(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
07 March 2024 (07.03.2024)

WIPO | PCT

(10) International Publication Number
WO 2024/049412 A1

(51) International Patent Classification:
H04N 1/60 (2006.01) *B41J 2/21* (2006.01)
B41J 2/175 (2006.01) *G07D 7/1205* (2016.01)

(21) International Application Number:
PCT/US2022/041970

(22) International Filing Date:
30 August 2022 (30.08.2022)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant: **HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.** [US/US]; 10300 Energy Drive, Spring, Texas 77389 (US).

(72) Inventors: **LEE, Ki-Youn**; 26, Yeonnaegaeul-ro, Sujeong-gu, Pangyo Alpha Dom City Block 6-3., Seongnam Si, Gyeonggi-do 13105 (KR). **OH, Hyunsoo**; 26, Yeonnaegaeul-ro, Sujeong-gu, Pangyo Alpha Dom City Block 6-3., Seongnam Si, Gyeonggi-do 13105 (KR). **LEE, Changhyung**; 26, Yeonnaegaeul-ro, Sujeong-gu, Pangyo Alpha Dom City Block 6-3., Seongnam Si, Gyeonggi-do 13105 (KR). **LIM, Donghong**; 26, Yeonnaegaeul-ro, Sujeong-gu, Building @ Samsung Electronics MaeTan, 3-Dong SuWon-Si KyungGi-Do, Seongnam Si, Gyeonggi-do 13105 (KR). **HONG, Jinmo**; 26, Yeonnaegaeul-ro, Sujeong-gu, Pangyo Alpha Dom City Block 6-3., Seongnam Si, Gyeonggi-do 13105 (KR).

(74) Agent: **KO, Steve Sokbong** et al.; HP Inc., 3390 E. Harmony Road, Mail Stop 35, Fort Collins, Colorado 80528 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH,

(54) Title: PRINT SUBSTANCE AGENT IDENTIFICATIONS

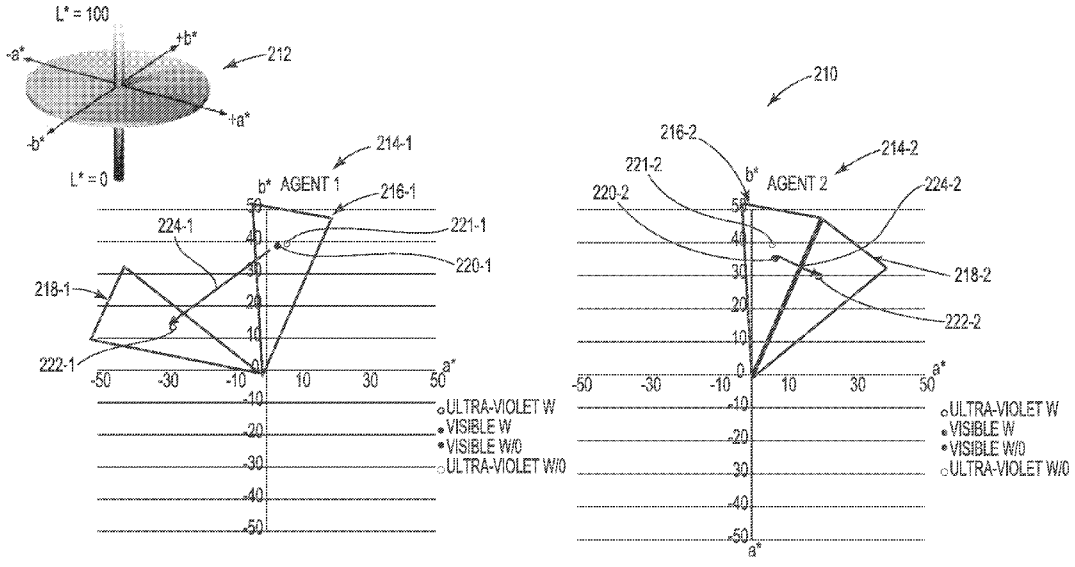


Figure 2

(57) Abstract: The present disclosure describes a printing device that includes instructions to calculate a depletion percentage for a color to be deposited at a plurality of locations on a substrate, determine a virtual quantity for a virtual deposit to be represented with the color at the plurality of locations based on the depletion percentage of the color, detect a property at the plurality of locations on the substrate based on a quantity of the virtual quantity at the plurality of locations, and perform an action at the plurality of locations based on the detected property.

[Continued on next page]

WO 2024/049412 A1

TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to the identity of the inventor (Rule 4.17(i))*

Published:

— *with international search report (Art. 21(3))*

PRINT SUBSTANCE AGENT IDENTIFICATIONS

Background

[0001] A computing device can allow a user to utilize computing device operations for work, education, gaming, multimedia, and/or other uses. Computing devices can be utilized in a non-portable setting, such as at a desktop, and/or be portable to allow a user to carry or otherwise bring the computing device along while in a mobile setting. These computing devices can utilize printing devices to generate images on a substrate or print medium. The printing device can perform a plurality of different printing functions to increase an image quality of the images generated on the print medium. The printing device can utilize a plurality of different print substances such as ink, toner, or other types of print substances.

Brief Description of the Drawings

[0002] Figure 1 illustrates an example of a method for performing print substance agent identifications.

[0003] Figure 2 illustrates an example of a diagram for performing print substance agent identifications.

[0004] Figure 3 illustrates an example of a diagram for performing print substance agent identifications.

[0005] Figure 4 illustrates an example of a printing device for performing print substance agent identifications.

[0006] Figure 5 illustrates an example of a memory resource storing instructions for performing print substance agent identifications.

[0007] Figure 6 illustrates an example of a printing system including a printing device for performing print substance agent identifications.

Detailed Description

[0008] A user may utilize a computing device for various purposes, such as for business and/or recreational use. As used herein, the term "computing device" refers to an electronic system having a processor (e.g., processor resource, hardware processor, etc.) and a memory resource. Examples of computing devices can include, for instance, a laptop computer, a notebook computer, a desktop computer, an all-in-one (AIO) computer, networking device (e.g., router, switch, etc.), and/or a mobile device (e.g., a smart phone, tablet, personal digital assistant, smart glasses, a wrist-worn device such as a smart watch, etc.), among other types of computing devices. As used herein, a mobile device refers to devices that are (or can be) carried and/or worn by a user.

[0009] Computing devices can be utilized with a plurality of peripheral devices and/or embedded devices. For example, computing devices can be included within or utilized with printing devices. As used herein, a printing device (e.g., printer, inkjet printer, laser printer, three-dimensional printer, etc.) can be a device that deposits a print substance on a substrate to generate an image on the substrate. For example, the printing device can be an inkjet printing device that deposits a printing fluid (e.g., ink, etc.) on to a sheet of print media (e.g., paper, plastic, etc.) to generate an image on the sheet of print media. In this example, the printing device can be communicatively coupled to a computing device that can provide print data for a print job to the printing device and/or be part of the printing device to receive print data from a remote computing device. As used herein, the print data for the print job can include information related to the image to be generated on the print media. For example, the print data can include a red-blue-green (RGB) input image to be generated on the substrate by the printing device.

[0010] Printing devices can utilize different print channels to deposit different colors on to the print medium (e.g., substrate, etc.). For example, a printing device can include a first print channel that deposits a black print substance, a second print channel that deposits a cyan print substance, a third print channel that deposits a yellow print substance, and a fourth print channel that deposits a magenta print substance. In some examples, the printing device can utilize different types of print substance that can be replaced or replenished throughout the lifespan of the printing device. The print substance can include different agents (e.g., light activated agents, fluorescent agents, etc.) that can be utilized to identify the type of print substance or

other properties of the print substance. For example, a fluorescent agent can be added to the print substance to fluoresce under an ultra-violet light source. However, a general fluorescent agent can be mimicked or copied such that the print substance fluoresces under the ultra-violet light, which can create an incorrect identification of the properties of the print substance.

[0011] The present disclosure describes utilizing an agent that alters a color of the print substance when the print substance is exposed to different light sources that utilize different wavelengths. In some examples, the agent is an invisible light-activated agent that is combine with the print substance, but instead of independently fluorescing, the agent alters a color of the print substance. In one example, the print substance can be a first color when exposed to a first light that has a first wavelength and the print substance can be a second color when exposed to a second light that has a second wavelength. In this example, a color shift can be calculated based on the change in color between the first color and the second color. When the color shift is within a particular color shift range, the print substance can be verified to have the particular agent within the print substance. When the color shift is outside the particular color range, it can be determined that the agent is not within the print substance. In this way, the print substance can be more accurately verified compared to previous systems and methods.

[0012] Figure 1 illustrates an example of a method 100 for performing print substance agent identifications. The method 100 can be executed or performed by a printing device and/or printing system. For example, the method 100 can illustrate instructions that can be stored on a memory resource that can be executed by a processor.

