(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 099 509 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
14.08.2019 Bulletin 2019/33

(21) Application number: **14880532.8**

(22) Date of filing: **31.01.2014**

(51) Int Cl.:
B41J 2/175 *(2006.01)* ***B41J 29/02*** *(2006.01)*
B41J 29/13 *(2006.01)*

(86) International application number:
PCT/US2014/014183

(87) International publication number:
WO 2015/116172 (06.08.2015 Gazette 2015/31)

(54) **INSTALLING AN INK CARTRIDGE IN IMAGING DEVICES**

INSTALLATION EINES TINTENPATRONES BEI BILDGEBUNGSVORRICHTUNGEN

INSTALLATION D'UNE CARTOUCHE D'ENCRE DANS DES DISPOSITIFS D'IMAGERIE

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(43) Date of publication of application:
07.12.2016 Bulletin 2016/49

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EP 3 099 509 B1

Printed by Jouve, 75001 PARIS (FR)

Description

BACKGROUND

[0001] Imaging devices require replacement of cartridges (e.g., ink cartridges). The ink of such cartridges are depleted over time and must be replaced to continue operation of the imaging device. Often, installation/replacement of a cartridge (e.g., a printer ink cartridge) into an imaging device (e.g., printer, scanner, etc.) involves relatively complex manipulation of the cartridge.

[0002] US20020030718A1 relates to an apparatus for horizontally loading and unloading an ink-jet print cartridge from a carriage in a printer. The apparatus includes a generally rectangular print cartridge, an elongate supporting lip located on a side wall of the print cartridge, a carriage body, a chute mounted on the carriage for receiving the print cartridge, and a generally horizontal rail on a side wall of the chute for guiding the print cartridge into the carriage. In operation, the apparatus horizontally loads a print cartridge into a carriage by translating the print cartridge horizontally forward into a carriage, engaging a lip on the print cartridge with a guide rail on the carriage, sliding the print cartridge up and over a datum on the carriage with the guide rail and latching the print cartridge in the carriage. The apparatus unloads a print cartridge from a carriage by rotating the print cartridge about a datum on the carriage, unlatching the print cartridge from the carriage, and horizontally translating the print cartridge out of the carriage.

[0003] US 2009/0195625A1 relates to a recording apparatus for preventing a drop of a recording head upon attachment of the recording head to a carriage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004]

FIG. 1 illustrates an example imaging device.

FIG. 2 is a top view of a portion of the example imaging device of FIG. 1.

FIG. 3 is an enlarged view of a portion of FIG. 2 illustrating an example installation system constructed in accordance with the teachings of this disclosure.

FIG. 4 illustrates the example installation system of FIG. 3 showing an example cartridge moving into an installed position. Fig. 5A is a top view of the example installation system of Figs. 3 and 4 showing an extended length cartridge moving into an installed position.

Fig. 5B is a top view of the example installation system of Figs. 3 and 4, but showing the extended length cartridge and a normal sized cartridge in installed positions.

Fig. 6 depicts an example implementation of a carriage of the example installation system of Figs. 3, 4, 5A and 5B showing a first cartridge and an extended length second cartridge in installed positions.

FIG. 7 depicts a portion of the chassis of the example installation system of FIGS. 3, 4, 5A and 5B.

FIG. 8A is a cross-sectional side view of the example installation system of FIGS. 3, 4, 5A and 5B.

FIG. 8B is another cross-sectional side view of the example installation system of FIGS. 3, 4, 5A and 5B showing a cartridge in a first position during an installation process.

FIG. 8C is a view similar to FIG. 8B but showing the cartridge in a second position during the installation process.

[0005] The figures are not to scale. Wherever possible, the same reference numbers will be used throughout the drawing(s) and accompanying written description to refer to the same or like parts. As used in this patent, stating that any part (e.g., a layer, a part, film, area, or plate) is in any way positioned on (e.g., positioned on, located on, disposed on, formed on, etc.) another part, means that the referenced part is either in contact with the other part, or that the referenced part is above the other part (relative to Earth) with one or more intermediate part(s) located therebetween. Stating that any part is in contact with another part means that there is no intermediate part between the two parts.

DETAILED DESCRIPTION

[0006] The invention is defined in the claims. In known imaging systems, installation of a cartridge into a front-loading imaging device requires specifically designed openings and/or clearance areas to enable insertion of the cartridge to a cartridge receptacle and/or installation position of the imaging device. In such known systems, these openings require the user to place a cartridge in a relatively small target zone, which may be difficult. Additionally or alternatively, the small target zone may not be easily accessible to the user. These openings and/or clearance areas may require increased manufacturing cost, increased design complexity, and/or unnecessarily constrain the design of the imaging device (e.g., impose a requirement for a significantly large clearance opening designated for loading the cartridge into the imaging device that may have been used instead to incorporate other design features). These openings and/or clearance areas may also diminish the overall aesthetic of the imaging device. In other known systems, installation requires a lever or latch on the cartridge to either facilitate a kinematic motion to install the cartridge into the imaging device or to provide the necessary application of force to seat the cartridge in the installation position. Such latches and/or levers require significant manufacturing cost, complexity and/or additional parts and features in the imaging device to receive the cartridge. Cartridges with latches or levers may confuse the user as to how to assemble the cartridge into the imaging device. Often, installation of these cartridges requires multiple steps

and/or counterintuitive manipulation.

[0007] Apparatus, methods, and articles of manufacture to install cartridges in imaging devices are disclosed herein. Some such examples reduce cost of the imaging device and/or cartridge, reduce complexity of the imaging device and/or cartridge, and/or improve the user experience by increasing the ease of installation of a cartridge in an imaging device. Some example installation systems disclosed herein have a first guide (e.g., a guide rail) on a first component (e.g., a printer chassis) of an imaging device and a second guide (e.g., a second guide rail) on a second component (e.g., a printer carriage or a cartridge chute) of the imaging device to guide a cartridge into an installation position in the imaging device. In some examples, the first guide has a geometry structured to guide the cartridge in a first direction towards the second component of the imaging device during installation of the cartridge in the imaging device. In some examples, the first and second guides are separated by a gap. However, the first and second guides have a geometry to enable the cartridge to move from the first guide and onto the second guide without catching on the gap. In some examples, the second guide receives the cartridge from the first guide and guides the cartridge into an installed position in the second component. The geometry of at least one of the first and second guides causes the cartridge to pass the gap without catching. The second guide of some disclosed examples has a geometry to guide the cartridge into an installed position in the second component. In some example installation systems disclosed herein, the geometry of the first or second guide includes a surface (e.g., a ramp) to engage a surface
(e.g., a tab) of the cartridge in order to urge the cartridge to transition from the first guide onto the second guide. In such examples, the positional arrangement of the first and second guides in relation to the gap allows the cartridge to transition from the first guide to the second guide with relative ease of assembly for the user. The transition may involve directional changes of the cartridge without the user significantly manipulating the cartridge.

[0008] Examples disclosed herein reduce (e.g., minimize) the need to have complex and expensive latching systems such as those known in the art. Such known systems may require additional parts and/or complexity, and may be difficult to manipulate or confusing to the end user. Eliminating such systems results in improved ease of installation of cartridges and, thus, an improved end user experience. Improved ease of installation may result in decreased returns and/or service calls related to the imaging device and/or cartridges. Additionally, examples disclosed herein reduce (e.g., eliminate) the need for complex openings (e.g., openings in the front of the imaging device), to access a cartridge receiving portion of an imaging device. Examples disclosed herein allow a cartridge to be inserted into an imaging device at a user-friendly location while reducing (e.g., minimizing) the manipulation necessary to install the cartridge into the imaging device.

[0009] Turning to FIG. 1, an example imaging device 100 (e.g., a printer) is shown. The example imaging device 100 of FIG. 1 has a base 102, a scan lid 104, a front panel 106 and a paper tray 108. The base 102 provides structure for the imaging device 100 and a housing for the components within. In the illustrated example, the lid 104 swivels relative to the base 102 to allow a user access to scanning functions of the imaging device 100. The front panel 106 in the illustrated example displays information to a user. In some examples, the front panel 106 also swivels open to expose internal components, such as those described in greater detail in connection with FIGS. 2-8C. The paper tray 108 in the illustrated example may be removed from the base 102 to, for example, install paper in the device.

[0010] FIG. 2 is a top, partially disassembled view of a portion of the front panel 106 of the example imaging device 100 of FIG. 1. In the example of FIG. 2, a scanner of the imaging device 100 has been removed to illustrate example internal components of the imaging device 100. In the example of FIG. 2, a chassis 202 is coupled to the front panel 106 through conventional fasteners (e.g., screws, rivets, etc.) at tabs 204. A movable carriage 205, which is positioned in a loading position in the example of FIG. 2, contains cartridge chutes 206, 208 to receive cartridges (e.g., ink cartridges, cartridge assemblies). In the example of FIG. 2, the carriage 205 and the chassis 202 comprise an example installation system 209 constructed in accordance with the teachings of this disclosure for installation of cartridges into the imaging device 100. A bottom surface 210 of the base 102 has a platen absorber 212 and an output assembly 216 mounted onto it. In the example of FIG. 2, an upper paper guide 218 is mounted to the base 102 and is used to direct paper within the imaging device 100.

