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(72) Inventors:
• **Wu, Lianjun**
Zhuhai Guangdong (CN)
• **Ding, Geming**
Zhuhai Guangdong (CN)

(71) Applicant: **Zhuhai Seine Technology Limited**
Xiangzhou District
Zhuhai Guangdong (CN)

(74) Representative: **Stuttard, Garry Philip**
Urquhart-Dykes & Lord LLP
Tower North Central
Merrion Way
Leeds LS2 8PA (GB)

(54) **Processing cartridge with a handle**

(57) The present invention provides a processing cartridge; the processing cartridge comprises at least a photosensitive drum, a developing roller, a casing (1) containing the photosensitive drum and the developing roller; the photosensitive drum is fixed to the casing to

form an electrostatic latent image, and the developing roller develops the electrostatic latent image on the photosensitive drum; the processing cartridge also comprises a handle (2), and the handle (2) is retractably fixed to the protective casing (1), which has an extending status and a shrinking status opposite to the extending status.

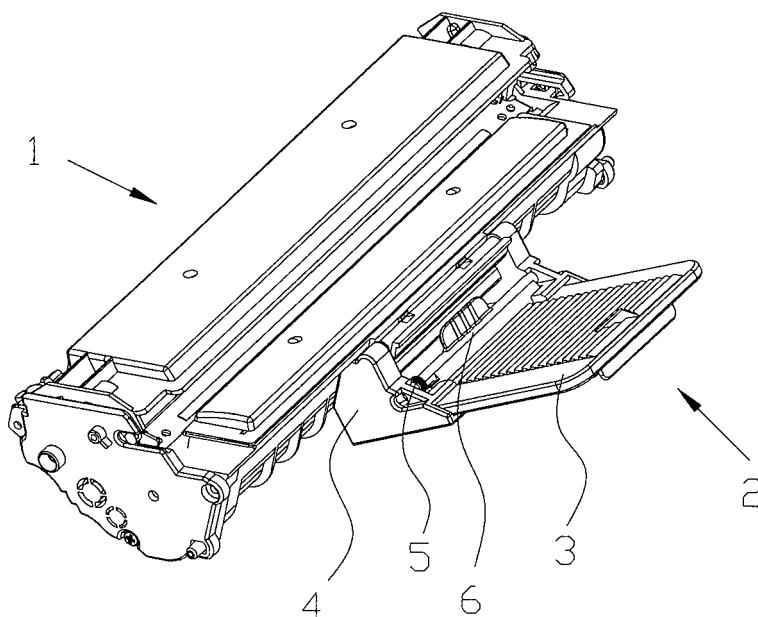


FIG. 2

Description

[0001] The present invention involves a processing cartridge used in an electronic imaging device such as a laser printer, a copying machine or a fax machine.

[0002] In the existing techniques, the processing cartridge of an ordinary electronic imaging device comprises a photosensitive drum, a developing roller, and a casing containing the photosensitive drum and the developing roller. The photosensitive drum is used to receive an electrostatic latent image; the developing roller provides the developer to the photosensitive drum to develop the electrostatic latent image.

[0003] When the developer in the processing cartridge is used up, the processing cartridge needs to be replaced. For that object, an ordinary processing cartridge is provided with a handle on its casing, for the convenience of assembling and disassembling the processing cartridge easily.

[0004] However, the handle of the above mentioned processing cartridge extrudes farther than the periphery of the casing of the processing cartridge, which enlarges the dimension of the processing cartridge, and that is very uneconomical.

[0005] The existing techniques also provide another kind of processing cartridge, which is provided with a folding handle fixed to the casing of the processing cartridge by a pivot, to be capable of rotating around a pivot, so as to reduce the size of the processing cartridge; but when being assembled or disassembled, it is easy to rotate around the pivot, so it is not stable.

[0006] To solve the above mentioned problems, the present invention provides a processing cartridge; the processing cartridge comprises at least a photosensitive drum, a developing roller, a casing containing the photosensitive drum and the developing roller; the photosensitive drum is fixed on the casing to form an electrostatic latent image, and the developing roller develops the electrostatic latent image on the photosensitive drum; the processing cartridge also comprises a handle, and the handle is retractably fixed to the casing, which has an extending status and a shrinking status opposite to the extending status.

