Description

FIELD OF THE INVENTION AND RELATED ART

The present invention relates to a process cartridge and an image forming apparatus using the process cartridge, wherein the process cartridge is detachably mountable into the image forming apparatus such as a copying apparatus and printer, more particularly to a driving system for the photosensitive member or drum contained in the process cartridge.

A process cartridge is known which is detachably mountable into a copying apparatus. The process cartridge is correctly positioned in the main assembly of the image forming apparatus by holding a part of a casing of the process cartridge by a positioning member mounted in the main assembly, as disclosed in U.S. Patents Nos. 4,591,258; 4,566,777; 4,575,221; and 4,588,280; and U.K. Patent No. 2119105. As for the photosensitive drum contained in the process cartridge, a more or less clearance is provided between the casing and the photosensitive drum in order to allow smooth rotation of the photosensitive drum in the process cartridge casing. This, however, may result in a change of the photosensitive drum position with respect to the main assembly when the photosensitive drum is driven from the main assembly side, and therefore, the image quality is deteriorated.

SUMMARY OF THE INVENTION

The present invention relates to a process cartridge arranged to be detachably located in the main assembly of an image forming apparatus as defined in claim 1.

How the present invention may be carried out will now be described, by way of example only, and with reference to the accompanying drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a longitudinal section of a part of a process cartridge and a part of an image forming apparatus according to an embodiment of the present invention.

Figure 2 is a cross-section of an image forming apparatus containing a process cartridge according to the embodiment of the present invention.

Figure 3 is a perspective view illustrating a helical gear for driving a photosensitive drum contained in the process cartridge.

Figure 4 is a sectional view illustrating force imparted to the photosensitive drum during the photosensitive drum being driven.

Figures 5 - 9 are sectional views of various modifications of the process cartridge according to embodiments of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A copying apparatus will be taken as an example of the image forming apparatus according to an embodiment of the present invention.

Referring to Figures 1 and 2, a part of the image forming apparatus and a part of a process cartridge according to an embodiment of the present invention are shown as a longitudinal section with respect to an axis of a photosensitive drum. The photosensitive drum is designated by reference numeral 1. To an end of the photosensitive drum 1, a flange 2 and a drum gear 3 which is a helical gear are fixed. The drum gear 3 is meshed with an unshown driving gear for driving a developing roller 11 to rotationally drive it. The process cartridge has a casing 4 having a drum positioning pin 5, which is engaged into a central bore of the flange 2, and a portion 3a of the drum gear 3 is engaged into a bore 4a of the cartridge casing, so that the photosensitive drum 1 is rotatably supported in the casing. A main assembly 6 of the copying apparatus has a cartridge positioning pin 7, which is inserted into a hole 4b of the process cartridge casing when the process cartridge is inserted into the main assembly in a direction indicated by an arrow in Figure 2. On the other hand, a pin 8 mounted to the main assembly 6 is inserted into a central bore of the drum gear 3. Thus, the process cartridge 4 is detachably received by the main assembly of the image forming apparatus. The main assembly 6 has a helical gear meshable with the aforementioned helical gear and is effective to drive the photosensitive drum 1 through the helical gear of the process cartridge. The helical gear 9 is driven by an unshown motor and it drives the drum gear 3.

As shown in Figure 2, wherein the process cartridge is shown as being inserted in place in the main assembly, the image forming apparatus further comprises a corona discharger 10, a developing roller 11, a developing device 12 and a cleaning device 13, which constitute in this embodiment process means contributable for forming repetitively an image on the photosensitive drum. Those process means are contained in the process cartridge 6 as a unit in this embodiment. The main assembly comprises a sheet feeding roller 14 and an image fixing device 15.

In operation, a copy sheet P of paper is fed by sheet feeding roller 14 and is advanced to a photosensitive drum 1 where a transfer corona discharger 16 is opposed thereto and is then pro-

cessed by the image fixing device 15 and is discharged. The photosensitive drum 1 is rotated in the direction indicated by an arrow, that is, a clockwise direction as shown in Figure 2.

As shown in Figure 3, the drum gear 3 is helically twisted counter clockwisely, that is, the helical drum gear 3 is twisted in the same direction as the direction of the photosensitive drum rotation during image forming operation. When the drum gear 3 is driven by a driving gear 9 which is also helical, the teeth of the drum gear 3 receive force in a direction perpendicular to the gear surface. The force can be resolved into a force in the circumferential direction of the photosensitive drum which is effective to rotate the photosensitive drum, and force in the direction of the rotational axis of the photosensitive drum which provides a thrust force in the leftward direction as seen in Figure 3, that is, the leftward direction as seen in Figure 2. Therefore, the photosensitive drum 1 is leftwardly urged.

