatif (74) étant directement couplée à l'élément d'acheminement d'encre en poudre (71) de manière à faire parvenir la force d'entraînement en rotation à l'élément d'acheminement d'encre en poudre (71), l'autre extrémité de l'élément de support rotatif (74) étant munie d'une partie arbre (78), la partie arbre (78) étant munie d'un premier élément de positionnement (80) au niveau de sa première extrémité formée d'un seul tenant avec la partie arbre (78) ; et
l'élément de couverture extérieur (51) est muni d'un deuxième élément de positionnement (52) maintenu au niveau de l'élément de couverture extérieur (51) ;
la cartouche de traitement (50) comprenant en outre un dispositif de retenue (81) comprenant une unité de retenue (52, 80) configurée pour passer à travers le trou traversant (54) et retenue au niveau de l'élément de couverture extérieur de manière rotative, et le dispositif de retenue (81) étant muni d'un troisième élément de positionnement (82) au niveau d'une extrémité et d'un quatrième élément de positionnement (85) au niveau de son autre extrémité ; dans laquelle le premier élément de positionnement (80) et le troisième élément de positionnement (82) viennent en prise l'un avec l'autre de manière rotative et le deuxième élément de positionnement (52) et le quatrième élément de positionnement (85) viennent en prise l'un avec l'autre de manière rotative ;
dans laquelle l'élément de support rotatif (74) comprend un engrenage (79) destiné à entraîner en rotation l'élément d'acheminement d'encre en poudre (71), l'engrenage (79) de l'élément de support rotatif étant raccordé en entraînement à un engrenage (31) agencé au niveau de la forme d'impression (3) par l'intermédiaire d'un pignon fou (83) agencé sur le dispositif de retenue (81).

2. Cartouche de traitement (50) selon la revendication

1, dans laquelle
le premier élément de positionnement (80) est une pièce convexe et le deuxième élément de positionnement (52) est une pièce concave, dans laquelle la pièce convexe et la pièce concave viennent en prise l'une avec l'autre de manière rotative.

3. Cartouche de traitement (50) selon la revendication 1, dans laquelle
le premier élément de positionnement (80) est une pièce concave et le deuxième élément de positionnement (52) est une pièce convexe, dans laquelle la pièce convexe et la pièce concave viennent en prise l'une avec l'autre de manière rotative.

4. Cartouche de traitement (50) selon l'une quelconque des revendications 1 à 3, dans laquelle l'élément de support rotatif (74) comprend
la partie arbre (78) ;
une pièce d'arbre (76) fixée à une deuxième extrémité de la partie arbre (78) ;
une pièce de raccord (75) fixée à la pièce d'arbre (76) et raccordée à un élément d'acheminement d'encre en poudre (71) ; et
l'engrenage (79) fourni autour de la partie arbre (78) est configuré pour recevoir la force d'entraînement en rotation issue de la forme d'impression (3) ;
un ou plusieurs parmi la pièce d'arbre (76), la pièce de liaison (75) et l'engrenage (79) étant formés d'un seul tenant avec la partie arbre (78) grâce à de la résine au moyen d'un moulage par injection.

5. Cartouche de traitement (50) selon la revendication 4, dans laquelle
la résine est une résine quelconque parmi résine polyacétal, résine polyamide, résine fluorine, résine polyimide, résine polyamide-imide, résine sulfure de polyphénylène, résine polyéthylène, résine à base de polyprène, et un alliage de résines constitué des résines ci-dessus.

6. Cartouche de traitement (50) selon l'une quelconque des revendications 1 à 5, dans laquelle l'élément d'acheminement d'encre en poudre (71) est un élément de type ressort hélicoïdal.

7. Cartouche de traitement (50) selon l'une quelconque des revendications 1 à 6, dans laquelle l'élément de nettoyage (70) est un élément de type racle.

8. Cartouche de traitement (50) selon l'une quelconque des revendications 1 à 7, dans laquelle la forme d'impression (3) est un élément en forme de tambour.

