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(54) **DONGLE GEAR PROCESS**

(57) The manufacturing process of toner cartridges for laser printers by improvement and adjustment of organic photo conductors, which comprises of a sequential procedure as follows: inspection of format and conditions of a toner cartridge; disassembly of the toner cartridge and cleaning of each part; the improvement and adjustment of the organic photo conductor; and the assembly

of parts for a complete toner cartridge. The improvement and adjustment of the organic photo conductor can be performed to improve and adjust the used organic photo conductor that has the length over a specified limit by using a cutting tool for cutting the organic photo conductor machine as well as to improve and adjust a used organic photo conductor that has the length as specified.

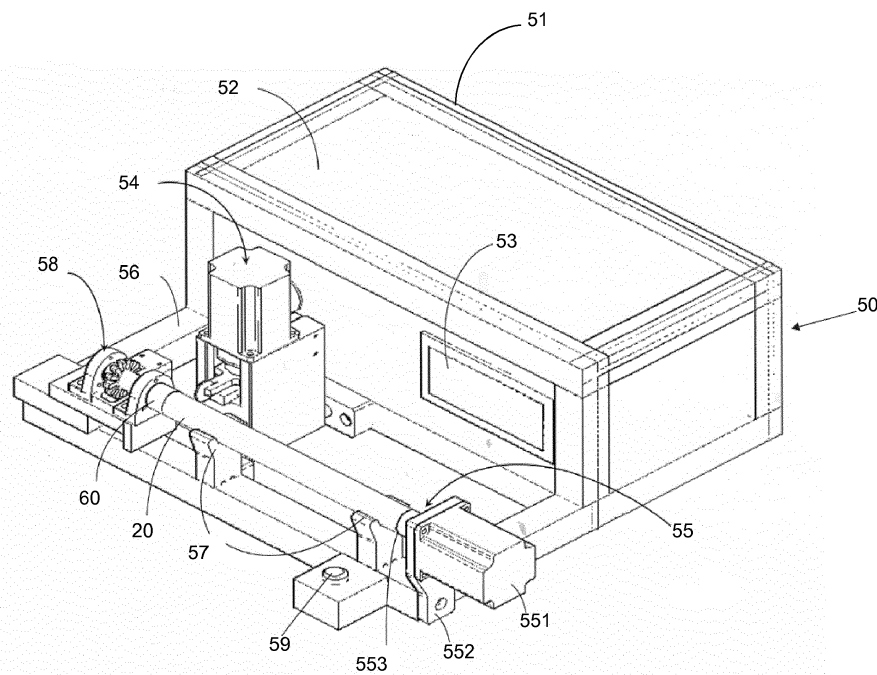


Fig. 4

Description

Title of Invention

[0001] Manufacturing process of toner cartridges for laser printers by improvement and adjustment of the organic photo conductor and cutting tool therefor.

Technical Field of Invention

[0002] Production engineering that involves the manufacturing process of toner cartridges for laser printers by the improvement and adjustment of the organic photo conductor and cutting tool therefor.

Background Art or Relevant Technical

[0003] Toner cartridges for laser printers nowadays are rather convenient and simple to use. The quality of the printed documents or articles is also relatively better than other types of toner cartridges. Current toner cartridges for laser printers have various characteristics and properties regarding the model and brand of the printer. As a result, the demand for toner cartridges has increased drastically. An impact that follows is the increase of waste as scrape of materials or parts that are the components of toner cartridges.

[0004] Therefore, there is the need to recycle toner cartridges for laser printers by disassembly and reassembly. The disassembly must rely on compliance of the engineering and manufacturing process and their specified regulations. Engineering tools are applied in the disassembly to achieve the maximum efficiency and a comparable quality between toner cartridge sand recycled toner cartridges. In addition, the production must use materials or parts from the used toner cartridges in order to further reduce waste of scrape materials or of parts of the toner cartridges as much as possible. The recycling process of the used toner cartridges for laser printers has a assembly that is clearly referenced by specified regulations, e. g. given in US 8,644,732. Therefore, the organic photo conductor of a used toner cartridge must be inspected and tested comprehensively and accurately according to all specified regulations. In case that the organic photo conductor failed the inspections and tests or has any problem, an adjustment to use organic photo conductors from other toner cartridge models is required. If the organic photo conductor from other toner cartridge models can be applied in the toner cartridge production, this can reduce the waste from the organic photo conductor by 80% of the total organic photo conductors that passed the inspection and test. Nevertheless, this depends on the manufacturing procedures, which are based on the compliance with specified regulations, and must use the materials or parts from the old toner cartridge.

The problem to be solved therefor is to reduce waste as scrape of materials or parts of the toner cartridge as much

as possible and to achieve the maximum efficiency and comparable quality between toner cartridges and recycled toner cartridges.

The invention solves this problem by a procedure of improvement and adjustment of an organic photo conductor for a used organic photo conductor that has the length over a specified limit according to claim 1 and by a procedure of improvement and adjustment of an organic photo conductor for a used organic photo conductor that has a length as specified and without the coupling member of the laser printer according to claim 2.

[0005] This invention involves the manufacturing process of a toner cartridge for a laser printer by improvement and adjustment of an organic photo conductor, which comprises of a sequential procedure as follows: inspection of format and conditions of the toner cartridge; disassembly of the toner cartridge and cleaning of each part; improvement and adjustment of the organic photo conductor; and the assembly of parts for a complete toner cartridge.

[0006] The improvement and adjustment of the organic photo conductor can be categorized into 2 cases as follows.

[0007] In Case 1 a used organic photo conductor has a length over a specified limit. The procedure for the improvement and adjustment of the organic photo conductor are then as follows. Cutting of the used organic photo conductor on the same side as its contact gear so that the cut organic photo conductor will have a standard length and can be reinstalled on the toner cartridge. This can be achieved by using a cutting tool for the organic photo conductor of the toner cartridge for laser printer.