As shown in Figure 4, a length 3c of the portion 3b of the drum gear 3 is shorter than a length 4c of the portion 4a, and therefore the portion 3b of the drum gear 3 pushes the portion 4b of the cartridge casing 4 leftwardly (arrow A), and as a result, the portion 4b of the casing 4 is leftwardly pushed (arrow B). Thus, the entire cartridge is urged to a portion 6a of a frame of the main assembly. Since, in this embodiment, the portion 6a of the main assembly is a reference positioning surface, to which a particular portion of the process cartridge casing 4 is abutted. As will be understood from the foregoing, the photosensitive drum 1 and the process cartridge casing 4 is always maintained at a predetermined position precisely by the photosensitive drum 1 being driven.

As will be understood from Figure 4, the drum gear 3 and the drum driving gear 9 are disposed adjacent such an longitudinal end of the process cartridge 4 as is nearer to the reference abutment surface 6a of the main assembly when the process cartridge is mounted in the main assembly. This is effective to correctly position the drum gear 3 with respect to the drum driving gear 9 in the thrust direction irrespective of manufacturing variations in lengths of the photosensitive drum. More particularly, the drum gear 3 is in alignment with the drum driving gear in the thrust direction so that the designed meshing conditions therebetween is achieved in the actual operation. Therefore, the teeth of the gear are not loaded with extreme force, and additionally, the force is not localized, whereby the meshing efficiency (a rate of a meshing portion to the entire length of the gear) is high, thus providing smooth rotation of the photosensitive drum.

Additional advantageous effects of employing the helical gear will be described, from a technical standpoint.

Because of the use of the helical gear, it is possible to form a high quality image without deterioration of the mechanical strength, even when the diameter of the photosensitive drum is reduced. Since a certain degree of mechanical strength of the gear is required for the drive transmission, there is a limitation to the dimension of the teeth. If the diameter of the photosensitive drum is decreased for the purpose of reducing the size and weight of the apparatus, the number of gear teeth relative to the unit circumferential length of the photosensitive drum decreases. If the photosensitive drum is driven with the relatively small number of gear teeth, the drum rotation becomes non-uniform, more particularly, the drum is substantially intermittently or stepwisely driven due to unavoidable play between gears. As a result, the image becomes not uniform in the circumferential direction of the photosensitive drum, thereby degrading the quality of the image. If the dimensions of the gear teeth are reduced in an attempt to increase the number of teeth, the mechanical strength and therefore the durability of the gear teeth decreases, and simultaneously, smooth meshing engagement at the time of the cartridge insertion is not accomplished. This is particularly important when the helical gears are automatically brought into meshing engagement with each other simply by inserting the process cartridge into the main assembly.

According to this invention, the drum gear 3 of the process cartridge is a helical gear to provide the above described problems simultaneously, as will be understood from the discussions made hereinbefore. Additionally, the helical gear is disposed at such a side of the process cartridge as is a leading side when the process cartridge is mounted into the main assembly, and the photosensitive drum is thrust and urged toward the leading side, when the photosensitive drum is driven through the helical gear, due to the direction of the helical twist of the helical gear. Therefore, the positioning by the helical gear is like an extension of the loading operation of the process cartridge to the correct position in the main assembly.

When the diameter of the photosensitive drum is 25 - 40 mm, the module of the helical drum gear 3 is preferably 0.5 - 1.5, and the twist angle is preferably 5 - 30 degrees, which have been confirmed through various experiments, since then the urging force and the friction between the drum gear 3 and the cartridge casing 4 are reconsiled property. In the embodiment actually produced, the diameter of the photosensitive drum 1 was 30 mm; and the drum gear 3 had the module of 0.8 and the twist angle of 10 degrees in the counter-clockwise

direction, with satisfactory results.