9. Cartouche de traitement (50) selon l'une quelconque des revendications 1 à 8, dans laquelle la forme d'impression (3) est un élément en forme de ceinture.

10. Appareil de formation d'image comprenant une cartouche de traitement (50) selon l'une quelconque des revendications 1 à 9.

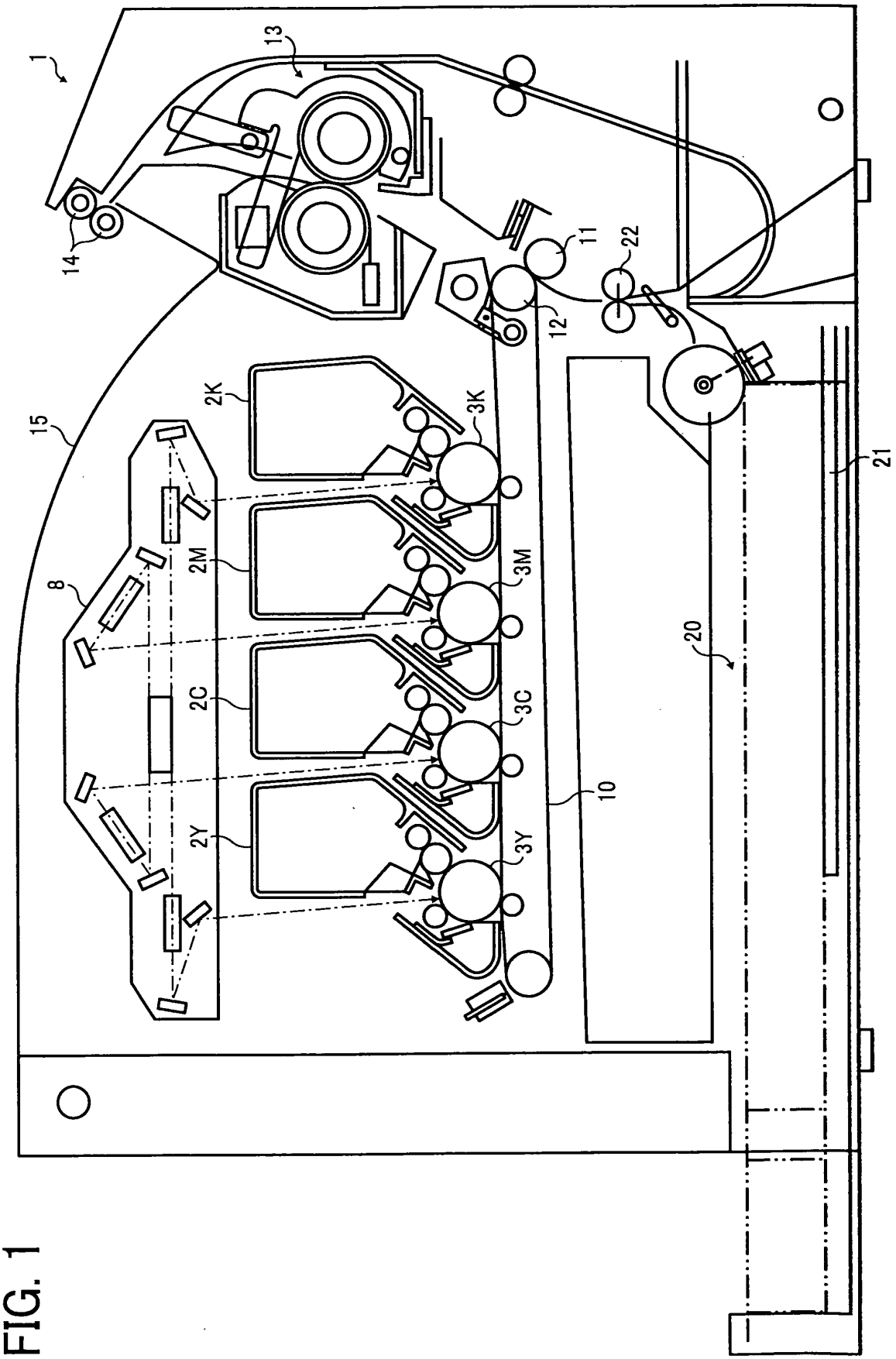


FIG. 1

FIG. 2

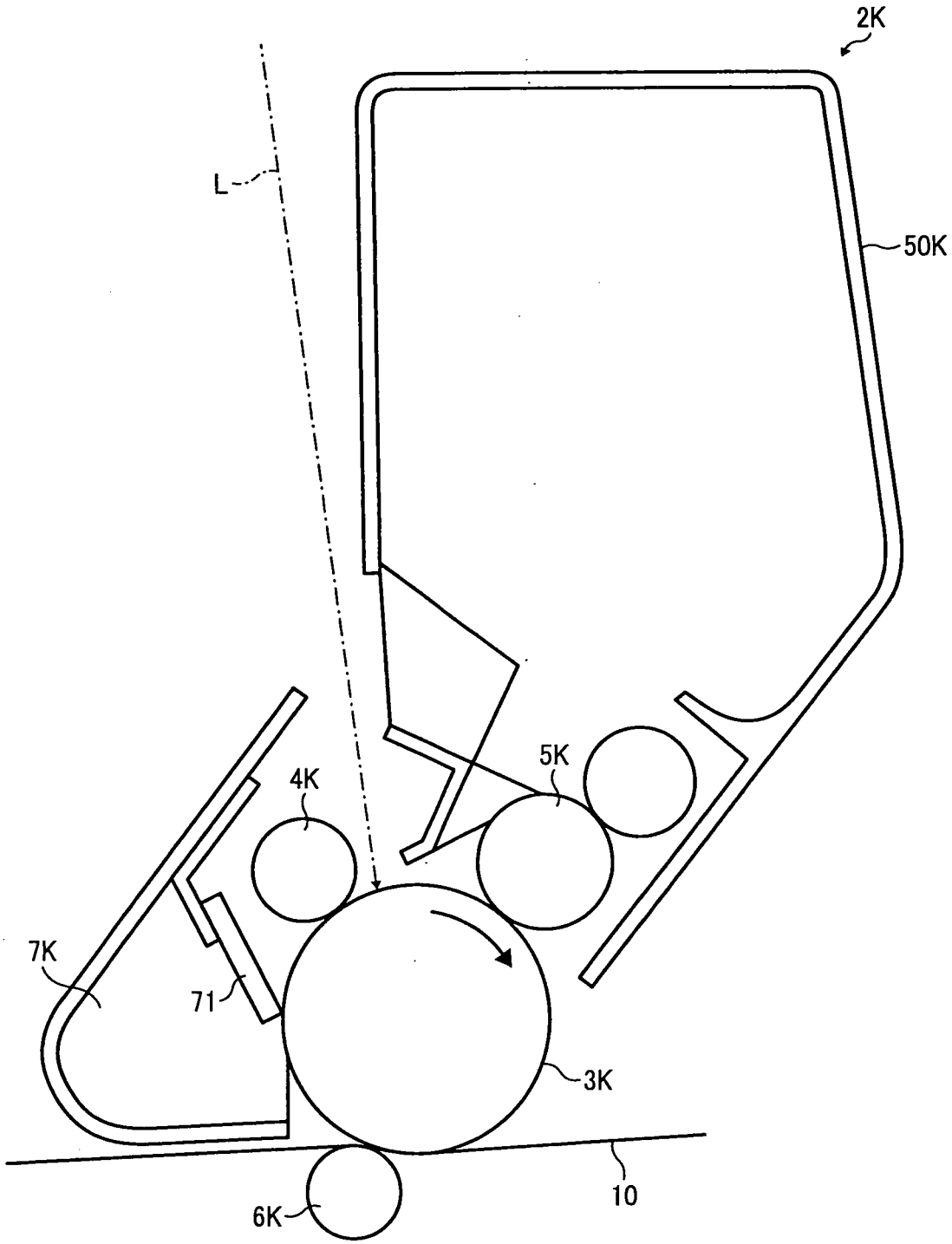
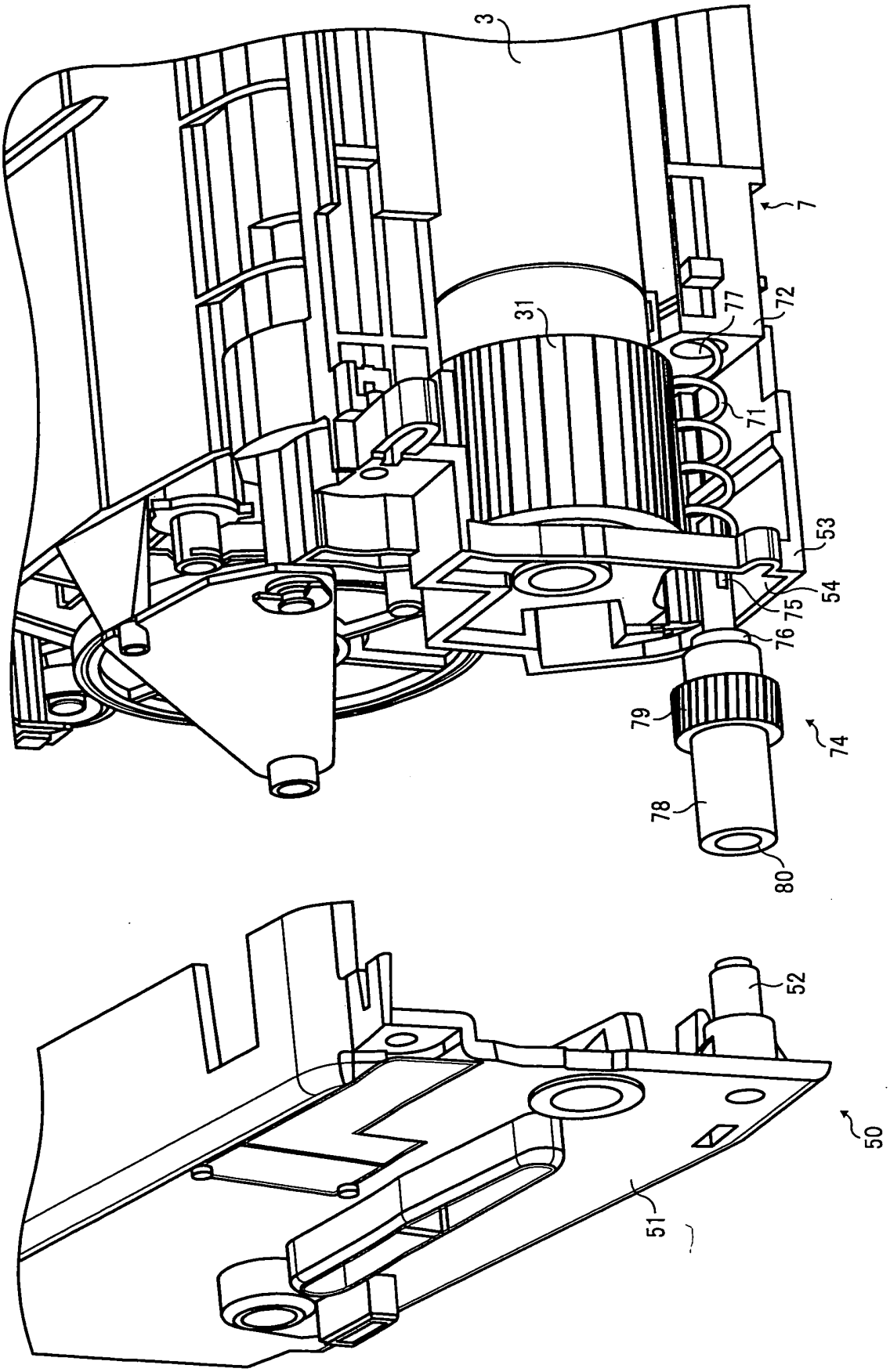