[0008] Coring of the internal of the organic photo conductor on the mentioned cut side in order to make a larger internal diameter of the cut side of the organic photo conductor in coring direction.

[0009] Removing of a drive joint, also called triangle gear that is on the other side of the mentioned cut side of the organic photo conductor. This is done in order to make the required size of the cylinder of the organic photo conductor.

[0010] Assembly of a contact gear, also called drive gear, of a ready to use printer to one side of the cylinder of the organic photo conductor by fastening.

[0011] Attachment of a coupling member of the printer. This can be done by attaching the coupling member of the ready to use printer with the other side of the cylinder of the organic photo conductor by secure bonding, and thus obtaining a recycled used organic photo conductor.

[0012] In Case 2 the used organic photo conductor has a length as a specified limit. The procedure for the improvement and adjustment of the organic photo conductor comprises removing of the drive joint that is on one side of the organic photo conductor. The mentioned organic photo conductor will have a contact gear on the other side.

[0013] Attachment of the coupling member of the printer. This can be done by attaching the coupling member

of the ready to use printer to the other side of the cylinder of the organic photo conductor by secure bonding, and thus obtaining a recycled used organic photo conductor.

[0014] Purpose of this invention is to arrange a manufacturing process for toner cartridges of laser printers by improvement and adjustment of the organic photo conductor. The manufacturing process focuses on recycling the used toner cartridges by using materials and parts of the old toner cartridges in reduce waste as scrape of materials or parts of the toner cartridge as much as possible. In addition, it also focuses to achieve the maximum efficiency and comparable quality between toner cartridges and recycled toner cartridges.

Further the invention solves the problem with a cutting tool for the organic photo conductor according to claim 3. Cutting tool of the organic photo conductor or similar comprises a motion controller set of a blade comprising of a first motor, that is the motor uses for blade rotation for cutting the organic photo conductor, a blade support attached with the end of the first motor, installed on the blade support and placed on the blade support housing, the function of the blade support is a power transmission from the first motor to the blade, the blade rotates with the speed of the first motor that is set in advanced, and a skid at the bottom of the blade support housing, the skid has a skid support on both side of the skid, the skid support is a fastener between a tool frame and the blade motion controller set.

The cutting tool further comprises a first holder for a cylinder of the organic photo conductor comprising a speed sensor to detect unbalance in speed at the end of the cylinder of the organic photo conductor on both sides, the speed sensor will send a signal to the first motor of the blade motion controller set and a second motor of a cylinder holder of the organic photo conductor to stop the operation, a shaft that holds the cylinder of the organic photo conductor attached with the speed sensor, this shaft holding the cylinder of the organic photo conductor is a cylinder fastener of the organic photo conductor that requires cutting on the contact gear side of the organic photo conductor, the bottom of a first cylinder holder of the organic photo conductor is a shaft support that holds the organic photo conductor as a supporter to fasten the first cylinder holder of the organic photo conductor to a front frame of the tool frame

[0015] The cutting tool further comprises a second holder of the cylinder of the organic photo conductor comprising the second motor, and is welded to the side of the front frame of the tool frame by an aluminum coupling, the second motor is the motor that is used to rotate the organic photo conductor on the side of the coupling member of the printer with the speed set in advanced, the speed is set to be related to the speed of the first motor of the blade motion controller set, and a holder of the organic photo conductor attached to the axle of the second motor, the function of the holder of the organic photo conductor is to fasten the organic photo conductor on the side with the coupling member of the printer.

In a preferred embodiment of the invention the cutting tool of the organic photo conductor comprises a control box made from plastic, in the front of the control box there is a monitor to display the operation of the first motor of the motion controller set of the blade and the second motor of the second cylinder holder of the organic photo conductor, inside the control box, there is a mode to control the first motor, a mode to control the second motor, switches box and power supply.

Also it is preferred that a front frame is connected with the front of the control box. The front frame is a part used for installation of the motion controller set of the blade and cylinder holders of the organic photo conductor, the first cylinder holder of the organic photo conductor is installed on the left-hand side of the front frame of the tool frame and the second cylinder holder of the organic photo conductor is installed on the right-hand side of the front frame of the tool frame and for installation of operation control switches.

In another preferred embodiment of the invention the cutting tool of the organic photo conductor has a distance between the cylinder of the organic photo conductor and the blade set in advanced in a suitable distance to not damage the surface of the cylinder of the organic photo conductor. This distance can be adjusted according to the radius and length of the organic photo conductor as required.

In another preferred embodiment of the invention the cutting tool of the organic photo conductor the driving of the first motor for blade rotation and the second motor that is used to rotate the cylinder of the organic photo conductor are specified to have a value that is related with the mode that controls the first motor and the mode that controls the second motor as mentioned previously.

The sequence of operations for cutting tool of the cylinder of the organic photo conductor according to this invention is as follows: A operator mounts the cylinder of the organic photo conductor on the holders and pushes the operation control switch. The control box will send a signal to the first cylinder holder in order to clamp the cylinder of organic photo conductor by moving the first cylinder holder axial. The organic photo conductor is now clamped between the first cylinder holder and the second cylinder holder. The motor of the second cylinder holder will rotate the cylinder of the organic photo conductor in a predefined speed. Once the speed has been reached the blade of the motion controller set of the blade moves perpendicular towards the cylinder of the organic photo conductor. Once the cylinder of the organic photo conductor is cut through the speed sensor detects speed unbalance and will signal the control box to stop the drive motor of the second cylinder holder set, pull back the motion controller set of the blade and the first cylinder holder set and release one side of the cylinder of organic photo conductor.