[0007] The handle is symmetrically located at the approximately center of the casing. The handle comprises at least one handle slide block, at least one handle support, at least one handle torsion spring, and at least one handle stopper; the handle support is fixed to the casing, and is connected to the casing as one body; the handle stopper and the handle torsion spring are fixed to the handle support; the handle torsion spring is fixed to the handle stopper, and is at a pretightening status, so as to make the handle stopper have a certain restoring force.

[0008] Two sides of the handle support are separately provided with slideways, and the handle slide block can slide on the slideways, so as to make the handle to form the extending status and the shrinking status opposite to the extending status.

[0009] Many bulges are formed on the handle slide block, and block grooves are formed between the bulges; the handle stopper is provided with a block tip, a push pedal, and a rotation axis; the handle torsion spring is located on the rotation axis; the block tip can be stuck into the block groove, and the length of the block tip is longer than the vertical distance from the rotation axis to the handle slide block; at this time the block tip can apply an acting force to the bulge to limit the sliding of the handle slide block; when an acting force is applied to the push pedal, the block tip exits from the block groove, so the handle slide block can slide freely.

[0010] When the handle is at the extending status, for the restoring force of the handle torsion spring, the block tip of the handle stopper is stuck into the block groove on the handle slide block; for the length of the block tip is longer than the vertical distance from the rotation axis to the handle slide block, at this time the block tip can apply an acting force to the bulge to limit the handle stopper to rotate counterclockwise, so as to make the handle slide block unable to slide downwards.

[0011] When separately applying a push force to the push pedal and the handle slide block, the block tip exits from the block groove, and at this time, under the action of the push force being applied, the handle slide block slides to the shrinking status along the slideway on the handle support.

[0012] When the processing cartridge is used, if a pull force is applied to the handle slide block, the handle slide block can slide on the slideway to the extending status.

[0013] Comparing with the existing techniques, the advantages of the present invention are that:

[0014] when the handle is at the shrinking status, the size of packaging and storing is decreased, so as to save the cost;

[0015] when the handle is at the extending status, it is convenient for the users to assemble or disassemble the processing cartridge in an electronic imaging device;

[0016] the structure is more stable and reliable than the folding handle.

[0017] FIG. 1 is a schematic diagram of the shrinking status of the processing cartridge in accordance with an embodiment of the present invention;

[0018] FIG. 2 is a schematic diagram of the extending status of the processing cartridge in accordance with an embodiment of the present invention;

[0019] FIG. 3 is a sectional schematic diagram of the side of the processing cartridge in accordance with an embodiment of the present invention; and

[0020] FIG. 4 is a local enlarged schematic diagram of the handle of the processing cartridge in accordance with an embodiment of the present invention.

[0021] The detailed components and elements described in the description are provided to roundly understand the embodiments of the present invention. So, those skilled in the art will realize to be capable of making various modifications and changes to the embodiments described here, without deviating from the scope and

spirit of the present invention. To be simple, the description to known functions and structures is omitted.

[0022] Referring to FIG. 1, FIG. 2 and FIG. 3, the processing cartridge comprises a photosensitive drum, a developing roller, a casing 1 containing the photosensitive drum and the developing roller, and a handle 2. The handle 2 is retractably fixed on the casing 1, and is approximately located at the center of the casing along the axial direction of the photosensitive drum, which has shrinking status and extending status. The handle 2 comprises a handle slide block 3, a handle support 4, a handle torsion spring 5, and a handle stopper 6.

[0023] The handle support 4 is fixed to the casing 1, and is connected to it as one body; the handle torsion spring 5 is fixed to the handle stopper 6, and the handle stopper 6 is fixed to the handle support 4; the handle torsion spring 5 is at a pretightening status, to make the handle stopper 6 have a certain restoring force.

[0024] Referring to FIG. 3, the two sides of the handle support 4 are separately provided with slideways 41; many bulges 31 are formed on the handle slide block 3, and block grooves 32 are formed between the bulges 31; the handle stopper 6 is provided with a block tip 61, a push pedal 62, and a rotation axis 63.

[0025] When the processing cartridge needs to change from the shrinking status to the extending status, a pull force F1 is applied to the handle slide block 3, and the handle slide block 3 can slide upward along the slideway 41; at this time, the handle stopper 6 rotates clockwise. Under the action of the restoring force applied by the handle torsion spring 5, the handle stopper 6 rotates counterclockwise to recover to the original status.

