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

(72) Inventors: **FITZGERALD, Sean Daniel**; 11311 Chinden Blvd, Boise, Idaho 83714-0021 (US). **LUKE, Jeffrey H**; 11311 Chinden Blvd, Boise, Idaho 83714-0021 (US). **LAVIGNE, Mathew**; 11311 Chinden Blvd, Boise, Idaho 83714-0021 (US).

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

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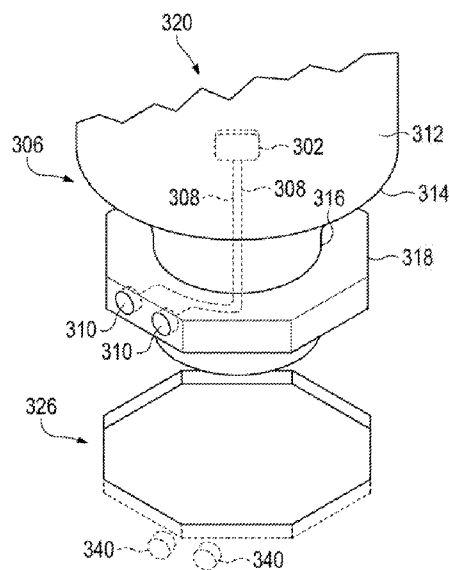


FIG. 3A

(57) Abstract: In an example, a print component includes a guide structure. The example guide structure includes a recess to receive a print material container and a guideway with a guide wall to support rotation of the print material container. Upon rotation of the print material container, an electrical contact of the print material container moves towards an electrical contact coupled to the guide structure of the print component. In another example, a container includes a housing, a material transfer interface, and a mechanical interface. In that example, the mechanical interface includes a guide structure that defines a protrusion and a guideway to allow the container to rotate within a recess defined by a receptacle shell. Upon rotation of the container, an electrical contact coupled to the guide structure moves towards an electrical contact on the receptacle shell.



Electrical Contacts Coupled to Guide Structures

BACKGROUND

[0001] Images are processed for use with computing machines, such as a print apparatus. A print apparatus, for example, may use control data based on processed image data to produce a physical representation of an image by operating a print material placement system according to the control data. The print apparatus may include a print material receiving station to receive a container of print material to use in producing the physical representation.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] Figures 1A and 2A are block diagrams depicting example print components.

[0003] Figures 1B and 2B are block diagrams depicting example print material containers coupled to example print components.

[0004] Figures 3A, 3B, 3C, 4, and 5 are isometric views of an example print material containers.

[0005] Figure 6 is a sectional view of an example container coupled to an example component.

[0006] Figures 7A-9B are top views of example interface states between example print components and example print material containers.

[0007] Figures 10 and 11 are block diagrams depicting example containers.

DETAILED DESCRIPTION

[0008] In the following description and figures, some example implementations of print apparatus, print components, and print material containers are described. In examples described herein, a "print apparatus" may be a device to print content on a physical medium (e.g., paper, textiles, a layer of powder-based build material, etc.) with a print material (e.g., ink or toner). In some examples, the

physical medium printed on may be a web roll or a pre-cut sheet. In the case of printing on a layer of powder-based build material, the print apparatus may utilize the deposition of print materials in a layer-wise additive manufacturing process. A print apparatus may utilize suitable print consumables, such as ink, toner, fluids, powders, or other raw materials for printing. In some examples, a print apparatus may be a three-dimensional (3D) print apparatus. An example of print material is powder toner heatable by a heat transfer device, such as carbon-based toner, plastic-based toner, or a plant-derived toner heatable by a laser or fuser. Another example of fluid print material is a water-based latex ink ejectable from a print head, such as a piezoelectric print head or a thermal inkjet print head. Other examples of print fluid may include dye-based color inks, pigment-based inks, solvents, gloss enhancers, fixer agents, and the like. Toner and 3D-print powder are examples of print materials that are particles (i.e., print particles). Some print particles, such as 3D-print particles may have an average diameter of 50 microns, where other print particles, such as laser toner particles, may have an average diameter of 20 microns. The print material container may be a print particle container to provide a supply of print particles to a host device. For example, the print material container may be a print particle supply container to supply print particles to a print particle receptacle of a print system.

[0009] In some example print apparatus, an exchangeable and/or rechargeable print material container may be used. The print material container may be attachable and detachable to a print component coupleable to a print apparatus. For example, a toner vessel may be charged and connected to a toner cartridge that is insertable into a toner receiving station of a laser print apparatus. The print component may be a component of a printer such as a print cartridge or a print receptacle that receives a container of print material. The print component may be attachable (e.g., a replaceable part) to a print apparatus or integral to a printer structure (e.g., a fixed part). The print material container may be sealingly connectable to the print apparatus (via the print component) to provide print material from the print material container to the print apparatus to use in a printing operation. The print component and/or the print apparatus may utilize information about the print material vessel and/or print component in an operation of the print apparatus. For example, a print cartridge may feature an electronic chip (e.g., a memory resource) attached, after assembly, to a print cartridge that is capable of reporting

data and/or record data. The mechanical interface of the container may influence the electrical connection of the container with the cartridge. A poor electrical connection with the print material container may fail to provide data useable for the cartridge and/or the print apparatus.

[0010] Various examples described below relate to an interface between a print component and a print material container with a guideway that guides electrical contacts towards a connection location upon rotation of the print material container. By providing a mechanical interface to assist rotation, the print material container may securely generate an electrical connection with the print component.

[0011] Figures 1A and 2A are block diagrams depicting example print components 100 and 200. Figures 1B and 2B are block diagrams depicting example print material containers 120 and 220 coupled to example print components 100 and 200 respectively. The print components discussed herein may be referred to as example components, such as cartridges or receptacles to receive a container and/or provide a supply of print material to a print apparatus.

[0012] Referring to Figure 1A, the print component 100 generally includes a guide structure 102 with features to assist forming an electrical connection. For example, the guide structure 102 may include an interface, such as a recess 104 and a guideway 106, to couple to a print material container to the print component 100. The interface assists forming an electrical connection between the print material container and the print component 100 with an electrical contact 110 coupled to the guide structure 102. The electrical contact 110 may be exposed on a surface of the guide structure 102 to allow for electrical connection to be made with the electrical contact 110. For example, the electrical contact 110 may also be partially embedded in the housing 106 with a surface exposed on the exterior facing surface to allow for external electrical connection. The electrical contact 110 may be made of any appropriate conductive material to form an electrical connection, such as beryllium copper. A single element depicted in any of the figures herein may represent a plurality of that element except where stated otherwise.

[0013] The recess 104 of Figures 1A and 1B forms an interface to receive a print material container 120 in a placement direction 128. The placement direction may be towards a docked position of the print material container 120 where the print material container 120 is securely connected within the recess 104 to the print component 100 to transfer print material to the print component 100, for example.

The recess 104 may guide the print material container to a port 112 in the placement direction 128 as shown in Figure 1B, where upon rotation 126 of the container 120 (as guided by the guideway 106), an electrical contact 124 moves towards electrical contact 110 to connect and form an electrical connection.

[0014] As used herein, a guideway is a track along which something moves. For example, the guideway 106 may be a groove that receives a guideway counterpart (e.g., a protruding feature that fits in the guideway) of a print material container and allows the guideway counterpart of the print material container to move along the groove. The guideway may be a recessed path or cavity that allows for translational and/or rotational movement along the path or within the cavity. The guideway 106 includes a guide wall 108. The guide wall 108 supports rotation of the print material container about an axis. The rotation about an axis may be centric or eccentric with respect to the print material container and/or the print cartridge receiving area.

[0015] The guide wall 108 of the guide structure may be part of a housing of the container 100. As examples, the guide wall 108 may be a sidewall of the housing, a wall of a floor or ceiling of a cavity in the housing, a wall of a lip of an opening of the housing, a periphery of an enclosure of the housing, a physical divider of interior space within the housing, a protrusion extending from the housing, a protrusion extending into the housing, a portion of a unibody structure of the housing, and the like.

[0016] The guide wall 108 may contain an electrical lead coupled to the electrical contact 110. The electrical lead may be formed of any appropriate electrically conductive material to electrically couple to the electrical contact 110. The electrical lead may be embedded in the guide wall 108 of the housing where the length of the electrical lead corresponding to the guide wall 108 is fully enclosed by material of the guide wall 108 or located within a channel defined through the guide wall 108 in which the electrical lead fits. The electrical contact 110 is coupled to the housing and located on the exterior of the housing to allow for an electrical contact point.

[0017] The print material container 120 and the print component 100 may include a material transfer interface. For example, the print material container 120 may include a portion of the housing defining a port 122 to a print material chamber containing print material and the material transfer interface of the print component

may include a portion of the guide structure 102 of the print component 100 defining a port 112 coupleable to port 122 of the print material container 120.

[0018] The print material container 120 may rotate upon insertion, rotate before insertion, rotate after insertion, or in conjunction with insertion. The rotation 126 of the print material container 120 may be about the axis of the material transfer interface. The rotation 126 of the print material container 120 may move the electrical contacts 110 and 124 towards each other and generate an electrical connection between the print material container 120 and the print component 100. The rotation 126 of the print material container 120 may generate pressure or otherwise form a seal between the print material container 120 and the print component 100 to transfer print material from the container 120 to the component 100.