Brief Description of drawing

[0016]

Figure 1 shows the manufacturing process of a toner cartridge for a laser printer by improvement and adjustment of an organic photo conductor according to this invention, 5

Figure 2 shows procedures for improvement and adjustment of the organic photo conductor in a manufacturing process of the toner cartridge for laser printer according to this invention, 10

Figures 3a, b illustrate three-dimensional images of the organic photo conductor and a cross-section image showing the position of drive gear of the organic photo conductor and coupling member. 15

Figure 4 illustrates a three-dimensional image of a cutting tool of the organic photo conductor according to this invention, 20

Figure 5a illustrates three-dimensional and disassembly part images of the motion controller set of the blade according to this invention.

Figure 5b illustrates three-dimensional and disassembly part images of the first holder of the cylinder of the organic photo conductor according to this invention. 25

Figure 5c illustrates three-dimensional and disassembly part images of a second holder of the cylinder of the organic photo conductor to this invention. 30

Detailed Description

[0017] Figure 1 and 2 illustrate a manufacturing process of a toner cartridge for a laser printer by improvement and adjustment of an organic photo conductor 60 according to this invention, which comprises a sequential procedure as follows. 35

1. Inspection 1 of format and conditions of a toner cartridge that comprises the following. 40
 - 1.1 Inspection of format of the toner cartridges by separating the toner cartridges by their format and type to toner cartridges that have an organic photo conductor 60 with a coupling member 200 of a laser printer and toner cartridges that have an organic photo conductor 60 without a coupling member 200 of a laser printer; and 45
 - 1.2 Inspection of conditions of the toner cartridge by inspecting the cylinder surface of the organic photo conductor 60 of the toner cartridges that have the organic photo conductor 60 with coupling member 200 of laser printer and the toner cartridge that have the organic photo conductor 60 without the coupling member of laser printer 200. 50 55

2. Disassembly 2 of toner cartridges into parts and cleaning of each part that comprises of the following.

- 2.1 Disassembly of toner cartridges by separating the toner cartridges into hopper and housing parts. The disassembled hopper comprises hopper, developer roller and charge controller. The disassembled housing comprises housing, organic photo conductor, shipping lock, coupling member of the printer, primary charge roller and wiper blade; and
- 2.2 Cleaning of each disassembled part, that means cleaning of hopper, develop roller, toner powder controller, housing, organic photo conductor, shipping lock, coupling member of the printer, primary charge roller and wiper blade.

3. Improvement and adjustment 3 of the organic photo conductor can be categorized into two cases (as shown in Figure 2)

- 3.1 In Case 1 30 the used organic photo conductor 60 (as illustrated in Figures 3a, b) has a length over a specified limit, e. g. specified by the US patent number 8,644,732.

Therefore, the used organic photo conductor 60 that has the length over the specified limit cannot be replaced or reinstalled with a coupling member 200 and drive gear, also called contact gear, 250 of the organic photo conductor 60 from the cylinder 20 of the organic photo conductor 60. As a result, the improvement and adjustment procedure 30 of the used the organic photo conductor 60 that has the length over the specified limit comprises of the following.

- 3.1.1 Cutting 31 of the used organic photo conductor on the same side as the contact gear of the mentioned organic photo conductor 60 with a cutting tool 50 (as illustrated in Figure 4) so that the cut organic photo conductor 60 will have a standard length and can be reinstalled on the toner cartridge. The cutting tool 50 of the organic photo conductor 60 comprises a tool frame 51 made from aluminum. The body of the cutting tool 50 also comprises a control box 52 made from plastic. In the front of the control box 52 is a monitor 53 to display the operation of a first motor 541 of a motion controller 54 of a blade 542 and a second motor 551 of a second cylinder holder 55 of the organic photo conductor. Inside the control box 52, there is a mode to control the first motor, a mode to control the second motor, a switches box and a power supply (which are not shown in the drawing). The front of the control box 52 is connected to a

front frame 56. The front frame 56 is used for installation of the motion controller 54 of the blade, cylinder support 57 of the organic photo conductor, the first cylinder holder 58 of the organic photo conductor 60, the second cylinder holder 55 of the organic photo conductor 60 and operation control switches 59.

Figure 5a illustrates the motion controller 54 of the blade 542 of the cutting tool 50 according to this invention. The motion controller 54 of the blade 542 comprises of the first motor 541 as a motor for rotating the blade 542 in order to cut the organic photo conductor 60. The distance between the cylinder 20 of the organic photo conductor 60 and the blade 542 can be specified in advance and be adjusted according to the radius and length of the organic photo conductor 60 as required. This must be in a suitable distance as specified in order not to damage the surface of the cylinder 20 of the organic photo conductor 60 and have the best quality result. At the end of the first motor 541 attached to the blade support 543, and installed on the blade support 543 and placed on the blade support housing 544 is the blade 542. The function of the blade support 543 is power transmission from the first motor 541 to make the blade 542 rotate. The blade 542 will rotate according to the speed of the first motor 541 that is set in advance. The blade motion controller set 54 can move perpendicular to the tool frame 51. The bottom of the blade support housing 544 is placed on a skid 545 that has a skid support 546 on both side of the skid 545. The skid support 546 serves as a fastener between the tool frame 51 and the blade motion controller set 54.

Figure 5b illustrates the first holder 58 of the cylinder 20 of the organic photo conductor of the cutting tool 50 according to this invention. The first holder 58 of the cylinder 20 of the organic photo conductor is installed on the left-hand side of the front frame 56 of the tool frame 51. The first holder 58 of the cylinder 20 of the organic photo conductor 60 comprises a speed sensor 581 to detect an unbalance of speed at the end of the cylinder 20 of the organic photo conductor 60. The speed sensor 581 will send a signal to the first motor 541 of the blade motion controller set 54 and the second motor 551 of the cylinder holder 55 of the organic photo conductor 60 to stop the operation. In addition, there is a shaft 582 that holds the cylinder 20 of the organic photo conductor 60

which is attached to the speed sensor 581. The shaft 582 is a cylinder fastener of the organic photo conductor 60 and requires the cutting on the contract gear side of the organic photo conductor 60. The bottom of the first cylinder holder 58 of the organic photo conductor 60 is a shaft support 583 and serves as a supporter to fasten the cylinder holder 58 to with the front frame 56 of the tool frame 51.

