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(71) Applicant: **HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.** [US/US]; 11445 Compaq Center Drive West, Houston, Texas 77070 (US).

(72) Inventors: **XU, De-Ming**; HP Inc., 138 Depot Road, Alexandra Road, Singapore 109683 (SG). **HUANG, Xiaoxi**; HP Inc., 138 Depot Road, Alexandra Road, Singapore 109683 (SG). **CHIA, Keng San**; HP Inc., 138 Depot Road, Alexandra Road, Singapore 109683 (SG).

(74) Agent: **GARDINER, Austin W.** et al.; HP Inc., Intellectual Property Administration, 3390 East Harmony Road, Mail Stop 35, Fort Collins, Colorado 80528 (US).

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(54) Title: MEDIA SUPPLY

(57) Abstract: A media supply apparatus is described. In an example implementation, the apparatus includes a first media roll to supply media to a second media roll of a printing system. The apparatus determines whether the second media roll of the printing system is wound with a threshold volume of the media supplied from the first media roll of the media roll assembly, and provides an input to the printing system to stop winding the media from the first media roll of the media roll assembly when the second media roll of the printing system is determined to be wound with the threshold volume of the media.

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MEDIA SUPPLY

BACKGROUND

[0001] Printing systems may use media in the form of rolls for printing large format media. A media roll may include a continuous roll of large format media. The large format media may include, for example, paper of a size greater than A3. Media rolls in printing systems may be utilized for printing posters, banners, wallpapers, and other large format prints.

BRIEF DESCRIPTION OF DRAWINGS

[0002] The following detailed description references the drawings, wherein:

[0003] Fig. 1 illustrates a media supply apparatus for a printing system, according to an example;

[0004] Fig. 2 illustrates a printing system with a media supply apparatus, according to an example;

[0005] Fig. 3 illustrates a printing system with a media supply apparatus, according to an example;

[0006] Fig. 4 illustrates a method of supplying media to a printing system, according to an example; and

[0007] Fig. 5 illustrates a method of supplying media to a printing system, according to an example.

DETAILED DESCRIPTION

[0008] Printing systems, such as large format printers, may include media in the form of a roll positioned internal to the system. Media from a media roll in a printing system may be drawn into a print unit of the printing system for printing and dispensed to an output region. The print unit may include print-heads coupled to printing-fluid source(s). When the media roll in the printing system is exhausted,

empty media core or spindle of the media roll may be removed and a new media roll may be installed in the printing system for printing.

[0009] Printing systems using media rolls are constrained by the size of the media roll that can be installed internally. Because of the size constraints, the media roll may have to be replaced frequently, for example, for bulk printing of large format media. Frequent replacement of media rolls makes bulk printing of large format media slow and laborious.

[0010] The present subject matter describes media supply apparatuses, printing systems with a media supply apparatus, and methods of supplying media from a media supply apparatus to a printing system. A media supply apparatus of the present subject matter can be coupled to a printing system, for example a large format printer, to supply extra media when media on an internal media roll of the printing system is exhausted. The media supply apparatus of the present subject matter, when provided on a printing system, increases the amount to media available for printing in the printing system. Increase in the amount of media available for printing facilitates in reducing the frequency of replacement of the internal media roll in the printing system. This makes bulk printing of large format media faster and less laborious.

[0011] In accordance with an example implementation of the present subject matter, the media supply apparatus includes a media roll assembly through which the media supply apparatus can be coupled to a printing system. The media roll assembly includes a media roll having media that can be supplied to a media roll of the printing system. The media roll of the media roll assembly may be referred to as a first media roll, and the media roll of the printing system may be referred to as a second media roll. The second media roll may be an internal media roll of the printing system. With the media supply apparatus coupled to the printing system, when the second media roll is found to be empty, media from the first media roll may be engaged with an empty media core of the second media roll. After engaging the media, the second media roll may rotate to wind the media from the first media roll onto the second media roll.

[0012] In an example implementation, the media supply apparatus includes a first sensor to monitor the amount of media, from the first media roll,

wound on the second media roll. Upon determining that the second media roll is wound with a threshold volume of the media from the first media roll, the first sensor provides an input to the printing system to stop winding the media from the first media roll. The media from the first media roll may then be cut, and the second media roll may be engaged with a print unit of the printing system for the purpose of printing. The threshold volume may indicate a specific volume of media, sufficient for supplying media for printing. For example, the threshold volume may be indicated by a particular roll height or other value to indicate when the second media roll is nearing full capacity, such as being sufficiently wound above 95% of full capacity. For another example, the threshold volume may include a range of volumes or a certain number of particular values within a range of volumes, such as 50% to 100% of full capacity of the second media roll.

[0013] In an example implementation, the media supply apparatus also includes a second sensor to determine whether the first media roll has media remaining to supply to the second media roll. Upon determining that the first media roll is empty, the second sensor provides an input to the printing system to stop rotating the second media roll.

[0014] The present subject matter is further described with reference to the accompanying figures. Wherever possible, the same reference numerals are used in the figures and the following description to refer to the same or similar parts. It should be noted that the description and figures merely illustrate principles of the present subject matter. It is thus understood that various arrangements may be devised that, although not explicitly described or shown herein, encompass the principles of the present subject matter. Moreover, all statements herein reciting principles, aspects, and examples of the present subject matter, as well as specific examples thereof, are intended to encompass equivalents thereof.

[0015] Fig. 1 illustrates a media supply apparatus 100 for a printing system 102, according to an example. The media supply apparatus 100 includes a media roll assembly 104 couplable to the printing system 102. The media roll assembly 104 may be mounted on the printing system 102 for supplying extra media from the media roll assembly 104 to the printing system 102.

[0016] The media roll assembly 104 includes a media roll, referred to as a first media roll 106. With the media roll assembly 104 mounted on the printing system 102, the first media roll 106 can supply media 108 to a media roll 110 of the printing system 102. The media roll 110 of the printing system 102 may hereinafter be referred to as the second media roll 110. In an example implementation, the first media roll 106 may be bigger than the second media roll 110, i.e., the first media roll 106 may have more volume of media in comparison to the volume of media that can be rolled on the second media roll 110.

[0017] In an example implementation, the media roll assembly 104 includes a gear assembly (not shown). The gear assembly of the media roll assembly 104 is arranged to couple a shaft (not shown) of the media roll assembly 104 with a media roll shaft (not shown) of the printing system 102. The shaft of the media roll assembly 104 may be a rotating shaft on which the first media roll 106 is mounted. Similarly, the media roll shaft of the printing system 102 may be a rotating shaft on which the second media roll 110 is mounted. The gear assembly of the media roll assembly 104 is such that the shaft of the media roll assembly 104 can be engaged or disengaged with the media roll shaft of the printing system 102. Also, the gear assembly is such that the shaft of the media roll assembly 104 and the media roll shaft of the printing system 102, when engaged with each other, rotate in the same direction.

