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(54) METHOD AND SYSTEM FOR CONVERTING A TONER CARTRIDGE PRINTER

VERFAHREN UND SYSTEM ZUR UMWANDLUNG EINES TONERPATRONENDRUCKERS

PROCÉDÉ ET SYSTÈME DE CONVERSION D'UNE IMPRIMANTE À CARTOUCHE DE TONER

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(73) Proprietor: **UI Technologies, Inc.**

Hawthorne, CA 90250 (US)

(72) Inventors:

- **JOSIAH, Michael Raymond**
NY 11980 Yaphank (US)
- **DOVI, Joseph**
NY 11980 Yaphank (US)

(74) Representative: **Patentgruppen A/S**

Aaboulevarden 31, 4th Floor
8000 Aarhus C (DK)

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EP 4 014 094 B1

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Description

FIELD OF USE

[0001] The present disclosure relates generally to printer cartridge replacement. More specifically, this disclosure relates to methods and systems of converting a white toner cartridge printer to a printer that prints with black toner.

BACKGROUND

[0002] Cyan (C), Magenta (M), Yellow (Y), and White (W) (or CMYW) laser or Light Emitting Diode (LED) type printers come standard with Cyan, Magenta, Yellow, and White toner and/or drum cartridges. However, CMYW toner printers are generally unable to be converted to print with toner other than cyan, magenta, yellow, and white, as these printers lack the appropriate toner and/or drum cartridges and the appropriate raster image processor (RIP) software for printing cartridge re-mapping.

[0003] Thus, there is a need for a system and method for converting a standard CMYW (four cartridge) toner printer to print using black.

[0004] WO 2016/197040 A1 discloses a method of converting a CMYK printer to print with white toner in the background. The CMYK printer comprises four printing cartridges: cyan, magenta, yellow, and black. The black toner printing cartridge may be in a first printing cartridge position. The method comprises removing the black toner printing cartridge and providing and installing a white toner printing cartridge into the first slot or position in the CMYK printer. The modified printer may be converted back to a traditional CMYK printer by removing the white toner cartridge from the first slot in the CMYK printer and re-installing the black toner printing cartridge.

SUMMARY OF EMBODIMENTS

[0005] To minimize the limitations in the cited references, and to minimize other limitations that will become apparent upon reading and understanding the present specification, the toner printer converting, refilling, and refurbishment systems and methods disclosed herein preferably allow a user to convert a CMYW printer into a CMYK or one that prints using black toner.

[0006] In various embodiments, the methods and systems may be used to convert a four cartridge white toner cartridge(s) and/or drum(s) printing machine to a printing machine that prints with black toner.

[0007] In one embodiment, a white CMYW toner cartridge printer is converted by replacing one of the standard color or white toner printing cartridges, from any slot, with a black toner cartridge and then using raster image processing (RIP) software to match or set in which printer slot each of the cartridges resides.

[0008] In another embodiment, a standard white toner cartridge printer is converted by replacing the color or

white toner printing cartridge in the last toner printing cartridge position with a black toner cartridge.

[0009] In one embodiment, the cartridge re-mapping is used to allow a black toner printing cartridge to be put in the "W" (White) slot (which may be the first slot in the printer) of a CYMW printer and the CYM cartridges are all in their original slots.

[0010] In one embodiment the printing cartridge integrated circuits (chips) may be swapped along with the toner printing cartridges, and the RIP software is configured to ensure that the correct colors print regardless of which slot the colors or black toner cartridges are placed.

[0011] The RIP software may allow or feature color rasterization, which enables the printer to use less toner by selectively removing pixels to use less toner. This feature gives a nicer feel and ads more durability to the finished product.

[0012] One embodiment may be a method of converting a CMYW toner printer to print with black toners, comprising the steps: providing a CMYW toner printer; wherein the CMYW toner printer has four starting toner printing cartridges; wherein the four starting toner printing cartridges comprise a white toner printing cartridge, a cyan toner printing cartridge, a magenta toner printing cartridge, and a yellow toner printing cartridge; removing one or more of the four starting toner printing cartridges from the CMYW toner printer, such that there are one or more empty toner cartridge slots; providing a black toner printing cartridges that are each filled with one type of one or more non-standard toners; and installing the black toner printing cartridge into the one or more empty toner cartridge slots. The method may also comprise providing raster image processor (RIP) software, such that the CMYW toner printer is able to incorporate the black toner into one or more images printed by the CMYW toner printer. The RIP software allows for remapping of the CMYW toner printer. The black toner printing cartridge may each have an appropriate chip, such that when the black toner printing cartridge is installed in the CMYW printer the appropriate chip is configured to allow the black toner printing cartridges to be recognized by the CMYW toner printer. The CMYW toner printer may be a laser toner printer. The CMYW toner printer may be a LED toner printer.

