Description

FIELD OF THE INVENTION

The present invention relates to an electrophotographic printing apparatus in which a visible image corresponding to an electrostatic latent image formed on a photosensitive drum is formed by a powder developing agent, and this visible image is transferred to a printing paper thereby to achieve printing, and more particularly an electrophotographic printing apparatus in which a developing device, a photosensitive member, a cleaner and the like are integrated into a single cartridge which is exchangeable.

BACKGROUND OF THE INVENTION

A conventional electrophotographic apparatus of the above type is shown in Japanese Patent Kokoku Publication No. 54,392/1983. In this apparatus, in an electrophotographic copier, a photosensitive drum and a developing device for toner development of the electrostatic latent image formed on the photosensitive drum in correspondence with the image of the original, and a cleaner for removing any powder developing agent remaining on the photosensitive drum are integrally mounted on a support member, and this support member is slid with respect to the main body of the electrophotographic copier in the direction of the axis of the photosensitive drum for removal and mounting.

The expression "integrally mounted" as used herein should means that the name components can be separated disassembled from the rest of the printing apparatus without being separated or disassembled from each other.

In the apparatus disclosed in the above publication, as set forth in the fourth column, the developing device, the photosensitive drum and the cleaner are integrated into a single exchangeable unit, and when either of them reaches the limit of life span, the entire exchangeable unit is exchanged for a new one.

Further, as shown in column 6 and column 11, and Fig. 2 in the publication, a toner bottle 20 is provided in the developing device A, and a powder developing agent formed by mixing the toner and the carrier is contained therein.

When the powder developing agent is exhausted, the exchangeable unit as a whole is at the limit of life span, and must be replaced regardless of the consumption or wear of other components. This leads to increase in the printing cost, and is detrimental to the economy of the user. The deficiency can be eliminated by increasing the capacity of the toner bottle, or by lowering the cost of the exchangeable unit. The former measure increases the size of the exchangeable unit, and the latter measure is technically difficult.

Of the components of the exchangeable unit, the toner bottle reaches the limit of life span when the powder developing agent contained therein is exhausted, but, at that time, other components may not have reached their limit of life span, and their limit of life span is dependent on factors other than the consumption of the powder developing agent, for instance the number of sheets that have been printed, and it is practically impossible to have the limit of life span of the toner bottle and all other components to reach simultaneously under various conditions.

For this reason, the user of the apparatus must dispose the exchangeable unit part of which can still be used, and this is uneconomical to the user.

US-A 4,757,344 discloses an electronic copier, laser printer or like imaging apparatus according to the preamble of claim 1.

US-A 4,866,482 discloses an image forming device for electrostatic recording apparatus according to the preamble of claim 1 wherein the primary charger is not integrally mounted in the image forming cartridge.

SUMMARY OF THE INVENTION

An object of the invention is to provide an electrophotographic printing apparatus with which waste of the components of the image forming cartridge can be minimized.

As a means of solving the above problems, the present invention provides an electrophotographic printing apparatus as claimed in claims 1 and 6.

With the electrophotographic printing apparatus of the above arrangement, when the powder developing agent is exhausted, it is sufficient if the developing agent tank is exchanged. Accordingly, it is possible to use the image-forming cartridge to its limit of life span while exchanging the developing agent tank.

Moreover, if the powder developing agent is still remaining in the tank when the image-forming cartridge has reached its limit of life span, the image-forming cartridge is removed from the main body, and the developing agent container that has been in use is removed, and then attached to a new image-forming cartridge, and this new image-forming cartridge is mounted to the main body. Waste of the powder developing agent is therefore avoided.

BRIEF DESCRIPTION Of THE DRAWINGS

Fig. 1 is a side view showing the general construction of an embodiment of the invention.

Fig. 2 is a perspective view showing the structure of the image-forming cartridge.

Fig. 3 is a perspective view showing the engagement section of the image-forming cartridge and the frame.

Fig. 4 is a perspective view showing the engagement between the frame and the image-forming car-

tridge.

Fig. 5 is a perspective view showing the engagement between the LED head and the image-forming cartridge.

Fig. 6 is a perspective view showing the means for fixing the developing agent tank.

Fig. 7 is a perspective view showing the state in which the developing agent tank is fixed.

DETAILED DESCRIPTION Of THE PREFERRED EMBODIMENTS

An embodiment of the invention will now be described with reference to the drawings.