[0019] Referring to Figures 2A and 2B, the print material transfer system operates generally the same as depicted in Figures 1A and 1B, however, instead of a recess to guide the print material container in a placement direction, a protrusion 204 guides the print material container 220 in a placement direction 228 and the protrusion 204 defines a port 212 to receive print material from the printer material container 220. For example, the placement direction may be towards a docked position of the print material container 220 where the print material container 220 is securely connected over the protrusion 204 to the print component 200 to transfer print material to the print component 200, for example. In this manner, the print material container 220 may rotate about the protrusion 204 and the guide wall 208 guides the electrical contact 224 towards the electrical contact 210 concurrent to the rotation about the protrusion 204.

[0020] For example, the guide structure 202 may define a protrusion 204 in a placement direction 228 to receive a print material container 220 having an electrical contact 224 and define a guideway 206 adjacent the protrusion 204. In that example, the guideway 206 includes a guide wall 208 to support rotation of the print material container 220 about the protrusion 204 in the direction 226. In this manner, the guideway 206 guides the electrical contact 224 of the print material container 220 towards the electrical contact 210 of the print component 200 upon rotation of the print material container 220 about the protrusion 204 in the direction 226. In some examples, the guideway 206 includes an edge to guide coupling of the print material container 220 along the placement direction and the edge leads to the guide wall

208 of the guideway 206 to allow for rotation of the print material container 220 once a face of the print material container 220 contacts the guide wall 208 of the guideway 206.

[0021] For another example, a material transfer interface of the print component 200 may define a port 212 coupleable to a print material chamber of a print material container 220. In that example, the print material container 220 electrically couples to the print component 200 upon rotation 226 of the print material container 220 about the protrusion 204, and the print material container 220 sealingly couples to the print component 200 upon rotation 226 of the print material container about the protrusion 204. In this manner, the print material container 220 is electrically connected and sealed to the print component 200 concurrently, for example.

[0022] Figures 3A, 3B, 3C, 4, and 5 are isometric views of an example print material containers 320, 420, and 520. The print material containers generally include a housing with a print material chamber, a memory resource embedded in a wall of the housing, and an electrical contact electrically coupled to the memory resource, such as via an electrical lead. Referring to Figures 3A, 3B, 3C, 4, and 5, the print material containers generally include a housing defining a body, a neck, and a rim. The shape of the body, neck, and/or rim may act as a guideway or guideway counterpart to guide rotation of the print material container. In the example of Figures 3A-3C, the rim 318 may act as a guideway counterpart to move within the guide structure 326 of a print component to move electrical contacts 310 towards electrical contacts on the guideway and couple a port to a print material chamber that may be located within the body 314. The body 314 of Figure 3A is depicted as generally tubular. In such an example, a cross-section of the tubular body may be any geometric shape. Other examples of body shapes include spherical, cuboid, a cube with rounded corners, a pyramid with rounded corners, and the like. In a similar fashion, neck shapes and rim shapes may be generally tubular with any number of geometric cross-sections (e.g., circle, square, triangle, rectangle with rounded corners, hexagon, etc.). The rim 318 defines a port coupled to the print material chamber located in the body 314. The neck 316 is coupled to the body 314 and the rim 318 is coupled to the neck 316. The body 314, neck 316, and rim 318 may include a channel, series of channels, or other interface to guide print material from the print material chamber to the port defined by the rim 318. The electrical contacts

may be located on an exterior surface of the rim, neck, body, or other portion of the housing. A memory resource may be embedded in a wall of the body, a wall of the neck, or a wall of the rim. Example implementations are shown in Figures 3A, 3B, 3C, 4, and 5.

[0023] Referring to Figure 3A, the memory resource 302 is embedded in a wall 312 of the body 314 of the housing 306 of the container 320. Electrical contacts 310 are located on an exterior surface of the rim 318 facing away from the rim 318 on a side of the neck 316 and coupled to the memory resource 302 via electrical leads 308. The plurality of electrical contacts of the print component may be located adjacent to each other on a same side of the side wall of the recess to complement location of the electrical contacts 310 of the print material container 320. The rim 318 may define a port coupled to a channel in the neck 316 coupled to a print material chamber in the body 314. In this manner, the memory resource 302 may be embedded in a wall of the body 314 defining a chamber. The shape of the rim 318, the neck 316, and/or the body 314 may act as a guideway or guideway counterpart to support rotation of the print material container 320 about an axis in a placement direction.

[0024] Referring to Figures 3B and 3C, the print material container 320 is inserted into a guide structure 326 of a printer component. The print material container 320 is inserted until the rim 318 is within the cavity formed by the guide structure 326 of the print component and able to be rotated so that the electrical contacts 310 exposed on the rim 318 of the print material container 320 align with the electrical contacts 340 exposed on a surface of a guide structure 326 defining the recess of the print component. In this manner, the print component includes a guide structure 326 defining a recess and a guideway adjacent the recess to support rotation (e.g., as depicted in Figure 3C) of the print material container 320 about an axis of the placement direction (e.g., as depicted in Figure 3B), and the print component includes a plurality of electrical contacts 340 coupled to the recessed container receiving area (e.g., the guide structure 326) towards which move the electrical contacts 310 upon rotation of the print material container 320.

[0025] Referring to Figure 4, the memory resource 402 is embedded in a wall 412 of the rim 418 of the housing 406 of the container 420. Electrical contacts 410 are symmetrically located on an exterior surface of the rim 418 towards the body 414 on opposing sides of the neck 416 and coupled to the memory resource 402 via

electrical leads 408. The plurality of electrical contacts of the print component may be located across from each other on substantially opposing side walls of the recess to complement the location of the electrical contacts 410 of the print material container 420. The rim 418 may define a port coupled to a channel in the neck 416 coupled to a print material chamber in the body 414. In this manner, the memory resource 402 may be embedded in a wall of the rim 418 defining a port. The shape of the rim 418, the neck 416, and/or the body 414 may act as a guideway or guideway counterpart to support rotation of the print material container 420 about an axis in a placement direction.

[0026] Referring to Figure 5, the memory resource 502 is embedded in a wall 512 of the neck 516 of the housing 506 of the container 520. Electrical contacts 510 are asymmetrically located on adjacent sides of an exterior surface of the rim 518 facing towards the body 514 and coupled to the memory resource 502 via electrical leads 508. The rim 518 may define a port coupled to a channel in the neck 516 coupled to a print material chamber in the body 514. In this manner, the memory resource 502 may be embedded in a wall of the neck 516 defining a channel between the print material chamber and the output port of the container. The shape of the rim 518, the neck 516, and/or the body 514 may act as a guideway or guideway counterpart to support rotation of the print material container 520 about an axis in a placement direction.

[0027] By embedding a memory resource with information about the print material container, the memory resource is protected by the container housing, for example. In this manner, the memory resource and the data stored thereon may maintain a level of integrity suitable for use with a print component and/or print apparatus. As an example, a secure smart-chip embedded in a container may provide data to a print apparatus to inform the device of attributes or features of the colorant or other particulates related to the colorant of the container to the device or cartridge. Example attributes or features may include chamber volume, mass of print material, print material remaining, print material type, print material characteristics, chemical composition, metallurgy, stir-rate integrity, and the like. The memory resource location for molding-in may be in an intricate or hard-to-reach location (e.g., unreachable without specialized equipment or significant container manipulation) during manufacturing that make integration with a colorant container (e.g., colorant container 520) without specialized equipment difficult. The memory resource may be

located on a non-visible location within the molding of the print component or colorant container with electrical leads molded into the containers to limit the likelihood of a counterfeit chip being added after the manufacturing process, and a remote connection, via the electrical leads, to the print device or component may be established when physical contact and electrical conduction is made. By providing an electrical connection to the memory resource embedded in the print material container, information provided in the memory resource may be retrievable by a compute system to perform an operation of the print apparatus based on the information on the memory resource, for example.

[0028] The memory resources discussed herein may be a passively accessible storage medium or may be part of an active system capable of retrieving and sending data of the storage medium. For example, a component shell (into which fits the container) may include a processor resource electrically coupled to an electrical contact of the component shell in electrical communication with an electrical contact of the container such that the processor resource of the component shell is able to retrieve data from the memory resource of the container.

[0029] Figure 6 is a sectional view of an example print material container 620 coupled to an example component 600. The print material container 620 is in a rotated state such that an electrical connection and a material transfer connection is made between the print material container 620 and the print component 600. The guideway 606 allows for rotation of the rim 618 to guide the electrical contacts 610 towards electrical contacts 640. The guideway 608 may include guide walls 603, 605, 607, 609, and 611 that may guide rotation of the print material container 620 about an axis of a placement direction into the guide way cavity. For example, the lip 632 may allow for insertion of the print material container into the space of the guideway 606 and the cavity of the guideway as defined by the guide walls 603, 605, 607, 609, and 611 may allow for and guide rotation of the rim 618 into the position depicted in Figure 6.