In the foregoing embodiment, the process cartridge detachably mountable into the main assembly contains the photosensitive drum 1, the corona discharger 10, the developing device 12 and the cleaning device 13. As other examples to which the present invention is applicable, the process cartridge may contain the photosensitive drum 1, the corona discharger 10 and the cleaning device 13, as shown in Figure 5. The process cartridge may contain the photosensitive drum 1, the discharger 10 and the developing device 12 as shown in Figure 6. The process cartridge main contain the photosensitive drum 1 and the cleaning device 13 or the developing device 12, as shown in Figure 7 or Figure 8. As an additional example, the process cartridge may contain the photosensitive drum 1, the discharger 10, the developing device 12 and the transfer discharger 16, as shown in Figure 9.

As described in the foregoing, according to the present invention, the process cartridge is automatically positioned to a reference position by a force imparted to the photosensitive drum by simply applying the driving force to the photosensitive member, so that the image forming operation can be effected with the process cartridge positioned correctly at the predetermined position during the image forming operation. Also, when the photosensitive drum is driven the process cartridge is moved to the predetermined reference position, and therefore, the process cartridge and the photosensitive drum in the process cartridge are placed in a designed position. Also, even if the diameter of the photosensitive drum is reduced, it is not necessary to reduce the dimensions of the gear teeth, so that a high quality image can be provided even in a small size apparatus without deteriorating the durability thereof.

While the invention has been described with reference to the structures disclosed herein, it is not confined to the details set forth and this application is intended to cover such modifications or changes as may come within the scope of the following claims.

Claims

1. A process cartridge arranged to be detachably located in the main assembly (6) of an image forming apparatus, said cartridge (4) comprising:
   a rotatable photosensitive member (1)
   process means (10,11,12,13) adapted to repetitively form images on said photosensitive member (1); and
   supporting means for supporting as a unit said photosensitive member and said process means,
   characterised in that the cartridge further comprises a helical gear (3) operatively coupled to said photosensitive member, said gear being adapted to mesh with a corresponding helical driving gear (9) provided in the main assembly (6) of the image forming apparatus in a manner that, when the cartridge is mounted to the main assembly, said photosensitive member is urged, when driven, in the direction of its rotational axis into a predetermined position in relation to the main assembly (6) of the image forming apparatus.

2. A cartridge as claimed in claim 1, wherein the helical gear (3) is disposed adjacent one longitudinal end of said photosensitive member (1) and is twisted, in use, in such a direction that when it receives the driving force from the image forming apparatus said helical gear (3) urges said photosensitive member toward said end.

3. A cartridge according to claim 1 or 2, wherein said helical gear (3) has a module of 0.5 - 1.5, and has a twist angle, with respect to its rotational axis, of 5 - 30 degrees.

4. A cartridge according to Claim 3, wherein the module is 0.8, and the twist angle is 10 degrees.

5. A cartridge according to any preceding claim, wherein said process cartridge is insertable into the image forming apparatus in the direction of the rotational axis of said photosensitive member (1), and said end is a leading end when said process cartridge is inserted into the image forming apparatus.

6. A cartridge according to any previous claim, further comprising a positioning portion cooperative with a member (8) of the image forming apparatus for relative positioning therebetween.

7. A cartridge according to claim 6, wherein said positioning portion is defined by an opening.

8. A cartridge according to claim 7, wherein the opening is coaxial with the rotation axis of said photosensitive member (1).

9. An image forming apparatus having a process cartridge as claimed in any preceding claim, and a second helical gear (9) meshed with the first mentioned helical gear (3) of the process cartridge to drive said photosensitive member (1).

direction, with satisfactory results.

In the foregoing embodiment, the process cartridge detachably mountable into the main assembly contains the photosensitive drum 1, the corona discharger 10, the developing device 12 and the cleaning device 13. As other examples to which the present invention is applicable, the process cartridge may contain the photosensitive drum 1, the corona discharger 10 and the cleaning device 13, as shown in Figure 5. The process cartridge may contain the photosensitive drum 1, the discharger 10 and the developing device 12 as shown in Figure 6. The process cartridge main contain the photosensitive drum 1 and the cleaning device 13 or the developing device 12, as shown in Figure 7 or Figure 8. As an additional example, the process cartridge may contain the photosensitive drum 1, the discharger 10, the developing device 12 and the transfer discharger 16, as shown in Figure 9.

As described in the foregoing, according to the present invention, the process cartridge is automatically positioned to a reference position by a force imparted to the photosensitive drum by simply applying the driving force to the photosensitive member, so that the image forming operation can be effected with the process cartridge positioned correctly at the predetermined position during the image forming operation. Also, when the photosensitive drum is driven the process cartridge is moved to the predetermined reference position, and therefore, the process cartridge and the photosensitive drum in the process cartridge are placed in a designed position. Also, even if the diameter of the photosensitive drum is reduced, it is not necessary to reduce the dimensions of the gear teeth, so that a high quality image can be provided even in a small size apparatus without deteriorating the durability thereof.