Figure 5c illustrates the second holder 55 of the cylinder 20 of the organic photo conductor 60 of the cutting tool 50 according to this invention. The second holder 55 is installed on the right-hand side of the front frame 56 of the tool frame 51. The second holder 55 comprises of the second motor 551, that is welded to a side of the front frame 56 of the tool frame 51 by a aluminum coupling 552. The second motor 551 is used to rotate the organic photo conductor 60 by the coupling member of the printer and its speed is set in advanced. The speed set is related to the speed of the first motor 541 of the blade motion controller set 54. The driving of the first motor 541 for rotation of blade 542 and the second motor 551 that is used to rotate the cylinder 20 of the organic photo conductor 60 are specified to have a value assigned by the mode that controls the first motor and the mode that control the second motor as mentioned previously. There is also a holder 553 of the organic photo conductor 60 attached to the axle of the second motor 551. The function of the holder 553 of the organic photo conductor 60 is to fasten the organic photo conductor 60 on the side with the coupling member of the printer.

The sequence of operations of the cutting tool 50 for the cylinder 20 of the organic photo conductor 60 according to this invention is as follows: A operator mounts the cylinder 20 of the organic photo conductor 60 on the holders 55, 58 and pushes the operation control switch 59. The control box 52 will send a signal to the first cylinder holder 58 in order to clamp the cylinder of organic photo conductor by moving the first cylinder holder 58 axial. The organic photo conductor 60 is now clamped between the first cylinder holder 58 and the second cylinder holder 55. The motor 551 of the second cylinder holder 55 will rotate the cylinder 20 of the organic photo conductor 60 in a predefined speed. Once the speed has been reached the blade 542 of the motion controller set 54 of the blade 542 moves per-

pendicular towards the cylinder 20 of the organic photo conductor 60. Once the cylinder 20 of the organic photo conductor 60 is cut through the speed sensor 581 detects speed unbalance and will signal the control box 52 to stop the drive motor 551 of the second cylinder holder 55, pull back the motion controller set 54 of the blade 542 and the first cylinder holder 58 and release one side of the cylinder 20 of organic photo conductor 60.

3.1.2 Coring 32 of the internal of the organic photo conductor 60 on the mentioned cut side will make a larger internal diameter of the cut side of the organic photo conductor 60 in the coring direction. 3.1.3

Removing 33 of a drive joint also called triangle gear, that is on the other side of the mentioned cut side of the organic photo conductor. This is to make the required size of the cylinder 20 of the organic photo conductor by removing of the drive joint.

3.1.4 Assembly 34 of the contact gear 250 of the ready use printer to one side of the cylinder 20 of the organic photo conductor 60 by fastening.

3.1.5 Attachment 35 of the coupling member 200 of the printer. This can be done by attaching the coupling member 200 of the ready to use printer with the other side of the cylinder 20 of the organic photo conductor 60 by secure bonding; and

3.1.6 Obtaining 36 the recycled organic photo conductor 60, which will be installed in a toner cartridge that passed the inspection of format and conditions of the toner cartridge 1 and the disassembly of toner cartridge into parts and cleaning of each part 2

3.2 In Case 2 the used organic photo conductor 60 has the length as the specified limit. The procedure for the improvement and adjustment 311 of the organic photo conductor are composed of the followings.

3.2.1 Removing 312 of the triangle gear that is on one side of the organic photo conductor. The mentioned organic photo conductor will have a contact gear 250 on its other side.

3.2.2 Attachment 313 of the coupling member 200 of the printer. This can be done by bringing the coupling member 200 of the ready to use printer to attach with the other side of the cylinder 20 of the organic photo conductor by securing bonding; and

3.2.3 Obtaining 314 the recycled organic photo conductor, which can be installed on

a toner cartridge that passed the inspection of format and conditions of the toner cartridge 1 and the disassembly of toner cartridge into parts and cleaning of each part 2

4. Assembly 4 of parts for a complete toner cartridge comprises the following.

4.1 The assembly of the toner cartridge in the hopper and housing. The assemblies of the hopper parts into their specified position are hopper, develop roller and charge controller. The assemblies of the housing parts into their specified position are housing, organic photo conductor, shipping lock, coupling member of the printer, primary charge roller and cleaning blade.

4.2 Addition of the toner into the toner cartridge of the assembled hopper; and

4.3 Testing of the recycled toner cartridge to be able to use with the same properties. The recycled toner cartridge will have comparable quality to the original toner cartridge. The recycled toner cartridge will be categorized according to its origin in order to arrange a delivery back to the origin of the toner cartridge of each type.

Claims

1. Improvement and adjustment (30) of an organic photo conductor for a used organic photo conductor that has the length over a specified limit comprises the of

- Cutting (31) of the used organic photo conductor on its side with a contact gear of the mentioned organic photo conductor so that a cut organic photo conductor will have a standard length and can be reinstalled on the toner cartridge by using a cutting tool,

- Coring (32) of the internal of the organic photo conductor on the mentioned cut side to make a larger internal diameter of the cut side organic photo conductor in coring direction,

- Removing (33) of the triangle gear that is on the other side of the mentioned cut side of the organic photo conductor to make the required size of the cylinder of the organic photo conductor,

- Assembly (34) of the contact gear of the ready to use organic photo conductor to one side of the cylinder of the organic photo conductor by fastening,

- Attachment (35) of the coupling member of the printer by attaching a coupling member of the ready to use printer to the other side of the cylinder of the organic photo conductor by secure bonding; and

- Obtaining (36) the recycled organic photo con-

ductor, which can be installed on a toner cartridge that passed the inspection of format and conditions (1) of the toner cartridge and the disassembly (2) of toner cartridge into parts and cleaning of each part.