[0030] The print material of the container 620 is transferable from the print material chamber 604 to an input port 636 of the component (e.g., via a channel of the neck of the container coupled to the chamber). The input port 636 is coupled to an output port 638 of the component 600 to transfer the print material to a print apparatus (e.g., the port of a toner component is able to be sealed and coupled to a toner receiving station of a print apparatus in a manner capable of print material

transfer). For example, the container 620 may define a port 650 (e.g., coupled to or part of a rim of the container) coupled to the print material chamber 604 that is sealingly coupleable (e.g., able to be coupled in a manner that generates a seal) to a port 636 of a component 600, where the component 600 may be able to dispense print material from the print material chamber 604 to output port 638 via the connection between the container port 650 and the input port 636 of the component 600.

[0031] The print material container 620 is coupled to the print component 600 via a container interface. The container interface may include a print material transfer interface as described above and an electrical interface. In an example, the container 620 is coupled to a shell of the component with a recessed interface to receive a rim of the container 620. In that example, an electrical contact on the component may be placed in a complementary location to the electrical contact of the container when the container is sealingly coupled to the recessed interface.

[0032] The print material container 620 includes a memory resource 602 and an electrical contact 610 coupled to the memory resource 602 via an electrical lead 608. When the print material container 620 is moved to the contact position, the electrical contact 610 aligns towards the electrical contact 640 of the print component 600. The electrical contact 640 of the component is electrically coupled to the controller 630 via electrical lead 642. The controller 630 is electrically coupled, via electrical lead 646, to the electrical contact 648 on the exterior of the component 600 at an electrical interface for a print apparatus. The controller 630 coupled to the component shell may include a processor resource electrically coupled to the electrical contact 640 on the component shell so that the processor resource is able to retrieve data from the memory resource 602. The electrical leads 608 may be connected to a communication interface of the memory resource 602 and/or connected to a power interface of the memory resource 602. As used herein, a communication interface is any appropriate circuitry to enable preparation of signals and/or transmission of signals along an electrical path. A power interface, as used herein, may refer to any appropriate circuitry to enable transfer of electrical power along an electrical path, including a ground connection for example. In some examples, the controller 630 may communicate data and provide power to the memory resource 602 over the same electrical path, such as manipulating characteristics of the signal to encode data.

[0033] The controller 630 may include a set of instructions that when executed cause the controller to retrieve data from the memory resource 602 of the print material container 620 via a first group of electrical leads 642 between the controller 630 and the electrical contacts 640 and provide a signal, via a second group of electrical leads 646, to the electrical contacts 648 where the signal corresponds to the data retrieved from the memory resource 602 of the print material container. In this manner, the controller 630 may provide (e.g., relay or actively transmit) the signal to be received by a print apparatus via an electrical connection with the electrical contacts 648 when the print component 600 is electronically coupled to a print material receiving station of the print apparatus.

[0034] The component shell may include a recess or other exterior surface that defines a guide feature to guide connection of the container to a receiving area such that the guide feature guides the electrical contact of the container towards an electrical contact of the receiving area. For example, the guide feature may be a recess that guides movement of electrical contacts of the container towards electrical contacts of the component (located inside the recess) upon insertion of the container into the recess of the component. For another example, the guide feature may be a protrusion with electrical contacts located thereon that align with electrical contacts on an exterior surface of the container when the mechanical port of the container mates with the protrusion of the component shell upon directing the container towards the component at the location of the protrusion.

[0035] The print component 600 may include a lip 632 protruding from a side wall defining a boundary of the recess to which the print material container 620 is insertable. The plurality of electrical contacts 640 of the print component 600 may be located on the lip 632 facing into the recess (e.g., facing a base wall defining a boundary of the recess). The lip 632 may be spaced apart from a base wall of the recess about a distance substantially equivalent to a width of a rim 618 of a print material container 620. The rim 618 of the print material container 620 may be shaped to be insertable into the recess at a first orientation and rotatable to a second orientation to align the plurality of electrical contacts 610 of the print material container 620 with the plurality of electrical contacts 640 on the print component 600. The plurality of electrical contacts 610 of the print material container 620 are located on a surface of the rim 618 facing away from the base wall of the recess when the print material container 620 is inserted into the recess.

[0036] In some examples, there may be a number of electrical contacts to, for example, provide obfuscation to electrical operation between the print material container and the print component. For example, a number of electrical contacts of the print component may be different from a number of electrical contacts of the print material container. In one example, a number of potential electrical contacts of the component is greater than the number of electrical contacts of the print material container.

[0037] The controller 630 may comprise a memory resource operatively coupled to a processor resource. A memory resource may contain a set of instructions that are executable by the processor resource and the set of instructions are operable to cause the processor resource to perform operations of a control program when the set of instructions are executed by the processor resource. For example, the processor resource may execute the set of instructions corresponding to a control program to perform communication operations to retrieve data from a memory resource or pass data from the memory resource 602, such as container data, to another processor resource or storage location.

[0038] A processor resource is any appropriate circuitry capable of processing (e.g., computing) instructions, such as one or multiple processing elements capable of retrieving instructions from a memory resource and executing those instructions. For example, the processor resource may be a central processing unit (CPU) that enables container data retrieval by fetching, decoding, and executing modules of instructions. Example processor resources include at least one CPU, a semiconductor-based microprocessor, a programmable logic device such as an application specific integrated circuit (ASIC), and the like. A processor resource may include multiple processing elements that are integrated in a single device or distributed across devices. A processor resource may process the instructions serially, concurrently, or in partial concurrence.

[0039] A memory resource represents a medium to store data utilized and/or produced by a print component or print apparatus. The medium is any non-transitory medium or combination of non-transitory media able to electronically store data. For example, the medium may be a storage medium, which is distinct from a transitory transmission medium, such as a signal. The medium may be machine-readable, such as computer-readable. The medium may be an electronic, magnetic, optical, or other physical storage device that is capable of containing (i.e., storing) executable

instructions. A memory resource may be integrated in the same device as a processor resource or it may be separate but accessible to that device and the processor resource. A memory resource may be distributed across devices. A memory resource may be a non-volatile memory resource such as read-only memory (ROM), a volatile memory resource such as random-access memory (RAM), a storage device, or a combination thereof.

[0040] Figures 7A-9B are top views of an example interface states between example print components 700, 800, and 900 and example print material containers 720, 820, and 920.

[0041] Referring to Figure 7A, the print material container 720 is inserted into a print component 700. The rim 718 of the print material container 720 is of a similar octagonal shape to the recess 704 defined by the housing of the print component 700. The electrical contacts 710 of the print material container 720 are not in contact with the electrical contacts 740 of the print component 700 in the state depicted in Figure 7A. Upon rotation in the direction 721, the electrical contacts 710 of print material container 720 move towards electrical contacts 740 of the print component 700. In the state depicted in Figure 7B, the electrical contacts 710 of the print material container 720 moved into a position to be in electrical connection with electrical contacts 740 of the print component 700. The rotation 721 is guided by a guide wall 706. In this manner, the guide wall 706 supports rotation of the print material container 720 about an axis in a placement direction through the recess 704. The rotation 721 may be about the central axis of the container 720. Though not included in the figures herein, visual features, such as arrows or lines to show alignment, may be used as a visual cue to indicate accurate insertion and rotation to the desired orientation. For example, an arrow may be placed on the component surface and the container may be rotated until an arrow on the container aligns with the arrow on the component.

[0042] Referring to Figure 8A, the print material container 820 is inserted into a print component 800. The rim 818 of the print material container 820 is of a similar quadrilateral shape to the recess 804 defined by the housing of the print component 800. The electrical contacts 810 of the print material container 820 are not in contact with the electrical contacts 840 of the print component 800 in the state depicted in Figure 8A. Upon rotation in the direction 821, the electrical contacts 810 of print material container 820 move towards electrical contacts 840 of the print component

800. In the state depicted in Figure 8B, the electrical contacts 810 of the print material container 820 moved into a position to be in electrical connection with electrical contacts 840 of the print component 800. The rotation 821 is guided by a guide wall 806 that guides the container 820 to rotate until the appropriate electrical connection is made between electrical contacts 810 and 840.

[0043] Referring to Figure 9A, the print material container 920 is inserted into a print component 900. The rim 918 of the print material container 920 is of a similar triangular shape to the recess 904 defined by the housing of the print component 900. The electrical contact 910 of the print material container 920 is not in contact with the electrical contact 940 of the print component 900 in the state depicted in Figure 9A. Upon rotation in the direction 921, the electrical contact 910 of print material container 920 moves towards electrical contact 940 of the print component 900. In the state depicted in Figure 9B, the electrical contact 910 of the print material container 920 moved into a position to be in electrical connection with electrical contact 940 of the print component 900. In this manner, a protrusion including the electrical contact 910 rotates into a position to make an electrical connection with the component 900. The rotation 921 is guided by a guide wall 906 that guides the container 920 to rotate until the appropriate electrical connection is made between electrical contacts 910 and 940.