While the invention has been described with reference to the structures disclosed herein, it is not confined to the details set forth and this application is intended to cover such modifications or changes as may come within the scope of the following claims.

Claims

1. A process cartridge arranged to be detachably located in the main assembly (6) of an image forming apparatus, said cartridge (4) comprising:
   a rotatable photosensitive member (1)
   process means (10,11,12,13) adapted to repetitively form images on said photosensitive member (1); and
   supporting means for supporting as a unit said photosensitive member and said process means,
   characterised in that the cartridge further comprises a helical gear (3) operatively coupled to said photosensitive member, said gear being adapted to mesh with a corresponding helical driving gear (9) provided in the main assembly (6) of the image forming apparatus in a manner that, when the cartridge is mounted to the main assembly, said photosensitive member is urged, when driven, in the direction of its rotational axis into a predetermined position in relation to the main assembly (6) of the image forming apparatus.

2. A cartridge as claimed in claim 1, wherein the helical gear (3) is disposed adjacent one longitudinal end of said photosensitive member (1) and is twisted, in use, in such a direction that when it receives the driving force from the image forming apparatus said helical gear (3) urges said photosensitive member toward said end.

3. A cartridge according to claim 1 or 2, wherein said helical gear (3) has a module of 0.5 - 1.5, and has a twist angle, with respect to its rotational axis, of 5 - 30 degrees.

4. A cartridge according to Claim 3, wherein the module is 0.8, and the twist angle is 10 degrees.

5. A cartridge according to any preceding claim, wherein said process cartridge is insertable into the image forming apparatus in the direction of the rotational axis of said photosensitive member (1), and said end is a leading end when said process cartridge is inserted into the image forming apparatus.

6. A cartridge according to any previous claim, further comprising a positioning portion cooperative with a member (8) of the image forming apparatus for relative positioning therebetween.

7. A cartridge according to claim 6, wherein said positioning portion is defined by an opening.

8. A cartridge according to claim 7, wherein the opening is coaxial with the rotation axis of said photosensitive member (1).

9. An image forming apparatus having a process cartridge as claimed in any preceding claim, and a second helical gear (9) meshed with the first mentioned helical gear (3) of the process cartridge to drive said photosensitive member (1).

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10. An apparatus as claimed in claim 9, when utilising a cartridge as claimed in any of claims 6 to 8, and further including a first positioning portion (8) for engagement with said positioning portion of said process cartridge, said first positioning portion (8) being fixed to a frame (6) of said image forming apparatus.

11. An apparatus according to claim 10, and further including a second positioning portion (7) which is engageable interrelatedly with mounting of said process cartridge into said image forming apparatus.

12. An apparatus according to claim 10 or 11 when utilising a cartridge as claimed in claim 7 or 8 wherein said second positioning portion (7) includes a pin engaging with a bore (4b) of the cartridge.

13. An apparatus according to any of claims 9 to 12 in the form of an electrophotographic copying apparatus.

14. A process cartridge according to any of claims 1 to 8, wherein said process means (10,11,12,13) includes at least one of charging means (10), developing means (11,12) or cleaning means (13).

15. A process cartridge according to any of claims 1 to 8 or 14, wherein said process cartridge includes an abutment portion (3a) for abutting said image forming apparatus when said process cartridge is mounted to said image forming apparatus.

16. An apparatus according to claim 15, further comprising a receiving portion (4a) to be abutted by the abutment portion (3a).

17. A cartridge according to claim 1, wherein said photosensitive member is in the form of a drum, and a diameter of said helical gear is larger than that of the photosensitive member.

18. A cartridge according to claim 1, wherein said photosensitive member is in the form of a drum coaxial with said helical gear.

19. A process cartridge according to claim 1, wherein said process cartridge contains as a unit said photosensitive member (1), a corona discharger (10) as a part of said process means and cleaning means (13).

20. A process cartridge according to claim 1, wherein said process cartridge contains as a unit said photosensitive member (1), a corona discharger (10) as a part of said process means and developing means (12).

21. A process cartridge according to claim 1, wherein said process cartridge contains as a unit said photosensitive member (1), and cleaning means (13) as a part of said process means.