[0013] One embodiment may be a method of converting a CMYW toner printer to print with a non-standard toner, comprising the steps: providing a CMYW toner printer; wherein the CMYW toner printer has four starting printing cartridges; wherein the four starting printing cartridges comprise a white toner printing cartridge, a cyan toner printing cartridge, a magenta toner printing cartridge, and a yellow toner printing cartridge; removing the white toner printing cartridge from the CMYW toner printer, such that there is an empty toner cartridge slot; providing a black toner printing cartridge that is filled with black toner; and installing the black toner printing cartridge into the empty toner cartridge slot. The method may also comprise the step of providing raster image

processor (RIP) software, such that the CMYW toner printer is able to incorporate the black toner into one or more images printed by the CMYW toner printer. The RIP software may allow for remapping of the CMYW toner printer. The black toner printing cartridge may have an appropriate chip, such that when the black toner printing cartridge is installed in the CMYW printer the appropriate chip is configured to allow the black toner printing cartridge to be recognized by the CMYW toner printer. The CMYW toner printer may be a laser toner printer. The CMYW toner printer may be a LED toner printer.

[0014] In some embodiments, once the non-standard toner cartridges have been swapped in, the printer settings and/or RIP software may allow the user to utilize those swapped in toners by telling the printer to print using the toners that were removed. So, for example, if the cyan toner cartridge was removed, then the printer may print 100% cyan to print using the black swapped in cartridge.

[0015] It is an object of the present system and method for converting a CMYW toner cartridge printer into a printer that is a CMYK toner cartridge printer.

[0016] It is an object of the present system and method for raster image processor software to provide cartridge remapping, which allows the system to print using a black toner from different cartridge positions.

[0017] In one embodiment of the system and method may use new empty or recycled empty toner cartridges that have been pre-cleaned and filed with a black toner. In this embodiment the original cartridge(s) that are removed do not have to be cleaned and filed, they can immediately be replaced by a prefilled new or used cartridge.

[0018] Other features and advantages inherent in the system and method for converting a standard toner cartridge printer into white, metallic, or light toner printer claimed and disclosed will become apparent to those skilled in the art from the following detailed description and its accompanying drawings. The invention is defined by the scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The drawings are of illustrative embodiments. They do not illustrate all embodiments. Other embodiments may be used in addition or instead. Details which may be apparent or unnecessary may be omitted to save space or for more effective illustration. Some embodiments may be practiced with additional components or steps and/or without all of the components or steps, which are illustrated. When the same numeral appears in different drawings, it refers to the same or like components or steps.

FIG. 1 is a flow block diagram of one embodiment of the method of converting a CMYW toner printer to print with a black toner with a single cartridge conversion.

FIG. 2 is a flow block diagram of one embodiment of the method of converting a CMYW toner printer to a CMYK toner printer.

FIG. 3 is a flow block diagram of one embodiment of the method of converting a CMYW toner printer to print with black toner printing cartridge.

DETAILED DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENTS

[0020] In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of various aspects of one or more embodiments. However, these embodiments may be practiced without some or all of these specific details. In other instances, well-known methods, procedures, and/or components have not been described in detail so as not to unnecessarily obscure aspects of embodiments.

[0021] While multiple embodiments are disclosed, still other embodiments will become apparent to those skilled in the art from the following detailed description. As will be realized, these embodiments are capable of modifications in various obvious aspects, all without departing from the scope of protection. Accordingly, the screen shots, figures, and the detailed descriptions thereof, are to be regarded as illustrative in nature and not restrictive. Also, the reference or non-reference to a particular embodiment shall not be interpreted to limit the scope of protection.

[0022] In the following description, certain terminology is used to describe certain features of one or more embodiments. For purposes of the specification, unless otherwise specified, the term "substantially" refers to the complete or nearly complete extent or degree of an action, characteristic, property, state, structure, item, or result. For example, in one embodiment, an object that is "substantially" located within a housing would mean that the object is either completely within a housing or nearly completely within a housing. The exact allowable degree of deviation from absolute completeness may in some cases depend on the specific context. However, generally speaking, the nearness of completion will be so as to have the same overall result as if absolute and total completion were obtained. The use of "substantially" is also equally applicable when used in a negative connotation to refer to the complete or near complete lack of an action, characteristic, property, state, structure, item, or result.

[0023] As used herein, the terms "approximately" and "about" generally refer to a deviance of within 15% of the indicated number or range of numbers. In one embodiment, the term "approximately" and "about", refer to a deviance of between 0.0001-40% from the indicated number or range of numbers.