[0013] The method 100 can include printing a test pattern. As used herein, a test pattern can be a print job where a printing device has deposited a print substance on to a substrate. In some examples, the test pattern includes a plurality of deposited print substances such that a particular print substance is deposited at a plurality of corresponding locations. In this way, each print substance can be analyzed individually. In this way, a plurality of colored print substances can be analyzed individually such that a first color print substance does not interact with a second color print substance. In one example, each of a plurality of different colored print substances can be deposited at corresponding locations on the substrate such that the plurality of different colored print substances are not overlapping.

[0014] In other examples, the test pattern can be a result of a print job provided to a printing device. For example, the test pattern can be an image generated on the substrate based on a digital image received at the printing device. In this way, a resulting print job image can be utilized as a test pattern to verify if the plurality of colored print substances include a particular agent (e.g., fluorescent agent, light activated agent, ultra-violet activated agent, an invisible light-activated agent, etc.).

[0015] At 102, the method 100 can include sensing test pattern under ultra-violet light. As described herein, the test pattern includes a print substance deposited on a substrate. As used herein, the ultra-violet light can be generated by a light source that is directed toward the test pattern on the substrate. That is, an ultra-violet light source can be utilized to direct light on the test pattern on the substrate. As used herein, the ultra-violet light or UV light can include a form of electromagnetic radiation with a wavelength between a range of 10 nanometers (nm) to 400 nm. In some examples, the ultra-violet light can be relatively shorter than a wavelength of visible light and relatively longer than X-rays. Although ultra-violet light sources are described as being utilized, similar artificial light sources can be utilized that include filters to remove wavelengths that are not within the ultra-violet light wavelength range. In this way, radiation within the ultra-violet light wavelength range can be directed to the test pattern on the substrate.

[0016] In some examples, sensing the test pattern under ultra-violet light includes scanning the test pattern when the ultra-violet light is directed on the test pattern. For example, a scanner device can create a digital image of the test pattern while the test pattern is exposed to the ultra-violet light generated by the ultra-violet light source. As described herein, the scanner device can be utilized to capture a color image of the test pattern under ultra-violet light where the color image of the test pattern is utilized to analyze the color of the print substance of the test pattern.

[0017] At 103, the method 100 includes detecting a region of interest. In some examples, detecting a region of interest can include detecting a location of a particular color of the test pattern. As described herein, the test pattern can include a plurality of different colors that are located at corresponding locations. In this way, the region of interest can be a particular color of the plurality of colors at a corresponding location of the test pattern. In some examples, the plurality of colors can be analyzed individually to determine a color change from a first light within the

visible wavelength spectrum to a second light within the ultra-violet wavelength spectrum. In this way, the region of interest can be a particular color to be analyzed or a location of the plurality of colors of the test pattern.

[0018] At 104, the method 100 can include calculating a red-green-blue (RGB) average for each color of the test pattern or each color of the region of interest. In some examples, calculating the RGB average for each color includes determining RGB values for each color a plurality of times utilizing the scanned image of the test pattern. In these examples, an average for the RGB values of each color can be calculated to determine an RGB value for each of the plurality of colors of the test pattern. At 105, the method 100 can include converting the RGB values for each to a L*a*b* value for each of the plurality of colors. As used herein, a L*a*b*value refers to a first value "L*" for perceptual lightness, and a second value "a*" and third value "b*" that represent the four unique colors of human vision: red, green, blue, and yellow.

[0019] At 106, the method 100 can include calculating the hue for non-black colors of the test pattern and a saturation for black on the test pattern. As described further herein, the hue value or hue angle can be a representative color value of the colors associated with the test pattern. In one example, the hue can typically be represented quantitatively by a value (e.g., numerical value, single number, etc.) often corresponding to an angular position around a central or neutral point or axis on a color space coordinate diagram (e.g., a chromaticity diagram, etc.) or color wheel. In other examples, the hue value can represent a color's dominant wavelength or represent the color's complementary color.

[0020] In this way, the color properties of the plurality of colors of the test pattern can be determined. As described further herein, the hue value can be utilized to determine when a print substance used to generate the test pattern includes a particular agent (e.g., UV agent, fluorescent agent, an invisible light-activated agent, etc.). For example, the hue value can change from a first hue color value under a first light with a first wavelength to a second hue color value under a second light with a second wavelength.

[0021] In addition, the saturation for the black on the test pattern can be calculated. Saturation can be a characteristic for chromatic intensity of a color. The saturation can be utilized for black color within the test pattern to determine when the black print substance includes a particular agent (e.g., UV agent, fluorescent agent,

etc.). For example, the saturation value can change from a first saturation under a first light with a first wavelength to a second saturation under a second light with a second wavelength.

[0022] At 107, the method 100 includes determining if there is a color shift (e.g., hue shift, etc.) for the plurality of non-black colors (e.g., magenta, cyan, yellow, etc.) and/or if there is a saturation shift for the black color of the test pattern. As described herein, the color shift and saturation shift can indicate that an agent is present within the corresponding print substance applied to the substrate to generate test pattern. In some examples, the color shift can be compared to a color shift range and the saturation shift can be compared to a saturation shift range. The agent can be determined to be present within a particular print substance when the color shift of the particular color on the test pattern is within a corresponding color shift range. In a similar way, the agent can be determined to be within the black print substance when the saturation shift of the black color on the test pattern is within a corresponding saturation shift range. In this way, the method 100 can move to 108 when the print substance includes the agent and move to 109 when the print substance does not include the agent.

[0023] Figure 2 illustrates an example of a diagram 210 for performing print substance agent identifications. As described herein, a printing device can deposit a print substance on to a substrate to generate a test pattern or image on the substrate. In some examples, the test pattern can include a plurality of different colors that can be identified with a particular hue value or hue angle on a defined color wheel 212.

[0024] The color wheel can start at 0 degrees represented by axis “a*” and moves in counter clockwise direction such that axis “b*” is 90 degrees. in some examples the color wheel 212 can be represented such that red is at 0 degrees, yellow is at 60 degrees, green is at 120 degrees, blue is at 240 degrees, and magenta is at 300 degrees. In this way, the hue value or hue angle can be represented on a first graph 214-1 and a second graph 214-2. The first graph 214-1 can represent a first agent that can be utilized with a particular color and the second graph 214-2 can represent a second agent that can be utilized with the particular color. As described herein, the particular agent can cause a different color shift for a particular color. For example, the diagram 210 can illustrate a print substance with the color yellow. In this example, the print substance has a hue value of 60 degrees

under a visible light spectrum. That is, under normal light conditions, the print substance appears yellow when deposited on a substrate.

[0025] As illustrated in the first graph 214-1, the print substance can include a visible light color range 216-1 and an ultra-violet light color range 218-1. That is, the hue color of the print substance can be represented by point 220-1 under visible light and the hue color of the print substance can be represented by point 222-1 under ultra-violet light. The quantity of hue shift can be illustrated by arrow 224-1. As described herein, the ultra-violet light color range 218-1 can be utilized as a color shift range for the particular agent that creates the hue shift illustrated by arrow 224-1. In this example, the same print substance without the agent will still have a hue color shift. However, the hue color shift without the agent is a shift from point 220-1 to point 221-1. In this example, the hue color shift does not shift out of the visible light color range 216-1 and does not shift into the ultra-violet light color range 218-1.

[0026] In some examples, the determination of the presence or absence of the particular agent can be based on the hue color shift from the point 220-1 to a resulting point under the ultra-violet light. For example, a color shift represented by arrow 224-1 from point 220-1 to point 222-1 is detected, a determination that the agent is present within the print substance can be made. In a counter example, the a determination that the agent is not within the print substance or is absent from the print substance can be made when the hue color shift is from point 220-1 to 221-1 or when point 222-1 is not within the ultra-violet light color range 218-1 (e.g., the hue color shift is outside the visible light color range 216-1, but not within the ultra-violet light color range 218-1, etc.).

[0027] The second graph 214-2 can utilize a second agent that is different than the first agent referenced in the first graph 214-1. As illustrated in the second graph 214-2, the print substance can include a visible light color range 216-2 that is the same or similar as the visible light color range 216-1 as referenced in the first graph 214-1. However, the ultra-violet light color range 218-2 can be different than the ultra-violet light color range 218-1 as referenced in the first graph 214-1. As illustrated in the second graph 214-2 the print substance can be at point 220-2 under a light source in the visible light spectrum and shift as illustrated by arrow 224-2 to point 222-2 under a light source in the ultra-violet spectrum when the second agent is present in the print substance. In contrast, the print substance can be at point 220-2 under a light source in the visible light spectrum and shift to point 221-2 under a

light source in the ultra-violet spectrum when the second agent is not present or absent in the print substance.