[0011] During imaging operations (e.g., printing), the carriage 205 of the illustrated example moves between a first position 220 and a second position 222 to position the cartridge in location(s) appropriate for printing. During installation and/or removal of one or more cartridges from the example carriage 205, the carriage 205 of FIG. 2 moves to a third position 224 to receive one or more new cartridges and/or position one or more old cartridges for removal. The movement of the printer carriage 205 to the third position 224 may result from, for example, the user interacting with the front panel 106 or may be automatically triggered by a condition of one or more of the cartridges (e.g., low ink content in any of the cartridges and/or incorrect cartridge installed, etc.). Installation and removal of example cartridges will be described in greater detail below in connection with FIGS. 3-8C.

[0012] FIG. 3 is an enlarged view of a portion of FIG.2 illustrating the example installation system 209 of FIG. 2. Although the example installation system 209 is shown in the example imaging device 100 of FIGS. 1 and 2, it can be used in other imaging devices having other form factors, features and/or functions. In the example of FIG. 3, the carriage 205 is positioned relative to the chassis

202 in the cartridge loading position for installation and/or removal of one or more cartridges. In other words, the carriage 205 is located in the third position 224 described also in connection with FIG. 2. As explained in connection with FIG. 2, the carriage 205 moves between first and second positions 220, 222 relative to the chassis 202 during imaging operations of the imaging device 100. In the cartridge installation position of FIG.3 (e.g., the third loading position 224 different from the first and second positions 220, 222), a downwardly angled tip 300 of a first guide of the chassis 202 and an upwardly angled tip 301 of a second guide of the carriage 205 are separated by a gap 302. As used herein, all positional references are relative to the Earth and relative to an example device positioned on a flat surface. The chassis 202 of the illustrated example has one or more first guides (e.g., guide rails, rails, guiding surfaces, guiding edges, etc.) 308, which in this example are integrated onto the chassis 202 (e.g., molded). The first guides 308 have a geometric construction to guide a cartridge in a first direction towards the carriage 205 during installation of the cartridge. In particular, a first top surface of the first guides 308 includes a first downwardly sloped surface 304 having a first slope. A second downwardly sloped surface 305 of the first guides 308 has a second slope greater than the first slope. The first guides 308 also include the downwardly angled tip 300 located at the distal end of the second downwardly sloped surface 305. In the illustrated example, the second slope of the second downwardly sloped surface 305 has a steeper angle relative to horizontal than the first slope of the first downwardly sloped surface 304. Further, "downwardly" in this example means dropping in vertical height from left to right in FIGS. 8A-8C (e.g., toward the installed position). The chassis 202 of the illustrated example has a contact surface 310 positioned for the cartridge to initially contact as the cartridge is being placed into the installation system 209.

[0013] In the example of FIG. 3, the carriage 205 has one or more second guides 312 to receive the cartridge from the first guides 308 of the chassis 202 to guide the cartridge into one of the chutes 206, 208 defined in the carriage 205 for imaging operations. Each top surface of the second guides 312 of the carriage 205 includes a first upwardly sloped surface 315 having a third slope, a second upwardly sloped surface 316 having a fourth slope greater than the third slope, and the upwardly angled tip 301 at the distal end of the first upwardly sloped surface 315. In the illustrated example, the third slope of the first upwardly sloped surface 315 has a steeper angle relative to horizontal than the fourth slope of the second upwardly sloped surface 316. "Upwardly" means increasing in vertical height moving from left to right in FIGS. 8A-8C (e.g., toward the installed position). The geometric construction and spatial arrangement of the first guides 308 of the chassis 202 and the second guides 312 of the carriage 205 directs the cartridge to move across the gap 302 without catching and without requiring special manipulation to a user. Instead, a user need only apply a force with a generally horizontal component to the cartridge and the guides 308, 312 will not control the movement of the cartridge as it progresses toward the installed position. In the illustrated example, the contact surface 310 of the chassis 202 is integral to the chassis 202 and the second guides 312 are integral to the carriage 205. In the illustrated example, the upwardly angled tip 301 of the carriage 205 and/or the downwardly angled tip 300 of the chassis 202 have a rounded edge to further increase the smoothness of the transition of a cartridge into its installed position. The rounded edge of the upwardly angled tip 301 is shown in greater detail in connection with FIG. 6.

[0014] In the illustrated example, an opening 317 of the chassis 202 provides an insertion/removal location for a cartridge to be installed or removed from into the example imaging device 100. This opening 317 is located in a user-accessible location and orientation. In the illustrated example, the carriage 205 has contours 318 to facilitate removal of the cartridge from the carriage 205 by increasing user access to the installed cartridge.

[0015] FIG. 4 illustrates the example installation system 209 of FIG. 3 showing an example cartridge 402 moving into an installed position. In the example of FIG. 4, the cartridge 402 is shown in an intermediate position as it transitions from the chassis 202 (e.g., passing over the gap 302) to the movable carriage 205. An edge 403 of the cartridge 402 first contacts and is guided downward by the first downwardly sloped surface 304 of the first guides 308, and then moves to the second downwardly sloped surface 305 to be guided further downward towards the base 102 of the imaging device 100 and the downwardly angled tip 300 before traversing the gap 302 and passing onto the top of the first upwardly sloped surface 315 of the second guides 312 of the carriage 205. As the cartridge 402 moves onto the second guides 312 of the carriage 205 and into the installation position, the edge 403 passes or contacts the upwardly angled tip 301 of the second guides 312 and then moves in an upward direction along the first upwardly sloped surface 315 and then on to the second upwardly sloped surface 316. To move the cartridge 402 away from the chassis 202, a user contacts and applies a force to one or more of a top surface 404, a front tab 406, a rear tab 408, and/or a back surface 410 of the cartridge 402. The first guide 308 and the second guide 312 cooperate to translate the force applied to the cartridge 402 by a user to a pivot and/or rocking motion that allows the cartridge 402 to transition from the chassis 202 to the carriage 205 and into the installation position with little user manipulation. In other words, the cartridge 402 is guided across the gap 302 into an installation position by the geometric arrangement of the first and second guides 308, 312. This overall geometric arrangement (e.g., surface contours, relative tip positioning, gap distance, etc.) translate the applied, generally horizontal, force from the user in the directed motion, thereby reducing (e.g., eliminating) the need for the

user to manipulate the cartridge 402. Instead, the user need only apply a forward, generally horizontal, force to the cartridge and the geometric construction of the guides 308, 312 will cause the cartridge to move downward, then upward into the installation position without catching on the gap 302. In the illustrated example, the gap 302 is shortened by moving the carriage 205 into the third loading position 224. Typically, the gap 302 is made larger (e.g., too large for a cartridge to traverse where the carriage 205 is in the first position 220 or the second position 222).

[0016] In the illustrated example, the chassis 202 has a ramp 412, which is integral to the chassis 202, to provide additional guidance to the cartridge 402 during installation. In the illustrated example, the cartridge 402 has a cutout or indentation 414 that provides clearance to allow the back of the cartridge 402 to rotate downward and/or displace in a direction towards a bottom surface of the imaging device 100 as the cartridge 402 moves across the gap 302 between the first and second guides 308, 312, thereby lifting the forward edge of the cartridge 402 and reducing the possibility of catching in the gap 302.

[0017] FIGS. 5A and 5B are top views of the example installation system 209 of FIGS. 3 and 4. Turning to FIG. 5A, an extended length cartridge 502 is shown moving between the chassis
202 and the carriage 205. As used herein, an extended length cartridge is a cartridge having a front to back dimension that is longer than a standard cartridge. The extended length cartridge 502 in the illustrated example is placed (e.g., dropped) into the opening 317 between the walls 506 by the user such that the cartridge 502 engages the first guides 308 of the chassis 202. In the illustrated example, the walls 506 define a highly visible and user-accessible opening so that the user can initiate installation by simply dropping the cartridge onto the first guides 308. In the illustrated example, the walls 506 initially position and/or align the cartridge 502 into the installation system 209 as the cartridge 502 falls onto the first guides 308. The installation system 209 of the illustrated example allows cartridges of different sizes (e.g., lengths) to be installed into the imaging device 100 by appropriately defining (e.g., dimensioning) an installation opening of the chassis 202 defined by lengths of the walls 506. In the illustrated example, the downwardly angled tip 300 of the first guides 308 has a rounded edge to further increase the smoothness of the transition of the cartridge onto the carriage 205. The user may contact the cartridge
S02 at any one or more of numerous locations of the cartridge 502 to push the cartridge 502 into the installed position.