[0026] When the pull force F1 applied to the handle slide block 3 is removed, the handle stopper 6 rotates counterclockwise under the action of the restoring force of the handle torsion spring 5, to recover to the original status, and the block tip 61 of the handle stopper 6 is stuck into the block groove 32 on the handle slide block 3. When a pull force F2 is applied to the handle slide block 3, the bulges 31 of the handle slide block 3 apply a force F rotating counterclockwise to the block tip 61, to make the handle stopper 6 have the trend of rotating counterclockwise. The length of the block tip 61 of the handle stopper 6 is longer than the vertical distance from the rotation axis 63 to the handle slide block 3; at this time, a barrier force is applied to the bulge 31 on the handle slide block 3 by the block tip 61, so the handle stopper 6 can not rotate counterclockwise, and the handle slide block 3 can not slide downwards.

[0027] Referring to FIG. 4, when a push force F3 is applied to the push pedal 62 of the handle stopper 6, the handle stopper 6 rotates clockwise, and the block tip 61 exits from the block groove 32; when a push force F4 is applied to the handle slide block 3, the handle slide block 3 can slide on the slideway 41 of the handle support 4, and at this time, the handle changes from the extending status to the shrinking status.

Claims

1. A processing cartridge comprising a photosensitive drum, a developing roller, a casing containing the photosensitive drum and the developing roller, wherein the photosensitive drum is fixed to the casing to form the electrostatic latent image and the developing roller develops the electrostatic latent image on the photosensitive drum, and a handle, **characterized in that** the handle is retractably fixed to the protective casing and has an extending status and a shrinking status opposite to the extending status.
2. A processing cartridge as claimed in claim 1 wherein the handle comprises at least one handle slide block, at least one handle support, at least one handle torsion spring and at least one handle stopper; wherein the handle support is fixed to the casing and is connected to the casing as one body; wherein the handle stopper and the handle torsion spring are fixed to the handle support; wherein the handle torsion spring is fixed to the handle stopper and is at a pretightening status so as to make the handle stopper have a certain restoring force.
3. A processing cartridge as claimed in claim 2 wherein two sides of the handle support are separately provided with slideways and the handle slide block can slide on the slideways so as to make the handle form the extending status and the shrinking status opposite to the extending status.
4. A processing cartridge as claimed in claim 2, wherein a plurality of bulges are formed on the handle slide block and block grooves are formed between the bulges, wherein the handle stopper is provided with a block tip, a push pedal and a rotation axis, wherein the handle torsion spring is located on the rotation axis, wherein the block tip can be stuck into the block groove and the length of the block tip is longer than the vertical distance from the rotation axis to the handle slide block whereby the block tip can apply an acting force to the bulge to limit the sliding of the handle slide block and when an acting force is applied to the push pedal, the block tip exits from the block groove so that the handle slide block can slide freely.
5. A processing cartridge as claimed in any preceding claim wherein the handle is symmetrically located at the approximate center of the casing.