2. Improvement and adjustment (311) of an organic photo conductor (3) for a used organic photo conductor that has a length as specified and without the coupling member of the laser printer comprises of Removing (312) of the triangle gear that is on one side of the organic photo conductor, the mentioned organic photo conductor will have a contact gear on its other side,

- Attachment (313) of a coupling member of the printer, by attaching the coupling member of the ready to use printer to the other side of the cylinder of the organic photo conductor by securing bonding; and

- Obtaining (314) the recycled organic photo conductor, which can be installed on a toner cartridge that passed inspection of format and conditions of the toner cartridge (1) and the disassembly of toner cartridge into parts and cleaning of each part (2).

3. Cutting tool (50) of the organic photo conductor (60) or similar comprising:

a motion controller of the blade (54) comprising of

- A first Motor (541) as the motor used for blade rotation (542) for cutting the organic photo conductor (60),

- A Blade support (543) attached with the end of the first motor (541), the blade support (543) that has the blade (542) is installed on the blade support (543) and is placed on the blade support housing (544), the function of the blade support (543) is a power transmission from the first motor (541) to make the blade (542) rotate, the blade (542) can rotate according to the speed of the first motor (541) that is set in advanced; and

- A Skid (546) at the bottom of the blade support housing (544), the skid (545) has a skid support (546) on both side of the skid (545), the skid support (546) is a fastener between the tool frame (51) and the blade motion controller set (54), and

a first holder (58) of the cylinder (20) of the organic photo conductor (60) comprising a Speed sensor (581) to detect unbalance speed at the end of the cylinder (20) of the organic photo

to conductor (60) on both sides, the speed sensor (581) can send a signal to the first motor (541) of the blade motion controller set (54) and a second motor (551) of a cylinder holder (55) of the organic photo conductor (60) to stop the operation,

a shaft (582) that holds the cylinder (20) of the organic photo conductor (60) attached with the speed sensor (581), this shaft (582) holds the cylinder (20) of the organic photo conductor (60) is a cylinder fastener of the organic photo conductor (60) that requires the cutting on the contact gear side of the organic photo conductor (60), the bottom of the first cylinder holder (58) of the organic photo conductor (60) is a shaft support (583) that holds the organic photo conductor (60) as a supporter to fasten the first cylinder holder (58) of the organic photo conductor (60) to a front frame (56) of a tool frame (51), and -a second holder (55) of the cylinder (20) of the organic photo conductor (60) comprising a second motor (551) welded to a side of the front frame (56) of the tool frame (51) with aluminum coupling (552), the second motor (551) is the motor used to rotate the organic photo conductor (60) on the side of the coupling member of the printer (200) with the speed set in advanced, the speed can be set related to the speed of the first motor (541) of the blade motion controller set (54); and

-A holder (553) of the organic photo conductor (60) attached to the axle of the second motor (551), the function of the holder (553) of the organic photo conductor (60) is to fasten the organic photo conductor (60) on the side with the coupling member of the printer (200).

4. Cutting tool (50) of the organic photo conductor (60) according to Claim 4 comprising

- A control box (52) made from plastic, in the front of the control box (52) is a monitor (53) to display the operation of the first motor (541) of the motion controller of the blade (54) and the second motor (551) of the second cylinder holder (55) of the organic photo conductor (60), inside the control box (52), there is a mode to control the first motor, a mode to control the motor No.2, switches box and power supply, and the front frame (56) connected with the front of the control box (52), the front frame (3) is a part used for installation of the motion controller (54) of the blade, cylinder support (57) of the organic photo conductor (60), the first cylinder holder (58) of the organic photo conductor (60) that is installed on the left-hand side of the front frame (56) of the tool frame (51) of the second cylinder holder (55) of the organic photo conductor (60)

that is installed on the right- hand side of the front frame (56) of the tool frame (51) and operation control switches (59).

5. Cutting tool (50) of the organic photo conductor (60) 5
according to Claim 4 and 5, wherein the distance
between the cylinder (20) of the organic photo con-
ductor (60) and the blade (542) has been specified
in advanced, it is also in a suitable distance as spec- 10
ified in order to not damage the surface of the cylinder
(20) of the organic photo conductor (60) and can be
adjusted according to the radius and length of the
organic photo conductor (60) as required.
6. Cutting tool (50) of the organic photo conductor (60) 15
according to Claim 4 to 6, wherein the driving of the
first motor (10) for blade rotation (12) and the second
motor (21) that is used to rotate the cylinder (20) of
the organic photo conductor (60) are specified to 20
have a value that is related with the mode that con-
trols the first motor and the mode that controls the
second motor as mentioned previously.