[0024] In the following description, certain terminology is used to describe certain features of one or more embodiments. For purposes of the specification, unless otherwise specified, the term "printing cartridge(s)" generally

refers to a toner cartridge, a laser toner cartridge, a LED toner cartridge, a drum cartridge, and/or a combined toner and drum cartridge.

[0025] As used herein, the term "toner" generally refers to a powder, particulate, or dry ink that is used in laser printers, printers, and printing machines to form the printed text and images on the medium being printed. Generally, toner particles are melted by the heat of a fuser, and bound to the media.

[0026] Regarding a CMYW printer, the letter "W" preferably stands for white.

[0027] Regarding a CMYK printer, the letter "K" refers to a standard (or non-standard) black toner.

[0028] The present specification discloses a system and method for converting a four cartridge white toner cartridge printer to a CMYK (color and black) toner printer. The method and system for converting a toner cartridge printer to a black and color toner printer preferably requires no special or dedicated printer drivers.

[0029] The present method and system for converting a white toner cartridge printer to a CMYK toner printer may allow the conversion of: (1) a conversion of a CMYW machine that has combined toner and drum cartridges; (2) a conversion of a CMYW machine that has separate toner and drum cartridges; and (3) a conversion of a CMYW machine with a single drum and separate toner printing cartridges.

[0030] Regarding the conversion of a CMYW machine that has a separate toner and drum cartridges, the conversion may comprise replacing one or more of the color cartridges or the white cartridge with a black toner printing cartridge and replacing the accompanying drum with a black drum.

[0031] Regarding the conversion of a CMYW machine that has separate toner printing cartridges, but a single drum cartridge, the conversion may comprise replacing the white or one or more of the color cartridges with a black toner printing cartridge and cleaning the accompanying drum portion of the respective toner(s) and priming it with black toner(s).

[0032] In another embodiment, the one or more black toner printing cartridges may be provided by disassembling the removed printing cartridges to create one or more empty cartridges, which are then cleaned and re-filled with a black toner.

[0033] In one embodiment, the starting cyan, yellow, magenta, and white toner printing cartridges are original/new cartridges. In another embodiment the starting cyan, yellow, magenta, and white toner printing cartridges themselves were previously used and/or refurbished.

[0034] In various embodiments the positioning of the non-standard toner cartridge(s) and the programming of the RIP software allows the user to print with the black toner cartridge(s) concurrently with the other colors in a single layer or print the black toner as a separate layer before and/or after the other colors have printed.

[0035] FIG. 1 is a flow block diagram of one embodiment of the method of converting a CMYW toner printer

to print with a black toner with a single cartridge conversion. FIG. 1 shows that the method **1100** may comprise the steps: providing a CMYW toner printer with four toner printing cartridges, cyan (C), magenta (M), yellow (Y), and white (W) **1105**; the cartridges may be in any order and the white cartridge may be in any position **1110**; removing the white toner printing cartridge **1112**; providing a non-standard toner printing cartridge **1115**; installing the black toner printing cartridge into the cartridge position that is empty after the white cartridge was removed **1120**; and providing raster image processor (RIP) software for cartridge remapping if necessary **1130**.

[0036] The RIP software may allow the printer to recognize the non-standard toner printing cartridge and specifically incorporate that toner into the image.

[0037] The black toner cartridge may each have a chip that allows the printer to recognize that the black toner has replaced the white cartridge, so that RIP software may automatically recognize that black has been put into the printer to replace the white toner cartridge. In other embodiments, the user may manually enter into the RIP software where the black toner was inserted into the printer. The RIP software is configured to allow the printer to print images that incorporate the black toner. In some embodiments, the user may move around the three starting color toners after taking out the white toner. The black toner is then inserted into the empty slot and the RIP software is used to remap the printer.

[0038] FIG. 2 is a flow block diagram of one embodiment of the method of converting a CMYW toner printer to a CMYK toner printer. FIG. 2 shows that the method **1200** may comprise the steps: providing a CMYW toner printer with four toner printing cartridges, cyan (C), magenta (M), yellow (Y), and white (W) **1205**; the cartridges may be in any order and the white cartridge may be in any position **1210**; removing the white toner printing cartridge **1212**; providing a black toner printing cartridge with an appropriate chip, wherein the chip allows the black toner printing cartridge to be recognized by the CMYW toner printer **1215**; installing the black toner printing cartridge into the cartridge position that is empty after the white cartridge was removed **1220**; providing raster image processor (RIP) software for cartridge remapping if necessary **1230**; the RIP software may: (1) allow the printer to recognize the black toner printing cartridge and specifically incorporate that toner into the image. The black toner may have a chip that allows the printer to recognize that the black toner has replaced the white cartridge. In other embodiments, the user may manually enter into the RIP software that the black toner was inserted into the printer. The RIP software is configured to allow the printer to print images that incorporate the black toner. In some embodiments, the user may move around the three color toners after taking out the white toner.