22. A process cartridge according to claim 1, wherein said process cartridge contains as a unit said photosensitive member (1), and developing means (12) as a part of said process means.

Patentansprüche

1. Verarbeitungseinheit (4), die derart ausgebildet ist, daß sie herausnehmbar in der Hauptbaugruppe eines Bilderzeugungsgerätes angeordnet ist, mit:

einem drehbaren lichtempfindlichen Bauelement (1);

Verarbeitungseinrichtungen (10,11,12,13), die für ein wiederholtes Erzeugen von Bildern auf dem lichtempfindlichen Bauelement (1) geeignet sind; und

Halteeinrichtungen zum Halten des lichtempfindlichen Bauelementes und der Verarbeitungseinrichtungen als eine Einheit,

dadurch gekennzeichnet daß,

die Verarbeitungseinheit außerdem ein zu dem lichtempfindlichen Bauelement in Wirkverbindung stehendes Schrägzahnrad (3) hat, das mit einem entsprechenden schrägverzahnten Antriebsrad (9) in Eingriff bringbar ist, das in der Hauptbaugruppe (6) des Bilderzeugungsgerätes in einer Weise angebracht ist, daß, wenn die Verarbeitungseinheit an der Hauptbaugruppe befestigt ist, das lichtempfindliche Bauelement, wenn angetrieben, in Richtung seiner Drehachse, in eine festgelegte Position in bezug auf die Hauptgruppe (6) des Bilderzeugungsgerätes andrückbar ist.

2. Verarbeitungseinheit gemäß Anspruch 1, worin das Schrägzahnrad (3) an einem längseitigen Endabschnitt des lichtempfindlichen Bauelementes (1) angrenzend angeordnet ist und, beim Betrieb, in eine solche Richtung verdrehbar ist, daß, wenn es die Antriebskraft von dem Bilderzeugungsgerät aufnimmt, das Schrägzahnrad (3) das lichtempfindliche Bauelement gegen den Endabschnitt drückt.

3. Verarbeitungseinheit gemäß Anspruch 1 oder 2, worin das Schrägzahnrad einen Modul von

0.5 bis 1.5 und einen Schrägungswinkel von 5 bis 30°, mit Bezug auf seine Drehachse, hat.

4. Verarbeitungseinheit gemäß Anspruch 3, worin der Modul 0.8 und der Schrägungswinkel 10° ist.

5. Verarbeitungseinheit gemäß einem der vorhergehenden Ansprüche, wobei die Verarbeitungseinheit in das Bilderzeugungsgerät in Richtung der Drehachse des lichtempfindlichen Bauelementes (1) einführbar ist und der Endabschnitt ein vornliegender Abschnitt ist, wenn die Verarbeitungseinheit in das Bilderzeugungsgerät eingefügt wird.

6. Verarbeitungseinheit gemäß einem der vorhergehenden Ansprüche, die außerdem einen Positionierungsabschnitt hat, der mit einem Bauelement (8) des Bilderzeugungsgerätes zur Relativpositionierung dieser Bauteile zusammenwirkt.

7. Verarbeitungseinheit gemäß Anspruch 6, worin der Positionierungsabschnitt durch eine Öffnung gebildet ist.

8. Verarbeitungseinheit gemäß Anspruch 7, worin die Öffnung koaxial mit der Drehachse des lichtempfindlichen Bauelementes (1) ist.

9. Bilderzeugungsgerät mit einer Verarbeitungseinheit, gemäß einem der vorhergehenden Ansprüche, und einem zweiten Schrägzahnrad (9), das mit dem zuerst genannten Schrägzahnrad (3) der Verarbeitungseinheit kämmt, um das lichtempfindliche Bauelement (1) anzutreiben.

10. Gerät gemäß Anspruch 9 mit einer Verarbeitungseinheit, gemäß einem der Ansprüche 6 bis 8 und das außerdem einen ersten Positionierungsabschnitt (8) zum Eingriff mit dem Positionierungsabschnitt der Verarbeitungseinheit hat, wobei der erste Positionierungsabschnitt (8) an einem Rahmen (6) des Bilderzeugungsgerätes befestigt ist.

11. Gerät gemäß Anspruch 10, das außerdem einen zweiten Positionierungsabschnitt (7) enthält, der beim Befestigen der Verarbeitungseinheit in dem Bilderzeugungsgerät in Eingriff bringbar ist.

