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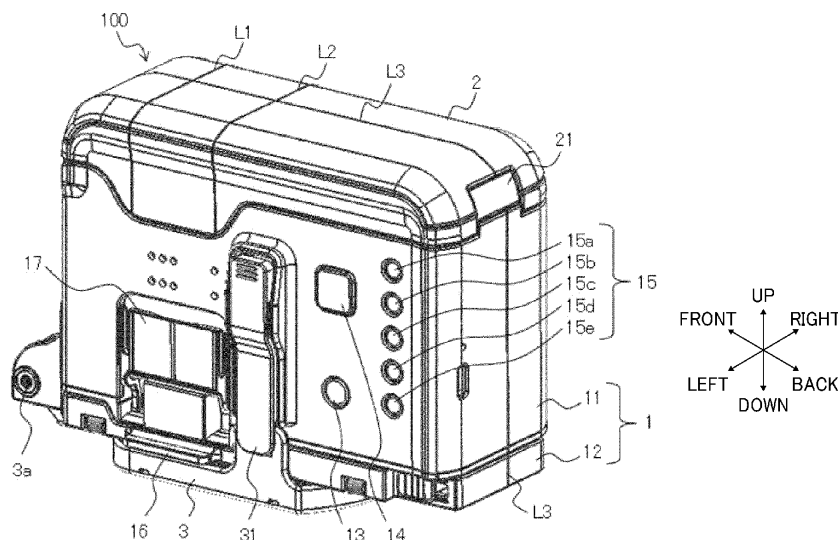
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(54) **PRINTING APPARATUS**

(57) A printing apparatus (100) includes a printing device (6), a body (1), a first member (16), and a second member (17). The printing device (6) performs printing on a recording medium. The body (1) holds the printing device (6). The first member projecting from the body (1) in a scanning direction in which the body (1) moves indicates a printing start position of the printing device (6) on the recording medium. The second member (17) moves between a position at which the second member

(17) projects beyond the first member (16) along the scanning direction and a position at which the second member (17) is housed in the body (1) or the first member (16). The second member (17) indicates a print width of the printing device (6) in a direction perpendicular to the scanning direction or in a direction perpendicular to a printing direction in which the printing apparatus (100) performs printing with the printing device (6).

FIG. 1



Description**BACKGROUND****Technical Field**

[0001] Embodiments of the present invention relate to a printing apparatus.

Related Art

[0002] Japanese Unexamined Patent Application Publication No. 2019-098696 discloses a printing apparatus that includes a first printing start position marker and a second printing start position marker. The second printing start position marker is disposed at an outer end position of a housing downstream from a head unit in a scanning direction in a first printing operation mode. The first printing start position marker is disposed at an outer end position of the housing downstream from the head unit in a scanning direction in a second printing operation mode.

SUMMARY

[0003] It is a general object of the present invention to provide a printing apparatus that facilitates printing at a desired position on a recording medium.

[0004] In order to achieve the above-mentioned object, there is provided a printing apparatus according to claim 1. Advantageous embodiments are defined by the dependent claims. Advantageously, the printing apparatus includes a printing device, a body, a first member and a second member. The printing device performs printing on a recording medium. The body holds the printing device. The first member projecting from the body in a scanning direction in which the body moves indicates a printing start position of the printing device on the recording medium. The second member moves between a position at which the second member projects beyond the first member along the scanning direction and a position at which the second member is housed in the body or the first member. The second member indicates a print width of the printing device in a direction perpendicular to the scanning direction or in a direction perpendicular to a printing direction in which the printing apparatus performs printing with the printing device.

[0005] Accordingly, the printing apparatus facilitates printing at a desired position on a recording medium.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0006] A more complete appreciation of the disclosure and many of the attendant advantages and features thereof can be readily obtained and understood from the following detailed description with reference to the accompanying drawings, wherein:

FIG. 1 is a schematic perspective view from a left side of a printing apparatus according to a first embodiment of the present invention;

FIG. 2 is a schematic perspective view from a right side of the printing apparatus;

FIG. 3 is a schematic perspective view from the left side of the printing apparatus when a head cover is opened;

FIG. 4 is a schematic perspective view from the right side of the printing apparatus when the head cover is opened;

FIG. 5 is a schematic perspective view from the left side of the printing apparatus when a top cover is opened;

FIG. 6 is a schematic perspective view from the left side of the printing apparatus, with an ink cartridge and a battery removed from the printing apparatus; FIG. 7 is a schematic perspective view from a bottom side of the printing apparatus when the head cover is opened;

FIG. 8 is a schematic perspective view from the bottom side of the printing apparatus, with a lower unit removed from the printing apparatus;