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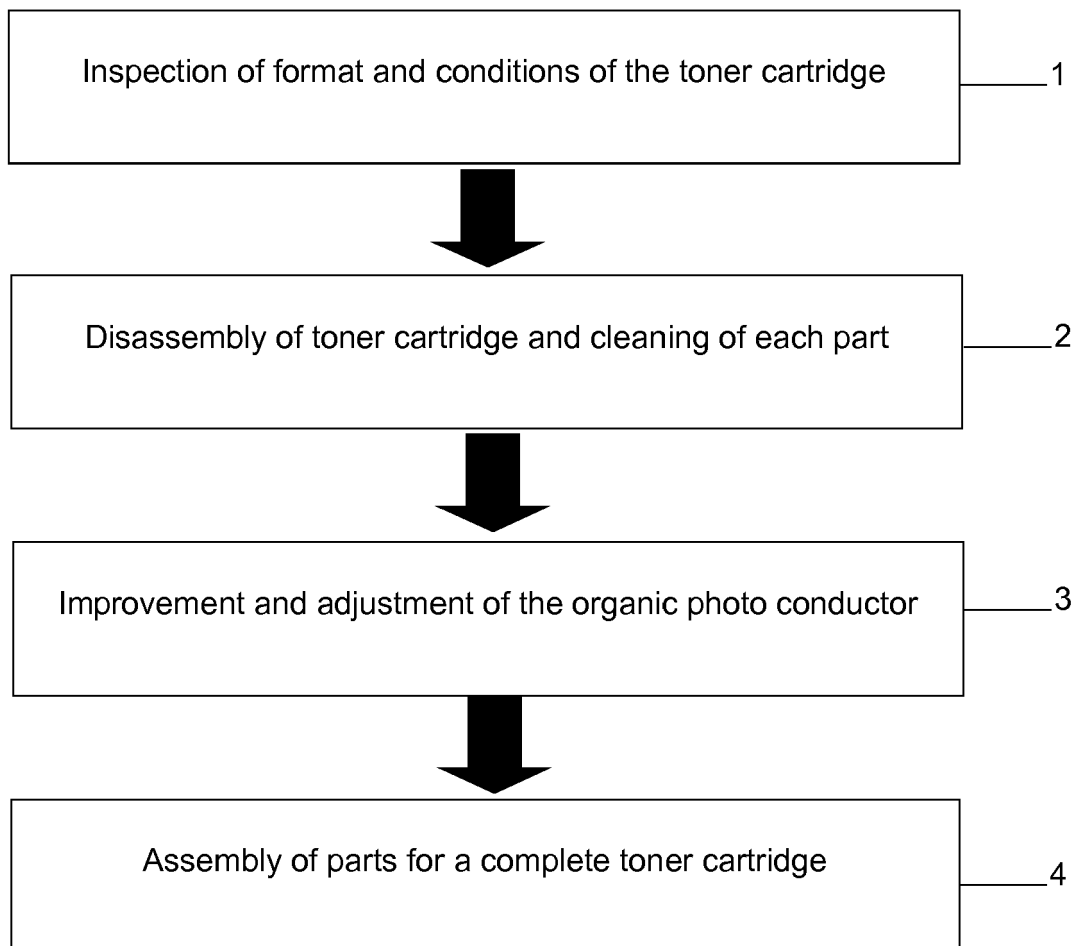