12. Gerät gemäß Anspruch 10 oder 11, mit einer Verarbeitungseinheit gemäß Anspruch 7 oder 8, worin der zweite Positionierungsabschnitt (7) einen Stift hat, der mit einer Bohrung (4b) der Verarbeitungeinheit in Eingriff steht.

13. Gerät gemäß einem der Ansprüche 9 bis 12, wobei das Gerät ein elektrofotografisches Kopiergerät ist.

14. Verarbeitungseinheit gemäß einem der Ansprüche 1 bis 8, worin die Verarbeitungseinrichtungen (10,11,12,13) mindestens eine Ladungseinrichtung (10), Entwicklungseinrichtung (11,12) oder Reinigungseinrichtung (13) enthalten.

15. Verarbeitungseinheit gemäß einem der Ansprüche 1 bis 8 oder 14, worin die Verarbeitungseinheit einen Anlageabschnitt (3a) zur Anlage für das Bilderzeugungsgerät hat, worin die Verarbeitungseinheit an dem Bilderzeugungsgerät befestigt ist.

16. Gerät gemäß Anspruch 15, das außerdem einen Aufnahmeabschnitt (4a) hat, der mit dem Anlageabschnitt (3a) in Anlage bringbar ist.

17. Verarbeitungseinheit gemäß Anspruch 1, worin das lichtempfindliche Bauelement die Form einer Walze hat, und der Durchmesser des Schrägzahnrades größer ist als der des lichtempfindlichen Bauelementes.

18. Verarbeitungseinheit gemäß Anspruch 1, worin das lichtempfindliche Bauelement die Form einer Walze hat und koaxial mit dem Schrägzahnrad angeordnet ist.

19. Verarbeitungseinheit gemäß Anspruch 1, worin die Verarbeitungseinheit das lichtempfindliche Bauelement (1), einen Übertragungs-Koronaentlader (10) als einen Teil der Verarbeitungseinrichtungen und eine Reinigungseinrichtung (13) als eine Einheit enthält.

20. Verarbeitungseinheit gemäß Anspruch 1, worin die Verarbeitungseinheit das lichtempfindliche Bauelement (1), einen Übertragungs-Koronaentlader (10) als einen Teil der Verarbeitungseinrichtungen und eine Entwicklungseinrichtung (12) als eine Einheit enthält.

21. Verarbeitungseinheit gemäß Anspruch 1, worin die Verarbeitungseinheit das lichtempfindliche Bauelement (1) und, als ein Teil der Verarbeitungseinrichtungen, eine Reinigungseinrichtung (13) als eine Einheit enthält.

22. Verarbeitungseinheit gemäß Anspruch 1, worin die Verarbeitungseinheit das lichtempfindliche Bauelement (1) und, als ein Teil der Verarbei-

tungseinrichtungen, eine Entwicklungseinrichtung (12) als eine Einheit enthält.

Revendications

1. Cartouche de traitement agencée pour être placée de façon amovible dans l'ensemble principal (6) d'un appareil de formation d'images, ladite cartouche (4) comportant :
un élément photosensible rotatif (1),
des moyens de traitement (10, 11, 12, 13) destinés à former de façon répétitive des images sur ledit élément photosensible (1) ; et
des moyens de support destinés à supporter en un bloc ledit élément photosensible et lesdits moyens de traitement,
caractérisée en ce que la cartouche comporte en outre une roue dentée hélicoïdale (3) accouplée fonctionnellement audit élément photosensible, ladite roue dentée étant destinée à engrener avec une roue dentée hélicoïdale menante correspondante (9) prévue dans l'ensemble principal (6) de l'appareil de formation d'images d'une manière telle que, lorsque la cartouche est montée sur l'ensemble principal, ledit élément photosensible soit sollicité, pondant qu'il est entraîné, dans la direction de son axe longitudinal jusque dans une position prédéterminée par rapport à l'ensemble principal (6) de l'appareil de formation d'images.

2. Cartouche selon la revendication 1, dans laquelle la roue dentée hélicoïdale (3) est disposée à proximité immédiate d'une extrémité longitudinale dudit élément photosensible (1) et est tournée en vrille, lors de l'utilisation, dans un sons tel que, lorsqu'elle reçoit la force d'entraînement provenant de l'appareil de formation d'images, ladite roue dentée hélicoïdale (3) sollicite ledit élément photosensible vers ladite extrémité.