[0018] Turning to FIG. 5B, the extended length cartridge 502 and a regular length cartridge 504 are shown in their respective installed positions within the carriage 205. In the illustrated example, the walls 506 of the chassis 202, and the walls S08 of the carriage 205 constrain the cartridges 502, 504 from moving side-to-side during installation or removal of the cartridges 502, 504.

[0019] FIG. 6 depicts an example implementation of the carriage 205 of the example installation system 209 of FIGS. 3, 4, 5A and 5B showing an extended length cartridge 608 and a standard length cartridge 610 in installed positions. In the illustrated example, the carriage 205 includes a carriage base 602, and the cartridge chutes 206, 208 shown in connection with FIG. 2. In the illustrated example, the standard length cartridge 610 is installed in the cartridge chute 206 and the extended length cartridge 608 is installed in the cartridge chute 208. In some examples, the cartridge chutes 206, 208 have guiding features and springs to further guide the cartridges 608, 610 into their respective installed positions. The carriage 205 of the illustrated example of FIG. 6 has a strain-relief 611 component to provide additional reinforcement to the cartridge chute 206 as the cartridge 610 engages the second guides 312. In some examples, additional walls 612, 614, 616, 618 further constrain the cartridges in a side-to-side direction as the cartridges 608, 610 move into and/or out of their respective installation positions. The carriage 205 may also include circuitry 620 and/or motor(s) for operation of the carriage 205 during imaging operations or installation operations (e.g., to move the carriage 205 to the cartridge installation position 224 described in connection with FIG. 2).

[0020] FIG. 7 is a detailed view of a portion of the chassis 202 of the example installation system 209 of FIGS. 2, 3, 4, 5A and 5B. In this example, the walls 506 define the first guides 308. While the first guides 308 are shown as integrally formed (e.g., molded) with the walls 506, in other examples, the first guides 308 are separate components and/or formed by additional processing (e.g., machining, etc.). As described in connection with FIG. 5A, the walls 506 of the illustrated example define a visible and intuitive installation area in which a user may simply drop a cartridge onto the first guides 308. The chassis 202 of the illustrated example defines an opening 702 to allow the rear of the cartridge to displace downward towards the bottom of the imaging device 100 as the cartridge transitions from the chassis 202 to the carriage 205. The opening 702 may be formed when the chassis 202 is molded. In the illustrated example, the walls 506 are separated by a cavity 701 to allow greater manufacturing flexibility and/or allow the walls 506 to elastically displace during installation of the cartridge. In some other examples, one or more of the above-mentioned features including the first and/or second guides 308, 312, the ramp 412 and/or the opening 702 are formed as part of the base 102 described in connection with FIGS. 1 and 2. In other examples, the first and/or second guides 308, 312 and/or the ramp 412 are constructed of separate parts that are fastened and/or assembled onto the chassis 202 and/or the base 102.

[0021] FIG. 8A is a cross-sectional side view of the example installation system 209 of FIGS. 3, 4, 5A and 5B. In the illustrated example, an installation path of a

cartridge is defined by the first downwardly sloped surface 304, the second downwardly sloped surface 30S, the gap 302, the first upwardly sloped surface 315 and the second upwardly sloped surface 316. In the illustrated example of FIG. 8A, the downwardly angled tip 300 of the first guides 308 of the chassis 202 and the upwardly angled tip 301 of the carriage 205 in the illustrated example of FIG. 8A are positioned in both a horizontal offset and a vertical offset relative to one another to define the gap 302. As described above, the geometric construction of the first and second guides 308, 312 facilitates the movement of the cartridge from the first guides 308 to the second guides 312 (e.g., bridging the downwardly angled tip 300 and the upwardly angled tip 301) by allowing a kinematic transition (e.g., rotation and/or movement) of the cartridge as the cartridge is transferred into an installation position of the cartridge. In the illustrated example, additional guides 801, which are integral with the carriage 205, are included in the installation system 209 to further guide the cartridge to transition across the gap and/or into the installation position of the cartridge as the cartridge moves along one or more of the first upwardly sloped surface 31 S or the second upwardly sloped surface 316.

[0022] FIGS. 8B and 8C are additional cross-sectional side views of the example installation system 209 of FIGS. 3, 4, 5A, 5B and 8A shown during installation of a cartridge 810. Turning to FIG. 8B, the cartridge 810 is shown transitioning from the chassis 202 to the carriage 205. In the illustrated example, a portion 811 of the cartridge 810 is shown raised relative to the surfaces 315, 316 of the second guides 312 and the upwardly angled tip 301 to prevent the pen 810 from catching during the transition (e.g., catching or getting trapped from entering the carriage 205). The cartridge 810 of the illustrated example is raised relative to the surfaces 315, 316 of the second guides 312 due to a rear portion of the cartridge 810 defined by an indentation 809 rotating downward relative to the ramp 412. In other words, in the illustrated example, the first and second guides 308, 312 and/or the ramp 412 prevent catching of the cartridge 810 by raising the first (e.g., front) end of the cartridge 810 relative to the upwardly angled tip 301 of the second guides 312.

[0023] The cartridge 810 of the illustrated example has one or more tab(s) (e.g., protrusion(s)) 812 to contact one or more of the first downwardly sloped surface 304, the second downwardly sloped surface 305, the first upwardly sloped surface 315 and/or the second upwardly sloped surface 316. In the illustrated example, the tab 812 first contacts the first downwardly sloped surface 304 when the cartridge 810 is placed onto the first guides 308. In the illustrated example, the tab 812 then contacts the second downwardly sloped surface 305 at a steeper angle relative to horizontal before entering the gap 302. After the tab 812 of the illustrated example traverses the gap 302, the tab 812 then contacts the first upwardly sloped surface 315 of the carriage 205. In the illustrated example, the tab 812 contacts the second upwardly sloped surface 316 prior to the cartridge 810 moving into the installation position. In the illustrated example, the tab 814 contacts the first upwardly sloped surface 304 or the second upwardly sloped surface 305 when the cartridge 810 is first placed on the first guides 308 depending on the length of the cartridge 810. In other examples, the tab 814 does not initially contact one of the first downwardly sloped surface 304 or the second downwardly sloped surface 305 and, instead, initially contacts the first upwardly sloped surface 315. In the illustrated example, as the cartridge 810 moves across the gap, the tab 814 first contacts the first upwardly sloped surface 315 prior to contacting the second upwardly sloped surface 316, which transitions the cartridge 810 into a less steep angle relative to horizontal prior to the cartridge 810 entering the installed position. In other examples, the cartridge 810 does not have the tabs 812, 814 and instead relies on an edge 816 of an upper perimeter of the top of the cartridge 810 to contact one or more of the first downwardly sloped surface 304, the second downwardly sloped surface 305, the first upwardly sloped surface 315, and/or the second upwardly sloped surface 316. In the illustrated example, the cartridge 810 has upper tabs 818 to contact and/or be constrained by the additional guides 801 described in connection with FIG. 8A. The additional guides 801 of the illustrated example provide further guidance to the cartridge 810 by contacting the upper tabs 818 and/ or a top perimeter or other top surf ace of the cartridge 810 to constrain the cartridge 810 from displacing upward as the cartridge moves into the installation position. The upper tabs 818 of the illustrated example also function as grip points for the user during installation or removal of the cartridge 810.

[0024] Turning to FIG. 8C, the cartridge 810 of the illustrated example is shown in a second position along the installation path during the installation process (i.e., closer to the installation position than the position of the cartridge 810 shown in FIG. 8B). A cartridge bottom edge 820 contacts and slides along the ramp 412 as the cartridge 810 transitions from the first guides 308 to the second guides 312, thereby allowing a bottom portion 822 of the cartridge 810 to move into the opening 702 described in connection with FIG. 7. The bottom portion 822 of the illustrated example cartridge 810 contains a fragile silicon plate. Contact with the fragile silicon plate is avoided due to the clearance provided by the opening 702. In the illustrated example, the downward slope of the ramp 412, the opening 702 and/or the indentation 809 of the cartridge 810 allow the tab 814 to move downward in relation to the position shown in FIG. 8B and towards the second guides 312 where the cartridge 810 rotates as the cartridge 810 is moved from the first and second guides 308, 312 to initially contact the first upwardly sloped surface 315 or the second upwardly sloped surface 316 of the second guides 312 as the cartridge moves from the chassis 202 and towards the carriage 205. In particular, the clock-wise rotation (e.g., clockwise to the orientation viewed in FIG. 8C) of the cartridge 810 caused

by the bottom portion 822 of the cartridge 810 moving into the opening 702 moves the tab 814 closer to the second guides 312.

[0025] The installation system 209 of the illustrated example translates vector components of the user applied forces to reduce manipulation required by the user of the cartridge 810 during installation, thereby increasing ease of installation of the cartridge 810 into the imaging device. Additionally, for removal of the cartridge 810, the user is only required to guide the cartridge 810 in an opposite direction from the installation path, thereby returning the cartridge 810 towards the chassis 202 and into a user-accessible position.