[0018] The media supply apparatus 100, as shown, includes a first sensor 112 to monitor the amount of media wound onto the second media roll 110 from the first media roll 106. The first sensor 112 may be activated to monitor the amount of media on the second media roll 110 while the media 108 from the first media roll 106 is being wound onto the second media roll 110. Based on the monitoring, the first sensor 112 may determine whether the second media roll 110 is wound with a threshold volume of the media 108 from the first media roll 106. Upon determining that the second media roll 110 is wound with the threshold volume of the media 108, the first sensor 112 may provide an input to the printing system 102 to stop winding the media 108 from the first media roll 106. This may prevent over-winding of media onto the second media roll 110. In an example

implementation, the threshold volume may be in a range of 50% to 100% of full capacity of the second media roll 110.

[0019] In an example implementation, the media supply apparatus 100 may also include a second sensor (not shown) to determine whether the first media roll 106 has media to supply to the second media roll 110. The second sensor may be activated to determine the presence of media on the first media roll 106 while the media 108 from the first media roll 106 is being wound onto the second media roll 110. Upon determining that the first media roll 106 is empty, the second sensor may provide an input to the printing system 102 to stop rotating the second media roll 110 for any further winding. This facilitates in terminating the winding process when there is no media remaining in the first media roll 106.

[0020] Fig. 2 illustrates a printing system 200 with a media supply apparatus 202, according to an example. The media supply apparatus 202 may be mounted on the printing system 200 for the purpose of supplying extra media to a media roll 204 of the printing system 200. The media roll 204 may be an internal media roll of the printing system 200 from which media is provided for printing. The media supply apparatus 202 includes a media roll 206. The media roll 206 may be associated with the printing system 200 when the media supply apparatus 202 is mounted on the printing system. Media 208 of the media roll 206 of the media supply apparatus 202, when engaged with the media roll 204 of the printing system 200, can be wound on the media roll 204. The media roll 204 may be referred to as a primary media roll 204 of the printing system 200, and the media roll 206 may be referred to a secondary media roll 206 of the printing system 200.

[0021] The printing system 200, as shown in Fig. 2, also includes a drive unit 210 coupled to the primary media roll 204. In an example implementation, the drive unit 210 may be a motor. A shaft (not shown) of the drive unit 210 may be coupled to a media roll shaft (not shown) have the primary media roll 204 mounted thereon. The drive unit 210 may rotate the primary media roll 204 to wind the media 208 from the secondary media roll 206 onto the primary media roll 204, when the media 208 from the secondary media roll 206 is engaged with the primary media roll 204. The drive unit 210 may also rotate the primary media

roll 204 to wind the media 208 until the primary media roll 204 is wound with a threshold volume of the media 208.

[0022] Fig. 3 illustrates a printing system 300 with a media supply apparatus 302, according to an example. The printing system 300 may be a large format printer. The printing system 300 includes a primary media roll 304 that supplies media for printing. The media supply apparatus 302 includes a secondary media roll 306, similar to the media roll of the media supply apparatus 202 shown in Fig. 2, to supply media 308 to the primary media roll 304.

[0023] The primary media roll 304 as shown in Fig. 3 includes a media core 310 having a slot (not shown) along the length of the media core 310 to engage the media 308 from the secondary media roll 306 prior to winding the media 308 on the primary media roll 304. The media 308 may be engaged in the slot of the media core 310 and the engagement is sealed using a press-bar 312. In an example implementation, the media core 310 may be made of plastic or carbon fiber, and the press-bar 312 may be made of a flexible material, for example, a thermoplastic material.

[0024] The printing system 300, as shown in Fig. 3, also includes a drive unit 314. The drive unit 314 may be similar to the drive unit 210 of the printing system 200. The drive unit 314 may be a motor coupled to the primary media roll 304. The drive unit 314 may rotate the primary media roll 304 in one direction to wind the media 308 from the secondary media roll 306 onto the primary media roll 304, and rotate the primary media roll 304 in the other direction to supply media from the primary media roll 304 for printing.

[0025] In an example implementation, the media supply apparatus 302 includes a gear assembly (not shown), similar to as described earlier for the media supply apparatus 100. The gear assembly of the media supply apparatus 302 is coupled with a shaft (not shown) of the media supply apparatus, on which the secondary media roll 306 is mounted. The gear assembly can be engaged and disengaged with a media roll shaft (not shown) of the printing system 300 on which the primary media roll 304 is mounted to couple and decoupled, respectively, the shaft of the media supply apparatus 302 with the media roll shaft of the printing system 300. Further, when engaged with the media roll shaft of the

printing system 300, the gear assembly rotates the shaft of the media supply apparatus 302 in the same direction as the direction of rotation of the media roll shaft of the printing system 300.

[0026] The media supply apparatus 302, as shown, includes a first sensor 316 to monitor the amount of media wound onto the primary media roll 304 from the secondary media roll 306. The first sensor 316 may be an electromechanical sensor. The first sensor 316, as shown in Fig. 3, includes a mechanical arm 318 whose one end is in contact with the primary media roll 304, and particularly with the media being wound on the primary media roll 304. The mechanical arm 318 moves outwards as the media is wound on the primary media roll 304. As the primary media roll 304 reaches a stage when it is wound with a specific threshold volume of media, the mechanical arm 318 attains a position such that the other end of the mechanical arm 318 comes in contact with a sensor chip (not shown) of the first sensor 316. The sensor chip of the first sensor 316, based on the contact with the mechanical arm 318, provides an input to the printing system 300 indicating that the primary media roll 304 is sufficiently wound and therefore stop the drive unit 314.

[0027] The media supply apparatus 302 also includes a second sensor 320 (shown with dashed line as it is behind the media 308) to determine whether the secondary media roll 308 has media to supply to the primary media roll 304. The second sensor 320 may be a reflection-based sensor that emits a light beam. A reflection plate 322 is positioned in front of the light beam. When the secondary media roll 306 has media to supply, the media from the secondary media roll 306 blocks the light beam from the second sensor 320 and thus no light is received back by the second sensor 320. When secondary media roll 306 is empty, i.e., the secondary media roll 306 has run out of media to supply, the light beam from the second sensor 320 is reflected back by the reflection plate 322, and is received by the second sensor 320. The reflected light received by the second sensor 320 triggers a sensor chip (not shown) of the second sensor 320 to provide an input to the printing system 300 indicating that the secondary media roll 306 is empty and therefore stop the drive unit 314.

[0028] In an example implementation, the media supply apparatus 302 also includes a media cutter 324. The media cutter 324 may include a knife edge, or a sharp edge, movable along a width of the media 308 to cut the media 308 and stop a supply of the media 308 from the secondary media roll 306 to the primary media roll 304. The media cutter 324 may be utilized to cut the media 308 when the primary media roll 304 is determined to be wound with the threshold volume of media and the drive unit 314 is stopped for further winding. In an example implementation, the media cutter 324 may be operated manually or automatically for cutting the media 308.

[0029] In an example implementation, the media supply apparatus 302 includes two side supports 326-1 and 326-2 in each side of the secondary media roll 306. The side supports 326-1 and 326-2 may provide covering to various components on the media supply apparatus 302 mounted on the printing system 300. In an example implementation, the media supply apparatus 302 also includes a first mounting rod 328 and a second mounting rod 330 (shown with dashed lines for the portion behind the media 308). Ends of the first mounting rod 328 and the second mounting rod 330 are coupled to the two side supports 326-1 and 326-2, as shown. Also, as shown, the media cutter 324 and the reflection plate 322 are mounted on the first mounting rod 328, and the second sensor 320 is mounted on the second mounting rod 330. The media cutter 324 may be moved on the first mounting rod 328 for cutting the media 308.