The black toner is then inserted into the empty slot and the RIP software is used to remap the printer.

[0039] In some embodiments **1240**, the black toner printing cartridge that is provided is the white toner print-

ing cartridge that has been removed. The method may further comprise the steps:

- disassembling the removed white printing cartridge;
- emptying and cleaning said disassembled and removed white printing cartridge;
- reassembling the empty, cleaned, disassembled, and removed white printing cartridge, such that an empty printing cartridge is created; and
- filling said empty printing cartridge with the black toner, such that the black toner printing cartridge that is filled with the black toner is created.

[0040] FIG. 3 is a flow block diagram of one embodiment of the method of converting a CMYW toner printer to print with black toner printing cartridge. FIG. 3 shows that the method of converting a CMYW toner printer **2000** may comprise the steps: providing a CMYW toner printer with four toner printing cartridges: cyan (C), magenta (M), yellow (Y), and white (W) **2005**; wherein the four toner printing cartridges may be in any order **2010** within the CMYW toner printer; removing one or more of the four toner printing cartridges (one, two, three, or four of the starting toner printing cartridges may be removed) **2015**; providing a black toner printing cartridge; the provided black toner printing cartridge may be new or recycled/re-furbished **2020**; and installing the black toner printing cartridge into the slot or one of the slots where the one or more starting toner printing cartridges were removed **2025**. In some embodiments, the method may further comprise providing raster image processor (RIP) software for cartridge remapping if necessary **2040**. In another embodiment, the black toner printing cartridges each have an appropriate chip, such that when it is installed the chip allows the black toner printing cartridge to be recognized by the CMYW toner printer **2050**.

[0041] In some embodiments, the method may comprise, as examples and not by limitation:

- removing all four starting toner cartridges and replacing them with four CMYK sublimation toner cartridges
- removing all four starting toner cartridges and replacing them with three CMY fluorescent cartridges and a black toner cartridge
- removing all four starting toner cartridges and replacing them with three CMY light/pastel cartridges and a black toner cartridge
- removing the three CMY colored cartridges and replacing them with CMY fluorescent cartridges
- removing the three CMY colored cartridges and replacing them with three CMY light/pastel cartridges
- removing the yellow cartridge and replacing it with gold metallic
- removing the white cartridge and replacing it with black
- any combination of the above and the swapping may or may not include matching similar incoming toners

to the outgoing toners

[0042] The foregoing description of the preferred embodiment has been presented for the purposes of illustration and description. While multiple embodiments are disclosed, still other embodiments will become apparent to those skilled in the art from the above detailed description, which shows and describes the illustrative embodiments. As will be realized, these embodiments are capable of modifications in various obvious aspects. Also, although not explicitly recited, one or more additional embodiments may be practiced in combination or conjunction with one another. It is intended that the scope of protection not be limited by this detailed description, but by the claims that are appended hereto.

Claims

- 1.** A method of converting a CMYW toner printer to print with black toner, comprising the steps:
 - providing a CMYW toner printer;
 - wherein said CMYW toner printer has four starting toner printing cartridges;
 - wherein said four starting toner printing cartridges comprise a white toner printing cartridge, a cyan toner printing cartridge, a magenta toner printing cartridge, and a yellow toner printing cartridge;
 - removing at least one of said four starting toner printing cartridges from said CMYW toner printer, such that there is at least one empty toner cartridge slot;
 - providing a black toner printing cartridge that is filled with black toner;
 - installing said black toner printing cartridge into said at least one empty toner cartridge slot;
 - providing raster image processor (RIP) software, such that said CMYW toner printer is able to incorporate said black toner into one or more images printed by said CMYW toner printer; and wherein said RIP software allows for remapping of said CMYW toner printer, such that the converted toner printer prints with said black toner cartridge concurrently with the other colors in a single layer.
- 2.** The method of claim 1, wherein said black toner printing cartridge has an appropriate chip, such that when said black toner printing cartridge is installed in said CMYW printer said appropriate chip is configured to allow said black toner printing cartridge to be recognized by said CMYW toner printer.
- 3.** The method of claim 1, wherein said CMYW toner printer is a laser toner printer.