Referring to Fig. 1, the electrophotographic printing apparatus of this embodiment comprises an outer housing or main body 101 to which a paper cassette 111, a paper pick-up roller 113, a pair of paper feed rollers 115, a pair of fixing rollers 117, another pair of paper feed rollers 119, a pair of paper eject rollers 121, and an image-forming cartridge 1 are provided. Paper that has been ejected by eject rollers 121 are placed and stacked on a printed paper tray 123.

The image-forming cartridge 1 is removably mounted in an internal frame 103 fixed in the main body 101. A developing agent tank 2 is removably mounted to the cartridge 1 and contains powder developing agent therein. A supply roller 3 is provided directly beneath the developing agent tank 2 for supplying the powder developing agent. A developing roller 4 is formed of an electrically conductive body and pressed against the supply roller 3. A toner blade 5 is pressed with a predetermined pressure against the developing roller 4. A photosensitive drum 6 has a photoconductive layer on its surface. The developing roller 4 is in contact with the photosensitive drum. A cleaner 7 is in contact with the surface of the photosensitive drum 6. A primary charger 17 is parallel with the central axis of the photosensitive drum 6. An light-emitting diode (LED) head 9 comprises a multiplicity of light-emitting diodes (LED's) disposed in the direction parallel with the central axis of the photosensitive drum 6 so as to illuminate the photoconductive layer on the surface of the photosensitive drum 6.

The supply roller 3, the developing roller 4 and the photosensitive drum 6 are supported to the support member of the image-forming cartridge 1, integrally and in parallel with each other, such that they are rotatable. The toner blade 5, the cleaner 7, and the primary charger 17 are mounted to the support member of the image-forming cartridge, with a predetermined positional relationship with respect to the developing roller 4 and the photosensitive drum 6. The LED head 9 is positioned relative to the supporting member of the image-forming cartridge 1 as illustrated in Fig. 1, by means of a mechanism to be described later.

Details of the image-forming cartridge 1 is shown in Fig. 2. In the figure, side plates 10 are provided on the right and left of the image-forming cartridge 1. They are fixed to the cartridge case main body part 11, and form the side surfaces of the image-forming cartridge. The supply roller 3, the developing roller 4, and the photosensitive drum 6 are rotatably supported, on the inner surfaces of the side plates, via bearings not shown. The side plates 10 support the primary charger 17 and the cleaner 7 such that they maintain the positional relationship with respect to the developing roller 4 and the photosensitive drum 6, respectively. That is, the supply roller 3, the developing roller 4, the photosensitive drum 6, the cleaner 7 and the primary charger 17 are positioned and supported by the side plates 10, as illustrated in Fig. 1.

A developing agent tank-containing case 11a is provided to contact, at its bottom, the cartridge case main body part 11, and coupled to the cartridge case main body part 11, with a predetermined positional relationship with respect to the cartridge case main body 11, by means of the side plates 10. The developing agent tank-containing case 11a supports the developing agent tank 2, such that the tank 2 can be mounted and removed. The mechanism for supporting the developing agent tank 2 will later be described in detail.

The left side plate 10 has a positioning post 13 on the left surface thereof. The right side plate 10 also has a similar positioning post, not shown. This positioning post 13 is used for mounting of the image-forming cartridge 1 to the main body 101.

The side plate 10 has an LED head positioning flat surface 14, on its top, and an LED guiding projection 15 having a truncated cone. The positioning flat surface 14 and the guiding projection 15 are provided for accurate positioning with respect to the photosensitive drum 6, and determine the position of the LED head 9 when the LED head 9 is mounted to the image-forming cartridge 1, as described later.

The image-forming cartridge 1 has a developing agent collecting mechanism, not shown, provided in the image-forming cartridge 1 and moved together with the drive gear of the photosensitive drum 6. The developing agent collecting mechanism collects the powder developing agent that has been removed by the cleaner 7 from the surface of the photosensitive drum 6, to the bottom of the image-forming cartridge 1, and conveys the collected powder developing agent to the developing agent tank-containing case by means of a helical conveying means, for the purpose of re-using the powder developing agent.

The primary charger 17 is fitted on the image-forming cartridge 1. A corona discharge wire 8 is made to span in the primary charger 17, in parallel with the central axis of the photosensitive drum 6. The primary charger 17 is provided with a discharging wire cleaner 18 which clamps the corona discharging wire 8, and which can slide along the discharge wire 8.