FIG. 9 is a schematic perspective view from a top side of the lower unit;

FIG. 10 is a schematic perspective view from the left side of the printing apparatus when the head cover and a second member are opened;

FIG. 11 is a schematic perspective view from the right side of the printing apparatus when the head cover and the second member are opened;

FIG. 12A is a top view of the printing apparatus at the time of printing;

FIG. 12B is a back view of the printing apparatus of FIG. 12A;

FIG. 13A is a top view of the printing apparatus at the time of printing;

FIG. 13B is a back view of the printing apparatus of FIG. 13A;

FIG. 13C is a partially enlarged view of the printing apparatus of FIG. 13B;

FIG. 14 is a view of a first member and the second member;

FIG. 15A is a top view of a printing apparatus at the time of printing according to a second embodiment of the present invention;

FIG. 15B is a back view of the printing apparatus of FIG. 15A;

FIG. 16A is a top view of a printing apparatus at the time of printing according to a third embodiment of the present invention;

FIG. 16B is a partially enlarged view of the printing apparatus of FIG. 16A;

FIG. 17 is a view of a first member according to a modification;

FIG. 18A is a view of a second member according to a first modification;

FIG. 18B is a view of a second member according

to a second modification;

FIG. 19 is a diagram illustrating a configuration of a printing apparatus to support a second member;

FIG. 20 is a view of the second member housed in the printing apparatus;

FIG. 21A is a diagram illustrating the printing apparatus held at a first stage of opening the head cover;

FIG. 21B is a diagram illustrating the printing apparatus held at a second stage of opening the head cover;

FIG. 21C is a diagram illustrating the printing apparatus held at a third stage of opening the head cover;

FIG. 22 is a diagram illustrating how to hold the printing apparatus for printing;

FIG. 23A is a schematic side view of a printing apparatus according to a first modification;

FIG. 23B is a schematic top view of the printing apparatus of FIG. 23A;

FIG. 23C is a schematic top view of the printing apparatus of FIG. 23A from which second members are drawn;

FIG. 24A is a schematic side view of a printing apparatus according to a second modification;

FIG. 24B is a schematic top view of the printing apparatus of FIG. 24A;

FIG. 24C is a schematic top view of the printing apparatus of FIG. 24A from which second members are drawn;

FIG. 25A is a schematic side view of a printing apparatus according to a third modification;

FIG. 25B is a schematic top view of the printing apparatus of FIG. 25A;

FIG. 25C is a schematic top view of the printing apparatus of FIG. 25A from which second members are drawn;

FIG. 26A is a schematic side view of a printing apparatus according to a fourth modification;

FIG. 26B is a schematic top view of the printing apparatus of FIG. 26A; and

FIG. 26C is a schematic top view of the printing apparatus of FIG. 26A from which second members are drawn.

[0007] The accompanying drawings are intended to depict embodiments of the present invention and should not be interpreted to limit the scope thereof. The accompanying drawings are not to be considered as drawn to scale unless explicitly noted. Also, identical or similar reference numerals designate identical or similar components throughout the several views.

DETAILED DESCRIPTION

[0008] In describing embodiments illustrated in the drawings, specific terminology is employed for the sake of clarity. However, the disclosure of this specification is not intended to be limited to the specific terminology so selected and it is to be understood that each specific

element includes all technical equivalents that have a similar function, operate in a similar manner, and achieve a similar result.

[0009] Referring now to the drawings, embodiments of the present disclosure are described below. As used herein, the singular forms "a," "an," and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise.

[0010] For the sake of simplicity, like reference numerals are given to identical or corresponding constituent elements such as parts and materials having the same functions, and redundant descriptions thereof are omitted unless otherwise required.

[0011] As used herein, the term "connected/coupled" includes both direct connections and connections in which there are one or more intermediate connecting elements.

[0012] FIG. 1 is a schematic view of a handheld mobile inkjet printer (HMP) 100 serving as a printing apparatus according to an embodiment of the present invention. Specifically, FIG. 1 is a schematic perspective view from a left side of the HMP 100.

[0013] In the following description, a "printing apparatus" refers to a configuration of a body, described later, provided with a printing device; whereas a "printing apparatus body" refers to a configuration of the body, described later, without the printing device.

[0014] The HMP 100 includes a body 1, a top cover 2, and a head cover 3. The HMP 100, in a substantially rectangular parallelepiped shape as a whole, has a length in a scanning direction to such an extent that a user can hold the HMP 100 with a palm. Note that the scanning direction is a printing direction along an axis indicated by two-headed arrow "left and right" of the two-headed arrows illustrated in FIG. 1.