[0030] In an example implementation, the media supply apparatus 302 may also include a top cover (not shown) to protect various components on the media supply apparatus 302 from external factors, such as dust.

[0031] Further, in an example implementation, the printing system 300 includes a control unit 332. The control unit 332 may be coupled to the drive unit 314, the first sensor 316, and the second sensor 320. The control unit 332 may be implemented through a combination of any suitable hardware and computer-readable instructions. The control unit 332 may be implemented in a number of different ways to perform various functions for the purposes of operating the drive unit 314, the first sensor 316, and the second sensor 320, in accordance with example implementations of the present subject matter. In an example, the

computer-readable instructions for the control unit 332 may be processor-executable instructions stored in a non-transitory computer-readable storage medium, and the hardware for the control unit 332 may include a processing resource (e.g., processor(s)), to execute such instructions. In the present examples, the non-transitory computer-readable storage medium stores instructions that, when executed by the processing resource, implements the control unit 332. The printing system 300 may include the non-transitory computer-readable storage medium storing the instructions and the processing resource (not shown) to execute the instructions. In an example, the non-transitory computer-readable storage medium storing the instructions may reside outside the printing system 300, but accessible to the printing system 300 and the processing resource of the printing system 300. In an example implementation, the control unit 332 may be implemented by electronic circuitry.

[0032] The processing resource of the printing system 300 may be implemented as microprocessors, microcomputers, microcontrollers, digital signal processors, central processing units, state machines, logic circuitries, and/or any devices that manipulate signals based on operational instructions. Among other capabilities, the processing resource may fetch and execute computer-readable instructions stored in a non-transitory computer-readable storage medium coupled to the processing resource of the printing system 300. The non-transitory computer-readable storage medium may include, for example, volatile memory (e.g., RAM), and/or non-volatile memory (e.g., EPROM, flash memory, NVRAM, memristor, etc.).

[0033] A procedure of operating the media supply apparatus 302 for supplying media from the media supply apparatus 302 to the printing system 300 is now described. It may be understood that the media supply apparatus 302 is mounted on the printing system 300 for supplying extra media to the primary media roll 304 of the printing system 300.

[0034] In an example implementation, when the primary media roll 304 is found to be empty, the media 308 from the secondary media roll 306 is engaged with the media core 310 of the primary media roll 304. For this, the media 308 is engaged in the slot of the media core 310 and sealed with the press-bar 312. It

may be noted that primary media roll 304 of the printing system 300 may have a factory-based media core initially. The factory-based media core is replaced with the media core 310 having a slot for engaging the media 308.

[0035] After engaging the media 308, the gear assembly of the media supply apparatus 302 is engaged with the media roll shaft of the printing system 300. Also, the first sensor 316 is engaged with the primary media roll 304 such that the mechanical arm 318 of the first sensor 316 is in contact with the empty media core 310.

[0036] In an example implementation, after engaging the media 308, the printing system 300 may receive an input indicative of media winding. Such an input may be received from a user of the printing system 300 to indicate winding of the media 308 onto the primary media roll 304. The control unit 332 may engage the gear assembly with the media roll shaft, and engage the first sensor 316 with the primary media roll 304, upon receiving the above input. The control unit 332 may also activate the first sensor 316 for monitoring the amount of media wound on the primary media roll 304.

[0037] Upon receiving the input and engaging the gear assembly and the first sensor 316, the control unit 332 actuates the drive unit 314 to rotate the primary media roll 304 in a first direction (e.g., clockwise direction) to wind the media 308 from the secondary media roll 306. During winding of the media 308, the mechanical arm 318 of the first sensor 316 moves outwards as the diameter of the primary media roll 304 increases. As the mechanical arm 318 reaches a specific position indicating that the primary media roll 304 is wound with the threshold volume of media, the sensor chip of the first sensor 316 provides an input to the control unit 332, and the control unit 332 accordingly stops the drive unit 314 from further rotation of the primary media roll 304.

[0038] After the drive unit 314 is stopped, the media 308 from the secondary media roll 306 is cut using the media cutter 324. In an example implementation, the media cutter 324 may be moved manually on the mounting rod 328 for cutting the media 308. In an example implementation, the control unit 332 may move the media cutter 324 on the mounting rod 328 for cutting the media 308.

[0039] During or prior to winding of the media 308, the control unit 332 may also activate the second sensor 320 for determining the availability of the media 308 on the secondary media roll 306. The second sensor 320, when active, emits a light beam, which is blocked by the media 308 rolling between the second sensor 320 and the reflection plate 322. As the secondary media roll 306 runs out of media to supply to the primary media roll 304, no media is present between the second sensor 320 and the reflection plate 322. At this, the second sensor 320 receives the light reflected from the reflection plate 322 indicating that the secondary media roll 306 is empty, the sensor chip of the second sensor 320 provides an input to the control unit 332, and the control unit 332 accordingly stops the drive unit 314 from further rotation of the primary media roll 304.

[0040] In an example implementation, the control unit 332 may also determine a rotational speed of the drive unit 314. It may be noted that as the media 308 on the secondary media roll 306 nears its end, the rotational speed of the drive unit 314 increases due to reduced traction. Thus, when the rotational speed of the drive unit 314 is determined to be more than a specific speed indicating that the media 308 on the secondary media roll 306 has reached an end, the control unit 332 may stop the drive unit 314 from further rotation of the primary media roll 304. After the drive unit 314 is stopped, the media 308 may be manually or automatically cut using the media cutter 324.

[0041] After the drive unit 314 is stopped from further rotation of the primary media roll 304, the gear assembly of the media supply apparatus 302 is disengaged with the media roll shaft of the printing system 300. Also, the first sensor 316 is disengaged with the primary media roll 304.

[0042] In an example implementation, after the drive unit 314 is stopped from further rotation of the primary media roll 304, the printing system 300 may receive an input indicative of media printing. Such an input may be received from a user of the printing system 300 to indicate printing of media from the primary media roll 304. Upon receiving the above input, the control unit 332 may disengage the gear assembly with the media roll shaft, and disengage the first sensor 316 with the primary media roll 304. The control unit 332 may also deactivate the first sensor 316 and the second sensor 320. Upon receiving the

input and disengaging the gear assembly and the first sensor 316, the control unit 332 may actuate the drive unit 314 to rotate the primary media roll 304 in a second direction (e.g., anticlockwise direction), opposite to the first direction, to provide media from the primary media roll 304 for printing.

[0043] Fig. 4 illustrates a method 400 of supplying media to a printing system, according to an example of the present subject matter. The method 400 can be implemented by processor(s) or computing system(s) through any suitable hardware, a non-transitory machine readable medium, or a combination thereof. Further, although the method 400 is described in context of the aforementioned printing system 300 and the media supply apparatus 302, other suitable computing or printing systems may be used for execution of the method 400 for supplying media from a secondary media roll of a media supply apparatus onto a primary media roll in a printing system. In some examples, processes involved in the method 400 can be executed based on instructions stored in a non-transitory computer-readable medium. The non-transitory computer-readable medium may include, for example, digital memories, magnetic storage media, such as a magnetic disks and magnetic tapes, hard drives, or optically readable digital data storage media.