Fig. 3 shows a fixing means for fixing the image-forming cartridge 1 to the electrophotographic printing apparatus main body 101.

Provided integrally with the frame 103 disposed in the main body 101 are a pair of supporting members 20 and a block 21. Each of the supporting members 20 has a U-shaped cut-away 23 opened upward. This cut-away 23 is engaged with the positioning post 13 provided on the side plate of the image-forming cartridge 1 (see Fig. 4). In Fig. 3, the positioning post 13 is coaxial with the photosensitive drum 6. The supporting members 20 and the positioning posts 13 support the image-forming cartridge 1 in the vicinity of the photosensitive drum 6.

With this arrangement, the positional relationship between the photosensitive drum 6, and a transfer electrode, not shown, in opposition to the printing paper, not shown, and the photosensitive drum 6 is determined.

Further, the blocks 21a, 21b integrally provided with the frame 103 support a pair of abutment parts 24a, 24b provided on the image-forming cartridge 1. The engagement between the blocks 21a, 21b, and the abutment parts 24a, 24b prevents the rotation of the image-forming cartridge 1 accompanying the rotation of the photosensitive drum 6, and maintains the positional relationship with the main body 101.

Fig. 5 shows the structure for positioning the LED head 9 with respect to the image-forming cartridge 1. In the figure, the frame 103 in which the image-forming cartridge is mounted is provided with an upper lid 26. This upper lid 26 is separate from an outer lid, not shown, which is provided at the top of the main body 101.

The LED head 9 is fixed to the inner surface of the upper lid 26. The upper lid 26 protect the printing section of the photosensitive drum 6.

A guide 27 is formed by bending a rectangular plate 28 having a rectangular perforations 28 (only one at one end being illustrated: other perforations are not seen in Fig. 5.) into the a shape with a channel-like cross section, and fixed at its central portion to the inner surface of the upper lid 26. Pairs of projections 29 (only one at one end being illustrated: others are not seen in the figure) are provided at each end of the LED head 9 and are engaging with the perforations 28. A compression spring 30 has one end fixed to the guide 27 and the other end abutting against the LED head 9. The perforations 28 are larger than the projections 29, and the LED head 9 is therefore movable within the range in which the projection 29 is engaged with the perforation 28. In this state, the compression spring 39 biases the LED head 9 away from the upper lid 26.

A shaft 31 supports the upper lid 26 such that it is rotatable with respect to the frame 103. A torsion spring 32 has one end engaged with the frame 103, and the other end engaged with the upper lid 26 to bias the upper lid 26 upward. Knobs 33 are slidable along grooves 34 provided in the upper lid 26. Each knob 33 has a latch, not shown, which is integrally formed with the knob. This latch is engaged with the jaw portion 35 (Fig. 4) on the frame 103, and fixes the upper lid 26 to the frame 103. The frame 103 is also fixed to the main body 101 by an engagement means, not shown. When the knob 33 is moved in the direction of arrow A in Fig. 5, the latch is disengaged, and the upper lid 26 is released. The released upper lid 26 then is lifted by the biasing of the torsion spring 32.

A top window 36 is provided in the upper lid 26, directly over the developing agent tank 2.

When the image-forming cartridge 1 is mounted to the frame 103 and the upper lid 26 is closed, the LED head 9 is brought to contact with the image-forming cartridge 1. The guiding projections 15 provided on the side plates 10 are engaged with guide perforations, not shown, provided at the predetermined locations on the lower surface of the LED head 9.

The compression spring 30 presses the LED head 9 against the positioning flat surfaces 14.

The guiding projections 15 have a shape of the tip of a truncated cone, while the LED head 9 having the guiding perforations is movable within a predetermined range with respect to the guide 27, so the positional relationship between the image-forming cartridge 1 and the LED head 9 is accurately corrected by the guiding projections 15, the guiding perforations, and the positioning flat surfaces 14.

To remove the image-forming cartridge 1, the outer lid, not shown, at the top of the main body is first opened, and the knobs 1 are moved in the direction of arrow A, and the upper lid 26 is opened, and the image-forming cartridge 1 is then lifted upward.

When the developing agent tank 2 alone is to be removed, the upper lid 26 is kept closed, and the engagement members 12 are manipulated in a manner to be described later, and the developing agent tank 2 is removed, through the top window 36, from the image-forming cartridge 1. In this way, the developing agent tank 2 alone can be removed through the top window 36 without removing the image-forming cartridge 1. A similar but opposite procedure is followed when the developing agent tank 2 is mounted.