[0026] From the foregoing, it will be appreciated that methods, apparatus and/or articles of manufacture have been disclosed to facilitate easier installation of cartridges into imaging devices while reducing manufacturing complexity and/or part cost. Improved ease of installation may result in reduced returns and/or service calls related to the imaging device and/or the cartridges. Additionally, example methods, apparatus and/or articles of manufacture disclosed herein allow greater design flexibility and/or aesthetics for the imaging devices (e.g., no large opening is required in the front of the imaging device). Examples disclosed herein also exhibit increased ease of installation also apply to removal of the cartridges from the imaging device as the user simply moves the cartridge in a direction opposite from the installation motion to easily move a cartridge out of the imaging device with relatively no manipulation of the cartridge.

Claims

1. An apparatus (100) comprising:

a first guide (308) on a first component (202) of an imaging device to guide a cartridge in a first direction toward a second component (205) of the imaging device during installation of the cartridge in the imaging device; and
a second guide (312) on the second component to receive the cartridge from the first guide during the installation of the cartridge, the first guide and the second guide defining a gap (302) therebetween, wherein the geometry of at least one of the first and second guides is to cause the cartridge to pass the gap without catching, the second guide to guide the cartridge into an installed position in the second component
the apparatus **characterized by** further comprising a ramp (412), wherein a bottom edge of the cartridge contacts and slides along the ramp as the cartridge transitions from the first guide to the second guide.

2. The apparatus as defined in claim 1, wherein the first component comprises a chassis.

3. The apparatus as defined in claim 1, wherein the second component comprises a carriage defining a cartridge chute.

4. The apparatus as defined in claim 3, wherein the carriage has first and second positions for operation of the imaging device, and a third position for installation of cartridges into the imaging device.

5. The apparatus as defined in claim 1, wherein the gap separates the first guide and the second guide in both horizontal and vertical directions.

6. The apparatus as defined in claim 1, wherein the first guide comprises a first downwardly sloped surface and a second downwardly sloped surface, the first downwardly sloped surface having a smaller slope from the second downwardly sloped surface.

7. The apparatus as defined in claim 1, wherein the second guide comprises a first upwardly sloped surface and a second upwardly sloped surface, the first upwardly sloped surface having a larger slope from the second upwardly sloped surface.

8. The apparatus as defined in claim 1, wherein one or more of the first guide and the second guide cause the cartridge to rotate backward then forward as it moves into the installed position.

9. The apparatus as defined in claim 1, further comprising a third guide to prevent an upward motion of the cartridge.

10. An apparatus according to claim 1, wherein the apparatus is an imaging device
wherein the second component comprises a carriage, the carriage to move relative to a chassis of the imaging device during an imaging operation; and
wherein the second guide is to receive the cartridge from the first guide and to guide the cartridge into an installed position in the carriage during the installation of the cartridge, and wherein at least one of the first guide and the second guide is to cause the cartridge to rotate backwards then forward to bridge the gap.

11. The imaging device as defined in claim 10, wherein the gap is defined by both horizontal and vertical offsets between tops of the first and second guides.

12. The imaging device as defined in claim 10, wherein the carriage has first and second positions for operation of the imaging device, and a third position for installation or removal of the cartridge into the imaging device.

13. The imaging device as defined in claim 10, further

comprising a third guide to restrain an upward motion of the cartridge.

Patentansprüche

1. Vorrichtung (100), Folgendes umfassend:

   eine erste Führung (308) auf einer ersten Komponente (202) einer Bilderzeugungsvorrichtung, um eine Kartusche in einer ersten Richtung zu einer zweiten Komponente (205) der Bilderzeugungsvorrichtung hin zu führen, während die Kartusche in der Bilderzeugungsvorrichtung installiert wird; und
   eine zweite Führung (312) auf der zweiten Komponente, um die Kartusche von der ersten Führung während der Installation der Kartusche aufzunehmen, wobei die erste Führung und die zweite Führung eine Lücke (302) dazwischen definieren, wobei die Geometrie der ersten und/oder der zweiten Führung dazu dient, zu bewirken, dass die Kartusche die Lücke ohne Hängenbleiben passiert, wobei die zweite Führung die Kartusche in eine installierte Position in der zweiten Komponente führen soll,
   wobei die Vorrichtung **dadurch gekennzeichnet ist, dass** sie ferner eine Rampe (412) umfasst, wobei eine untere Kante der Kartusche die Rampe berührt und entlang dieser gleitet, während die Kartusche von der ersten Führung auf die zweite Führung übergeht.

2. Vorrichtung nach Anspruch 1, wobei die erste Komponente ein Chassis umfasst.

3. Vorrichtung nach Anspruch 1, wobei die zweite Komponente einen Wagen umfasst, der eine Kartuschenrutsche definiert.

4. Vorrichtung nach Anspruch 3, wobei der Wagen eine erste und eine zweite Position für den Betrieb der Bilderzeugungsvorrichtung und eine dritte Position für die Installation der Kartuschen in die Bilderzeugungsvorrichtung aufweist.

5. Vorrichtung nach Anspruch 1, wobei die Lücke die erste Führung und die zweite Führung sowohl in horizontaler als auch in vertikaler Richtung trennt.

6. Vorrichtung nach Anspruch 1, wobei die erste Führung eine erste nach unten geneigte Oberfläche und eine zweite nach unten geneigte Oberfläche umfasst, wobei die erste nach unten geneigte Oberfläche eine kleinere Neigung bezüglich der zweiten nach unten geneigten Oberfläche aufweist.

7. Vorrichtung nach Anspruch 1, wobei die zweite Führung eine erste nach oben geneigte Oberfläche und eine zweite nach oben geneigte Oberfläche umfasst, wobei die erste nach oben geneigte Oberfläche eine größere Neigung bezüglich der zweiten nach oben geneigten Oberfläche aufweist.

8. Vorrichtung nach Anspruch 1, wobei die erste Führung und/oder die zweite Führung bewirkt, dass sich die Kartusche rückwärts, dann vorwärts dreht, während sie sich in die installierte Position bewegt.

9. Vorrichtung nach Anspruch 1, ferner umfassend eine dritte Führung, um eine Aufwärtsbewegung der Kartusche zu verhindern.

10. Vorrichtung nach Anspruch 1, wobei die Vorrichtung eine Bilderzeugungsvorrichtung ist, wobei die zweite Komponente einen Wagen umfasst, wobei sich der Wagen während eines Bilderzeugungsvorgangs relativ zu einem Chassis der Bilderzeugungsvorrichtung bewegt; und wobei die zweite Führung dazu dient, während der Installation der Kartusche die Kartusche von der ersten Führung aufzunehmen und die Kartusche in eine installierte Position in dem Wagen zu führen, und wobei die erste Führung und/oder die zweite Führung dazu dient, zu bewirken, dass die Kartusche sich rückwärts, dann vorwärts dreht, um die Lücke zu überbrücken.

11. Bilderzeugungsvorrichtung nach Anspruch 10, wobei die Lücke sowohl durch einen horizontalen als auch einen vertikalen Versatz zwischen oberen Enden der ersten und der zweiten Führung definiert ist.

12. Bilderzeugungsvorrichtung nach Anspruch 10, wobei der Wagen eine erste und eine zweite Position für den Betrieb der Bilderzeugungsvorrichtung und eine dritte Position für die Installation oder das Entfernen der Kartusche in der Bilderzeugungsvorrichtung aufweist.

13. Bilderzeugungsvorrichtung nach Anspruch 10, die ferner eine dritte Führung umfasst, um eine Aufwärtsbewegung der Kartusche zu begrenzen.

Revendications

1. Appareil (100), comprenant :

   un premier guide (308) sur un premier composant (202) d'un dispositif d'imagerie destiné à guider une cartouche dans une première direction vers un second composant (205) du dispositif d'imagerie pendant l'installation de la cartouche dans le dispositif d'imagerie ; et
   un deuxième guide (312) sur le second composant destiné à recevoir la cartouche provenant

du premier guide pendant l'installation de la cartouche, le premier guide et le deuxième guide définissant un espace (302) entre eux, la géométrie d'au moins l'un des premier et deuxième guides permettant d'amener la cartouche à traverser l'espace sans se coincer, le deuxième guide permettant de guider la cartouche dans une position installée dans le second composant l'appareil étant **caractérisé en ce qu'**il comprend en outre une rampe (412), un bord inférieur de la cartouche entrant en contact et coulissant le long de la rampe lorsque la cartouche passe du premier guide au deuxième guide.

2. Appareil selon la revendication 1, dans lequel le premier composant comprend un châssis.

3. Appareil selon la revendication 1, dans lequel le second composant comprend un chariot définissant une glissière pour cartouche.