[0028] In a specific example, the color of the print substance can be yellow. In this example, the first graph 214-1 can be represented by particular hue angles. The hue angle of the yellow can be 81 degrees in the visible spectrum and 79 degrees in the ultra-violet spectrum without the first agent. In this example, the hue angle of the yellow can be 85 degrees in the visible spectrum and 154 degrees in the ultra-violet spectrum with the first agent. In another example, the color of the print substance can be magenta. In this specific example, the hue angle can be 33 degrees in the visible spectrum and 29 degrees in the ultra-violet spectrum without the first agent. In this specific example, the hue angle of the magenta print substance can be 24 degrees in the visible spectrum and 55 degrees in the ultra-violet spectrum when the magenta print substance includes the first agent. Furthermore, the print substance can by cyan. In this example, the hue angle of the cyan print substance can be 260 degrees in the visible spectrum and 264 degrees in the ultra-violet spectrum when the cyan print substance does not include the first agent. In this example, the hue angle of the cyan print substance can be 261 degrees in the visible spectrum and 336 degrees in the ultra-violet spectrum when the cyan print substance includes the first agent.

[0029] As described herein, the hue angle color shift for each of the plurality of colors can changed based on the original color or color within the visible spectrum as well as the particular agent utilized with the original color. In this way, determining when a particular agent is present within the particular print substance can include identifying the original color and corresponding color shift when exposed to visible spectrum light and when exposed to ultra-violet spectrum light.

[0030] In this way, the presence or absence of the second agent can be detected independently from the first agent. Thus, the first agent can be utilized for a first type of print substance with a particular color and the second agent can be utilized for a second type of print substance with the particular color and the first type of print substance can be distinguished from the second type of print substance based on the color shift that corresponds to the particular agent utilized. In addition, the example of the first graph 214-1 and the second graph 214-2 can be specific to a particular color. However, the first agent and/or the second agent can be utilized with a plurality of other colors and have corresponding color shifts that are unique to the

plurality of other colors. That is, the color shift for the first agent in a first color can be different than the color shift for the first agent in a second color. For this reason, a color shift range to identify a particular agent can be designated for each of a plurality of colors to determine when the particular agent is within each of the plurality of colors.

[0031] Figure 3 illustrates an example of a diagram 330 for performing print substance agent identifications. The saturation level can be a percentage from 0 to 100 percent where 0 percent is complete saturation and is viewable as black and 100 percent is a low saturation that is viewable as a lighter black or potentially different color than black.

[0032] The diagram 330 illustrates a saturation level of a print substance. In some examples, the diagram 330 illustrates a first saturation point 332 that illustrates a saturation level of 0 percent. The first saturation point 332 can represent a black color of the test pattern under light within the visible light spectrum. In some examples, the first saturation point 332 can illustrate that the saturation of the black color under the visible spectrum appears as black to a human user. In some examples, the diagram 330 includes an area 339 where the black color will appear black to a human user.

[0033] As described herein, a saturation shift can represent the change in saturation from a first saturation when the black color is under a visible light spectrum to a second saturation when the black color is under an ultra-violet light spectrum. In some examples, the diagram 330 includes a second saturation point 334 that can illustrate a saturation shift from the first saturation point 332 when the print substance that was deposited to generate the black color does not include an agent. In this example, the second saturation point 334 is within the area 339. In this example, the second saturation point 334 may appear black under the ultra-violet light spectrum and may not be outside the area 339.

[0034] In some examples, the diagram 330 includes a third saturation point 336. The third saturation point can represent a saturation of the black color when the print substance that generated the black color includes a first agent. As illustrated in the diagram 330, the third saturation point 336 is outside the area 339 and thus may appear as a relatively lighter black or other color when under the ultra-violet light spectrum. In a similar way, the diagram 330 includes a fourth saturation point 338. The fourth saturation point can represent a saturation of the black color when the

print substance that generated the black color includes a second agent. The fourth saturation point 338 is outside the area 339 and thus may also appear as a lighter black or other color when under the ultra-violet light spectrum.

[0035] In a specific example, the saturation of a black portion of a test pattern can be 1 percent under a visible light spectrum. In this example, the saturation of the black portion can be 5 percent under an ultra-violet spectrum when the black print substance does not include an agent (e.g., light activated agent, ultra-violet agent, fluorescent agent, etc.). In this example, the saturation of the black portion can be 26 percent under the ultra-violet spectrum when the black print substance includes an agent (e.g., first agent, second agent, etc.).

[0036] Figure 4 illustrates an example of a printing device 440 for performing print substance agent identifications. The printing device 440 can include a processor 442 that can execute instructions 446, 448, 450 to perform the methods described herein. In some examples, the printing device 440 can include a computing device or communicatively coupled to a computing device. In other examples, the printing device 440 can include a controller or other hardware to executing the instructions 446, 448, 450 and/or perform the methods described herein.

[0037] In some examples the printing device 440 can include a processor 442 (e.g., processor resource, processing resource, etc.) communicatively coupled to a memory resource 444. As described further herein, the memory resource 444 can include instructions 446, 448, 450 that can be executed by the processor 442 to perform particular functions. In some examples, the printing device 440 is coupled to a print engine to deposit a print substance on to a substrate to generate an image on the substrate.

[0038] The printing device 440 can include components such as a processor 442. As used herein, the processor 442 can include, but is not limited to: a central processing unit (CPU), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA), a metal-programmable cell array (MPCA), a semiconductor-based microprocessor, or other combination of circuitry and/or logic to orchestrate execution of instructions 446, 448, 450. In other examples, the printing device 540 can include instructions 446, 448, 450 stored on a machine-readable medium (e.g., memory resource 444, non-transitory computer-readable medium, etc.) and executable by a processor 442. In a specific example, the printing device

440 utilizes a non-transitory computer-readable medium storing instructions 446, 448, 450 that, when executed, cause the processor 442 to perform corresponding functions.

[0039] As described herein, the printing device 440 can be a device that can generate images on a substrate utilizing print substances (e.g., ink, toner, etc.). The print substances can be combined with a light activated agent or substance. In some examples, the light activated agent can alter a hue color value or hue color angle of the print substance when the print substance is under an ultra-violet light source. For example, the light activated agent can be a Benzoisoquinoline compound, a Europium complex compound, among other types of compounds that can result in a hue color change of a colored print substance when the print substance is under an ultra-violet light source. In a specific example, the agent can include, but is not limited to: a (6,7-dimethoxy-2-(octan-3-y1)-1H-benzo[de]isoquinoline-1,3(2H)-dione), a (2-(benzo[d]thiazol-2y1)phenol), a (Europium (1,10-phenanthroline) tri(1,1,1-trifluoro-4-hydroxy-4-(2-thienyl)-3-buten-2-one complex), and/or other types of benzoisoquinoline and Europium complex compounds.

[0040] In some examples, the printing device 440 can include instructions 446 that can be executed by a processor 442 to determine a color shift range for a print substance combined with an agent. As described herein, the color shift range can be a predicted range for a color shift when the print substance is subjected to a light source in the ultra-violet spectrum. That is, the color shift range can be a range of degrees within the hue color wheel or a range of colors that the print substance will shift if the print substance includes the agent. As described herein, the color shift range can be a predicted color range for the particular agent associated with the print substance. For example, the predicted color range for a particular print substance can be based on the original color (e.g., color under visible light spectrum, etc.) and the particular agent combined with the print substance.

[0041] In some examples, the printing device 440 can include instructions 448 that can be executed by a processor 442 to detect a color shift for the print substance based on a change between a first color when the print substance is exposed to a first light having a first wavelength range and a second color when the print substance is exposed to a second light having a second wavelength range. Detecting the color shift for the print substance can include performing a first scan when the print substance is under a first light having the first wavelength range. In

some examples, the first wavelength range is the visible spectrum range. For example, the visible spectrum range can be approximately 380 nanometers to approximately 750 nanometers. In some examples, the first color can be an original color or intended color of the print substance when deposited on the print substrate.

[0042] In some examples, the second wavelength range can be the ultra-violet spectrum of light. For example, the ultra-violet spectrum can be approximately 10 nm to 400 nanometers. In some examples, the second wavelength range can be provided by a second light source that can be activated to detect the color change from the first color to the second color. In some examples, detecting the color shift can include performing a second scan when the print substance is under the second light source within the ultra-violet spectrum. In some examples, the color shift or color change can be calculated through a comparison of the first scan and the second scan of the print substance.

[0043] In some examples, the printing device 440 can include instructions 450 that can be executed by a processor 442 to identify an existence of the agent within the print substance when the color shift for the print substance is within the color shift range. As described herein, the existence of the agent can be verified if the actual color shift from the first wavelength range to the second wavelength range is within the predicted color shift for the print substance with the particular color and the particular agent.

[0044] In some examples, the agent can be determined to be present within the print substance when the color shift is within the color shift range and the agent can be determined to be absent from the print substance when the color shift is outside the color shift range. That is, in some examples, the printing device 440 can identify an absence of the agent within the print substance when the color shift for the print substance is outside the color shift range.