[0044] Figures 10 and 11 are block diagrams depicting example containers 1000 and 1100. The containers 1000 and 1100 may be print material containers, such as print material containers discussed earlier herein. For example, the container 1000 may include a print material chamber 1001 to hold print material. For another example, the container 1100 may include a housing 1102 defining a print material chamber 1101 to hold and transfer a supply of print particles, such as laser toner.

[0045] Referring to Figure 10, the container 1000 may include a material transfer interface 1012 defining a port 1014 coupled to the print material chamber 1001. The material transfer interface 1012 may include a channel to transfer print material from the print material chamber 1001 to the exterior of the print material container 1000 (e.g., into a print component or a print material delivery system of a print apparatus).

[0046] The print material container 1000 may include a mechanical interface 1004. The mechanical interface 1004 may include a guide structure defining a

protrusion 1006 and a guideway 1008 to allow the container to rotate within a recess defined by a shell associated with a print receptacle of a host device. For example, the neck of the container, such as the neck 316, 416, or 516 of Figures 3-5, may act as a guideway that supports rotation of the print material container about an axis of a placement direction. In other examples, the rim of the container, such as rim 318, 418, and 518 of Figures 3-5 may act as a guideway counterpart that supports rotation of the print material container about an axis of a placement direction. An electrical contact 1010 may be coupled to the protrusion 1006 of the guide structure. Upon rotation of the container 1000, the electrical contact 1010 moves towards an electrical contact on a shell associated with a receptacle (e.g., into which the container 100 is inserted).

[0047] Referring to Figure 11, the container 1100 may include a material transfer interface 1112 and a mechanical interface 1104 similar to the material transfer interface 1012 and the mechanical interface 1004 of Figure 10 with an additional protrusion 1116 included in the mechanical interface 1104 and an additional electrical contact 1118 coupled to the protrusion 1116. For example, the second protrusion 1116 defined by the mechanical interface may be symmetrically located with respect to the first protrusion 1106 such that the electrical contact 1118 is symmetrically located on second protrusion 1116. For another example, the second protrusion 1116 defined by the mechanical interface may asymmetrically located with respect to the first protrusion 1106 such that the electrical contact 1118 is asymmetrically located on second protrusion 1116.

[0048] The housing 1102 may define or be coupled to the mechanical interface 1104, the material transfer interface 1112, and/or the print material chamber 1101. The housings discussed herein, such as housing 1102, may be made of any appropriate material formable into a container. For example, a polymer composite may be used to form the housing to define a print material chamber and a guide structure. Example plastic polymers may include thermoplastic polymers such as acrylonitrile butadiene styrene (ABS), synthetic resins such as vinyl, semi-synthetic organic compounds, organic polymers, and the like. Other appropriate structural materials useable to form the housing include metal, plastic, ceramic, glass, rubber, and the like, or any composite thereof. The guide structures (such as the guideways and guide walls discussed herein as well as any other portion of the

housing as discussed herein) may be made of the same structural material as the remainder of the housing or may be made of different structural material.

[0049] By implementing a print material container and/or the print component with a guide structure that enables movement of electrical contact upon rotation, a proper electrical connection may be, for example, ensured between the print material container and the print component.

[0050] All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the elements of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or elements are mutually exclusive.

[0051] The terms "include," "have," and variations thereof, as used herein, mean the same as the term "comprise" or appropriate variation thereof. Furthermore, the term "based on," as used herein, means "based at least in part on." Thus, a feature that is described as based on some stimulus may be based only on the stimulus or a combination of stimuli including the stimulus. Furthermore, the use of the words "first," "second," or related terms in the claims are not used to limit the claim elements to an order or location, but are merely used to distinguish separate claim elements.

[0052] The present description has been shown and described with reference to the foregoing examples. It is understood, however, that other forms, details, and examples may be made without departing from the spirit and scope of the following claims.

CLAIMS

What is claimed is:

1. A print component comprising:
 - a guide structure defining:
 - a recess in a placement direction to receive a print material container having a plurality of electrical contacts; and
 - a guideway adjacent the recess, the guideway including a guide wall to support rotation of the print material container about an axis of the placement direction; and
 - a plurality of electrical contacts coupled to the guide structure, the guideway to guide the plurality of electrical contacts of the print material container to move towards the plurality of electrical contacts of the print component upon rotation of the print material container about the axis of the placement direction.
2. The print component of claim 1, comprising:
 - a material transfer interface defining a port coupleable to a print material chamber of the print container.
3. The print component of claim 2, wherein:
 - the rotation of the print material container is about the axis of the material transfer interface;
 - the rotation of the print material container generates an electrical connection between the print material container and the print component; and
 - the rotation of the print material container generates a seal between the print material container and the print component.
4. The print component of claim 1, comprising:
 - a lip protruding from a side wall defining a boundary of the recess, the plurality of electrical contacts located on the lip facing into the recess.
5. The print component of claim 4, wherein:

the lip is spaced apart from a base wall of the recess about a distance substantially equivalent to a width of a rim of a print material container, the rim of the print material container shaped to be insertable into the recess at a first orientation and rotatable to a second orientation to align the plurality of electrical contacts of the print material container with the plurality of electrical contacts on the print component.

6. The print component of claim 5, wherein:

the plurality of electrical contacts of the print component are located on the lip surface facing the base wall of the recess; and

the plurality of electrical contacts of the print material container are located on a surface of the rim facing away from the base wall of the recess when the print material container is inserted into the recess.

7. The print component of claim 6, wherein:

the plurality of electrical contacts of the print component are located adjacent to each other on a same side of the side wall of the recess.

8. The print component of claim 6; wherein:

the plurality of electrical contacts of the print component are located across from each other on substantially opposing side walls of the recess.

9. The print component of claim 1, wherein:

a number of electrical contacts of the print component is different from a number of electrical contacts of the print material container.

10. A print receptacle comprising:

a guide structure defining:

a protrusion in a placement direction to receive a print material container having an electrical contact; and

a guideway adjacent the protrusion, the guideway including a wall to support rotation of the print material container about the protrusion; and

an electrical contact coupled to the guide structure, the guideway to guide the electrical contact of the print material container towards the electrical contact of

the print receptacle upon rotation of the print material container about the protrusion.

11. The print receptacle of claim 10, wherein:

the guideway includes an edge to guide coupling of the print material container along the placement direction, the edge leading to the wall of the guideway to allow for rotation of the print material container once a face of the print material container contacts the wall of the guideway.

12. The print receptacle of claim 11, comprising:

a material transfer interface defining a port coupleable to a print material chamber of the print particle container.

13. The print receptacle of claim 12, wherein:

the print material container is electrically coupled to the print receptacle upon rotation of the print material container about the protrusion; and

the print material container is sealingly coupled to the print receptacle upon rotation of the print material container about the protrusion.

14. A print particle supply container to supply print particles to a print particle receptacle of a host device, the print particle supply container comprising:

a print material chamber;

a material transfer interface including a port coupled to the print material chamber;

a mechanical interface coupled to the housing, the mechanical interface including a guide structure defining:

a first protrusion; and

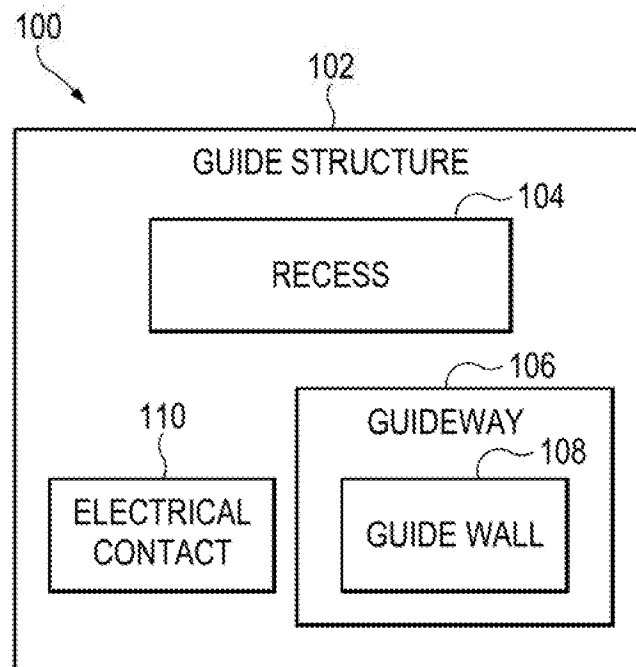
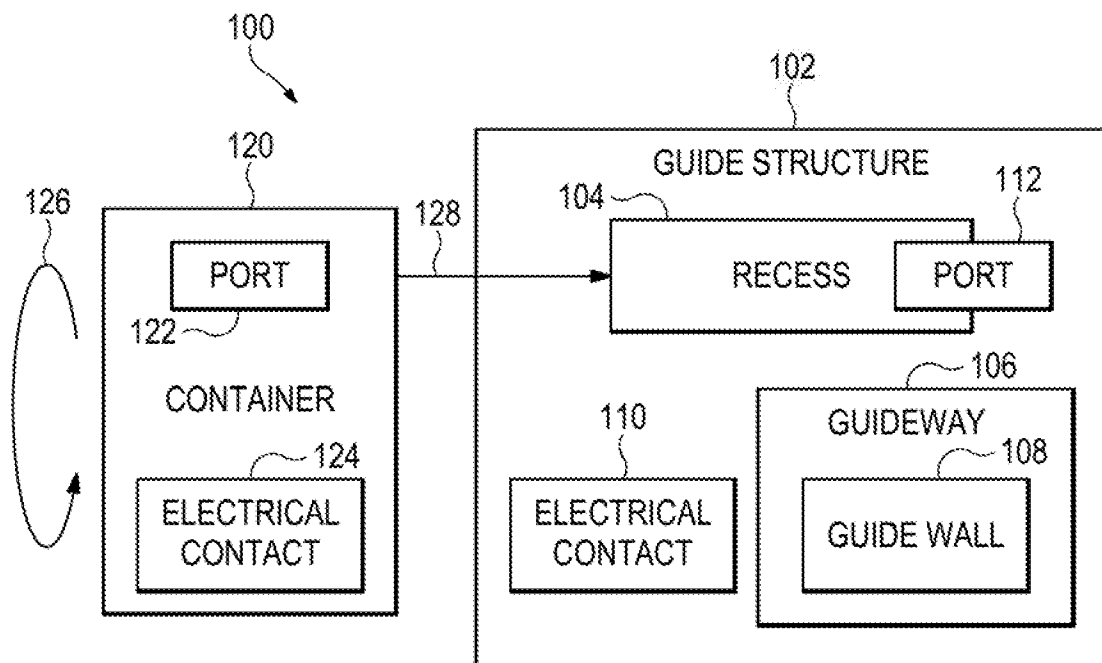
a guideway to allow the container to rotate within a recess defined by a shell associated with the receptacle; and