[0044] Referring to Fig. 4, at block 402, a drive unit of the printing system 300 is actuated to rotate a primary media roll of the printing system 300 to wind media from a secondary media roll of a media supply apparatus 302 onto the primary media roll, when the media from the secondary media roll is engaged with the primary media roll. In an example, the media from the secondary media roll is engaged with the primary media roll when the primary media roll is found to be empty. The drive unit of the printing system 300 may be coupled with the primary media roll and may be actuated by a control unit of the printing system 300 upon receiving a user input indicating media winding. Also, the secondary media roll is coupled with the primary media roll through a gear assembly of the media supply apparatus 302, as described earlier.

[0045] At block 404, an input from a first sensor of the media supply apparatus 302 is received by the printing system 300, where the input indicates that the primary media roll is wound with a threshold volume of the media supplied

from the secondary media roll. The input from the first sensor may be received by the control unit of the printing system 300 while the media from the secondary media roll is wound on the primary media roll. The first sensor may be engaged with the primary media roll, as described earlier, prior to winding the media.

[0046] Upon receiving the input from the first sensor, the drive unit of the printing system 300 is stopped, at block 406, from further rotation of the primary media roll. The drive unit may be stopped by the control unit of the printing system 300.

[0047] After stopping the drive unit, the media from the secondary media roll may be cut using a media cutter of the media supply apparatus 302, the gear assembly of the media supply apparatus 302 may be disengaged with the primary media roll, and the first sensor may be disengaged with the primary media roll, by the control unit of the printing system 300. Further, the drive unit may be actuated by the control unit to rotate the primary media roll for supplying media from the primary media roll for printing.

[0048] Further, in an example implementation, while the media from the secondary media roll is wound on the primary media roll, an input from a second sensor of the media supply apparatus 302 is received by the printing system 300, where the input indicates that the secondary media roll is empty. The second sensor may be activated prior to winding the media. The input from the second sensor may be received by the control unit of the printing system 300.

[0049] Upon receiving the input from the second sensor, the drive unit of the printing system 300 is stopped from further rotation of the primary media roll. The drive unit may be stopped by the control unit of the printing system 300. After stopping the drive unit, the gear assembly of the media supply apparatus 302 may be disengaged with the primary media roll, the first sensor may be disengaged with the primary media roll and deactivated, and the second sensor may be deactivated, by the control unit of the printing system 300. Further, the drive unit may be actuated by the control unit to rotate the primary media roll for supplying media from the primary media roll for printing.

[0050] Further, in an example implementation, while the media from the secondary media roll is wound on the primary media roll, a rotational speed of the

drive unit is determined by the control unit of the printing system 300. When the rotational speed of the drive unit is determined to be more than a specific speed indicating that the media on the secondary media roll has reached an end, the drive unit is stopped by the control unit from further rotation of the primary media roll. After stopping the drive unit, the gear assembly of the media supply apparatus 302 may be disengaged with the primary media roll, the first sensor may be disengaged with the primary media roll and deactivated, the second sensor may be deactivated, and the drive unit may be actuated by the control unit to rotate the primary media roll for supplying media from the primary media roll for printing.

[0051] Fig. 5 illustrates a method 500 of supplying media to a printing system, according to an example of the present subject matter. The method 500 can be implemented by processor(s) or computing system(s) through any suitable hardware, a non-transitory machine readable medium, or a combination thereof. Further, although the method 500 is described in context of the aforementioned printing system 300 and the media supply apparatus 302, other suitable computing or printing systems may be used for execution of the method 500 for supplying media from a secondary media roll of a media supply apparatus onto a primary media roll in a printing system. In some examples, processes involved in the method 500 can be executed based on instructions stored in a non-transitory computer-readable medium. The non-transitory computer-readable medium may include, for example, digital memories, magnetic storage media, such as a magnetic disks and magnetic tapes, hard drives, or optically readable digital data storage media.

[0052] In an example implementation, prior to executing the method 500, the media supply apparatus 302 may be installed on the printing system 300. When the primary media roll 304 of the printing system 300 is found to be empty, it is checked whether the primary media roll 304 has the media core 310 with a slot to engage media from the secondary media roll 306. If the primary media roll has a media core other than the media core 310 with the slot, then the media core 310 is installed in the printing system 300, and the media 308 from the secondary media roll 306 is engaged in the slot of the media core 310. If the primary media

roll 304 has the media core 310 with the slot, then the media 308 from the secondary media roll 306 is engaged in the slot of the media core 310. The engagement of the media 308 is sealed using a press-bar 312.

[0053] Referring to Fig. 5, at block 510, an input indicative of media winding is received. At block 512, the gear assembly of the media supply apparatus 302 is engaged with the media roll shaft of the printing system 300, the first sensor 316 is engaged with the primary media roll 304, and the first sensor 316 and the second sensor 320 are activated.

[0054] At block 514, the drive unit 314 is actuated by the control unit 332 to rotate the primary media roll 304 in a first direction to wind the media 308. At block 516, the control unit 332 checks whether an input indicating that the primary media roll 304 is wound with a threshold volume of media is received from the first sensor 316. If such an input is received from the first sensor 316 ('yes' branch from block 516), then the drive unit 314 is stopped by the control unit 332 from further rotation of the primary media roll 304, at block 518.

[0055] If such an input is not received from the first sensor 316 ('no' branch from block 516), then the control unit determines whether a rotational speed of the drive unit 314 is more than a specific speed indicating that the media 308 on the secondary media roll 306 has reached its end, at block 520. If the rotation speed of the drive unit 314 is determined to be more than the specific speed ('yes' branch from block 520), then the drive unit 314 is stopped by the control unit 332 from further rotation of the primary media roll 304, at block 522.

[0056] If the rotation speed of the drive unit 314 is determined to be not more than the specific speed ('no' branch from block 520), then the control unit 332 checks whether an input indicating that the secondary media roll 306 is empty is received from the second sensor 320, at block 524. If such an input is received from the second sensor 320 ('yes' branch from block 524), then the drive unit 314 is stopped by the control unit 332 from further rotation of the primary media roll 304, at block 526. If such an input is not received from the second sensor 320 ('no' branch from block 524), then the method 500 proceeds to block 514.

[0057] After blocks 518 and 522, the media 308 from the secondary media roll 306 is cut using the media cutter 324, at block 528. At block 530, an input

indicative of media printing is received. At block 532, the gear assembly is disengaged with the media roll shaft, the first sensor 316 is disengaged with the primary media roll 304, and the first sensor 316 and the second sensor 320 are deactivated, by the control unit 332. At block 534, the drive unit 314 is actuated by the control unit 332 to rotate the primary media roll 304 in a second direction, opposite to the first direction, to provide media from the primary media roll 304 for printing.

[0058] Although examples for the present disclosure have been described in language specific to structural features, it is to be understood that the appended claims are not limited to the specific features described herein. Rather, the specific features are disclosed and explained as examples of the present disclosure.