[0045] Figure 5 illustrates an example of a memory resource 544 storing instructions 554, 556, 558, 560, 562, 564 for performing print substance agent identifications. In some examples, the memory resource 544 can be a part of a computing device, printing device, or controller that can be communicatively coupled to a printing system that includes printing devices or components of a printing device. For example, the memory resource 544 can be part of a printing device 440 as referenced in Figure 4.

[0046] In some examples, the memory resource 544 can be communicatively coupled to a processor 542 that can execute instructions 554, 556, 558, 560, 562, 564 stored on the memory resource 544. For example, the memory resource 544 can be communicatively coupled to the processor 542 through a communication path 552. In some examples, a communication path 552 can include a wired or wireless connection that can allow communication between devices and/or components within a single device.

[0047] The memory resource 544 may be electronic, magnetic, optical, or other physical storage device that stores executable instructions. Thus, a non-transitory machine readable medium (MRM) (e.g., a memory resource 544) may be, for example, a non-transitory MRM comprising Random-Access Memory (RAM), read-only memory (ROM), an Electrically-Erasable Programmable ROM (EEPROM), a storage drive, an optical disc, and the like. The non-transitory machine readable medium (e.g., a memory resource 544) may be disposed within a controller and/or computing device. In this example, the executable instructions 554, 556, 558, 560, 562, 564 can be "installed" on the device. Additionally, and/or alternatively, the non-transitory machine readable medium (e.g., a memory resource 544) can be a portable, external or remote storage medium, for example, which allows a computing system or printing system to download the instructions 554, 556, 558, 560, 562, 564 from the portable/external/remote storage medium. In this situation, the executable instructions may be part of an "installation package". As described herein, the non-transitory machine readable medium (e.g., a memory resource 544) can be encoded with executable instructions for performing print substance agent identifications.

[0048] The instructions 554, when executed by the processor 542, can include instructions to determine a color shift range for a first print substance with a first color. As described herein, the color shift range can be a predicted color shift area for a particular agent that is combined with a particular color. In this way, the color shift range can be determined based on the first color and the type or particular agent to be combined with the first print substance with the first color. In some examples, the first color is a non-black color such as, but not limited to, cyan, yellow, magenta, among other colors that can be utilized with print substances.

[0049] The instructions 556, when executed by the processor 542, can include instructions to determine a color saturation range for a second print substance with a second color. As described herein, the color saturation range can be a predicted

saturation range or saturation percentage for the second color. In some examples, the second color is a black color. The color saturation range can be based on the type of agent combined with the second print substance or the type of agent suspected as being combined with the second print substance. In this way, a saturation shift that occurs within the color saturation range can indicate the particular agent is combined with the second print substance and a saturation shift that occurs outside the color saturation range can indicate an absence of the particular agent.

[0050] In other examples, the processor 542 can determine when the color saturation shift is greater than a threshold value. In these examples, the threshold value can be associated with a particular area (e.g., area 339 as referenced in Figure 3, etc.) surrounding 0 percent saturation level. In this way, the threshold value can be a saturation percentage that is greater than a particular percentage under the ultra-violet light source. In these examples, the processor 542 can identify the second print substance includes the second light activated agent in response to the color saturation shift being greater than the threshold value.

[0051] The instructions 558, when executed by the processor 542, can include instructions to determine a color shift for the first print substance through a first comparison of the first print substance exposed to a first light having a first wavelength range and exposed to a second light having a second wavelength range. As described herein, the color shift can be a change in a hue color under the first light and a hue color under the second light. As described herein, the hue color under the first light can be the hue color under light within the visible light spectrum and the hue color under the second light can be the hue color under light within the ultra-violet light spectrum. In some examples, the hue color of the first print substance under the first light can be compared to the hue color of the first print substance under the second light to determine the color shift for the first print substance.

[0052] The instructions 560, when executed by the processor 542, can include instructions to identify the first print substance includes a first light activated agent when the color shift is within the color shift range for the first print substance. As described herein, the first light activated agent can alter a hue color of the first print substance from a first color under the visible light spectrum to a second color under the ultra-violet light spectrum. When the color shift corresponds to the color shift that

corresponds to the first light activated agent it can be determined the first light activated agent is combined with the first print substance. That is, when the color shift of the first print substance is within the color shift range that corresponds to the first light activated agent it can be determined that the first light activated agent is within the first print substance.

[0053] The instructions 562, when executed by the processor 542, can include instructions to determine a color saturation shift for the second print substance through a second comparison of the second print substance exposed to the first light and exposed to the second light. As described herein, the color saturation shift can be a difference between a first saturation when the second print substance is exposed to the first light and a second saturation when the second print substance is exposed to the second light. As described herein, the saturation shift can be based on the type of light activated agent that is combined with the second print substance. In this way, the color saturation shift can be utilized to identify a particular type of light activated agent that is within the second print substance.

[0054] The instructions 564, when executed by the processor 542, can include instructions to identify the second print substance includes a second light activated agent when the color saturation shift is within the color saturation range. As described herein, the color saturation shift can be a particular percentage shift that can correspond to a particular light activated agent. In this way, the second light activated agent can be determined to be combined with the second print substance based on whether the color saturation shift is within the color saturation range associated with the second light activated agent.

[0055] Figure 6 illustrates an example of a printing system 670 including a printing device 640 for performing print substance agent identifications. In some examples the printing device 640 can include a computing device or controller that includes a processor 642 communicatively coupled to a memory resource 644. As described herein, the memory resource 644 can include or store instructions 678, 680, 682, 684, 686 that can be executed by the processor 642 to perform particular functions.

[0056] The printing system 670 can include a print engine 672 that can be utilized to deposit a print substance on a print substrate. The print engine 672 can be communicatively coupled to the printing device 640 by the communication path 652-1. In some examples, the print engine 672 can generate a test pattern that includes a

plurality of different colors at a plurality of corresponding locations that can be individually analyzed under a first light source and a second light source (e.g., ultra-violet light source 674, etc.).

[0057] The printing system 670 can include an ultra-violet light source 674 to provide light on to the print substrate and/or print substance on the print substrate. The ultra-violet light source 674 can be communicatively coupled to the printing device 640 by the communication path 652-2. In some examples, the ultra-violet light source 674 can generate light in the ultra-violet light spectrum. In these examples, the ultra-violet light source 674 can direct ultra-violet light on to the print substance deposited on the print substrate by the print engine 672. For example, the ultra-violet light source 674 can be activated to provide ultra-violet light on the test pattern.

[0058] The printing system 670 can include an image scanner device 676 to scan or generate a digital image of the print substance on the print substrate. The image scanner device 676 can be communicatively coupled to the printing device 640 by the communication path 652-3. As used herein, an image scanner device 676 is a device that captures digital images of images on a substrate. For example, the image scanner device 676 can be a scanner associated with the printing system 670 that can generate a digital image of the test pattern generated by the print engine 672. In this way, the digital image can be utilized to analyze the color of the print substance deposited on the substrate when the ultra-violet light source 674 is activated or deactivated. In these examples, the digital image of the test pattern under visible light can be compared to the digital image of the test pattern under ultra-violet light.

[0059] The printing device 640 can include instructions 678 that can be executed by a processor 642 to instruct the image scanner device 676 to perform a first scan of the substrate with the deposited print substance when the ultra-violet light source 674 is activated. In these examples, the image scanner device 676 can capture an image of the hue color of the deposited print substance under ultra-violet light. The print substance deposited by the print engine 672 can be analyzed and a hue color of the print substance under the ultra-violet light can be determined.

[0060] The printing device 640 can include instructions 680 that can be executed by a processor 642 to instruct the image scanner device 676 to perform a second scan of the substrate with the deposited print substance when the ultra-violet light source 674 is deactivated. In a similar way, the image scanner device 676 can

capture an image of the print substance under light within the visible light spectrum. The image captured by the image scanner device 676 can be utilized to analyze the print substance to determine the hue color of the print substance under visible light.

[0061] The printing device 640 can include instructions 682 that can be executed by a processor 642 to compare the first scan to the second scan to determine a color shift of the print substance. As described herein, the hue color change from a first color in the visible spectrum to a second color in the ultra-violet spectrum can be utilized to identify the color shift of the print substance. The color shift can be determined based on the color change between the first scan and the second scan.

[0062] The printing device 640 can include instructions 684 that can be executed by a processor 642 to compare the color shift of the print substance to a predetermined color shift range for the print substance to determine when an agent is present within the print substance. As described herein, the detected color shift or hue color change between the first scan and the second scan can be utilized to identify if a particular agent is combined with the print substance. In some examples, the particular agent can be utilized to identify a particular function of the print substance. For example, a particular type of print substance can include a corresponding agent that can be identified based on the color shift. In this way, the agent can be identified as being combined within the print substance when the color shift is within a color shift range that corresponds to the agent.

[0063] The printing device 640 can include instructions 686 that can be executed by a processor 642 to verify the print substance is to be utilized by the print engine 672 when the agent is present within the print substance. As described herein, the agent can be combined with a particular print substance that can be utilized with particular printing devices. In this way, the print substance can be verified to work with the print engine 672 when a particular agent is detected within the print substance.