Fig. 1

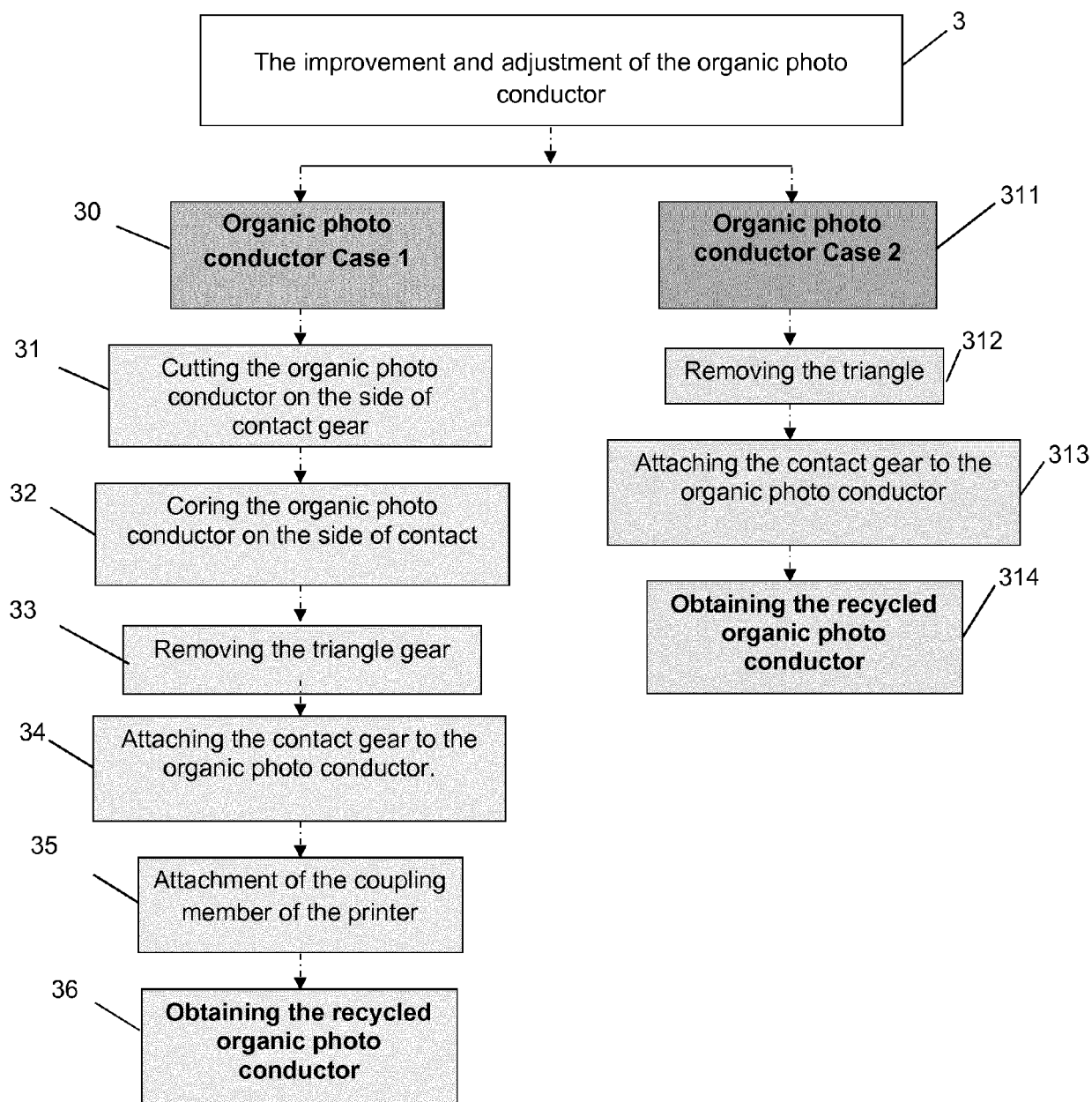


Fig. 2

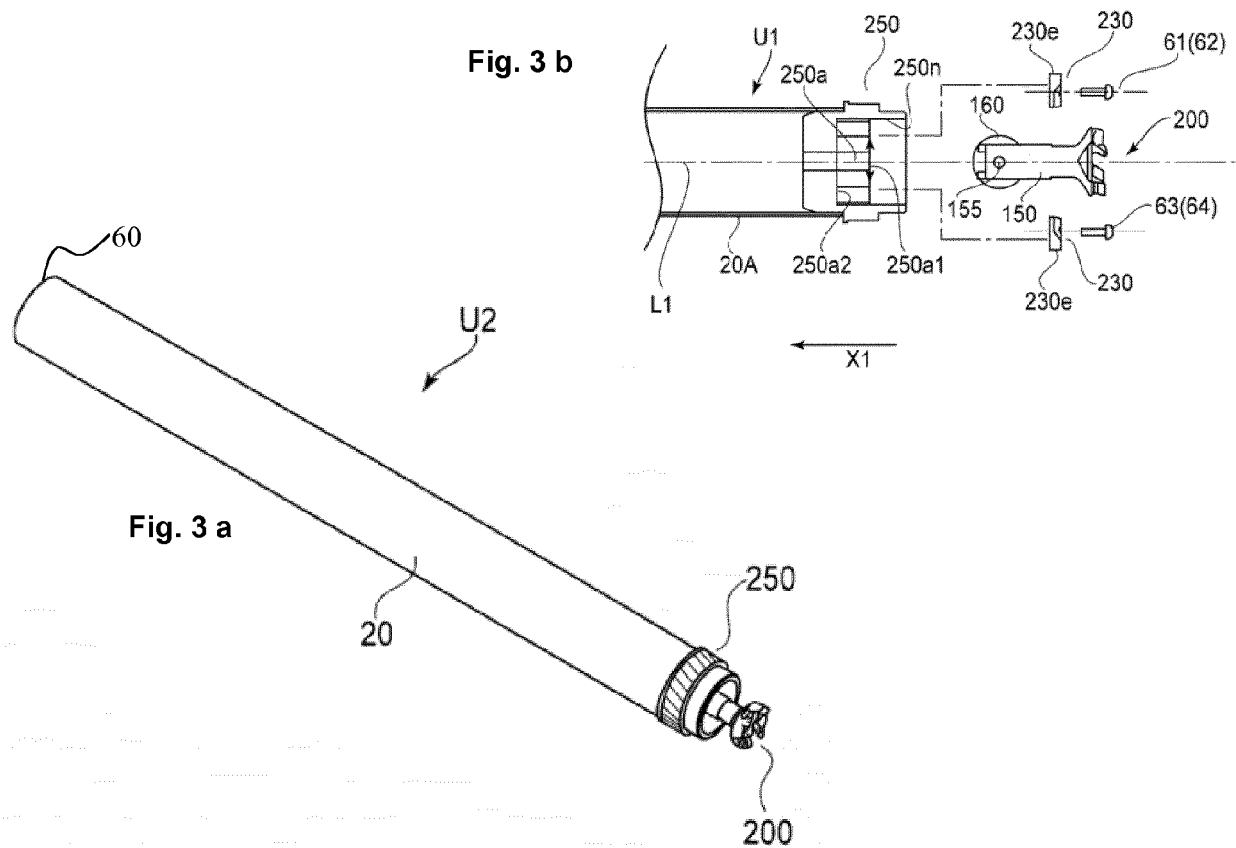


Fig. 3 a, b
(PRIOR ART)