The configuration for mounting and removing the developing agent tank 2 to or from the image-forming cartridge 1 will now be described.

In Fig. 6, a shaft 37 is formed integrally with the engagement member 12. A perforation 38 is provided in the side plate of the developing agent tank-containing case 11a. The developing agent tank 2 has a side plank 39, an outer cylinder 40 and an inner cylinder 41. The side plank is provided with a groove 42. An elongated projection 43 is provided on the inner side of the engagement member 12. The engagement member 12 is provided with a grip 44. A limiter 45 is provided for stopping the rotation of the grip 44 at a

predetermined position.

By inserting the shaft 37 in the perforation 38, the engagement member 12 is held to the side plate of the developing agent tank-containing case 11a such that it can rotate. The side plank 39 is fixed to the end of the inner cylinder 41 of the developing agent tank 2. With the rotation of the side plank 39, the inner cylinder 41 rotates relative to the outer cylinder 40.

The developing agent tank-containing case 11a has a semi-circular hollow part 46 which is opened upward to receive the developing agent tank 2. The hollow part 46 has, at its bottom, an opening, not shown, which communicates with the developing section, and the developing agent in the developing agent tank is supplied through this opening to the developing section.

To mount the developing agent tank 2, the groove 42 of the side plank 39 is made to assume the same direction as the elongated projection 43 of the engagement member 12, and the developing agent tank 2 is inserted from the above in the direction of arrow B such that the groove 42 engages with the elongated projection 43. Fig. 7 shows the state after the insertion. The grip 44 is then rotated in the direction of arrow C. As a result, a groove 44a provided on the inner side of the grip 44 is pushed up onto a step portion 39b provided in front of a tab 39a of the side plank 39, whereby the developing agent tank 2 is pushed downward, and is fixed to tile developing agent tank-containing case 11a. When the grip 44 is further rotated in the same direction, the grip 44 is further rotated in the same direction, the grip 44 abuts against the end of the tab 3a to rotate the side plank 39. The outer cylinder 40 is fixed and prevented from rotating by a limiter, not shown. Accordingly, after the grip 44 is rotated to the limiter 45, the inner cylinder 41 of the developing agent tank 2 rotates together with the rotation of the side plank 39, and its opening, not shown, is superimposed with an opening, not shown, of the outer cylinder 40 and the developing agent contained therein can flow out. The above-mentioned opening is also superimposed with the opening at the bottom of the hollow part 46 of the developing agent tank-containing case 11a, and the developing agent therefore is supplied through the bottom of the containing case 11a to the developing section.

When the developing agent tank 2 is removed from the image-forming cartridge 1, a procedure opposite to that described above is followed: the grip 44 is rotated in the direction opposite to the arrow C, to the original position, and the tank is pulled upward. During the rotation of the grip 44 to the original position, the developing agent tank 2 and the inner cylinder 44 are rotated in the direction opposite to that described above, and the opening is thereby closed.

As has been described, according to the invention, the photosensitive drum and the developing means for supplying the powder developing agent to the surface of the photosensitive drum, and the cleaner for removing the developing agent from the surface of the photosensitive drum are integrally mounted to the support member to form an image-forming cartridge, and the cartridge is removably mounted to the main body of the electrophotographic printing apparatus, and the developing agent tank is removably mounted to the cartridge. It is therefore possible to exchange the cartridge alone or the developing agent tank alone. The cost associated with the use of the apparatus is reduced. Moreover, since the components forming the cartridge, e.g., the photosensitive drum, are not handled by itself, there will be no toner scattering, and the convenience is improved.

Furthermore, by integrally forming the cleaner and the developing device, the toner re-using mechanism, which is described earlier, is realized.