4. The method of claim 1, wherein said CMYW toner printer is an LED toner printer.
5. The method of any of claims 1-4, wherein said step of removing at least one of said four starting toner printing cartridges comprises:
removing said white toner printing cartridge from said CMYW toner printer, to provide said empty toner cartridge slot.
6. The method of claim 5, wherein said black toner printing cartridge that is provided is said white toner printing cartridge that has been removed;
wherein said method further comprising the steps:

disassembling said removed white printing cartridge;
emptying and cleaning said disassembled and removed white printing cartridge;
reassembling said empty, cleaned, disassembled, and removed white printing cartridge, such that an empty printing cartridge is created; and
filling said empty printing cartridge with said black toner, such that said black toner printing cartridge that is filled with said black toner is created.

Patentansprüche

1. Verfahren zum Umwandeln eines CMYW-Tonerdruckers, um mit schwarzem Toner zu drucken, umfassend die Schritte:

Bereitstellen eines CMYW-Tonerdruckers;
wobei der CMYW-Tonerdrucker vier Ausgangs-Tonerdruckerpatronen aufweist;
wobei die vier Ausgangs-Tonerdruckerpatronen eine Weißtonerdruckerpatrone, eine Cyan-tonerdruckerpatrone, eine Magentatonerdruckerpatrone und eine Gelbtonerdruckerpatrone umfassen;
Entfernen mindestens einer der vier Ausgangs-Tonerdruckerpatronen aus dem CMYW-Tonerdrucker, derart, dass mindestens ein leerer Tonerpatronensteckplatz vorhanden ist;
Bereitstellen einer Schwarztonerdruckerpatrone, die mit schwarzem Toner gefüllt ist;
Einsetzen der Schwarztonerdruckerpatrone in den mindestens einen leeren Tonerpatronensteckplatz;
Bereitstellen einer Rasterbildprozessor-Software (RIP-Software), derart, dass der CMYW-Tonerdrucker in der Lage ist, den schwarzen Toner in ein oder mehrere Bilder einzubeziehen, die durch den CMYW-Tonerdrucker gedruckt werden; und
wobei die RIP-Software eine Neuordnung des

CMYW-Tonerdruckers ermöglicht, derart dass der umgewandelte Tonerdrucker mit der schwarzen Tonerdruckerpatrone gleichzeitig mit den anderen Farben in einer einzigen Schicht druckt.

2. Verfahren nach Anspruch 1, wobei die Schwarztonerdruckerpatrone einen passenden Chip aufweist, derart, dass, wenn die Schwarztonerdruckerpatrone in den CMYW-Drucker eingesetzt ist, der passende Chip konfiguriert ist, um der Schwarztonerdruckerpatrone zu ermöglichen, durch den CMYW-Tonerdrucker erkannt zu werden.
3. Verfahren nach Anspruch 1, wobei der CMYW-Tonerdrucker ein Lasertonerdrucker ist.
4. Verfahren nach Anspruch 1, wobei der CMYW-Tonerdrucker ein LED-Tonerdrucker ist.
5. Verfahren nach einem der Ansprüche 1 bis 4, wobei der Schritt des Entfernens mindestens einer der vier Ausgangs-Tonerdruckerpatronen umfasst:
Entfernen der Weißtonerdruckerpatrone aus dem CMYW-Tonerdrucker, um den leeren Tonerpatronensteckplatz bereitzustellen.
6. Verfahren nach Anspruch 5, wobei die Schwarztonerdruckerpatrone, die bereitgestellt wird, die Weißtonerdruckerpatrone ist, die entfernt wurde;
wobei das Verfahren ferner umfassend die Schritte:

Auseinanderbauen der entfernten weißen Druckerpatrone;
Leeren und Reinigen der auseinandergebauten und entfernten weißen Druckerpatrone; Wiederzusammenbauen der leeren, gereinigten, auseinandergebauten und entfernten weißen Druckerpatrone,
derart, dass eine leere Druckerpatrone entsteht; und
Füllen der leeren Druckerpatrone mit dem schwarzen Toner, derart, dass die Schwarztonerdruckerpatrone entsteht, die mit dem schwarzen Toner gefüllt ist.