We claim:

1. A media supply apparatus, comprising:

a media roll assembly couplable to a printing system, the media roll assembly including a first media roll to supply media to a second media roll of the printing system; and

a first sensor to:

determine whether the second media roll of the printing system is wound with a threshold volume of the media supplied from the first media roll of the media roll assembly; and

provide an input to the printing system to stop winding the media from the first media roll of the media roll assembly when the second media roll of the printing system is determined to be wound with the threshold volume of the media.

2. The media supply apparatus as claimed in claim 1, comprising a second sensor to:

determine whether the first media roll of the media roll assembly has media to supply; and

provide an input to the printing system to stop rotating the second media roll of the printing system when the first media roll of the media roll assembly is determined to be empty.

3. The media supply apparatus as claimed in claim 1, wherein the media roll assembly comprises a gear assembly to couple a shaft of the media roll assembly with a media roll shaft of the printing system, such that the shaft of the media roll assembly and the media roll shaft of the printing system, when engaged with each other, rotate in same direction.

4. A printing system comprising:

a primary media roll to provide media for printing;

a media supply apparatus including a secondary media roll coupled to the primary media roll to supply media to the primary media roll; and

a drive unit coupled to the primary media roll, the drive unit is to:

rotate the primary media roll to wind media from the secondary media roll onto the primary media roll, when the media from the secondary media roll is engaged with the primary media roll and until the primary media roll is wound with a threshold volume of the media.

5. The printing system as claimed in claim 4, comprising a first sensor to determine whether the primary media roll is wound with the threshold volume of the media supplied from the secondary media roll.

6. The printing system as claimed in claim 5, comprising a control unit coupled to the drive unit, the control unit is to:

actuate the drive unit to rotate the primary media roll to wind media from the secondary media roll onto the primary media roll, upon receiving an input indicative of media winding; and

stop the drive unit upon receiving an input from the first sensor indicating that the primary media roll is wound with the threshold volume of the media.

7. The printing system as claimed in claim 4, comprising a second sensor to determine whether the secondary media roll has media to supply to the primary media roll.

8. The printing system as claimed in claim 7, comprising a control unit coupled to the drive unit, the control unit is to:

actuate the drive unit to rotate the primary media roll to wind media from the secondary media roll onto the primary media roll, upon receiving an input indicative of media winding; and

stop the drive unit upon receiving an input from the second sensor indicating that the secondary media roll is empty.

9. The printing system as claimed in claim 4, comprising a control unit coupled to the drive unit, the control unit is to:

determine a rotational speed of the drive unit rotating the primary media roll; and

stop the drive unit when the rotational speed of the drive unit is more than a specific speed indicating that the media on the secondary media roll has reached an end.

10. The printing system as claimed in claim 4, wherein the media supply apparatus comprises a media cutter to cut the media and stop a supply of the media from the secondary media roll to the primary media roll.

11. The printing system as claimed in claim 10, comprising a control unit coupled to the media cutter, the control unit is to move the media cutter to cut the media from the secondary media roll when the primary media roll is wound with the threshold volume of the media supplied from the secondary media roll.

12. The printing system as claimed in claim 4, wherein the primary media roll comprises a media core having a slot in which the media from the secondary media roll is engaged, using a press-bar, prior to winding the media on the primary media roll.

13. A method of supplying media from a secondary media roll of a media supply apparatus onto a primary media roll in a printing system, the method comprising:

actuating a drive unit, by a control unit of the printing system, to rotate the primary media roll to wind the media from the secondary media roll onto the primary media roll, when the media from the secondary media roll is engaged with the primary media roll;

receiving, by the control unit, an input from a first sensor indicating that the primary media roll is wound with a threshold volume of the media supplied from the secondary media roll; and

stopping, by the control unit, the drive unit upon receiving the input from the first sensor.

14. The method as claimed in claim 13, comprising:

receiving, by the control unit, an input from a second sensor indicating that the secondary media roll is empty; and

stopping, by the control unit, the drive unit upon receiving the input from the second sensor.

15. The method as claimed in claim 13, comprising:

determining, by the control unit, a rotational speed of the drive unit rotating the primary media roll; and

stopping, by the control unit, the drive unit when the rotational speed of the drive unit is more than a specific speed indicating that the media on the secondary media roll has reached an end.