4. Appareil selon la revendication 3, dans lequel le chariot a des première et deuxième positions pour le fonctionnement du dispositif d'imagerie et une troisième position pour l'installation de cartouches dans le dispositif d'imagerie.

5. Appareil selon la revendication 1, dans lequel l'espace sépare le premier guide et le deuxième guide dans des directions à la fois horizontale et verticale.

6. Appareil selon la revendication 1, dans lequel le premier guide comprend une première surface inclinée vers le bas et une seconde surface inclinée vers le bas, la première surface inclinée vers le bas ayant une pente plus faible à partir de la seconde surface inclinée vers le bas.

7. Appareil selon la revendication 1, dans lequel le deuxième guide comprend une première surface inclinée vers le haut et une seconde surface inclinée vers le haut, la première surface inclinée vers le haut ayant une pente plus importante à partir de la seconde surface inclinée vers le haut.

8. Appareil selon la revendication 1, dans lequel un ou plusieurs du premier guide et du deuxième guide entraîne la rotation de la cartouche vers l'arrière puis vers l'avant lorsqu'elle se déplace dans la position installée.

9. Appareil selon la revendication 1, comprenant en outre un troisième guide pour empêcher un mouvement vers le haut de la cartouche.

10. Appareil selon la revendication 1, dans lequel l'appareil est un dispositif d'imagerie le second composant comprenant un chariot, le chariot devant se déplacer par rapport à un châssis du dispositif d'imagerie pendant une opération de formation d'image ; et

le deuxième guide devant recevoir la cartouche provenant du premier guide et guider la cartouche dans une position installée dans le chariot pendant l'installation de la cartouche, et au moins l'un du premier guide et du deuxième guide devant entraîner la rotation de la cartouche vers l'arrière puis vers l'avant pour combler l'espace.

11. Dispositif d'imagerie selon la revendication 10, dans lequel l'espace est défini à la fois par des décalages horizontaux et verticaux entre les parties supérieures des premier et deuxième guides.

12. Dispositif d'imagerie selon la revendication 10, dans lequel le chariot a des première et deuxième positions pour le fonctionnement du dispositif d'imagerie, et une troisième position pour l'installation ou le retrait de la cartouche dans le dispositif d'imagerie.

13. Dispositif d'imagerie selon la revendication 10, comprenant en outre un troisième guide pour limiter un mouvement vers le haut de la cartouche.

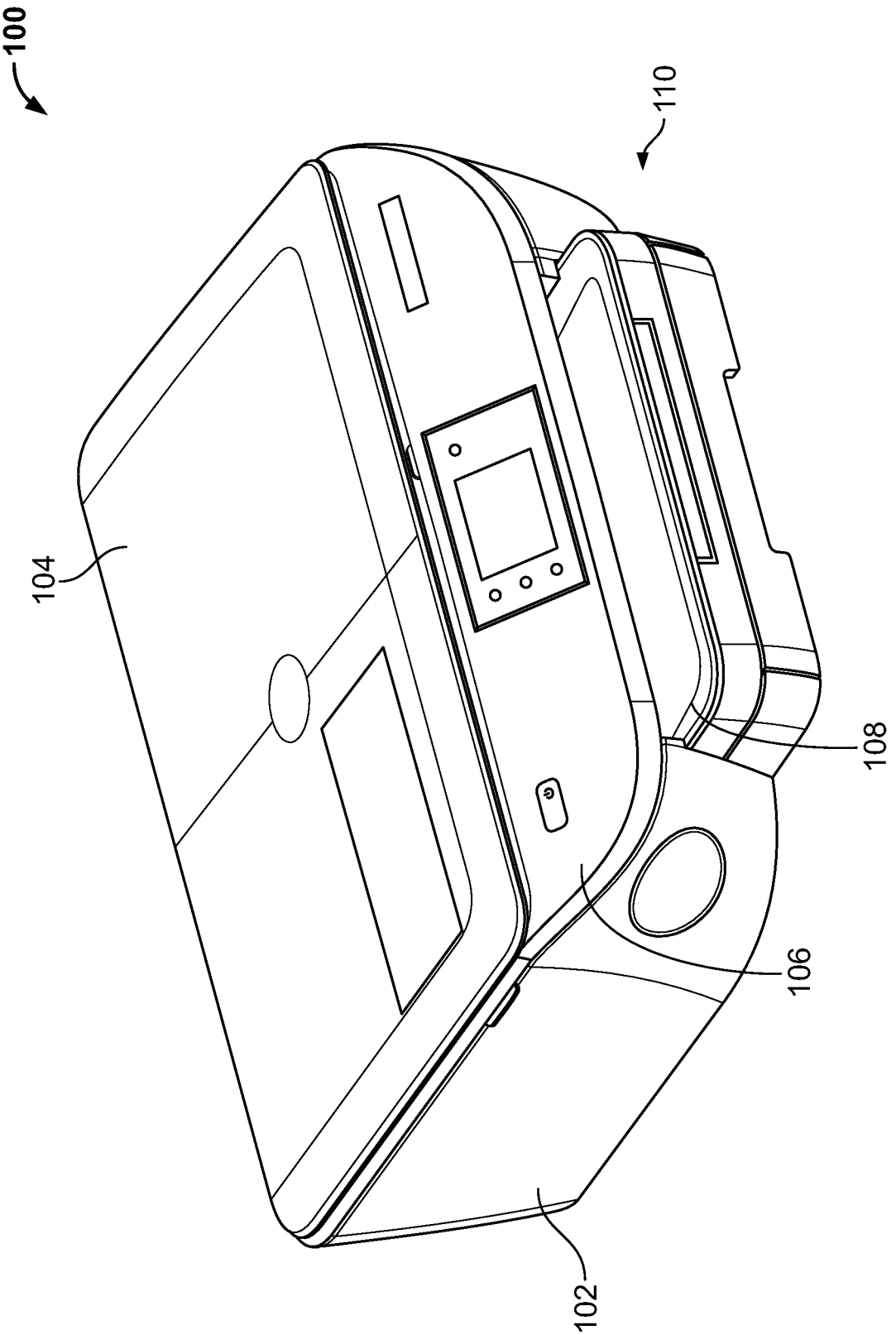

FIG. 1

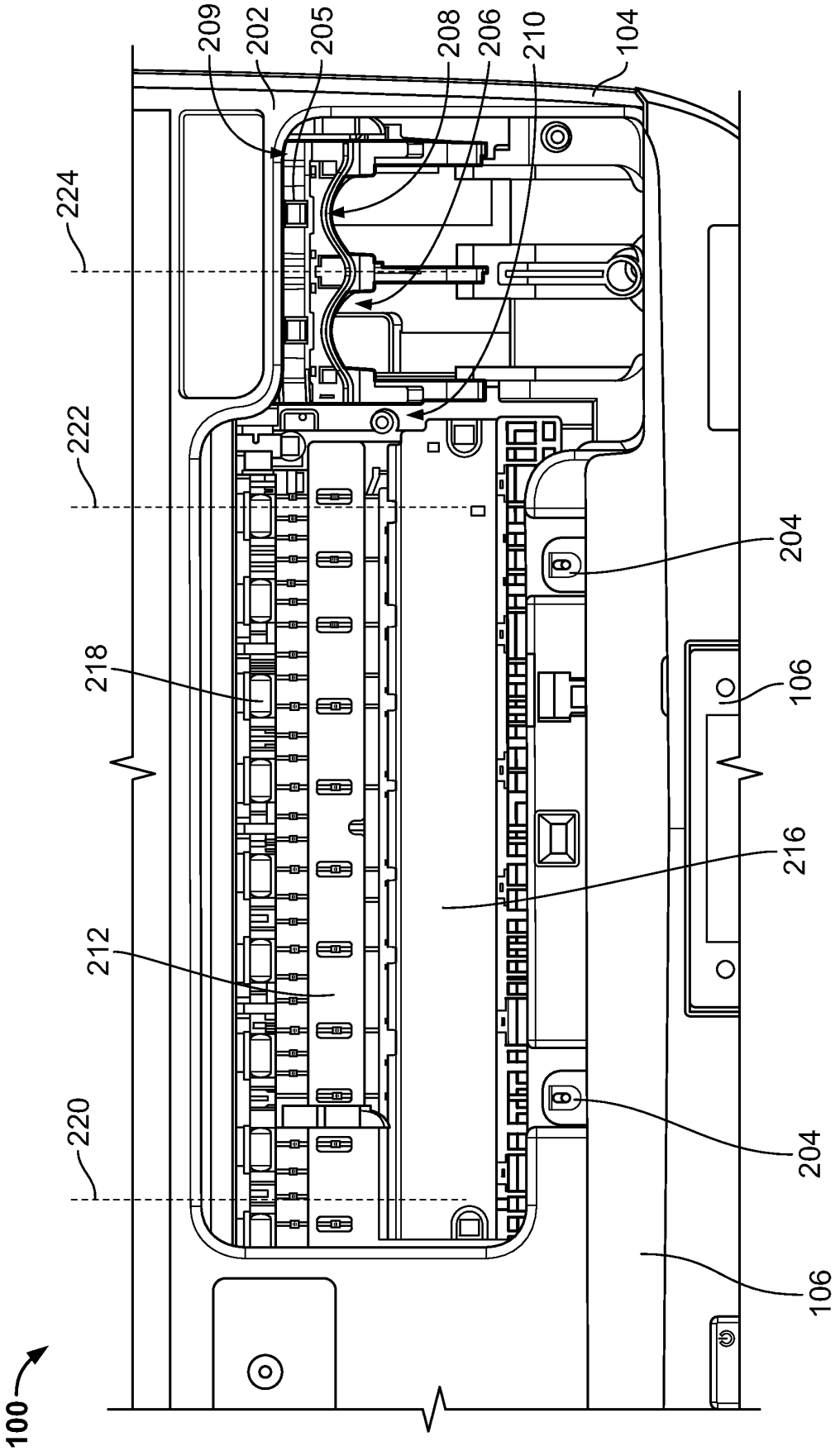
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FIG. 2