Revendications

1. Procédé de conversion d'une imprimante à toner CMJB pour imprimer avec du toner noir, comprenant les étapes :

fournir d'une imprimante à toner CMJB ;
dans lequel ladite imprimante à toner CMJB a quatre cartouches d'impression de toner de départ ;
dans lequel lesdites quatre cartouches d'im-

- pression de toner de départ comprennent une cartouche d'impression de toner blanc, une cartouche d'impression de toner cyan, une cartouche d'impression de toner magenta et une cartouche d'impression de toner jaune ; 5
- retirer au moins l'une desdites quatre cartouches d'impression de toner de départ de ladite imprimante à toner CMJB, de telle sorte qu'il y a au moins un emplacement de cartouche de toner vide ; 10
- fournir une cartouche d'impression de toner noir qui est remplie de toner noir ;
- installer ladite cartouche d'impression de toner noir dans ledit au moins un emplacement de cartouche de toner vide ; 15
- fournir un logiciel processeur d'image tramée (RIP), de telle sorte que ladite imprimante à toner CMJB est capable d'incorporer ledit toner noir dans une ou plusieurs images imprimées par ladite imprimante à toner CMJB ; et 20
- dans lequel ledit logiciel RIP permet une reprogrammation de ladite imprimante à toner CMJB, de telle sorte que l'imprimante à toner converti imprime avec ladite cartouche de toner noir en même temps que les autres couleurs dans une couche unique. 25
2. Procédé selon la revendication 1, dans lequel ladite cartouche d'impression de toner noir a une puce appropriée, de telle sorte que lorsque ladite cartouche d'impression de toner noir est installée dans ladite imprimante CMJB ladite puce appropriée est configurée pour permettre à ladite cartouche d'impression de toner noir d'être reconnue par ladite imprimante à toner CMJB. 30 35
3. Procédé selon la revendication 1, dans lequel ladite imprimante à toner CMJB est une imprimante laser à toner. 40
4. Procédé selon la revendication 1, dans lequel ladite imprimante à toner CMJB est une imprimante DEL à toner. 45
5. Procédé selon l'une quelconque des revendications 1 à 4, dans lequel ladite étape consistant à retirer au moins l'une desdites quatre cartouches d'impression de toner de départ comprend : 50
- retirer ladite cartouche d'impression de toner blanc de ladite imprimante à toner CMJB, pour fournir ledit emplacement de cartouche de toner vide.
6. Procédé selon la revendication 5, dans lequel ladite cartouche d'impression de toner noir qui est fournie est ladite cartouche d'impression de toner blanc qui a été retirée ; 55
- dans lequel ledit procédé comprend en outre les étapes :

démonter ladite cartouche d'impression blanche retirée ;

vider et nettoyer ladite cartouche d'impression blanche démontée et retirée ;

remonter ladite cartouche d'impression blanche vide, nettoyée, démontée et retirée, de telle sorte qu'une cartouche d'impression vide est créée ; et

remplir ladite cartouche d'impression vide avec ledit toner noir, de telle sorte que ladite cartouche d'impression de toner noir qui est remplie avec ledit toner noir est créée.