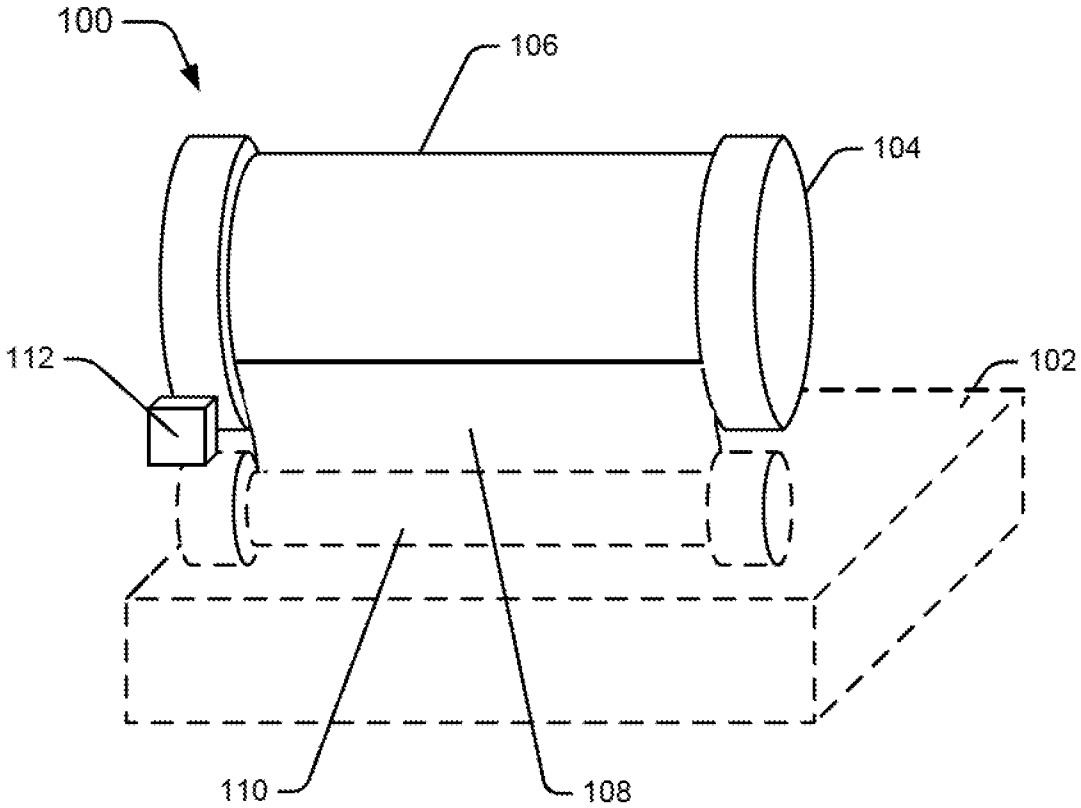


Fig. 1

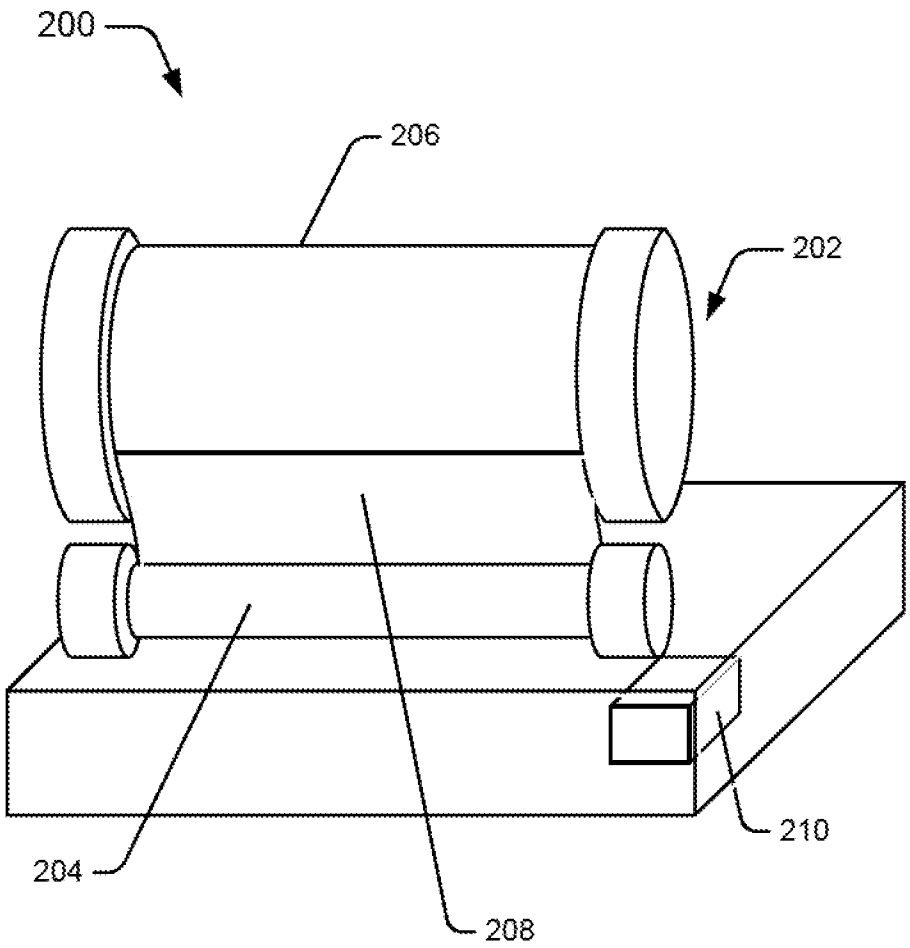


Fig. 2

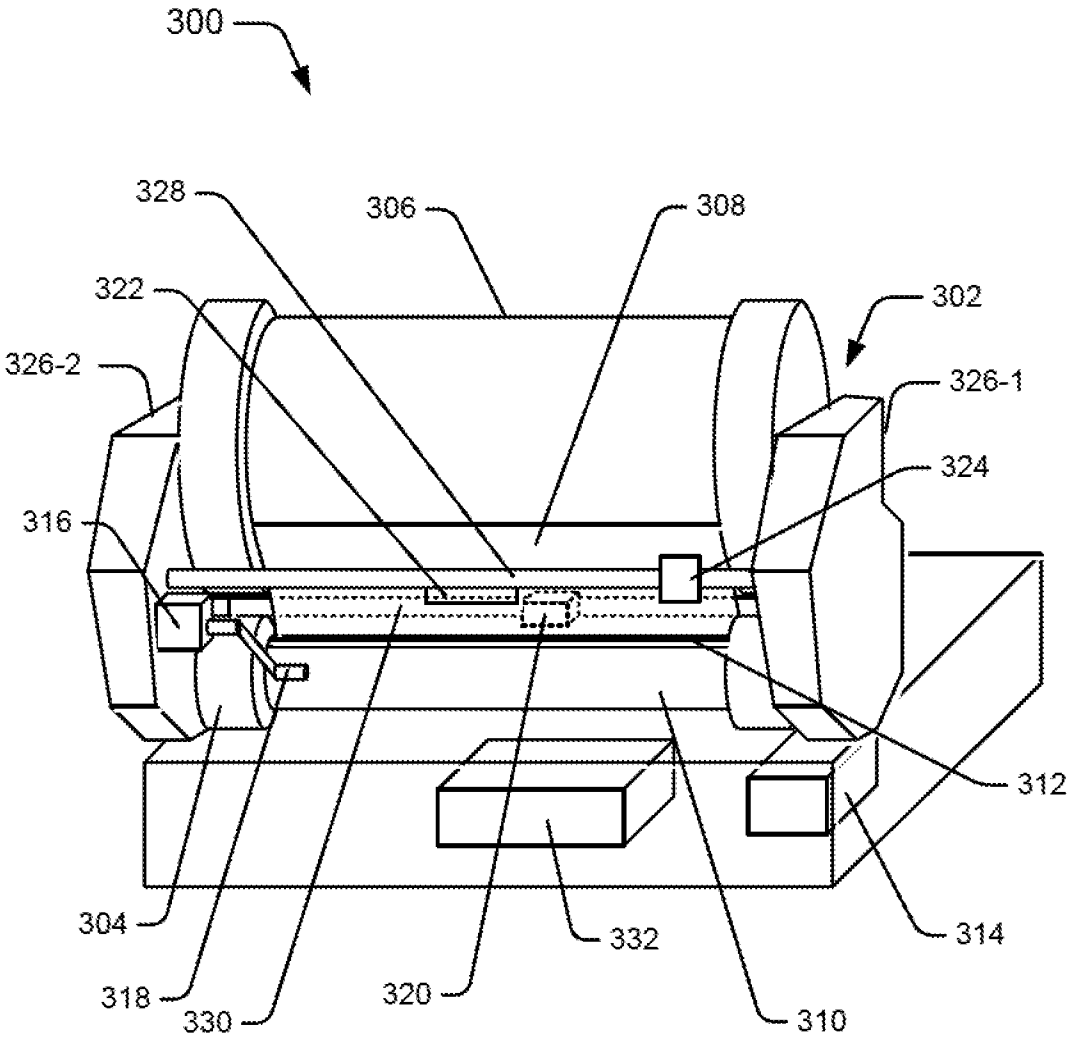

300
328
306
308
322
302
326-2
326-1
324
316
312
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332
314
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320
330
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Fig. 3