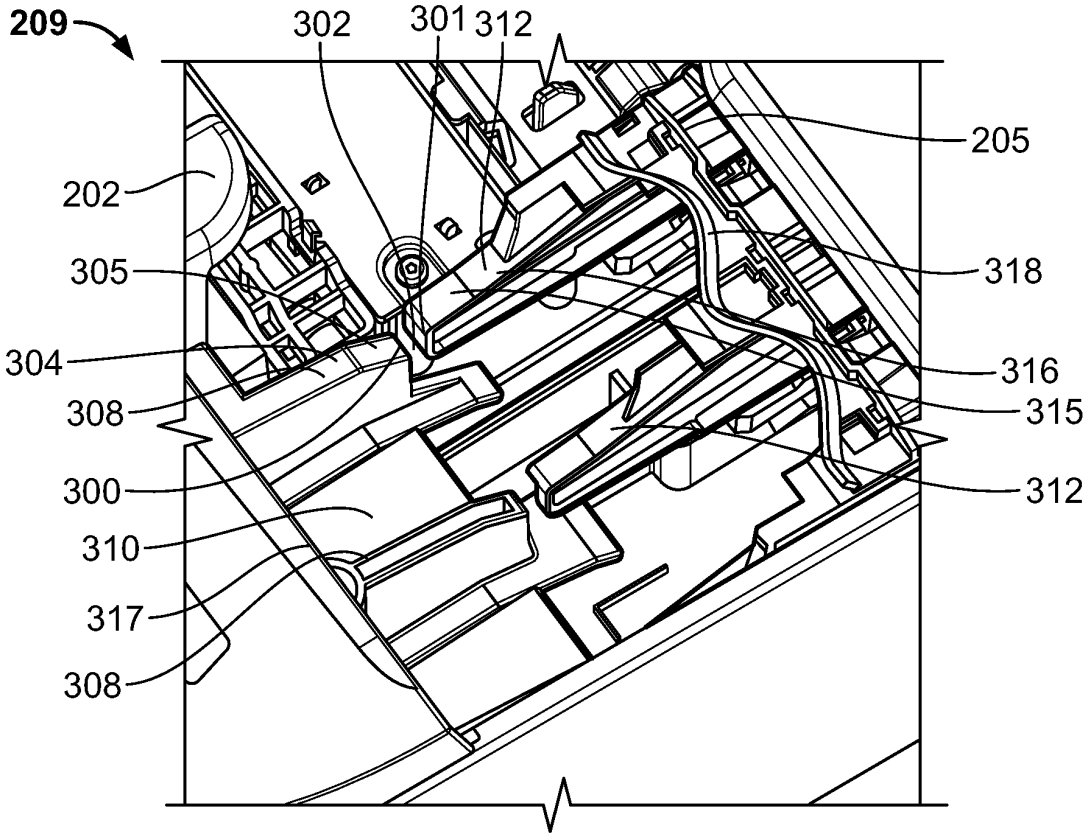
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FIG. 3

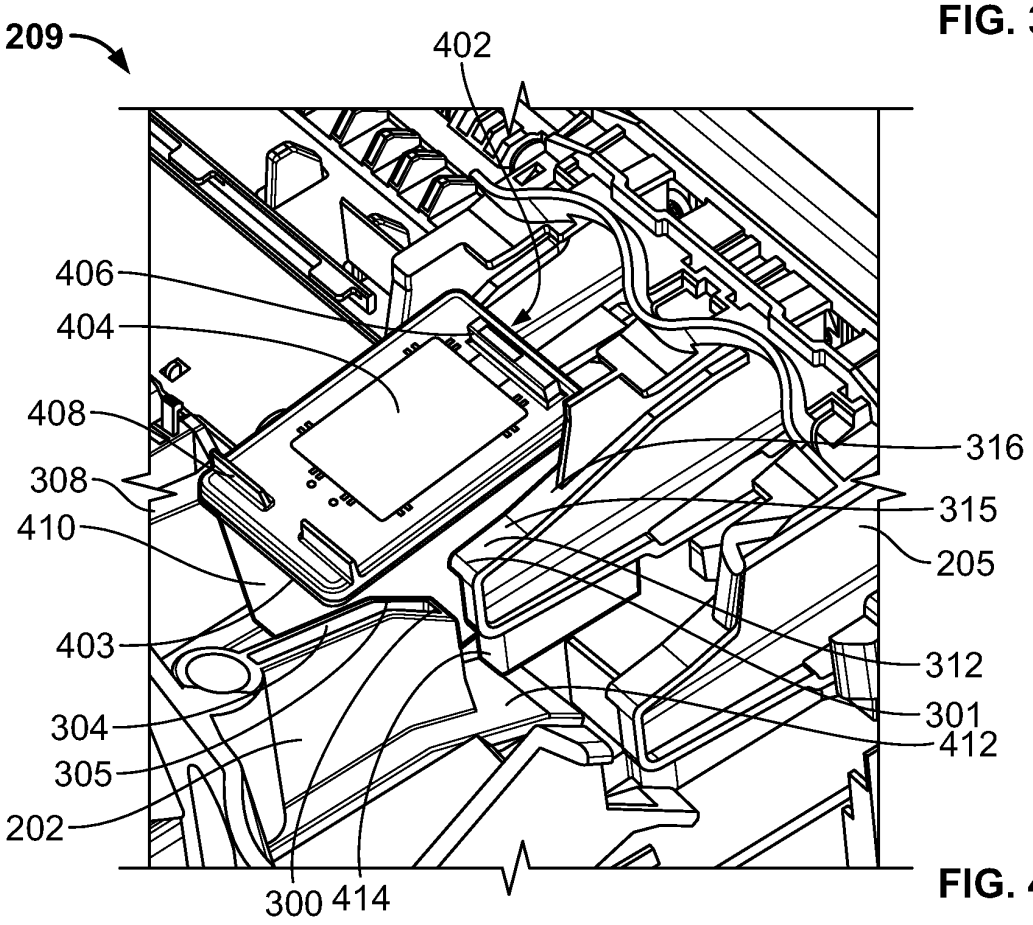
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FIG. 4

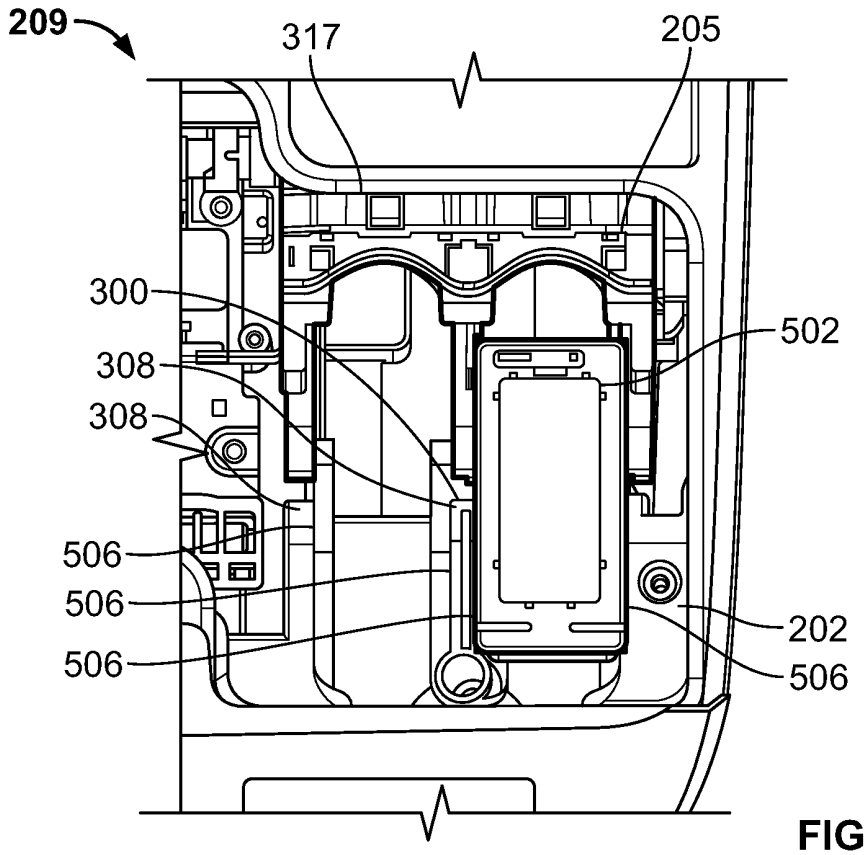
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FIG. 5A