3. Cartouche selon la revendication 1 ou 2, dans laquelle ladite roue dentée hélicoïdale (3) présente un module de 0,5 à 1,5, et un angle de rotation en vrille, par rapport à son axe longitudinal, de 5 à 30 degrés.

4. Cartouche selon la revendication 3, dans laquelle le module est de 0,8 et l'angle de rotation en vrille est de 10 degrés.

5. Cartouche selon l'une quelconque des revendications précédentes, dans laquelle ladite cartouche de traitement peut être insérée dans l'appareil de formation d'images dans la direction de l'axe de rotation dudit élément photosensible (1), et ladite extrémité est une extrémité avant lorsque ladite cartouche de traitement est insérée dans l'appareil de formation d'images.

6. Cartouche selon l'une quelconque des revendications précédentes, comportant en outre une partie de positionnement coopérant avec un élément (8) de l'appareil de formation d'images pour un positionnement relatif entre eux.

7. Cartouche selon la revendication 6, dans laquelle ladite partie de positionnement est définie par une ouverture.

8. Cartouche selon la revendication 7, dans laquelle l'ouverture est coaxiale avec l'axe de rotation dudit élément photosensible (1).

9. Appareil de formation d'images ayant une cartouche de traitement selon l'une quelconque des revendications précédentes, et une seconde roue dentée hélicoïdale (9) en prise avec la première roue dentée hélicoïdale citée (3) de la cartouche de traitement pour entraîner ledit élément photosensible (1).

10. Appareil selon la revendication 9, lorsqu'il utilise une cartouche selon l'une quelconque des revendications 6 à 8, et comprenant en outre une première partie (8) de positionnement destinée à s'engager avec ladite partie de positionnement de ladite cartouche de traitement, ladite première partie (8) de positionnement étant fixée à un bâti (6) dudit appareil de formation d'images.

11. Appareil selon la revendication 10, et comprenant en outre une seconde partie (7) de positionnement qui peut être engagée en liaison avec le montage de ladite cartouche de traitment dans ledit appareil de formation d'images.

12. Appareil selon la revendication 10 ou 11 lorqu'il utilise une cartouche selon la revendication 7 ou 8, dans lequel ladite seconde partie (7) de positionnement comprend un ergot s'engageant dans un trou (4b) de la cartouche.

13. Appareil selon l'une quelconque des revendications 9 à 12, sous la forme d'un appareil de copie électrophotographique.

14. Cartouche de traitement selon l'une quelconque des revendications 1 à 8, dans laquelle lesdits moyens de traitement (30, 11, 12, 13) comprennent au moins un moyen de chargé (10), un moyen de développement (11, 12) ou

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un moyen de nettoyage (13).

15. Cartouche de traitement selon l'une quelconque des revendications 1 à 8 ou 14, dans laquelle ladite cartouche de traitement comprend une partie de butée (3a) destinée à s'appliquer en butée contre ledit appareil de formation d'images lorsque ladite cartouche de traitement est montée sur ledit appareil de formation d'images.

16. Appareil selon la revendication 15, comportant en outre une partie (4a) de réception destinée à recevoir en butée la partie de butée (3a).

17. Cartouche selon la revendication 1, dans laquelle ledit élément photosensible se présente sous la forme d'un tambour, et le diamètre de ladite roue dentée hélicoïdale est supérieur à celui de l'élément photosensible.

18. Cartouche selon la revendication 1, dans laquelle ledit élément photosensible se présente sous la forme d'un tambour coaxial avec ladite roue dentée hélicoïdale.

19. Cartouche selon la revendication 1, dans laquelle ladite cartouche de traitement contient en un bloc ledit élément photosensible (1), un dispositif (10) de décharge d'effluves faisant partie desdits moyens de traitement et un moyen (13) de nettoyage.

20. Cartouche de traitement selon la revendication 1, dans laquelle ladite cartouche de traitement contient d'un seul bloc ledit élément photosensible (1), un dispositif (10) de décharge d'effluves faisant partie desdits moyens de traitement et un moyen (12) de développement.

21. Cartouche de traitement selon la revendication 1, dans laquelle ladite cartouche de traitement contient en un bloc ledit élément photosensible (1), et un moyen de nettoyage (13) faisant partie desdits moyens de traitement.

22. Cartouche de traitement selon la revendication 1, dans laquelle ladite cartouche de traitement contient en un bloc ledit élément photosensible (1) et un moyen (12) de développement faisant partie desdits moyens de traitement.