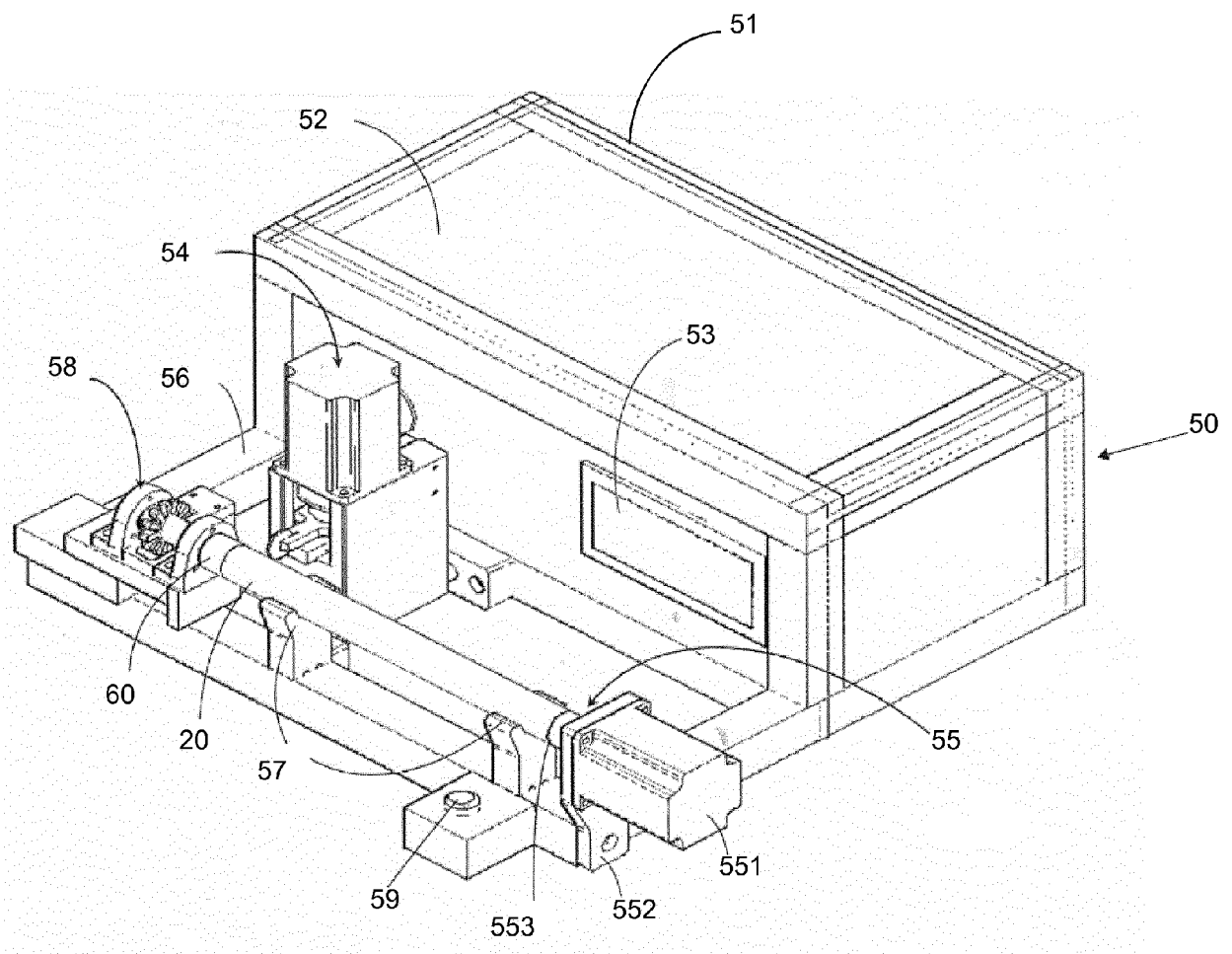


Fig. 4

Fig. 5 a

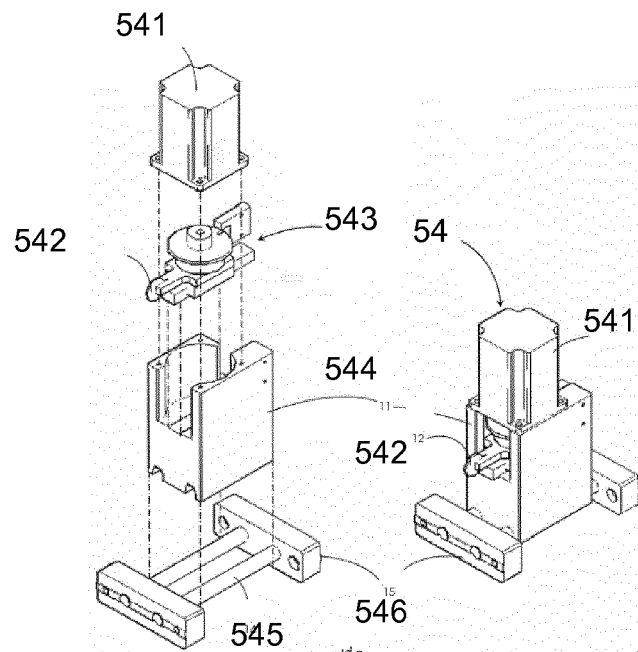


Fig. 5 b

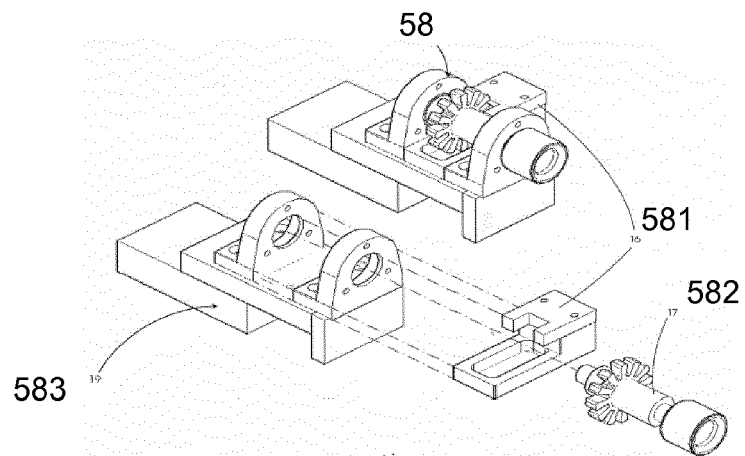
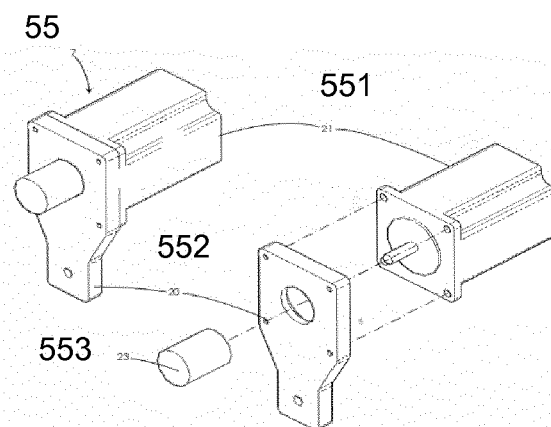


Fig. 5 c





EUROPEAN SEARCH REPORT

Application Number
EP 16 18 6284

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2007/025760 A1 (WILLIAMS JAMES R [US] ET AL) 1 February 2007 (2007-02-01)	1,2	INV. G03G21/18
A	* paragraphs [0002] - [0005], [0046] - [0048], [0059] - [0066]; figures 1,2,18-25 *	3	
X	US 2007/269232 A1 (DAVISON COLIN [CN] ET AL) 22 November 2007 (2007-11-22) * the whole document *	2	
A	WO 2010/004854 A1 (CANON KK [JP]; BATORI YOSHIYUKI [JP]; HARA NOBUYOSHI [JP]) 14 January 2010 (2010-01-14) * page 1, column 7 - page 3, column 6 * * page 30, line 25 - page 49, line 15 * * figures 1-34 *	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			G03G
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 April 2017	Examiner Kys, Walter
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