a first electrical contact coupled to the first protrusion of the guide structure, the first electrical contact of the guide structure to move towards a first electrical contact on the shell upon rotation of the container.

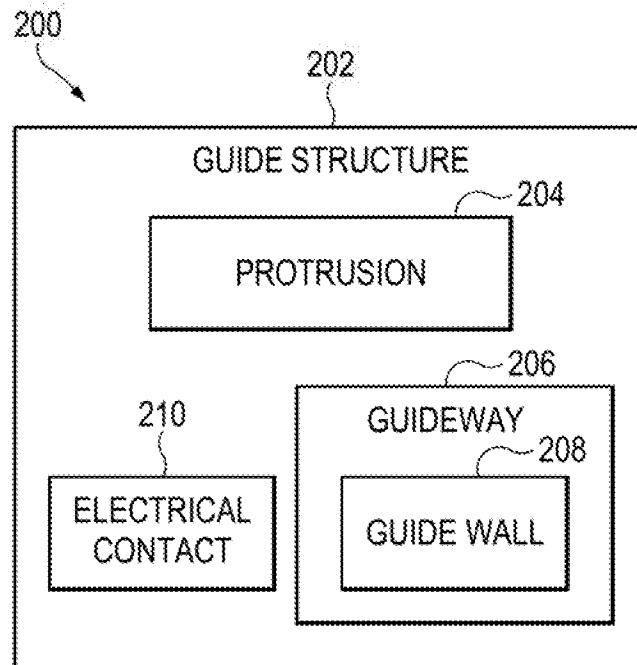
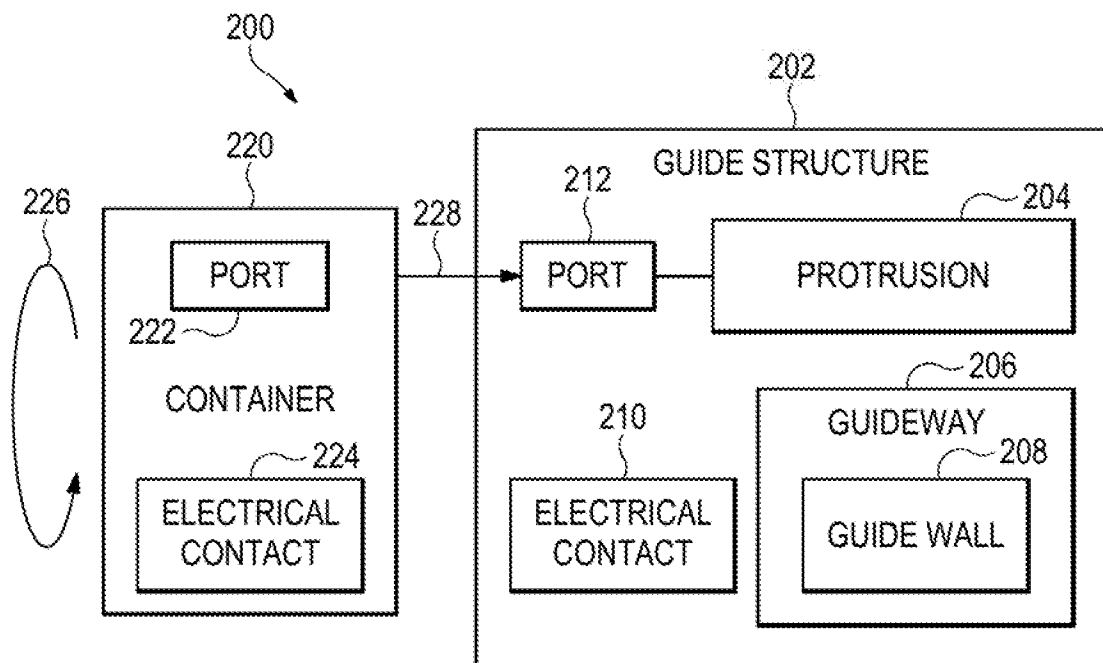
15. The print particle supply container of claim 14, further comprising:

a second protrusion defined by the mechanical interface; and
a second electrical contact located on a second protrusion, wherein:
the second protrusion is symmetrically located with respect to the first protrusion, or
the second protrusion is asymmetrically located with respect to the first protrusion.