FIG. 3



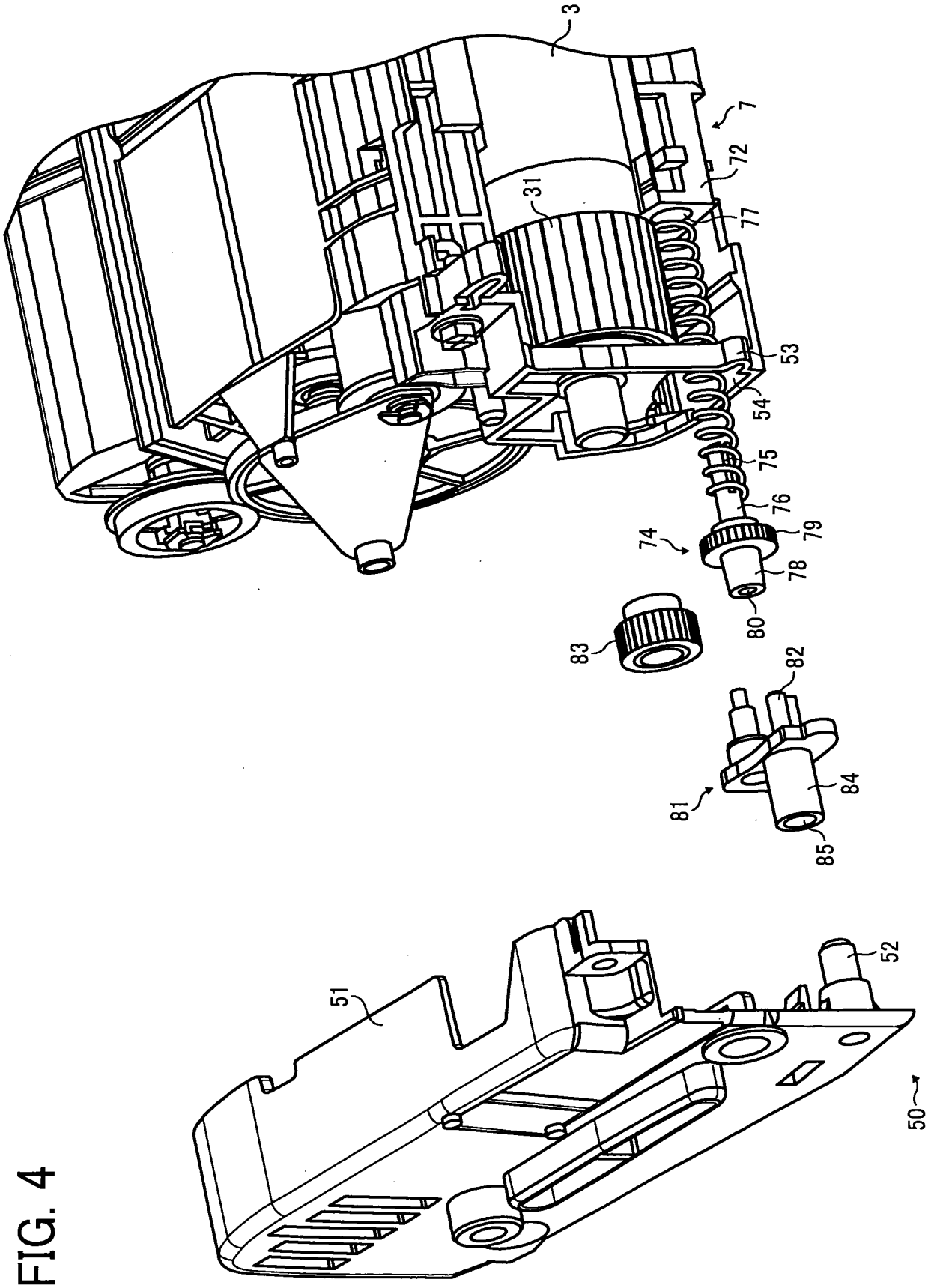


FIG. 4

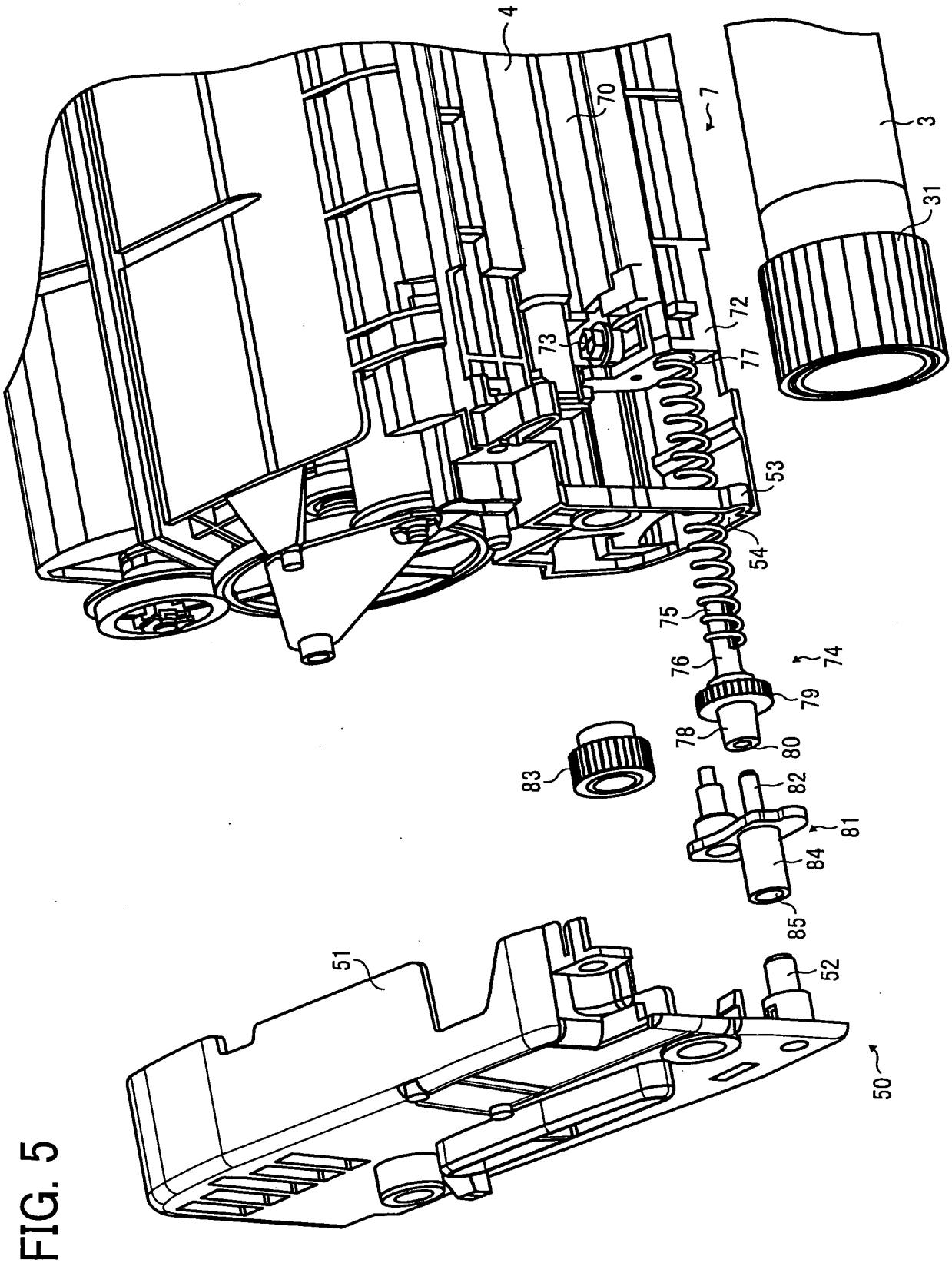