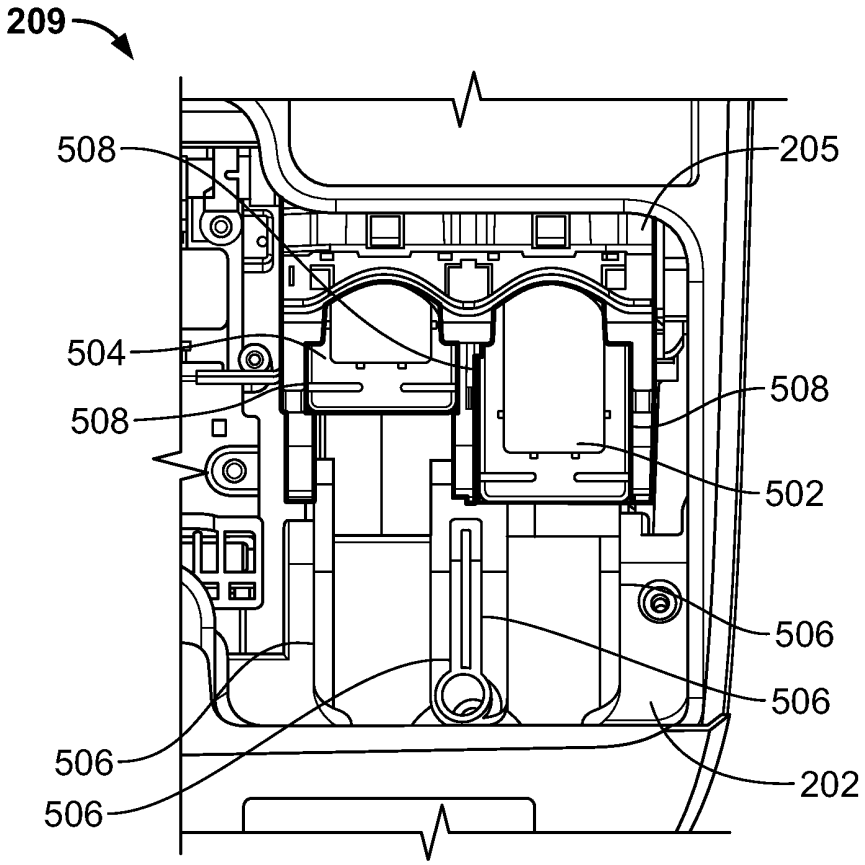
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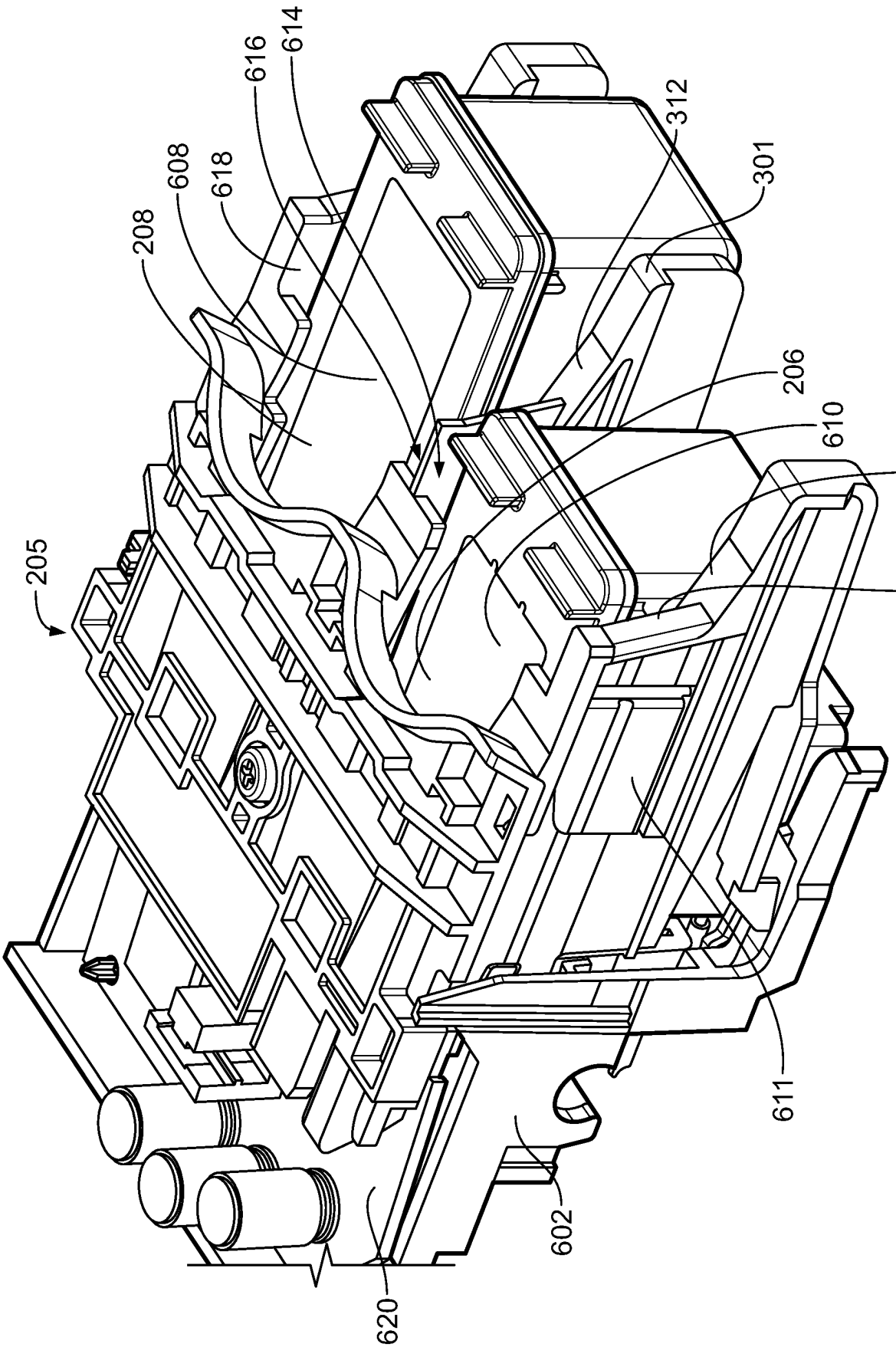
FIG. 5B



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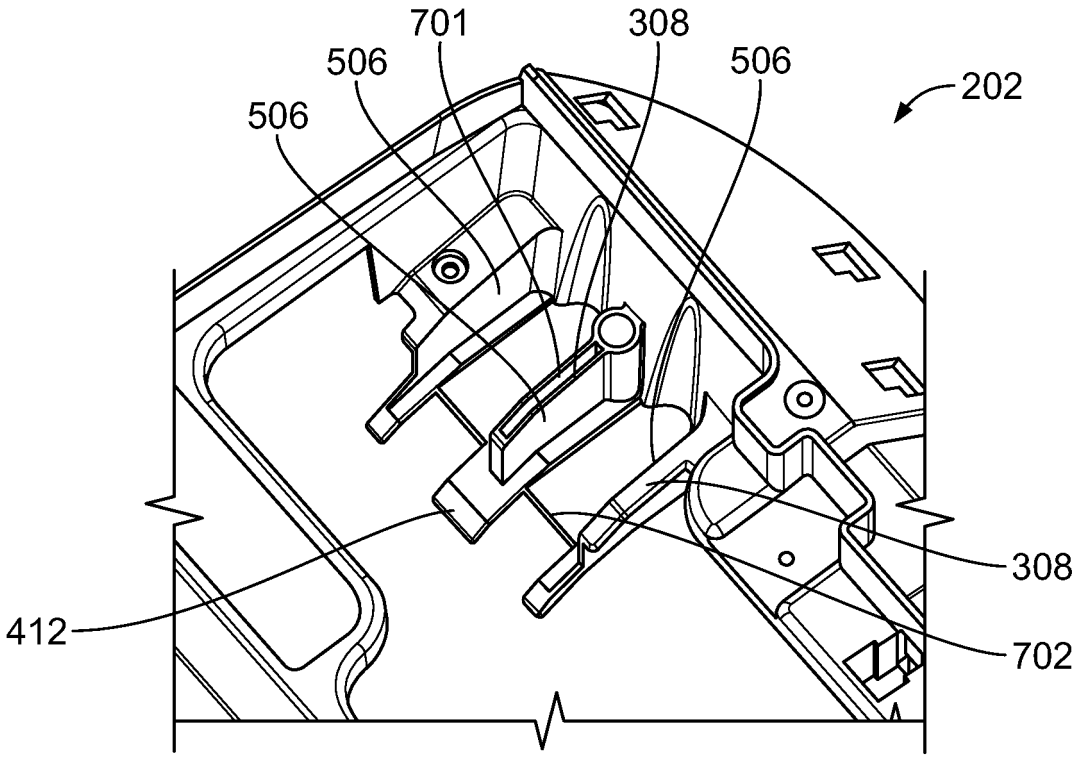
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202
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412
702