Claims

1. An electrophotographic printing apparatus comprising:

a photosensitive drum (6) having a photoconductive layer on its surface;

a primary charger (17) for uniformly charging the surface of said photosensitive drum (6);

a developing agent tank (2) for containing powder developing agent;

a developing means (3, 4) for supplying said powder developing agent supplied from said developing agent tank (2) to the surface of said photosensitive drum (6); and

a cleaner (7) for removing said powder developing agent from the surface of said photosensitive drum (6);

wherein a visible image using said powder developing agent corresponding to an electrostatic latent image formed on said photosensitive drum (6) is formed, and the visible image is transferred to the surface of a printing paper to achieve printing;

said photosensitive drum (6), said primary charger (17), said developing means (3, 4), a container for said developing agent tank, and said cleaner (7) are integrally mounted to a support member to form an image-forming cartridge (1); characterized in that

said cartridge (1) is removably mounted to a main body (101) of said electrophotographic printing apparatus; and

said developing agent tank (2) is removably mounted in said container of said cartridge (1);

said image-forming cartridge (1) is provided in a frame (103);

said frame (103) has an upper lid (26) having a window (36); and

predetermined position.

By inserting the shaft 37 in the perforation 38, the engagement member 12 is held to the side plate of the developing agent tank-containing case 11a such that it can rotate. The side plank 39 is fixed to the end of the inner cylinder 41 of the developing agent tank 2. With the rotation of the side plank 39, the inner cylinder 41 rotates relative to the outer cylinder 40.

The developing agent tank-containing case 11a has a semi-circular hollow part 46 which is opened upward to receive the developing agent tank 2. The hollow part 46 has, at its bottom, an opening, not shown, which communicates with the developing section, and the developing agent in the developing agent tank is supplied through this opening to the developing section.

To mount the developing agent tank 2, the groove 42 of the side plank 39 is made to assume the same direction as the elongated projection 43 of the engagement member 12, and the developing agent tank 2 is inserted from the above in the direction of arrow B such that the groove 42 engages with the elongated projection 43. Fig. 7 shows the state after the insertion. The grip 44 is then rotated in the direction of arrow C. As a result, a groove 44a provided on the inner side of the grip 44 is pushed up onto a step portion 39b provided in front of a tab 39a of the side plank 39, whereby the developing agent tank 2 is pushed downward, and is fixed to tile developing agent tank-containing case 11a. When the grip 44 is further rotated in the same direction, the grip 44 is further rotated in the same direction, the grip 44 abuts against the end of the tab 3a to rotate the side plank 39. The outer cylinder 40 is fixed and prevented from rotating by a limiter, not shown. Accordingly, after the grip 44 is rotated to the limiter 45, the inner cylinder 41 of the developing agent tank 2 rotates together with the rotation of the side plank 39, and its opening, not shown, is superimposed with an opening, not shown, of the outer cylinder 40 and the developing agent contained therein can flow out. The above-mentioned opening is also superimposed with the opening at the bottom of the hollow part 46 of the developing agent tank-containing case 11a, and the developing agent therefore is supplied through the bottom of the containing case 11a to the developing section.

When the developing agent tank 2 is removed from the image-forming cartridge 1, a procedure opposite to that described above is followed: the grip 44 is rotated in the direction opposite to the arrow C, to the original position, and the tank is pulled upward. During the rotation of the grip 44 to the original position, the developing agent tank 2 and the inner cylinder 44 are rotated in the direction opposite to that described above, and the opening is thereby closed.

As has been described, according to the invention, the photosensitive drum and the developing means for supplying the powder developing agent to the surface of the photosensitive drum, and the cleaner for removing the developing agent from the surface of the photosensitive drum are integrally mounted to the support member to form an image-forming cartridge, and the cartridge is removably mounted to the main body of the electrophotographic printing apparatus, and the developing agent tank is removably mounted to the cartridge. It is therefore possible to exchange the cartridge alone or the developing agent tank alone. The cost associated with the use of the apparatus is reduced. Moreover, since the components forming the cartridge, e.g., the photosensitive drum, are not handled by itself, there will be no toner scattering, and the convenience is improved.

Furthermore, by integrally forming the cleaner and the developing device, the toner re-using mechanism, which is described earlier, is realized.

Claims

1. An electrophotographic printing apparatus comprising:

a photosensitive drum (6) having a photoconductive layer on its surface;

a primary charger (17) for uniformly charging the surface of said photosensitive drum (6);

a developing agent tank (2) for containing powder developing agent;

a developing means (3, 4) for supplying said powder developing agent supplied from said developing agent tank (2) to the surface of said photosensitive drum (6); and

a cleaner (7) for removing said powder developing agent from the surface of said photosensitive drum (6);

wherein a visible image using said powder developing agent corresponding to an electrostatic latent image formed on said photosensitive drum (6) is formed, and the visible image is transferred to the surface of a printing paper to achieve printing;