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**FIG. 1A****FIG. 1B**

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**FIG. 2A****FIG. 2B**

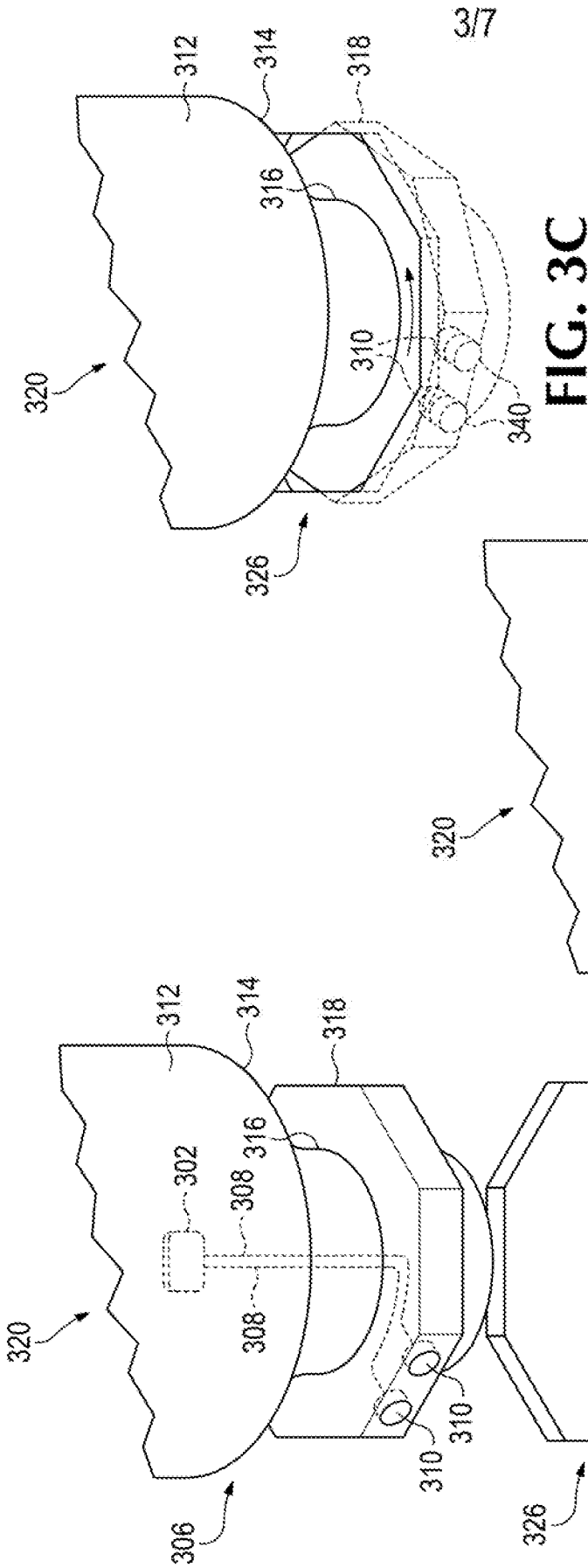


FIG. 3C

FIG. 3A

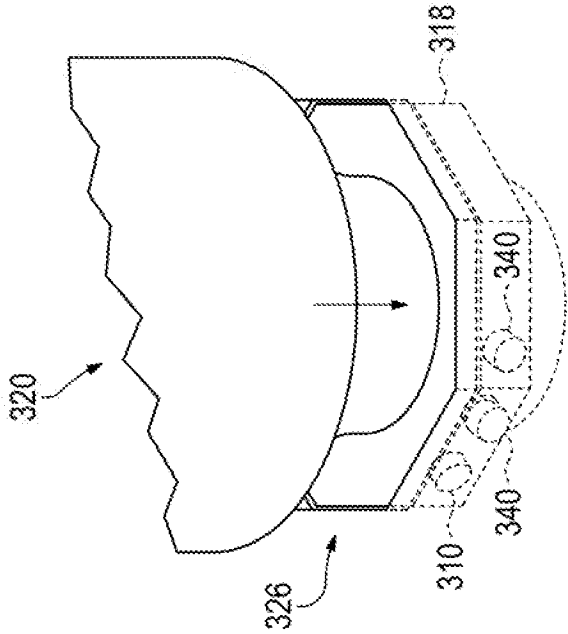


FIG. 3B

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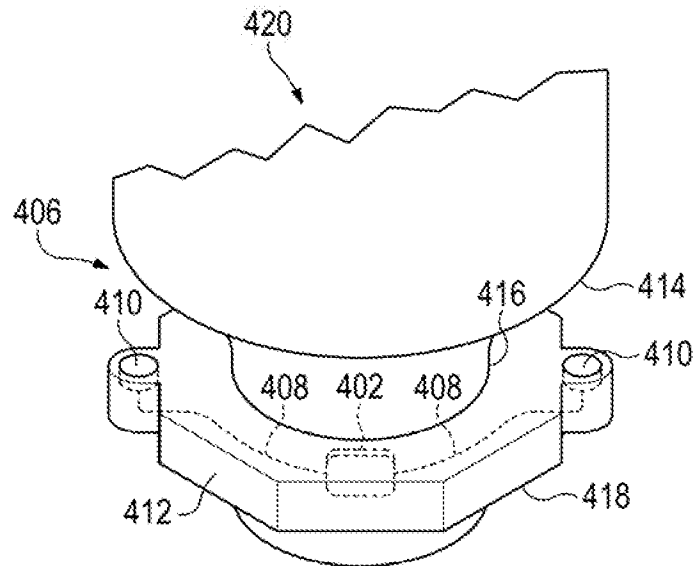


FIG. 4

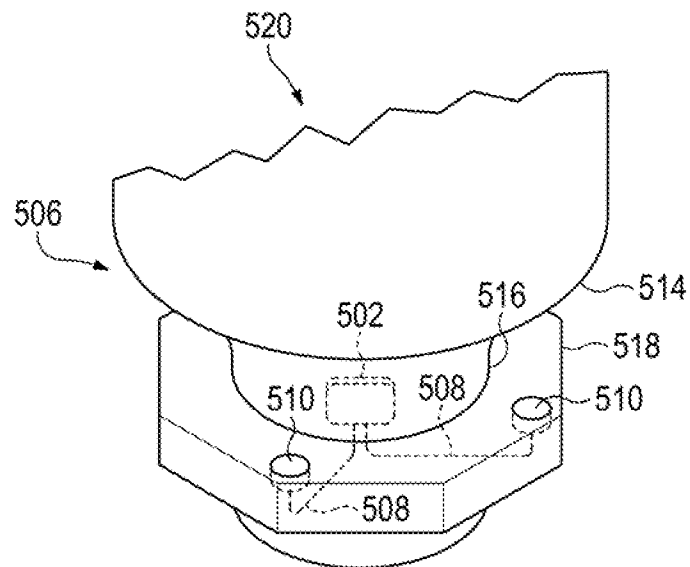


FIG. 5

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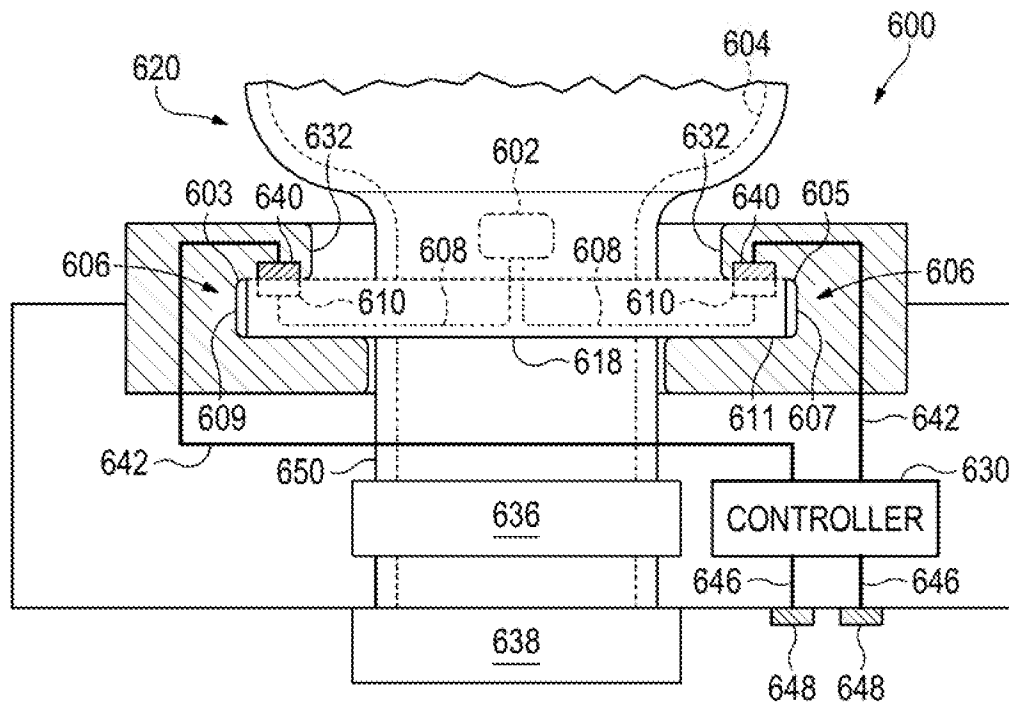


FIG. 6

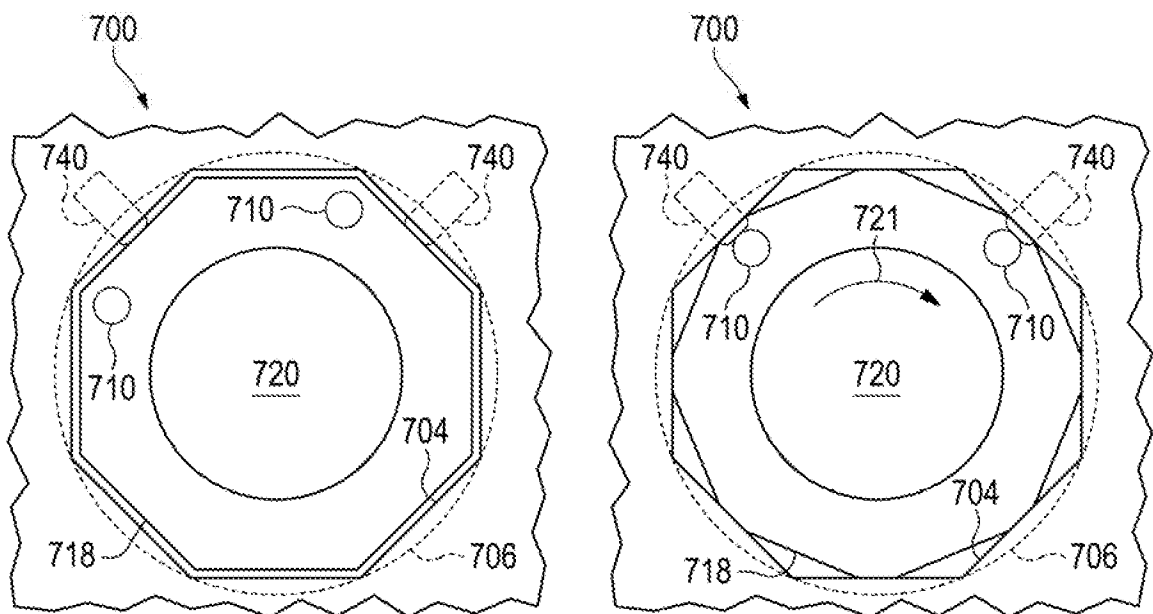


FIG. 7A

FIG. 7B

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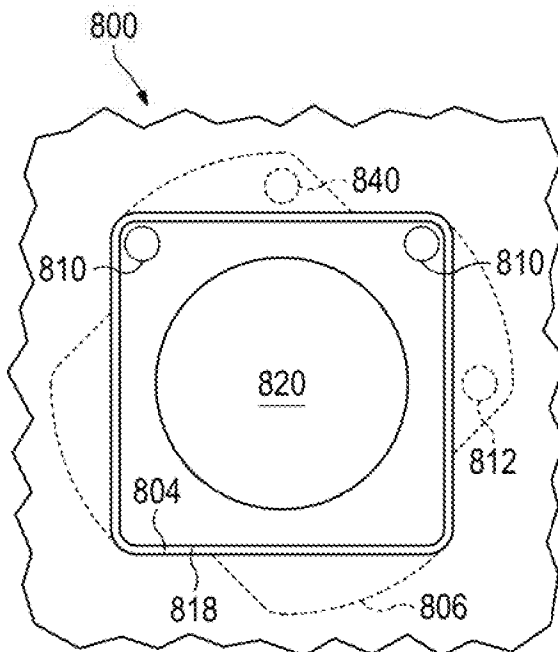