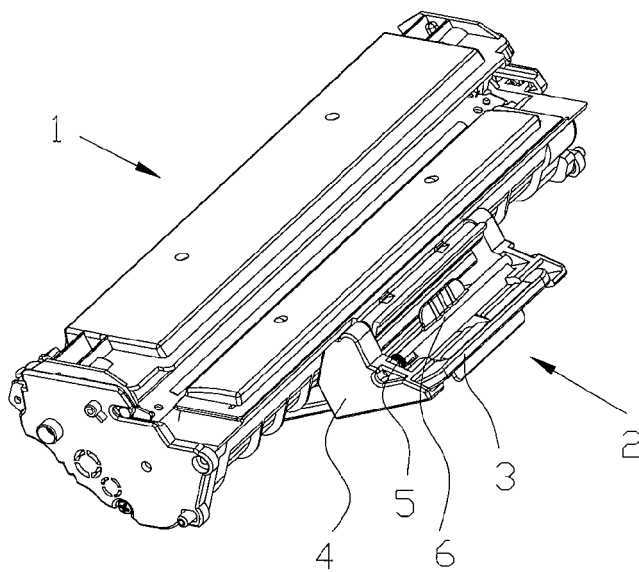


FIG. 1

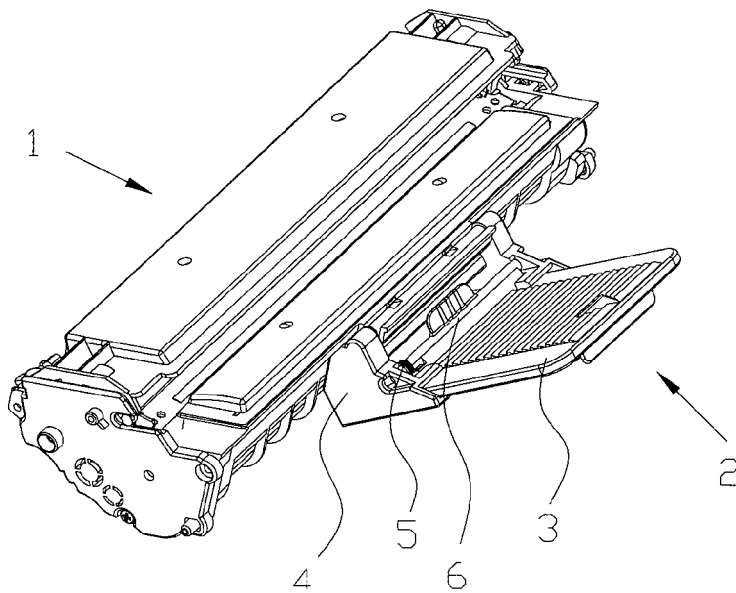


FIG. 2

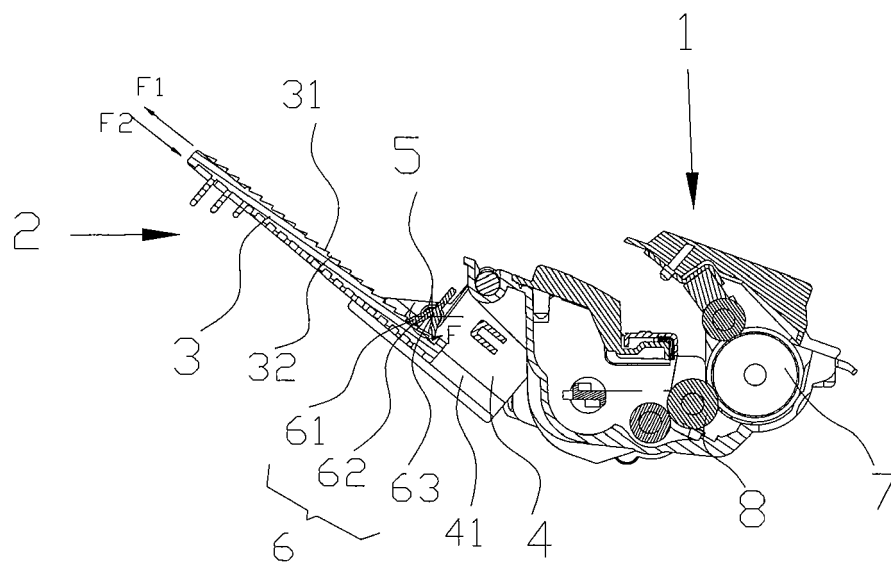


FIG. 3

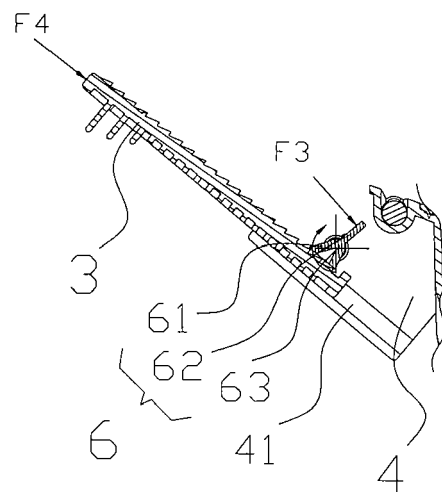


FIG. 4



EUROPEAN SEARCH REPORT

Application Number
EP 09 15 5412

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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X	JP 2003 084646 A (CANON KK) 19 March 2003 (2003-03-19) * abstract; figures 6-9 * * paragraphs [0090] - [0096] * -----	1,5	
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X	CN 101 373 369 A (ZHUHAI SAINA TECHNOLOGY CO LTD [CN]) 25 February 2009 (2009-02-25) * abstract; figures 1,2 * -----	1,5	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			G03G
Place of search		Date of completion of the search	Examiner
Munich		23 July 2009	Billmann, Frank
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 15 5412

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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23-07-2009

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