[0064] In some examples, the printing device 640 can include instructions that can be executed by a processor 642 to verify the print substance is utilized with a particular cartridge model of the print engine 672. In this way, the particular agent can correspond to a particular cartridge model and when the particular agent is detected within the print substance, the printing device 640 can verify that the particular cartridge model is being utilized by the print engine 672.

[0065] In the foregoing detailed description of the disclosure, reference is made to the accompanying drawings that form a part hereof, and in which is shown by way of illustration how examples of the disclosure may be practiced. These examples are described in sufficient detail to enable those of ordinary skill in the art to practice the examples of this disclosure, and it is to be understood that other examples may be utilized and that process, electrical, and/or structural changes may be made without departing from the scope of the disclosure. Further, as used herein, “a” refers to one such thing or more than one such thing.

[0066] The figures herein follow a numbering convention in which the first digit corresponds to the drawing figure number and the remaining digits identify an element or component in the drawing. For example, reference numeral 102 may refer to element 102 in Figure 1 and an analogous element may be identified by reference numeral 302 in Figure 3. Elements shown in the various figures herein can be added, exchanged, and/or eliminated to provide additional examples of the disclosure. In addition, the proportion and the relative scale of the elements provided in the figures are intended to illustrate the examples of the disclosure and should not be taken in a limiting sense.

[0067] It can be understood that when an element is referred to as being "on," "connected to", “coupled to”, or "coupled with" another element, it can be directly on, connected, or coupled with the other element or intervening elements may be present. In contrast, when an object is “directly coupled to” or “directly coupled with” another element it is understood that are no intervening elements (adhesives, screws, other elements) etc.

[0068] The above specification, examples, and data provide a description of the system and method of the disclosure. Since many examples can be made without departing from the spirit and scope of the system and method of the disclosure, this specification merely sets forth some of the many possible example configurations and implementations.

What is claimed is:

1. A printing device, comprising:

a processor; and

a non-transitory memory resource storing machine-readable instructions stored thereon that, when executed, cause the processor to:

determine a color shift range for a print substance combined with an agent;

detect a color shift for the print substance based on a change between a first color when the print substance is exposed to a first light having a first wavelength range and a second color when the print substance is exposed to a second light having a second wavelength range; and

identify an existence of the agent within the print substance when the color shift for the print substance is within the color shift range.

2. The printing device of claim 1, wherein the processor is to identify an absence of the agent within the print substance when the color shift for the print substance is outside the color shift range.

3. The printing device of claim 1, wherein the agent is an invisible light-activated agent.

4. The printing device of claim 1, wherein the first wavelength range is in a visible spectrum and the second wavelength range is in the ultra-violet spectrum.

5. The printing device of claim 1, wherein the color shift is calculated based on a hue color angle change from the first color to the second color.

6. A non-transitory memory resource storing machine-readable instructions stored thereon that, when executed, cause a processor to:

determine a color shift range for a first print substance with a first color;

determine a color saturation range for a second print substance with a second color;

determine a color shift for the first print substance through a first comparison of the first print substance exposed to a first light having a first wavelength range and exposed to a second light having a second wavelength range;

identify the first print substance includes a first light activated agent when the color shift is within the color shift range for the first print substance;

determine a color saturation shift for the second print substance through a second comparison of the second print substance exposed to the first light and exposed to the second light; and

identify the second print substance includes a second light activated agent when the color saturation shift is within the color saturation range.

7. The memory resource of claim 6, wherein the non-transitory memory resource include instructions that cause the processor to:

identify the first print substance is absent of the first light activated agent when the color shift is outside the color shift range; and

identify the second print substance is absent the second light activated agent when the color saturation shift is outside the color saturation range.

8. The memory resource of claim 6, wherein the first print substance includes a non-black color and the second print substance includes a black color.

9. The memory resource of claim 6, wherein the non-transitory memory resource include instructions that cause the processor to determine when the color saturation shift is greater than a threshold value.

10. The memory resource of claim 9, wherein the non-transitory memory resource include instructions that cause the processor to identify the second print substance includes the second light activated agent in response to the color saturation shift being greater than the threshold value.

11. A printing system, comprising:

a print engine to deposit a print substance on a substrate;

an ultra-violet light source directed toward the substrate;

an image scanner device to scan the print substance on the substrate;

and

a processor to:

instruct the image scanner device to perform a first scan of the substrate with the deposited print substance when the ultra-violet light source is activated;

instruct the image scanner device to perform a second scan of the substrate with the deposited print substance when the ultra-violet light source is deactivated;

compare the first scan to the second scan to determine a color shift of the print substance;

compare the color shift of the print substance to a predetermined color shift range for the print substance to determine when an agent is present within the print substance; and

verify the print substance is to be utilized by the print engine when the agent is present within the print substance.

12. The printing system of claim 11, wherein the processor is to verify the print substance is utilized with a particular cartridge model of the print engine.

13. The printing system of claim 11, wherein the print engine is to deposit a plurality of additional print substances on the substrate, wherein each of the plurality of additional print substances include a corresponding predetermined color shift range.

14. The printing system of claim 11, wherein the print engine is to deposit a black print substance on the substrate.

15. The printing system of claim 14, wherein the processor is to:

compare the first scan to the second scan to determine a saturation shift of the black print substance; and

compare the saturation shift of the black print substance to a predetermined saturation shift range for the black print substance to determine when the agent is present within the black print substance.

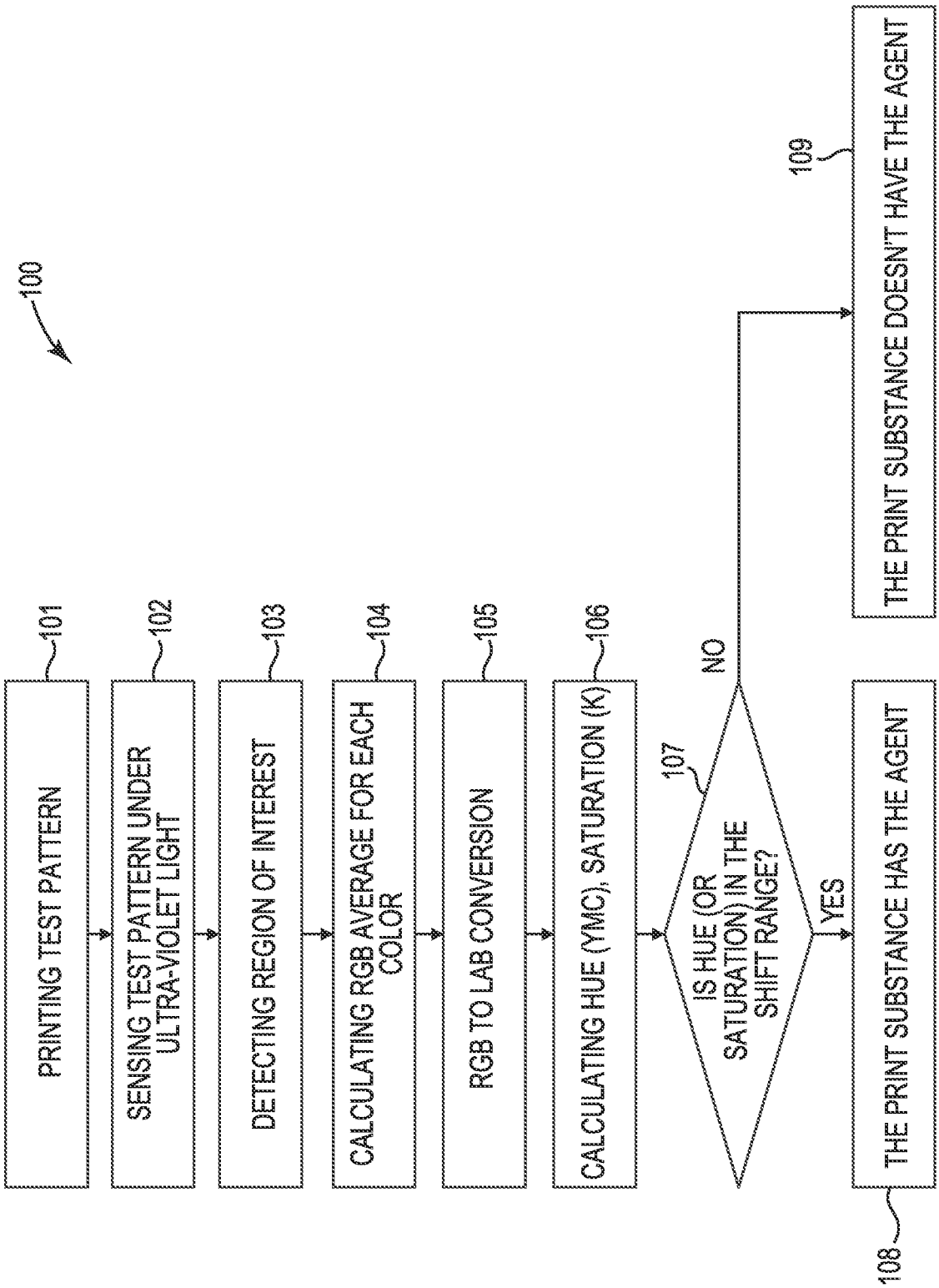

100
PRINTING TEST PATTERN
101
SENSING TEST PATTERN UNDER ULTRA-VIOLET LIGHT
102
DETECTING REGION OF INTEREST
103
CALCULATING RGB AVERAGE FOR EACH COLOR
104
RGB TO LAB CONVERSION
105
CALCULATING HUE (YMC), SATURATION (K)
106
IS HUE (OR SATURATION) IN THE SHIFT RANGE?
107
NO
YES
THE PRINT SUBSTANCE HAS THE AGENT
108
THE PRINT SUBSTANCE DOESN'T HAVE THE AGENT
109