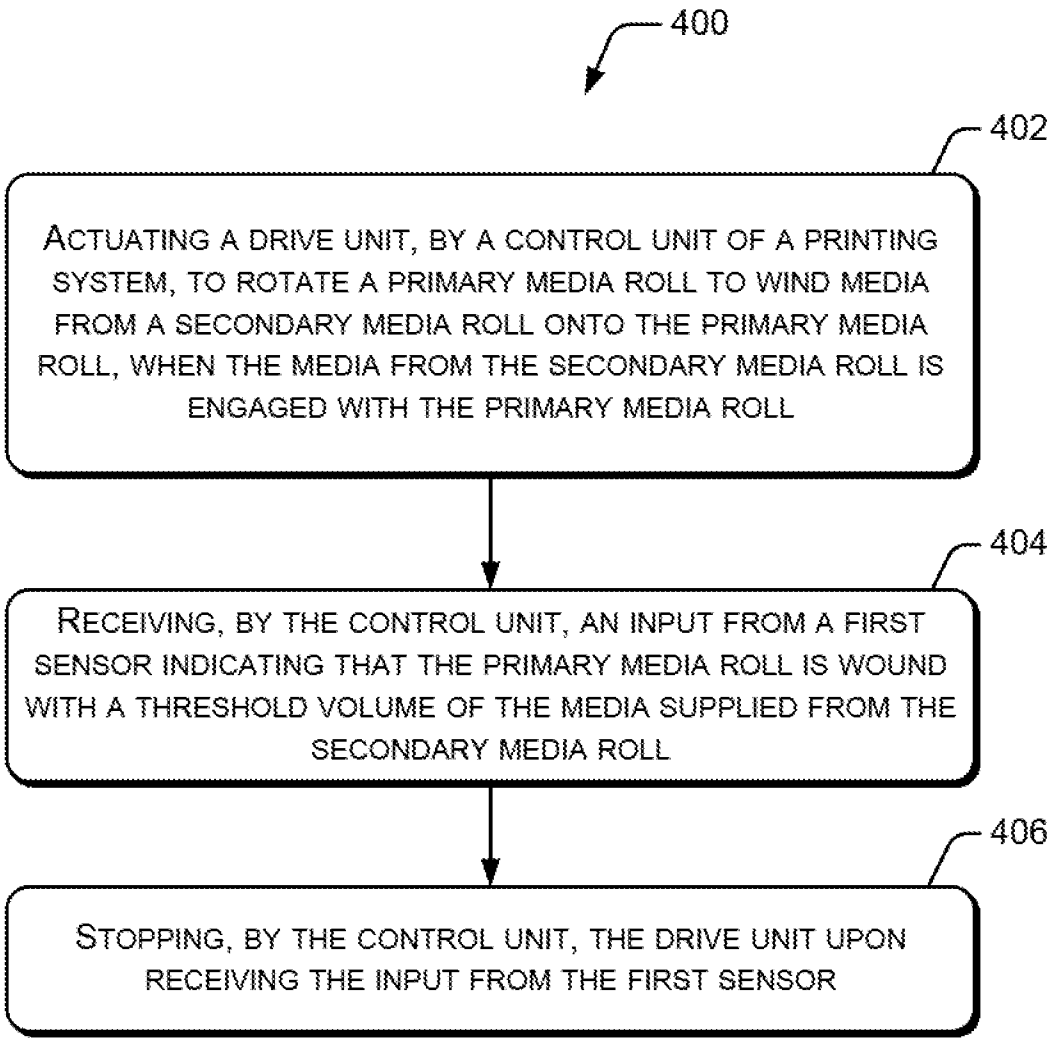

400
402
ACTUATING A DRIVE UNIT, BY A CONTROL UNIT OF A PRINTING SYSTEM, TO ROTATE A PRIMARY MEDIA ROLL TO WIND MEDIA FROM A SECONDARY MEDIA ROLL ONTO THE PRIMARY MEDIA ROLL, WHEN THE MEDIA FROM THE SECONDARY MEDIA ROLL IS ENGAGED WITH THE PRIMARY MEDIA ROLL
404
RECEIVING, BY THE CONTROL UNIT, AN INPUT FROM A FIRST SENSOR INDICATING THAT THE PRIMARY MEDIA ROLL IS WOUND WITH A THRESHOLD VOLUME OF THE MEDIA SUPPLIED FROM THE SECONDARY MEDIA ROLL
406
STOPPING, BY THE CONTROL UNIT, THE DRIVE UNIT UPON RECEIVING THE INPUT FROM THE FIRST SENSOR