said photosensitive drum (6), said primary charger (17), said developing means (3, 4), a container for said developing agent tank, and said cleaner (7) are integrally mounted to a support member to form an image-forming cartridge (1); characterized in that

said cartridge (1) is removably mounted to a main body (101) of said electrophotographic printing apparatus; and

said developing agent tank (2) is removably mounted in said container of said cartridge (1);

said image-forming cartridge (1) is provided in a frame (103);

said frame (103) has an upper lid (26) having a window (36); and

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said developing agent tank (2) can be mounted into said container of said cartridge (1) and can be removed from said container of said cartridge (1) through said window (36) of said upper lid (26), whereby said developing agent tank (2) can be mounted to and removed from said container of said cartridge (1) while said cartridge (1) is mounted to said body (101) of said electrophotographic printing apparatus.

2. The apparatus of claim 1, wherein

said developing agent tank (2) has an inner cylinder (41) having an opening, and an outer cylinder (40) having an opening which does not overlap the opening of said inner cylinder (41) when said developing agent tank (2) is not mounted in said image-forming cartridge (1); and

said container has an opening overlapping said opening of said outer cylinder (40) when said developing agent tank (2) is mounted in said container;

said apparatus further comprises means for rotating said inner cylinder (41) relative to said outer cylinder (40) such that said opening of said inner cylinder (41), said opening of said outer cylinder (40), and said opening of said container overlap each other, to permit supply of developing agent tank (2) to said developing means (3, 4).

3. The apparatus of Claim 1, further comprising a print head (9) for forming an electrostatic latent image on said photosensitive drum (6), said print head (9) being mounted to said upper lid (26) in such a way that it is movable relative to said upper lid (26).

4. The apparatus of Claim 1, further comprising a biasing means (30) for biasing said print head (9) away from said upper lid (26).

5. The apparatus of Claim 1, wherein

said developing agent tank (2) includes an inner cylinder (41) having an opening and an outer cylinder (40) having an opening,

said inner cylinder (41) being independently rotatable such that the opening of said inner cylinder (41) can be aligned with the opening of said outer cylinder (40).

6. An electrophotographic printing apparatus, comprising:

a main body (101), said main body (101) including a plurality of paper transporting rollers (113, 115, 117, 119, 121);

a frame (103) mounted in said main body (101) of said apparatus and having an opening which faces upward;

an openable lid (26) mounted on said frame (103), covering said opening, and having a window (36);

an image-forming cartridge (1) removably mounted to said main body (101), said image-forming cartridge (1) including a photosensitive drum (6) having a photoconductive layer on its surface, and means (3, 4) for supplying developing agent to said photosensitive drum (6); and

a developing agent tank (2) removably mounted to said image forming cartridge (1) and removable through said window (36) when said lid (26) is closed.

Patentansprüche

1. Elektrofotografisches Druckgerät, enthaltend:
eine fotoempfindliche Trommel (6) mit einer fotoleitenden Schicht auf ihrer Oberfläche;
einen Primärlader (17), um die Oberfläche der fotoempfindlichen Trommel (6) gleichförmig aufzuladen;
einen Entwicklungsmitteltank (2) zur Aufnahme von Pulverentwicklungsmittel;
eine Entwicklungseinrichtung (3, 4), um das von dem Entwicklungsmitteltank (2) zugeführte Pulverentwicklungsmittel der Oberfläche der fotoempfindlichen Trommel (6) zuzuführen; und
einen Reiniger (7) zum Entfernen des Pulverentwicklungsmittels von der Oberfläche der fotoempfindlichen Trommel (6);
wobei unter Verwendung des Pulverentwicklungsmittels entsprechend einem auf der fotoempfindlichen Trommel (6) gebildeten elektrostatischen latenten Bild ein sichtbares Bild gebildet wird und das sichtbare Bild auf die Oberfläche eines Druckpapiers übertragen wird, um das Drucken durchzuführen;
wobei die fotoempfindliche Trommel (6), der Primärlader (17), die Entwicklungseinrichtung (3, 4), ein Behälter für den Entwicklungsmitteltank und der Reiniger (7) integral an einem Tragelement montiert sind, um eine Bilderzeugungskassette (1) zu bilden;
dadurch gekennzeichnet, daß
die Kassette abnehmbar an einem Hauptkörper (101) des elektrofotografischen Druckgeräts montiert ist; und
der Entwicklungsmitteltank (2) herausnehmbar im Behälter der Kassette (1) montiert ist;
die Bilderzeugungskassette (1) in einem Rahmen (103) vorgesehen ist;
der Rahmen (103) einen oberen Deckel (26) mit einem Fenster (36) aufweist; und
der Entwicklungsmitteltank (2) im Behälter der Kassette (1) montiert werden kann und durch das Fenster (36) des oberen Deckels (26) hindurch aus dem Behälter der Kassette (1) herausgenom-