FIG. 8A

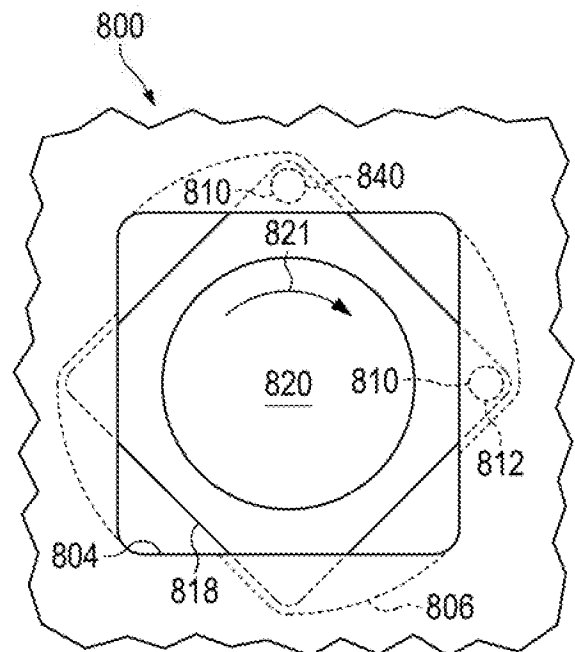


FIG. 8B

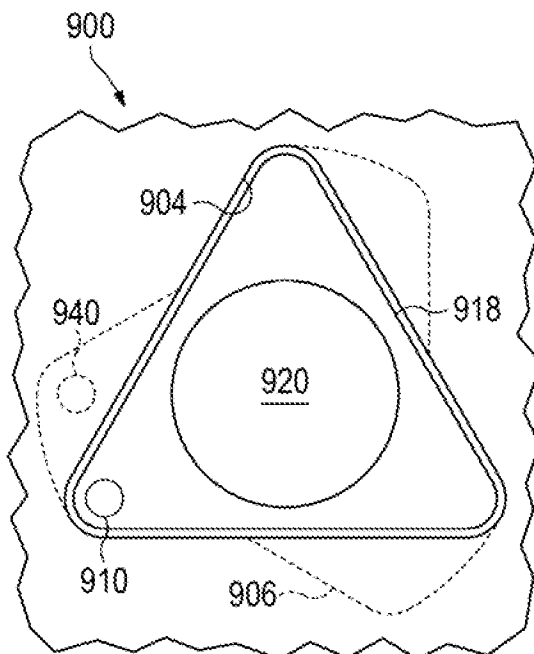


FIG. 9A

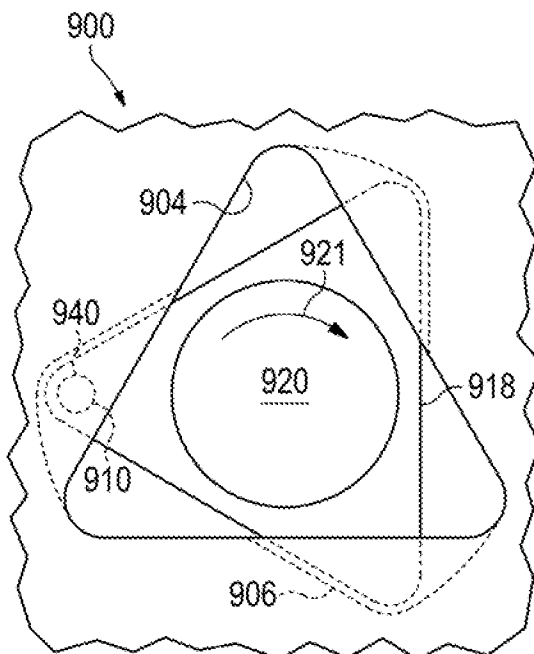
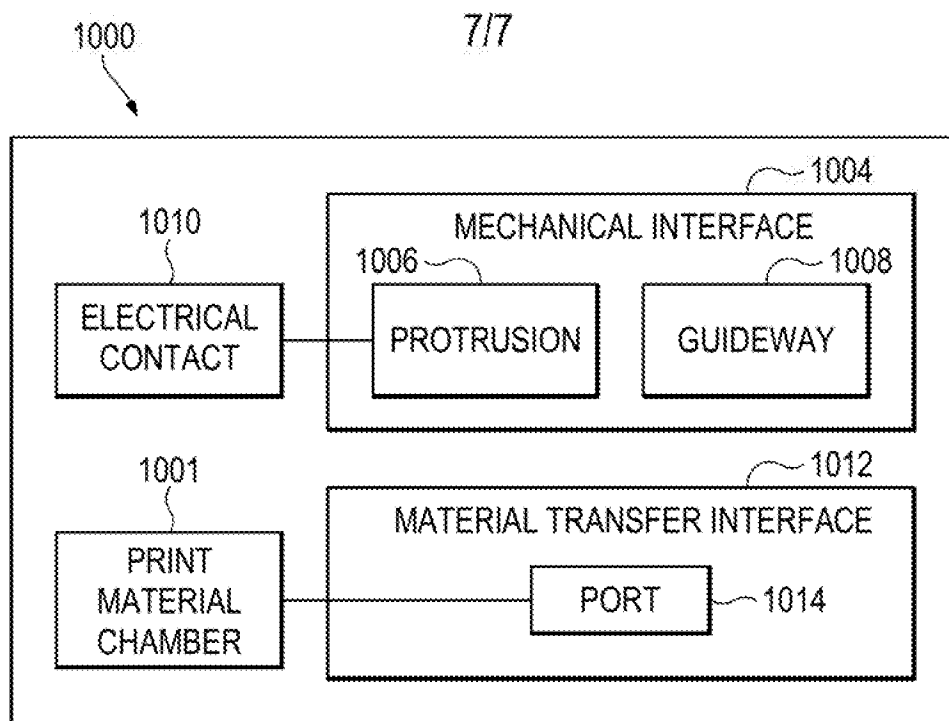
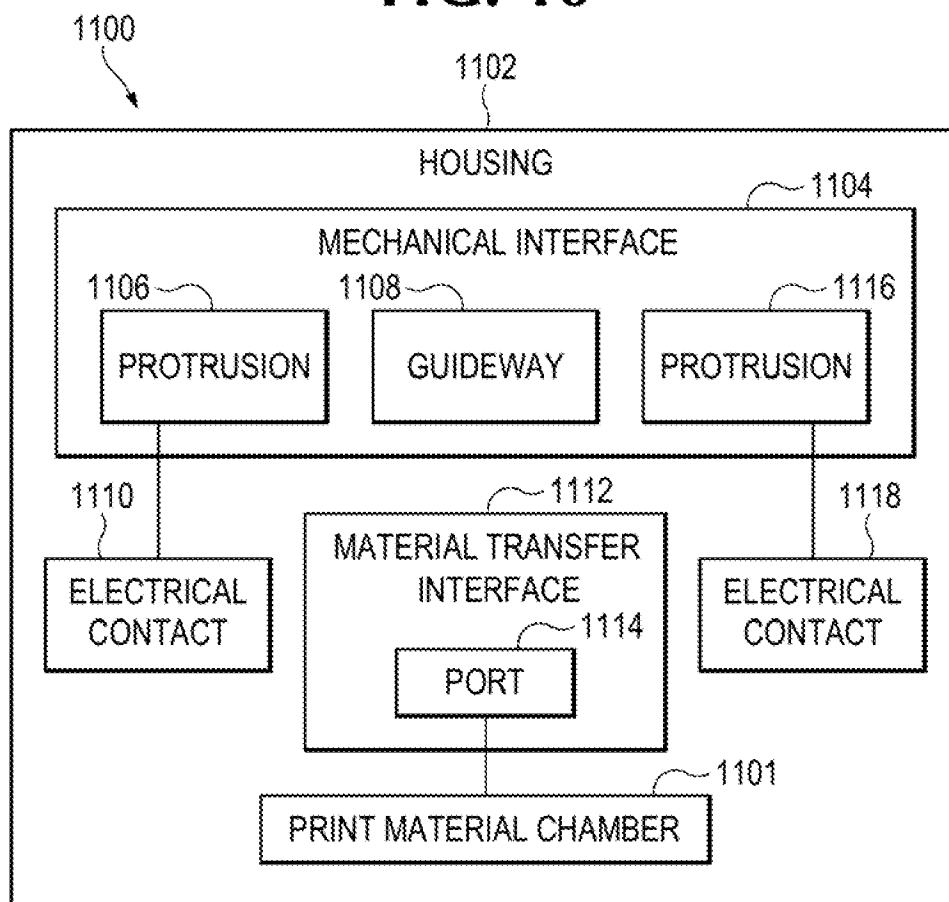