FIG. 7

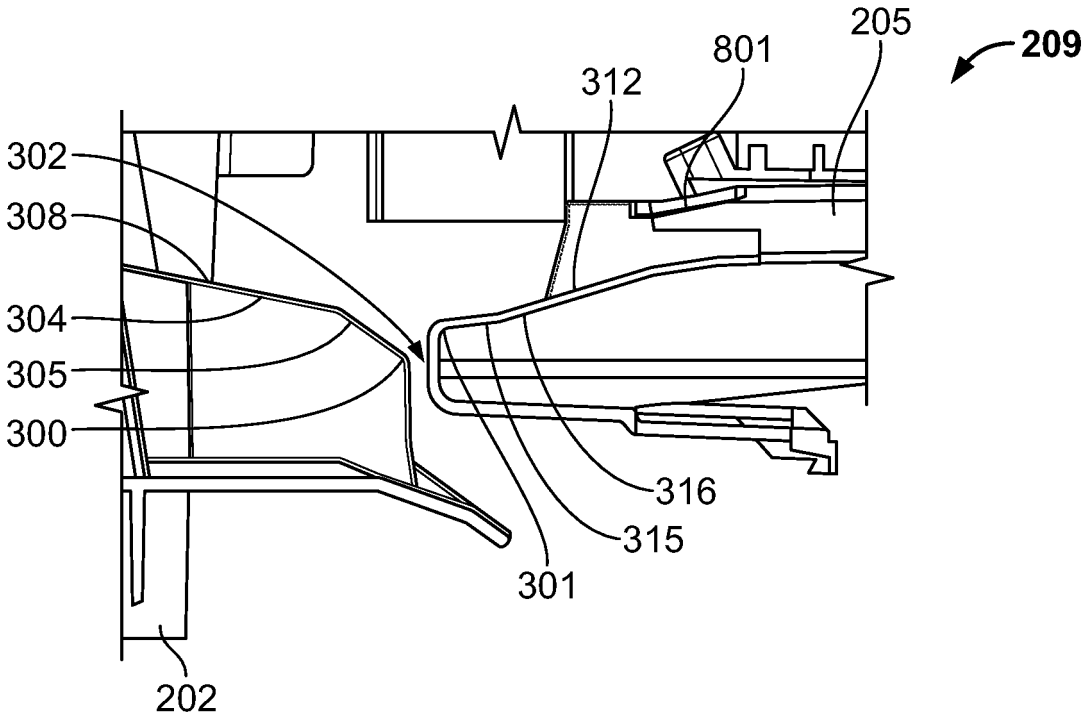
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FIG. 8A

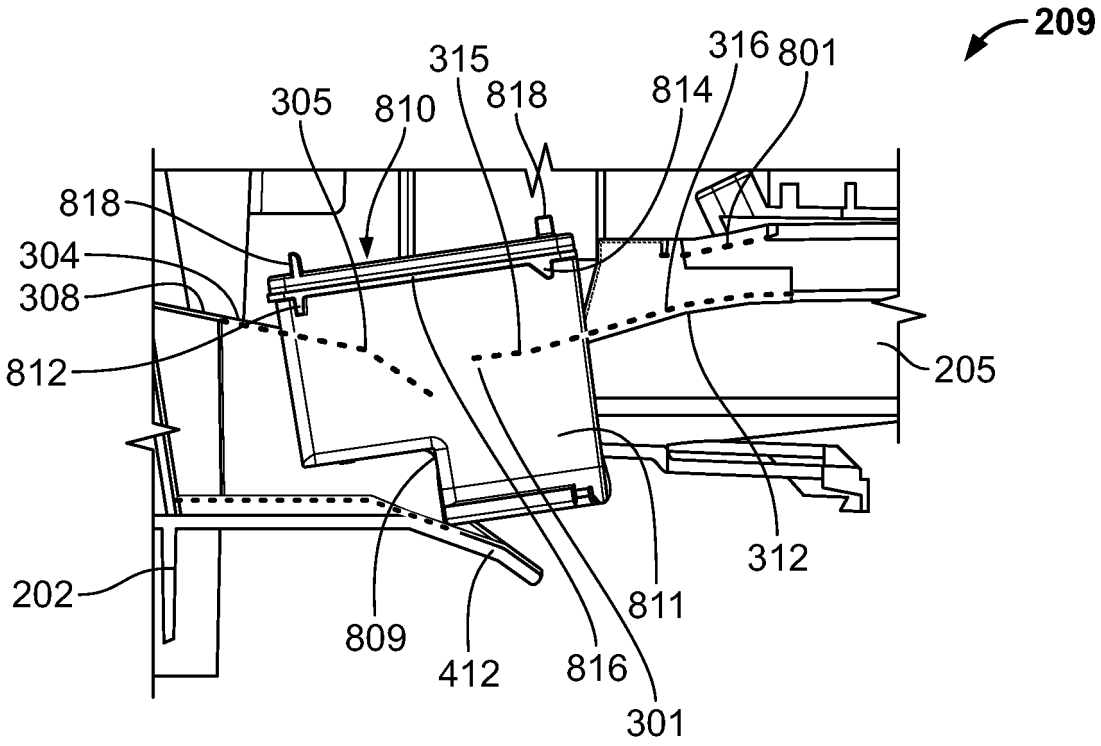
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FIG. 8B

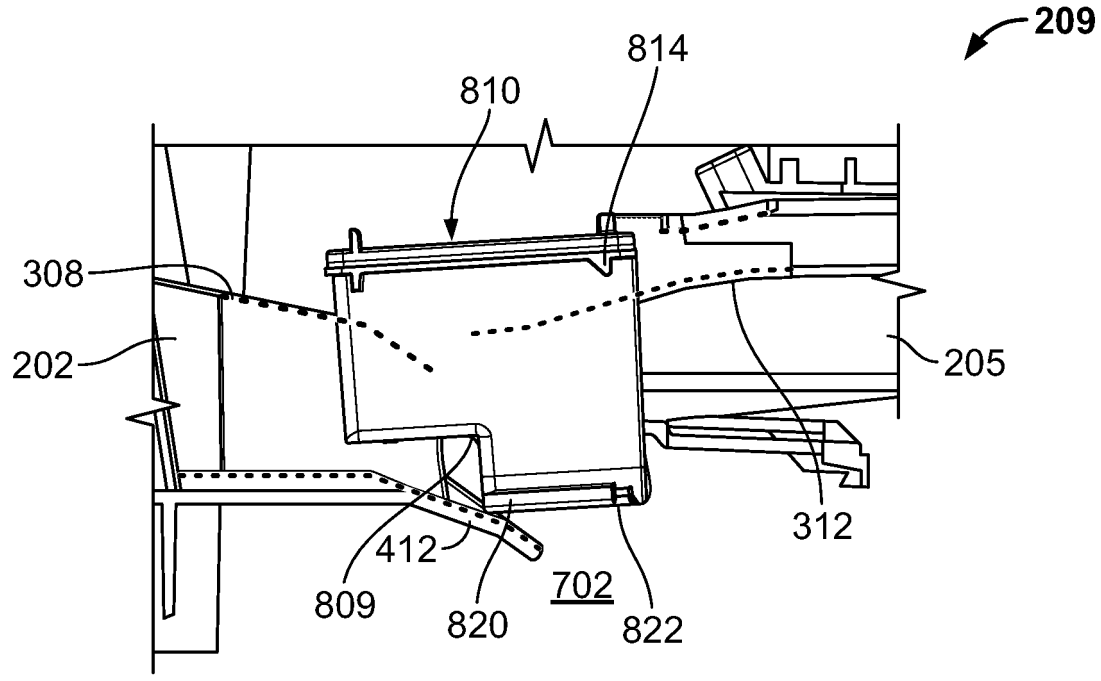
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FIG. 8C

REFERENCES CITED IN THE DESCRIPTION

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