Fig. 4

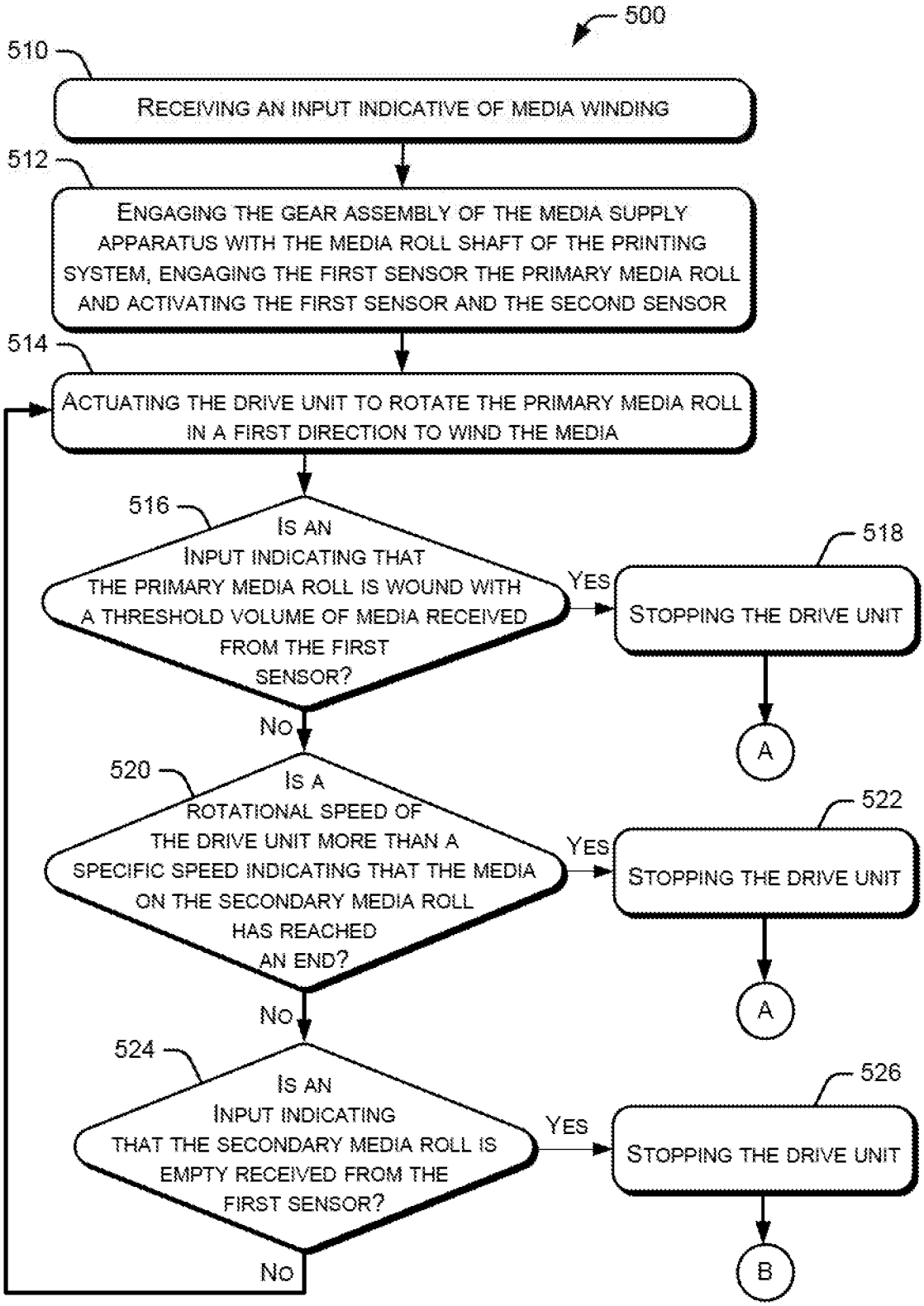

500
510
RECEIVING AN INPUT INDICATIVE OF MEDIA WINDING
512
ENGAGING THE GEAR ASSEMBLY OF THE MEDIA SUPPLY APPARATUS WITH THE MEDIA ROLL SHAFT OF THE PRINTING SYSTEM, ENGAGING THE FIRST SENSOR THE PRIMARY MEDIA ROLL AND ACTIVATING THE FIRST SENSOR AND THE SECOND SENSOR
514
ACTUATING THE DRIVE UNIT TO ROTATE THE PRIMARY MEDIA ROLL IN A FIRST DIRECTION TO WIND THE MEDIA
516
IS AN INPUT INDICATING THAT THE PRIMARY MEDIA ROLL IS WOUND WITH A THRESHOLD VOLUME OF MEDIA RECEIVED FROM THE FIRST SENSOR?
YES
518
STOPPING THE DRIVE UNIT
A
NO
520
IS A ROTATIONAL SPEED OF THE DRIVE UNIT MORE THAN A SPECIFIC SPEED INDICATING THAT THE MEDIA ON THE SECONDARY MEDIA ROLL HAS REACHED AN END?
YES
522
STOPPING THE DRIVE UNIT
A
NO
524
IS AN INPUT INDICATING THAT THE SECONDARY MEDIA ROLL IS EMPTY RECEIVED FROM THE FIRST SENSOR?
YES
526
STOPPING THE DRIVE UNIT
B
NO

Fig. 5

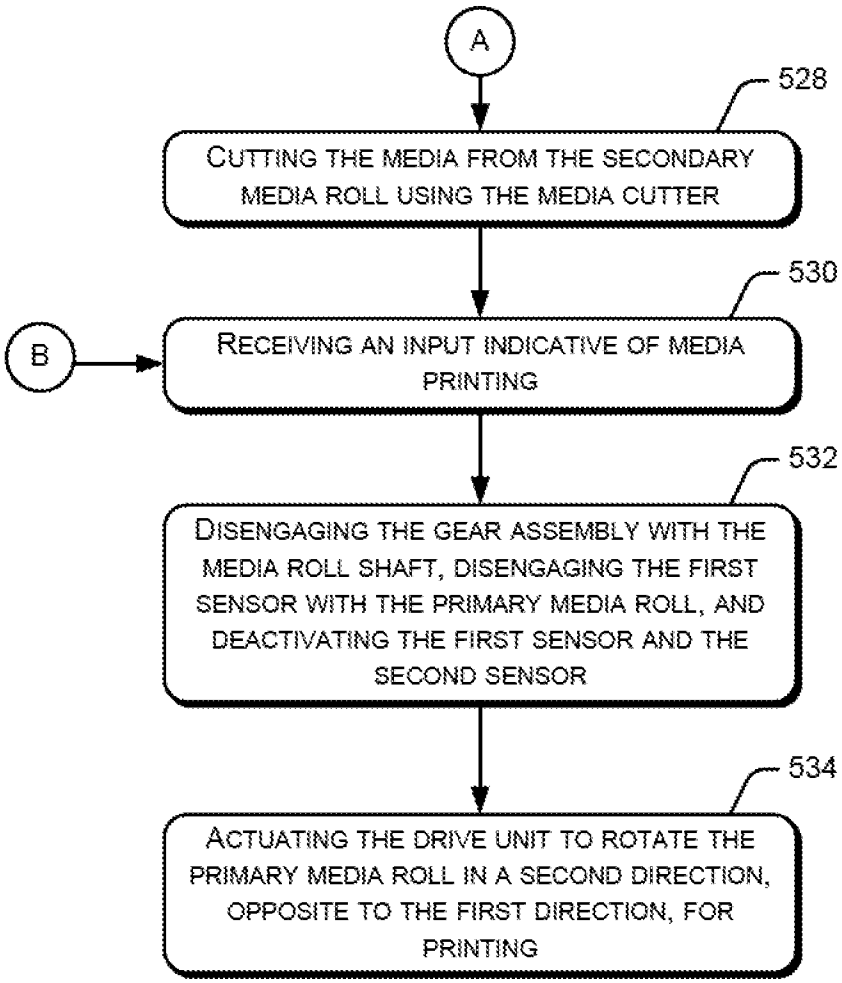

A
528
CUTTING THE MEDIA FROM THE SECONDARY MEDIA ROLL USING THE MEDIA CUTTER
530
B
RECEIVING AN INPUT INDICATIVE OF MEDIA PRINTING
532
DISENGAGING THE GEAR ASSEMBLY WITH THE MEDIA ROLL SHAFT, DISENGAGING THE FIRST SENSOR WITH THE PRIMARY MEDIA ROLL, AND DEACTIVATING THE FIRST SENSOR AND THE SECOND SENSOR
534
ACTUATING THE DRIVE UNIT TO ROTATE THE PRIMARY MEDIA ROLL IN A SECOND DIRECTION, OPPOSITE TO THE FIRST DIRECTION, FOR PRINTING

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2016/057332

A. CLASSIFICATION OF SUBJECT MATTER

B41J 15/04 *(2006.01)*
B65H 43/00 *(2006.01)*

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)

B41J 15/00, 15/04, B65H 19/00, 19/26, 43/00

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)

Esp@cenet, PAJ, USPTO, RUPAT, USPTO, PatSearch (RUPTO internal)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2004/0056086 A1 (DIEBOLD SELF-SERVICE SYSTEMS DIVISION OF DIEBOLD, INCORPORATED) 25.03.2004, claims, figs. 1-8	1-9, 13-15 10-12
Y	SU 525605 A1 (SPETSIALNOE KONSTRUKTORSKOE BUPO PO PROEKTIROVANIU SREDSTV MEKHANIZATSII DLYA PREDPRIYATII LEGKOI PROMYSHLENNOSTI) 01.11.1976, col. 11, line 7 - col. 12, line 16, figs. 1-9	10-11
Y	US 5388923 A (SEXTANT AVIONIQUE) 14.02.1995, col. 4, lines 1-8, figs. 2-6	12
A	US 5879092 A (INTERBOLD) 09.03.1999, figs. 1-9	1-15
A	US 4875633 A1 (TOPPAN MOORE COMPANY, LTD.) 24.10.1989, figs. 1-5	1-5

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:

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"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
01 June 2017 (01.06.2017)	20 July 2017 (20.07.2017)
Name and mailing address of the ISA/RU: Federal Institute of Industrial Property, Berezhkovskaya nab., 30-1, Moscow, G-59, GSP-3, Russia, 125993 Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37	Authorized officer I.Gornostaev Telephone No. 495 531 65 15

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2016/057332

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	RU 2373069 C1 (OOO KB DORS OOO KB DORS) 20.11.2009, abstract, fig.1	1-15