Figure 1

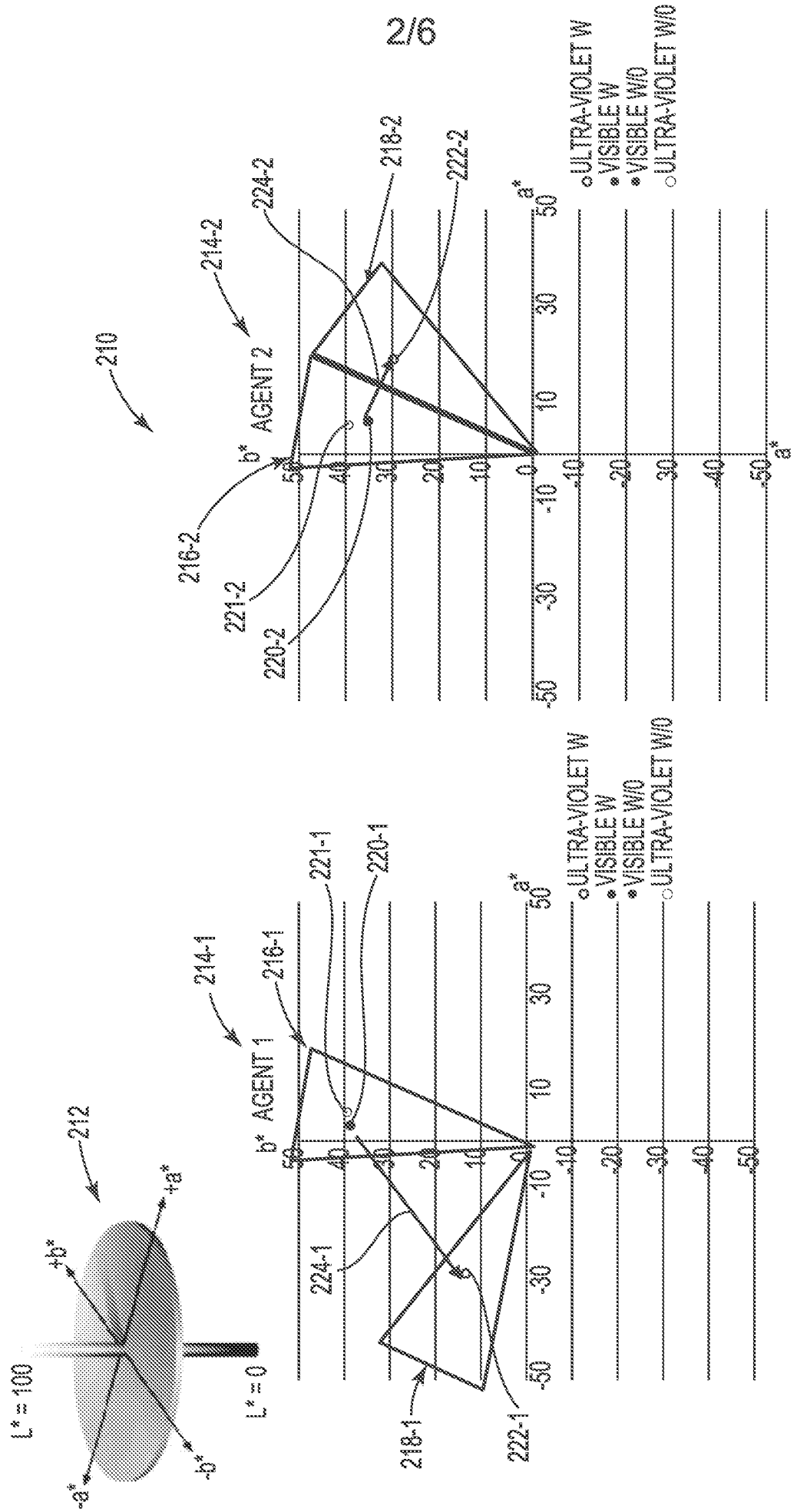

210
212
L* = 100
L* = 0
+a*
+b*
-b*
-a*
214-1
b* AGENT 1
216-1
221-1
220-1
224-1
218-1
222-1
214-2
b* AGENT 2
216-2
221-2
220-2
224-2
218-2
222-2
a*
ULTRA-VIOLET W
VISIBLE W
VISIBLE W/O
ULTRA-VIOLET W/O

Figure 2

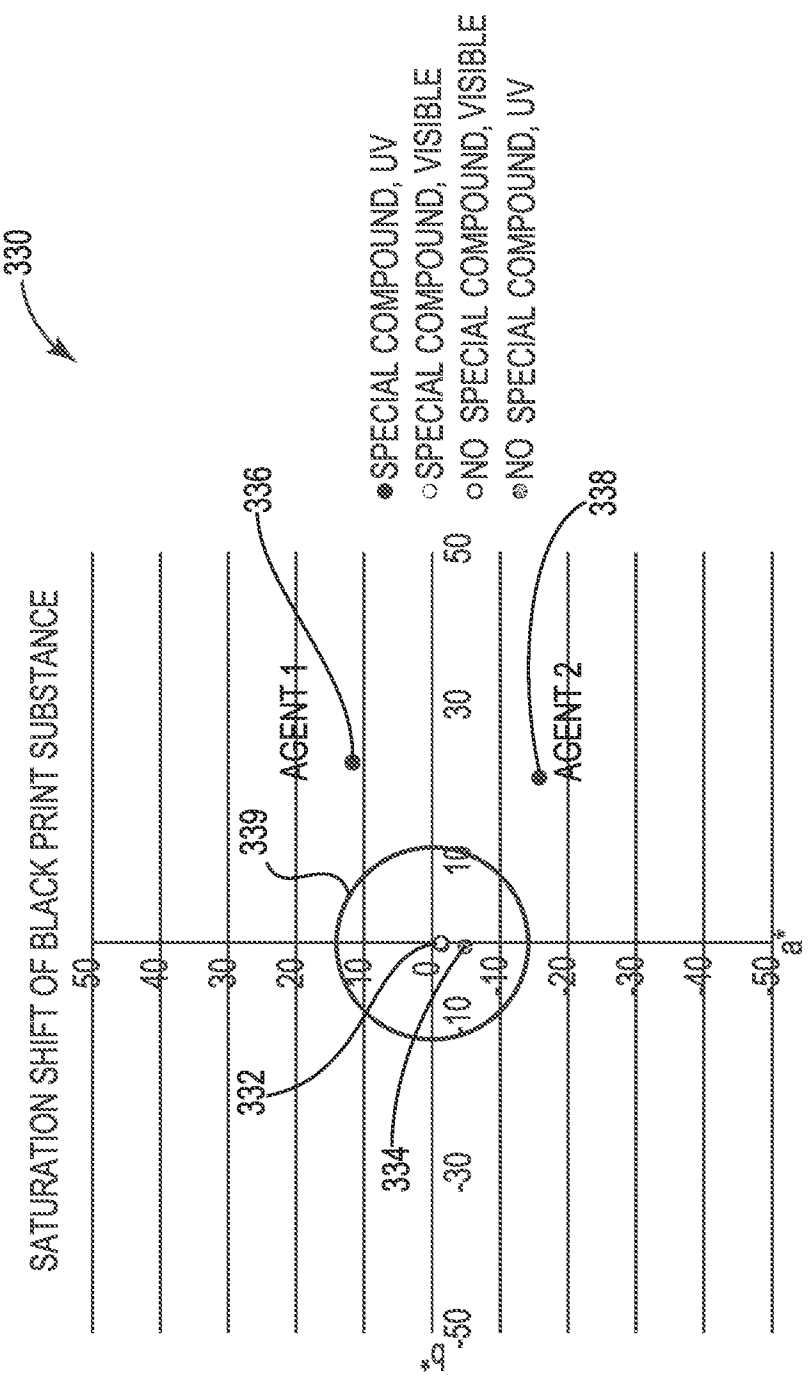

330
SATURATION SHIFT OF BLACK PRINT SUBSTANCE
SPECIAL COMPOUND, UV
SPECIAL COMPOUND, VISIBLE
NO SPECIAL COMPOUND, VISIBLE
NO SPECIAL COMPOUND, UV
336
338
AGENT 1
AGENT 2
339
332
334
50
40
30
20
10
0
-10
-20
-30
-40
-50
a*
b*