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men werden kann, wodurch der Entwicklungsmitteltank (2) am Behälter der Kassette (1) montiert und daraus herausgenommen werden kann, während die Kassette (1) am Körper (101) des elektrofotografschen Druckgeräts montiert ist.

2. Gerät nach Anspruch 1, wobei
der Entwicklungsmitteltank (2) einen Innenzylinder (41) mit einer Öffnung und einem Außenzylinder (40) mit einer Öffnung aufweist, die sich nicht mit der Öffnung des Innenzylinders (41) überlappt, wenn der Entwicklungsmitteltank (2) nicht in der Bilderzeugungskassette (1) montiert ist; und
der Behälter eine Öffnung hat, die sich mit der Öffnung des Außenzylinders (40) überlappt, wenn der Entwicklungsmitteltank (2) im Behälter montiert ist;
wobei das Gerät ferner eine Einrichtung zum Drehen des Innenzylinders (41) relativ zum Außenzylinder (40) aufweist, so daß die Öffnung des Innenzylinders (41), die Öffnung des Außenzylinders (40) und die Öffnung des Behälters einander überlappen, um eine Zufuhr vom Entwicklungsmitteltank (2) an die Entwicklungseinrichtung (3, 4) zu ermöglichen.

3. Gerät nach Anspruch 1, das ferner einen Druckkopf (9) zur Bildung eines elektrostatischen latenten Bildes auf der fotoempfindlichen Trommel (6) aufweist, wobei der Druckkopf (9) auf eine solche Weise an dem oberen Deckel (26) montiert ist, daß er relativ zu dem oberen Deckel (26) beweglich ist.

4. Gerät nach Anspruch 1, das ferner eine Vorspanneinrichtung (30) aufweist, um den Druckkopf (9) von dem oberen Deckel (26) weg vorzuspannen.

5. Gerät nach Anspruch 1, wobei
der Entwicklungsmitteltank (2) einen Innenzylinder (41) mit einer Öffnung und einen Außenzylinder (40) mit einer Öffnung enthält,
wobei der Innenzylinder (41) unabhängig drehbar ist, so daß die Öffnung des Innenzylinders (41) auf die Öffnung des Außenzylinders (40) ausgerichtet werden kann.

6. Elektrofotografisches Druckgerät, enthaltend:
einen Hauptkörper (101), der eine Vielzahl von Papiertransportwalzen (113, 115, 117, 119, 121) enthält;
einen Rahmen (103), der in dem Hauptkörper (101) des Geräts montiert ist und der eine Öffnung aufweist, die nach oben zeigt;
einen auf dem Rahmen (103) montierten aufmachbaren Deckel (26), der die Öffnung bedeckt und ein Fenster (36) aufweist;
eine abnehmbar an dem Hauptkörper (101) montierte Bilderzeugungskassette (1), die eine fotoempfindliche Trommel (6) mit einer fotoleitenden Schicht auf ihrer Oberfläche und eine Einrichtung (3, 4) enthält, um der fotoempfindlichen Trommel (6) Entwicklungsmittel zuzuführen; und
einen Entwicklungsmitteltank (2), der abnehmbar an der Bilderzeugungskassette (1) montiert ist und der bei geschlossenem Deckel (26) durch das Fenster (36) hindurch herausnehmbar ist.