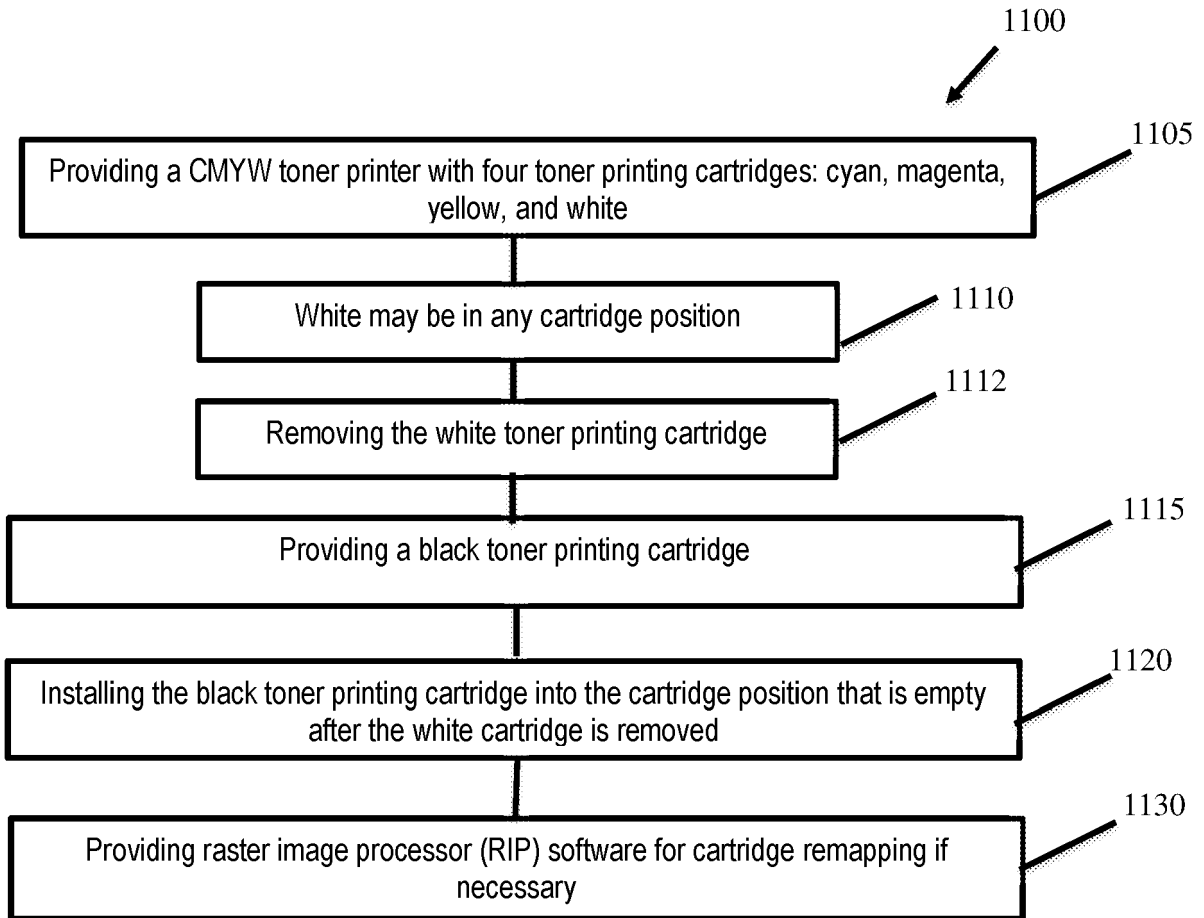


FIG. 1

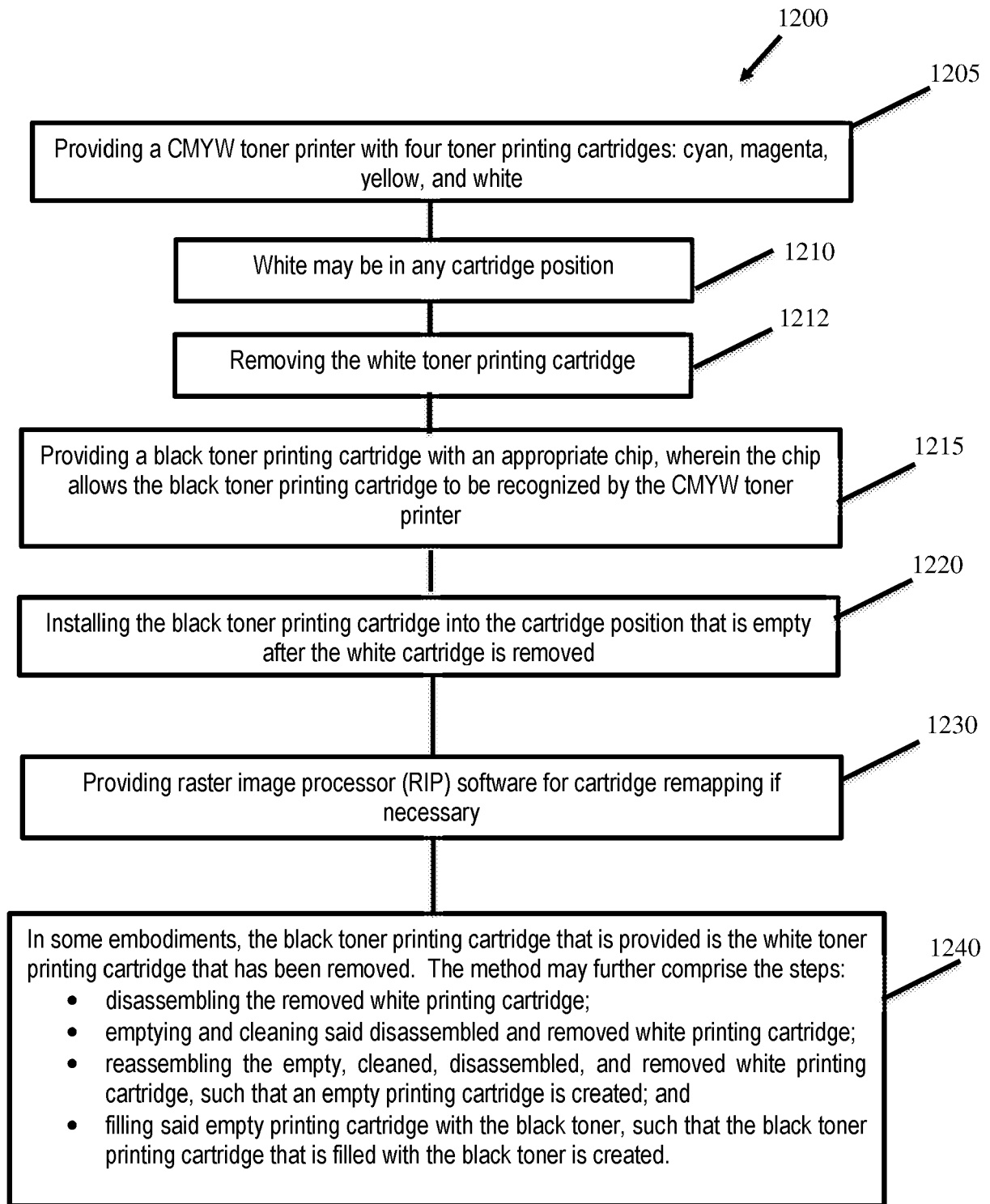


FIG. 2

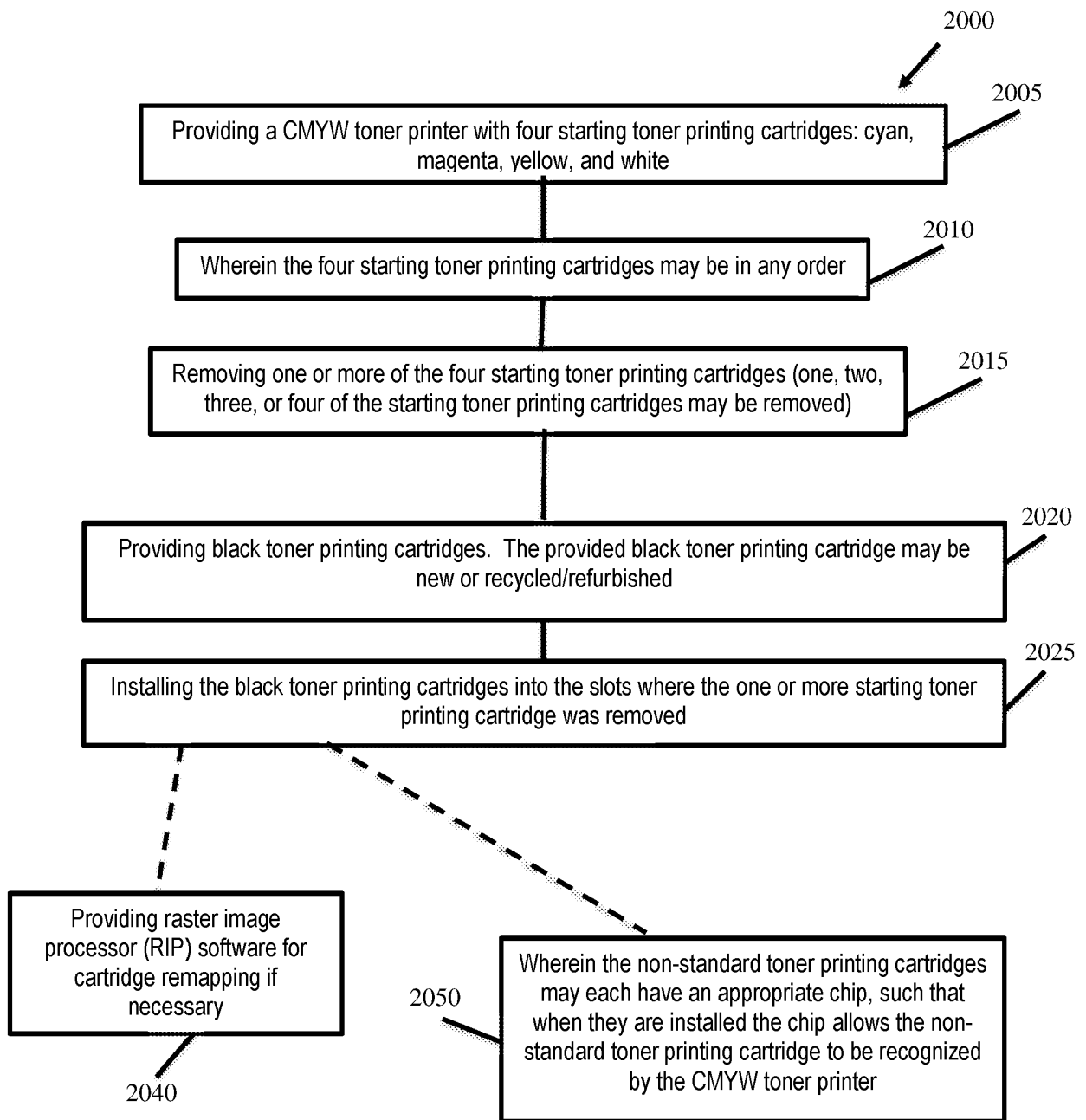


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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