Figure 3

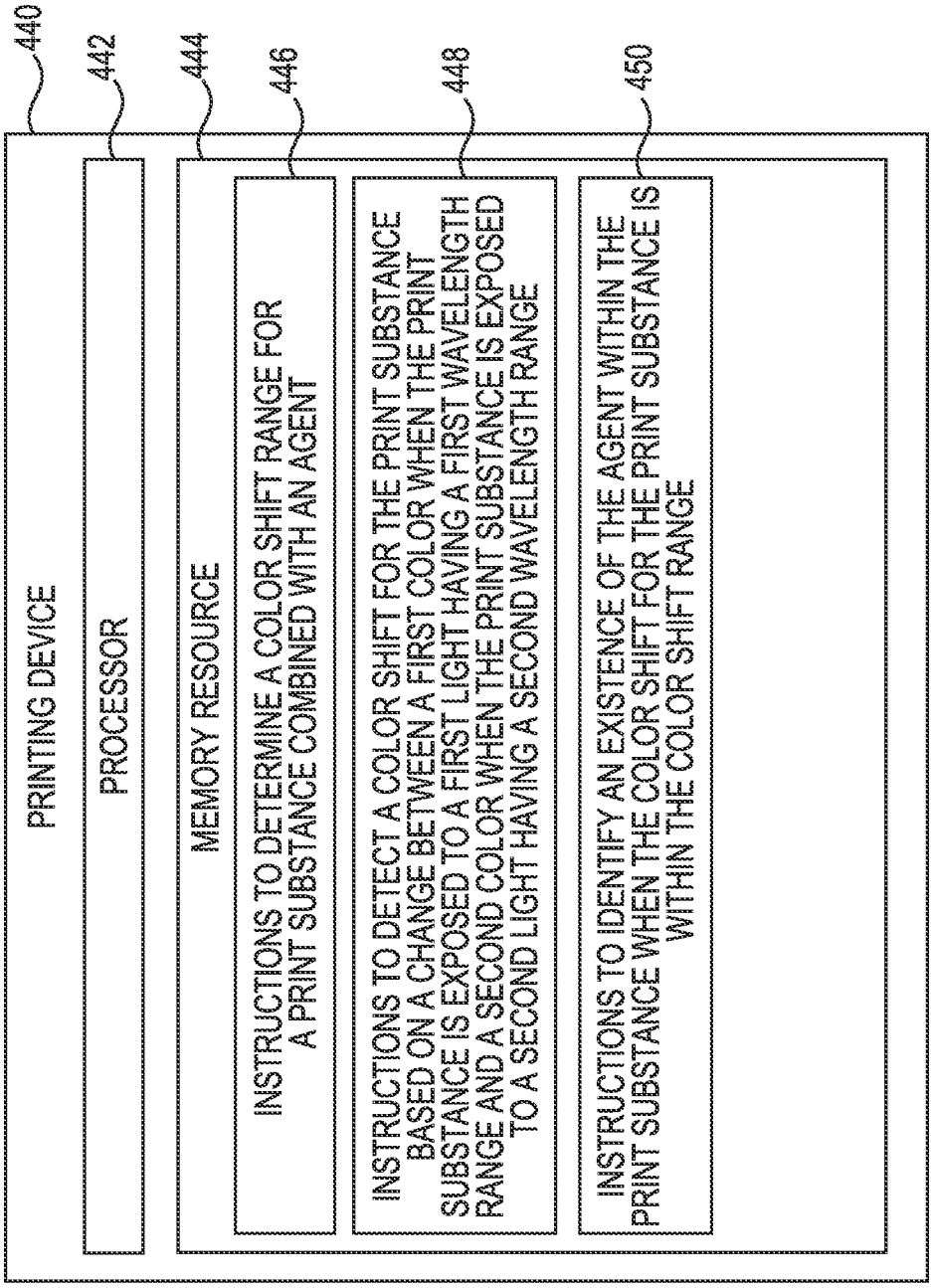

440
PRINTING DEVICE
442
PROCESSOR
444
MEMORY RESOURCE
446
INSTRUCTIONS TO DETERMINE A COLOR SHIFT RANGE FOR A PRINT SUBSTANCE COMBINED WITH AN AGENT
448
INSTRUCTIONS TO DETECT A COLOR SHIFT FOR THE PRINT SUBSTANCE BASED ON A CHANGE BETWEEN A FIRST COLOR WHEN THE PRINT SUBSTANCE IS EXPOSED TO A FIRST LIGHT HAVING A FIRST WAVELENGTH RANGE AND A SECOND COLOR WHEN THE PRINT SUBSTANCE IS EXPOSED TO A SECOND LIGHT HAVING A SECOND WAVELENGTH RANGE
450
INSTRUCTIONS TO IDENTIFY AN EXISTENCE OF THE AGENT WITHIN THE PRINT SUBSTANCE WHEN THE COLOR SHIFT FOR THE PRINT SUBSTANCE IS WITHIN THE COLOR SHIFT RANGE