FIG. 9B

**FIG. 10****FIG. 11**

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2018/048783

A. CLASSIFICATION OF SUBJECT MATTER

INV. B41J2/175 G03G15/08
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)

B41J G03G

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	EP 2 261 751 A2 (FUJI XEROX CO LTD [JP]) 15 December 2010 (2010-12-15) paragraphs [0042] - [0044], [0064] - [0066]; figures 4, 5, 8, 9 -----	1-15
X	EP 2 367 068 A2 (TOSHIBA KK [JP]; TOSHIBA TEC KK [JP]) 21 September 2011 (2011-09-21) paragraphs [0012] - [0015]; figures 2, 6 -----	1-3, 10-15
X	US 8 590 742 B2 (DEVOS JOHN A [US]; MORROW MICHAEL M [US] ET AL.) 26 November 2013 (2013-11-26) figures 5, 6 column 12, line 18 - column 13, line 19; figure 12 ----- -/--	1,10,14



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

9 May 2019

Date of mailing of the international search report

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Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Adam, Emmanuel

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2018/048783

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/182048 A1 (NOZAWA IZUMI [JP] ET AL) 18 July 2013 (2013-07-18) paragraphs [0001] - [0047]; figures 5, 7, 21 -----	1,10,14
X	WO 98/55318 A1 (HEWLETT PACKARD CO [US]; CHILDERS WINTHROP D [US] ET AL.) 10 December 1998 (1998-12-10) page 9, lines 10-21; figure 3 column 12, line 22 - column 14, line 17 -----	1,10,14
X	WO 2015/112501 A1 (MOLECULAR DEVICES LLC [US]) 30 July 2015 (2015-07-30) paragraph [0059]; figures 4a, 5 -----	1,10,14
X	US 6 505 926 B1 (TRAFTON R WINFIELD [US] ET AL) 14 January 2003 (2003-01-14) column 5, lines 31-61; figures 5, 6, 16 -----	1,10,14
X	WO 2011/155642 A1 (RICOH CO LTD [JP]; TAKAHASHI YASUFUMI [JP] ET AL.) 15 December 2011 (2011-12-15) page 23, line 31 - page 24, line 5 page 30, lines 7-22; figures 4, 5, 16, 17 -----	1,10,14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2018/048783

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2261751	A2	15-12-2010	AU 2010202431 A1 06-01-2011
		BR PI1001836 A2 05-07-2011	
		CA 2706949 A1 11-12-2010	
		CN 101923306 A 22-12-2010	
		EP 2261751 A2 15-12-2010	
		JP 4412421 B1 10-02-2010	
		JP 2010286655 A 24-12-2010	
		KR 20100133304 A 21-12-2010	
		RU 2010123799 A 20-12-2011	
		TW 201100983 A 01-01-2011	
		US 2010316414 A1 16-12-2010	
EP 2367068	A2	21-09-2011	CN 102193404 A 21-09-2011
		EP 2367068 A2 21-09-2011	
		JP 5526058 B2 18-06-2014	
		JP 2011180598 A 15-09-2011	
		KR 20110100149 A 09-09-2011	
		US 2011217067 A1 08-09-2011	
US 8590742	B2	26-11-2013	US 2011121024 A1 26-05-2011
		WO 2010014340 A1 04-02-2010	
US 2013182048	A1	18-07-2013	AR 085900 A1 06-11-2013
		AR 085901 A1 06-11-2013	
		AU 2012101587 A4 29-11-2012	
		AU 2012367018 A1 22-08-2013	
		AU 2012370408 A1 12-09-2013	
		BR 112013006402 A2 05-07-2016	
		BR 112013006544 A2 24-10-2017	
		CA 2860539 A1 12-07-2013	
		CA 2873805 A1 12-07-2013	
		CA 2909682 A1 12-07-2013	
		CN 103442895 A 11-12-2013	
		CN 103476591 A 25-12-2013	
		CN 103640338 A 19-03-2014	
		CN 104669798 A 03-06-2015	
		CN 104760419 A 08-07-2015	
		CN 106183431 A 07-12-2016	
		EP 2629977 A1 28-08-2013	
		EP 2635441 A1 11-09-2013	
		EP 2786869 A1 08-10-2014	
		EP 2857206 A1 08-04-2015	
		ES 2526686 T3 14-01-2015	
		ES 2534135 T3 17-04-2015	
		HK 1188187 A1 12-06-2015	
		KR 20130120453 A 04-11-2013	
		KR 20130120454 A 04-11-2013	
		KR 20140146141 A 24-12-2014	
		KR 20160075811 A 29-06-2016	
		RU 2013112599 A 10-03-2016	
		RU 2013112602 A 10-03-2016	
		RU 2016139114 A 13-12-2018	
		TW 201328889 A 16-07-2013	
		TW 201328890 A 16-07-2013	
		TW 201328891 A 16-07-2013	
		TW 201328892 A 16-07-2013	
		TW 201714758 A 01-05-2017	
		US 8297738 B1 30-10-2012	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2018/048783

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
		US 8439482 B1	14-05-2013	
		US 2013182047 A1	18-07-2013	
		US 2013182048 A1	18-07-2013	
		US 2013182049 A1	18-07-2013	
		US 2014210917 A1	31-07-2014	
		US 2014368585 A1	18-12-2014	
		US 2016129696 A1	12-05-2016	
		WO 2013105142 A1	18-07-2013	
		WO 2013105143 A1	18-07-2013	
		WO 2013105144 A1	18-07-2013	
		WO 2013105145 A1	18-07-2013	

WO 9855318	A1	10-12-1998	CN 1259086 A	05-07-2000
			DE 69812950 T2	11-12-2003
			DE 69833054 T2	07-09-2006
			DE 69833983 T2	23-11-2006
			DE 69834142 T2	28-12-2006
			DE 69834143 T2	21-12-2006
			EP 0994779 A1	26-04-2000
			EP 1219448 A2	03-07-2002
			EP 1275512 A1	15-01-2003
			EP 1287997 A1	05-03-2003
			EP 1287998 A1	05-03-2003
			EP 1293347 A2	19-03-2003
			ES 2191304 T3	01-09-2003
			ES 2251562 T3	01-05-2006
			ES 2257504 T3	01-08-2006
			ES 2257507 T3	01-08-2006
			ES 2257508 T3	01-08-2006
			JP 4088353 B2	21-05-2008
			JP 2002513340 A	08-05-2002
			WO 9855318 A1	10-12-1998

WO 2015112501	A1	30-07-2015	CN 106103690 A	09-11-2016
			EP 3097181 A1	30-11-2016
			JP 2017506331 A	02-03-2017
			US 2017089882 A1	30-03-2017
			WO 2015112501 A1	30-07-2015

US 6505926	B1	14-01-2003	DE 60200265 T2	10-03-2005
			EP 1285766 A1	26-02-2003
			JP 2003072103 A	12-03-2003
			US 6505926 B1	14-01-2003
			US 2003043243 A1	06-03-2003

WO 2011155642	A1	15-12-2011	AU 2011262748 A1	21-06-2012
			CA 2782610 A1	15-12-2011
			CA 2972759 A1	15-12-2011
			CN 102667640 A	12-09-2012
			CN 103645621 A	19-03-2014
			CN 104076672 A	01-10-2014
			CN 104133357 A	05-11-2014
			CN 104317175 A	28-01-2015
			EP 2494413 A1	05-09-2012
			EP 2752716 A2	09-07-2014
			EP 2980656 A1	03-02-2016
			ES 2474175 T3	08-07-2014
			HK 1174694 A1	31-07-2015

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2018/048783

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		HK 1198779 A1	05-06-2015
		HK 1201946 A1	11-09-2015
		KR 20120081617 A	19-07-2012
		KR 20140067112 A	03-06-2014
		KR 20140124812 A	27-10-2014
		KR 20170110730 A	11-10-2017
		RU 2012113860 A	20-10-2013
		SG 179020 A1	27-04-2012
		SG 10201504616T A	30-07-2015
		SG 10201504617X A	30-07-2015
		TW 201220007 A	16-05-2012
		TW 201439691 A	16-10-2014
		TW 201640234 A	16-11-2016
		TW 201741786 A	01-12-2017
		TW 201842423 A	01-12-2018
		US D743400 S	17-11-2015
		US D757161 S	24-05-2016
		US D758482 S	07-06-2016
		US 2012200871 A1	09-08-2012
		US 2013188985 A1	25-07-2013
		US 2013223877 A1	29-08-2013
		US 2014037325 A1	06-02-2014
		US 2014286670 A1	25-09-2014
		US 2014314443 A1	23-10-2014
		US 2014341602 A1	20-11-2014
		US 2015293485 A1	15-10-2015
		US 2017153572 A1	01-06-2017
		US 2018253028 A1	06-09-2018
		WO 2011155642 A1	15-12-2011