Revendications

1. Appareil d'impression électrophotographique comprenant :
un tambour photosensible (6) ayant une couche photoconductrice sur sa surface;
un chargeur principal (17) pour charger uniformément la surface dudit tambour photosensible (6);
un réservoir d'agent de développement (2) pour contenir l'agent de développement xérographique;
un moyen de développement (3, 4) pour amener ledit agent de développement xérographique alimenté à partir dudit réservoir d'agent de développement (2) jusqu'à la surface dudit tambour photosensible (6); et
un appareil de nettoyage (7) pour enlever ledit agent de développement xérographique de la surface dudit tambour photosensible (6);
dans lequel une image visible utilisant ledit agent de développement xérographique correspondant à une image latente électrostatique formée sur ledit tambour photosensible (6) est formée, et dans lequel l'image visible est transférée sur la surface d'un papier d'impression pour réaliser l'impression;
ledit tambour photosensible (6), ledit chargeur principal (17), ledit moyen de développement (3, 4), un récipient destiné audit réservoir d'agent de développement, et ledit appareil de nettoyage (7) sont montés d'un seul tenant sur un élément support pour former une cartouche de formation d'image (1);
caractérisé en ce que
ladite cartouche (1) est montée de façon à pouvoir être démontée sur un corps principal (101) dudit appareil d'impression électrophotographique; et
ledit réservoir d'agent de développement (2) est monté de façon à pouvoir être démonté dans ledit récipient de ladite cartouche (1);
ladite cartouche de formation d'image (1) est disposée dans un cadre (103);
ledit cadre (103) comporte un couvercle

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supérieur (26) ayant une fenêtre (36); et

ledit réservoir d'agent de développement (2) peut être monté dans ledit récipient de ladite cartouche (1) et peut être enlevé dudit récipient de ladite cartouche (1) à travers ladite fenêtre (36) dudit couvercle supérieur (26), ce par quoi ledit réservoir d'agent de développement (2) peut être monté sur ledit récipient de ladite cartouche (1) et enlevé de celui-ci, tandis que ladite cartouche (1) est montée sur ledit corps (101) dudit appareil d'impression électrophotographique.

2. Appareil selon la revendication 1, dans lequel

ledit réservoir d'agent de développement (2) comporte un cylindre intérieur (41) ayant une ouverture, et un cylindre extérieur (40) ayant une ouverture qui ne recouvre pas l'ouverture dudit cylindre intérieur (41) lorsque ledit réservoir d'agent de développement (2) n'est pas monté dans ladite cartouche de formation d'image (1); et

ledit récipient comporte une ouverture recouvrant ladite ouverture dudit cylindre extérieur (40), lorsque ledit réservoir d'agent de développement (2) est monté dans ledit récipient;

ledit appareil comprend en outre un moyen pour faire tourner ledit cylindre intérieur (41) par rapport audit cylindre extérieur (40), de sorte que ladite ouverture dudit cylindre intérieur (41), ladite ouverture dudit cylindre extérieur (40), et ladite ouverture dudit récipient se recouvrent les unes les autres pour permettre l'alimentation depuis le réservoir d'agent de développement (2) jusqu'audit moyen de développement (3, 4).

3. Appareil selon la revendication 1, comprenant en outre une tête d'impression (9) pour former une image latente électrostatique sur ledit tambour photosensible (6), ladite tête d'impression (9) étant montée sur ledit couvercle supérieur (26) de manière à ce qu'elle puisse se déplacer par rapport audit couvercle supérieur (26).

4. Appareil selon la revendication 1, comprenant en outre un moyen de rappel (30) pour éloigner ladite tête d'impression (9) dudit couvercle supérieur (26).

5. Appareil selon la revendication 1, dans lequel

ledit réservoir d'agent de développement (2) comprend un cylindre intérieur (41) ayant une ouverture et un cylindre extérieur (40) ayant une ouverture,

ledit cylindre intérieur (41) pouvant tourner de façon indépendante de sorte que l'ouverture dudit cylindre intérieur (41) puisse être alignée avec l'ouverture dudit cylindre extérieur (40).

6. Appareil d'impression électrophotographique comprenant :

un corps principal (101), ledit corps principal (101) comprenant une pluralité de rouleaux de transport de papier (113, 115, 117, 119, 121);

un cadre (103) monté dans ledit corps principal (101) dudit appareil et possédant une ouverture qui fait face vers le haut;

un couvercle ouvrable (26) monté sur ledit cadre (307) couvrant ladite ouverture et possédant une fenêtre (36);

une cartouche de formation d'image (1) montée de façon à pouvoir être enlevée sur ledit corps principal (101), ladite cartouche de formation d'image (1) comprenant un tambour photosensible (6) ayant une couche photoconductrice sur sa surface, et des moyens (3, 4) pour amener un agent de développement audit tambour photosensible (6); et

un réservoir d'agent de développement (2) monté de façon à pouvoir être enlevé sur ladite cartouche de formation d'image (1) et pouvant être enlevé à travers ladite fenêtre (36) quand ledit couvercle (26) est fermé.