FIG. 5

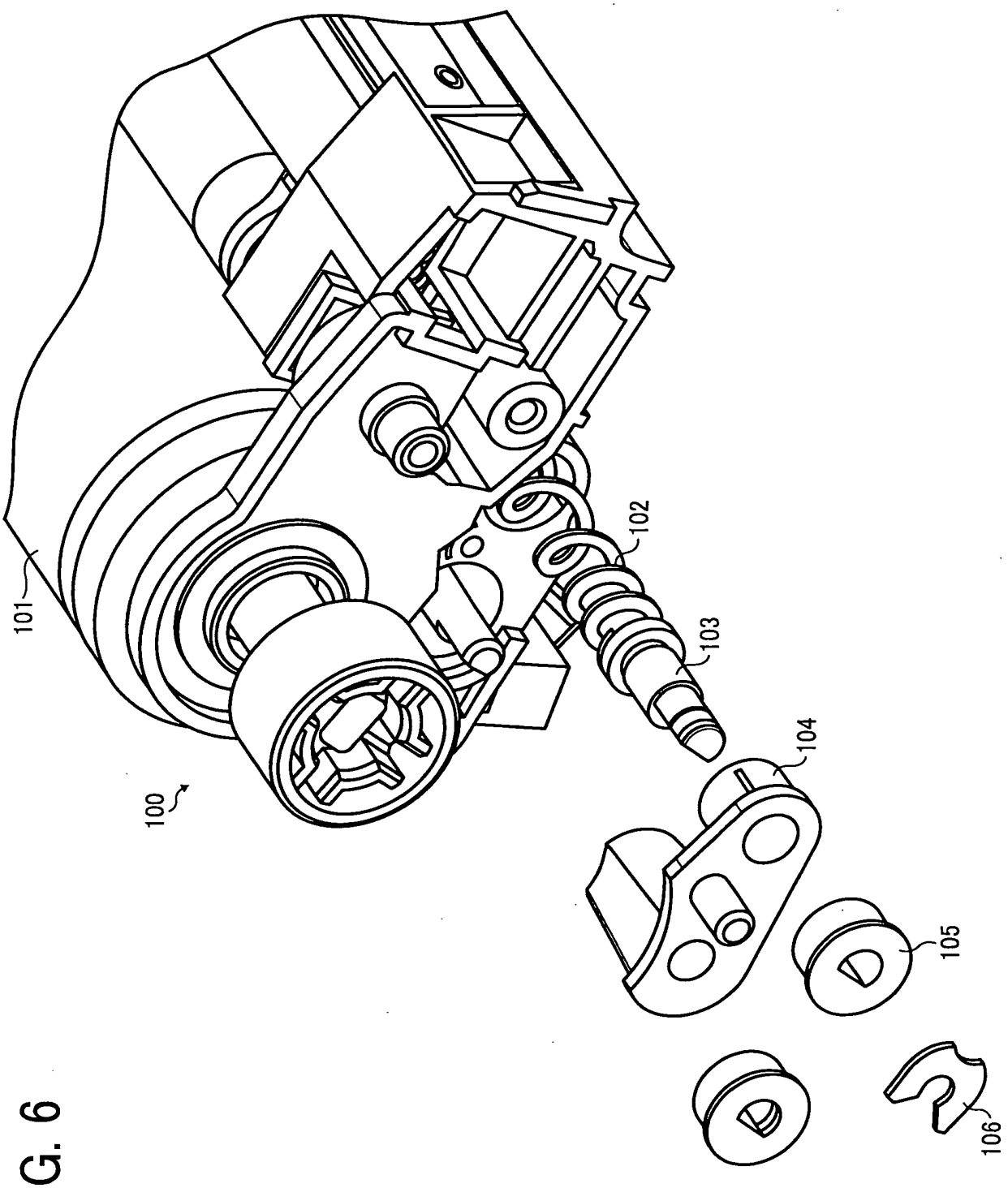


FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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