Figure 4

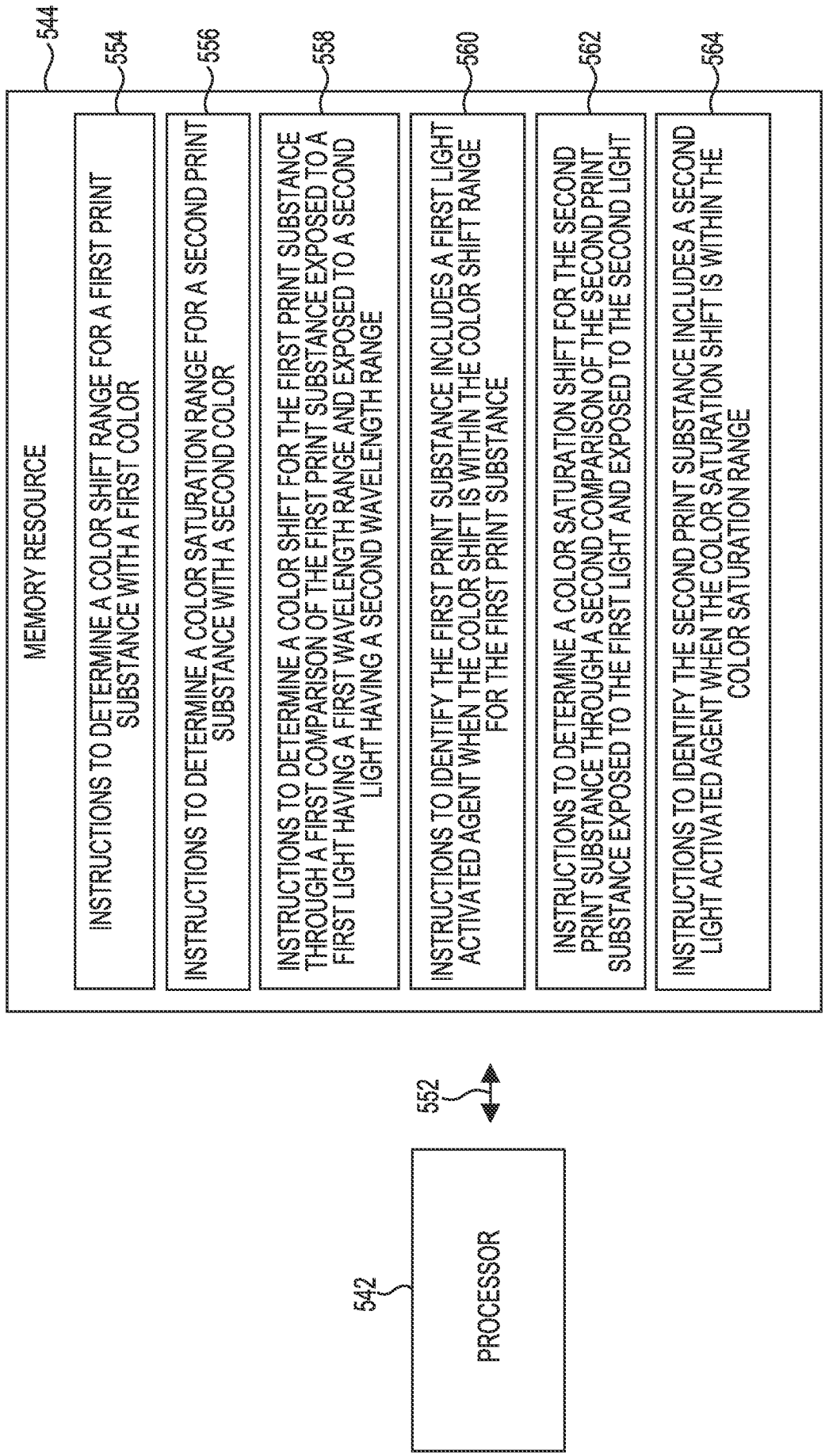

544
MEMORY RESOURCE
554
INSTRUCTIONS TO DETERMINE A COLOR SHIFT RANGE FOR A FIRST PRINT SUBSTANCE WITH A FIRST COLOR
556
INSTRUCTIONS TO DETERMINE A COLOR SATURATION RANGE FOR A SECOND PRINT SUBSTANCE WITH A SECOND COLOR
558
INSTRUCTIONS TO DETERMINE A COLOR SHIFT FOR THE FIRST PRINT SUBSTANCE THROUGH A FIRST COMPARISON OF THE FIRST PRINT SUBSTANCE EXPOSED TO A FIRST LIGHT HAVING A FIRST WAVELENGTH RANGE AND EXPOSED TO A SECOND LIGHT HAVING A SECOND WAVELENGTH RANGE
560
INSTRUCTIONS TO IDENTIFY THE FIRST PRINT SUBSTANCE INCLUDES A FIRST LIGHT ACTIVATED AGENT WHEN THE COLOR SHIFT IS WITHIN THE COLOR SHIFT RANGE FOR THE FIRST PRINT SUBSTANCE
562
INSTRUCTIONS TO DETERMINE A COLOR SATURATION SHIFT FOR THE SECOND PRINT SUBSTANCE THROUGH A SECOND COMPARISON OF THE SECOND PRINT SUBSTANCE EXPOSED TO THE FIRST LIGHT AND EXPOSED TO THE SECOND LIGHT
564
INSTRUCTIONS TO IDENTIFY THE SECOND PRINT SUBSTANCE INCLUDES A SECOND LIGHT ACTIVATED AGENT WHEN THE COLOR SATURATION SHIFT IS WITHIN THE COLOR SATURATION RANGE
552
542
PROCESSOR

Figure 5

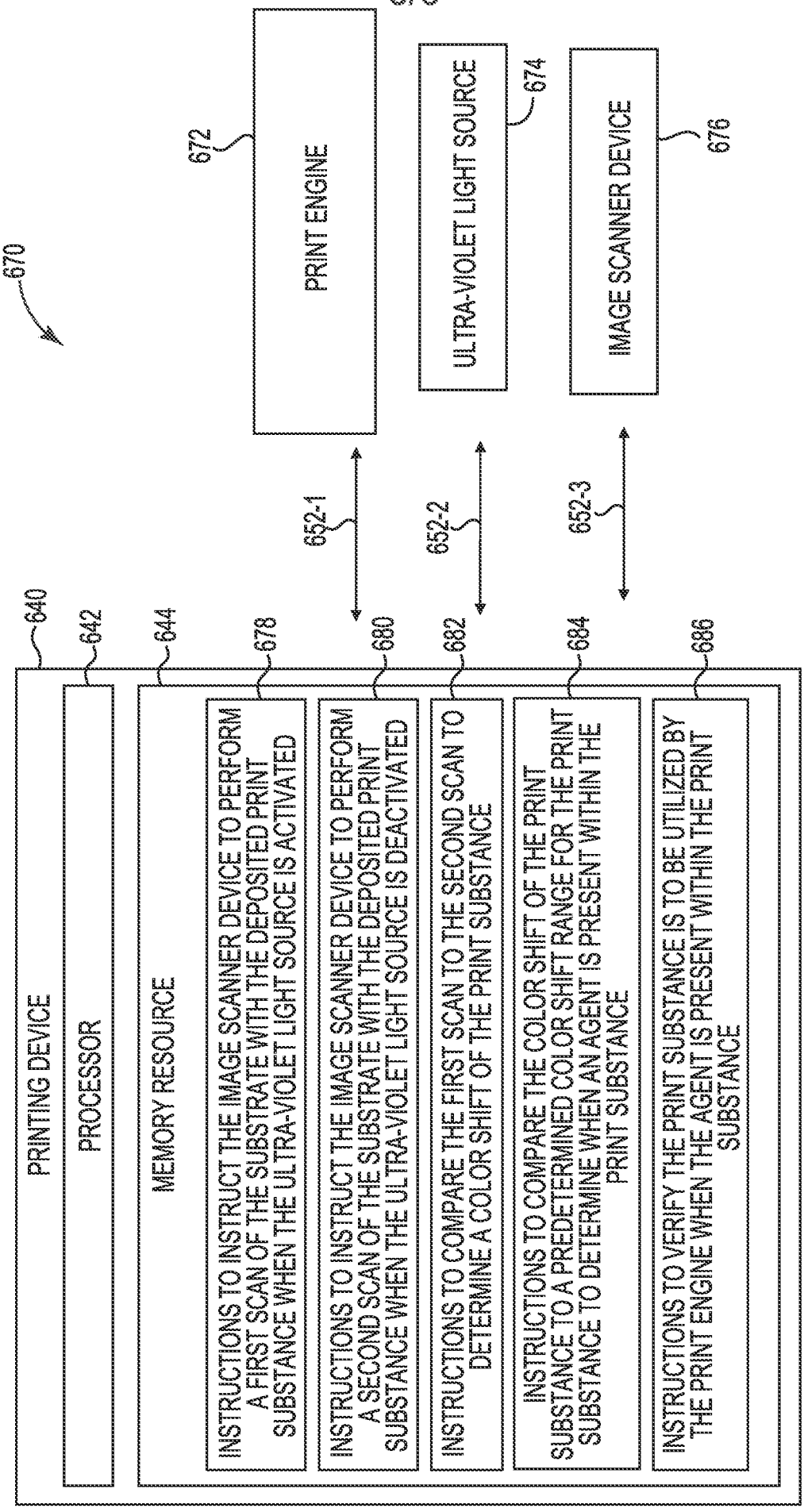

670
672
PRINT ENGINE
674
ULTRA-VIOLET LIGHT SOURCE
676
IMAGE SCANNER DEVICE
652-1
652-2
652-3
640
PRINTING DEVICE
642
PROCESSOR
644
MEMORY RESOURCE
678
INSTRUCTIONS TO INSTRUCT THE IMAGE SCANNER DEVICE TO PERFORM A FIRST SCAN OF THE SUBSTRATE WITH THE DEPOSITED PRINT SUBSTANCE WHEN THE ULTRA-VIOLET LIGHT SOURCE IS ACTIVATED
680
INSTRUCTIONS TO INSTRUCT THE IMAGE SCANNER DEVICE TO PERFORM A SECOND SCAN OF THE SUBSTRATE WITH THE DEPOSITED PRINT SUBSTANCE WHEN THE ULTRA-VIOLET LIGHT SOURCE IS DEACTIVATED
682
INSTRUCTIONS TO COMPARE THE FIRST SCAN TO THE SECOND SCAN TO DETERMINE A COLOR SHIFT OF THE PRINT SUBSTANCE
684
INSTRUCTIONS TO COMPARE THE COLOR SHIFT OF THE PRINT SUBSTANCE TO A PREDETERMINED COLOR SHIFT RANGE FOR THE PRINT SUBSTANCE TO DETERMINE WHEN AN AGENT IS PRESENT WITHIN THE PRINT SUBSTANCE
686
INSTRUCTIONS TO VERIFY THE PRINT SUBSTANCE IS TO BE UTILIZED BY THE PRINT ENGINE WHEN THE AGENT IS PRESENT WITHIN THE PRINT SUBSTANCE

Figure 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2022/041970

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04N1/60 B41J2/175 B41J2/21 G07D7/1205
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04N B41J G07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/005303 A1 (AUSLANDER JUDITH D [US] ET AL) 2 January 2003 (2003-01-02) figures 1-4 paragraph [0004] - paragraph [0006] paragraph [0052] - paragraph [0054] -----	1-5, 11-15
A	US 2005/156984 A1 (UEJIMA ATSUSHI [JP] ET AL) 21 July 2005 (2005-07-21) paragraph [0050] paragraph [0060] - paragraph [0065] paragraph [0068] paragraph [0073] - paragraph [0074] -----	1-15
A	JP 2004 195914 A (HOKUETSU PAPER MILLS) 15 July 2004 (2004-07-15) the whole document -----	1-15

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 March 2023	03/04/2023

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	João, César

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2022/041970

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2003005303 A1	02-01-2003	AU 2002308625 A1	25-11-2002
		CA 2446814 A1	21-11-2002
		CN 1636225 A	06-07-2005
		EP 1444636 A2	11-08-2004
		JP 4175898 B2	05-11-2008
		JP 2004534303 A	11-11-2004
		US 2003005303 A1	02-01-2003
		US 2010117350 A1	13-05-2010
		WO 02093456 A2	21-11-2002
US 2005156984 A1	21-07-2005	NONE	
JP 2004195914 A	15-07-2004	NONE	