[0015] The body 1 includes an upper unit 11 and a lower unit 12. The lower unit 12 is removable from the upper unit 11. A detailed description thereof is deferred. The top cover 2 is opened and closed with respect to the upper unit 11. When the user presses a switch 21, which is used to open or close the top cover 2, the top cover 2 is unlocked and opened upward with a shaft proximate to a front side of the top cover 2 as a fulcrum.

[0016] The head cover 3 is opened and closed with respect to the lower unit 12. When the user presses an upper end of a lever 31, which is used to open or close the head cover 3, a claw disposed at a lower end of the lever 31 comes off from an engagement hole of the head cover 3. As a result, the head cover 3 is opened from a position below the body 1 to a position in front of the body 1 with a head cover shaft 3a proximate to a front side of the upper unit 11 as a fulcrum.

[0017] On a left side of the upper unit 11, operation buttons such as a power button 13, a print button 14, and an accumulated print button 15 are gathered together. The power button 13 switches between ON and OFF of the power of the HMP 100 when the power button 13 is pressed. The print button 14 switches between the start

and standby of printing performed by the HMP 100 when the print button 14 is pressed. The accumulated print button 15 includes a plurality of sub-buttons 15a to 15e. As print data is accumulated in a memory inside the body 1 in association with the respective sub-buttons 15a to 15e, the print data is retrieved when the corresponding one of the sub-buttons 15a to 15e is pressed.

[0018] Note that the operation buttons described above are not limited to push-buttons. Alternatively, for example, a touch panel may be disposed on a side of the body 1 so that the user can perform the operations described above through the touch panel, instead of using the operation buttons described above.

[0019] The lower unit 12 includes a first member 16 projecting from a side of the lower unit 12 (or a side of the body 1) in the scanning direction of the HMP 100.

[0020] The first member 16 serves as a mark indicating a printing start position when the user places the HMP 100 on a recording medium. The first member 16 has a length in a direction perpendicular to the scanning direction (i.e., a front-back direction along an axis indicated by two-headed arrow "front and back" of the two-headed arrows illustrated in FIG. 1) equal to a print width of the printing device, which is a print width of a head that performs inkjet recording in the present example. A detailed description thereof is deferred.

[0021] In the present embodiment, the side of the body 1 (i.e., the side of the upper unit 11 or the side of the lower unit 12) refers to an outer surface of the body 1 (i.e., an outer surface of the upper unit 11 or an outer surface of the lower unit 12) excluding the lever 31 and the operation buttons. The first member 16 may project to such an extent that the user can visually recognize the first member 16 when the user views the HMP 100 from a top side of the body 1. In other words, an outermost end of the first member 16 may or may not define a maximum width value in the scanning direction of the HMP 100.

[0022] The upper unit 11 includes a second member 17 that is disposed near the first member 16 and may be housed in the upper unit 11. The second member 17 is drawn from the upper unit 11 by the user at the time of printing, for example. The second member 17 guides the HMP 100 in the scanning direction so that the HMP 100 is correctly moved in a desired printing direction. A detailed description of the first member 16 and the second member 17 is deferred.

[0023] The top cover 2 has two parallel lines L1 and L2 extending from a left side of the top cover 2 to a right side of the top cover 2 via a top side of the top cover 2. Note that the right side of the top cover 2 is illustrated in FIG. 2. An interval between the lines L1 and L2 corresponds to a print width Lh of the head, which will be described later, thus serving as a reference for the user to ascertain the print width when placing the HMP 100 on the recording medium.

[0024] The top cover 2 also has a line L3 extending in the front-back direction on the top side of the top cover

2. The line L3 extends on front and back sides of the body 1 in addition to the top side of the top cover 2. Note that the front side of the body 1 is illustrated in FIG. 2. The line L3 corresponds to a position of a head, which will be described later. Specifically, the line L3 corresponds to a position of a nozzle row from which ink is discharged, thus serving as a reference for the user to ascertain the head position when placing the HMP 100 on the recording medium.

[0025] The lines L1, L2, and L3 may be designed in advance in molds of the body 1 and the top cover 2 so that the lines L1, L2, and L3 are formed integrally with the body 1 and the top cover 2. Alternatively, the lines L1, L2, and L3 may be provided as stickers or stamped lines.

[0026] The lines L1, L2, and L3 are not limited to the lines described above. The line L3 may be provided alone, without the lines L1 and L2. Alternatively, the lines L1 and L2 may be provided without the line L3. The line L3 may be simply provided on the front and back sides of the body 1, without being provided on the top side of the top cover 2.

[0027] FIG. 2 is a schematic perspective view from the right side of the HMP 100.

[0028] As illustrated in FIG. 1, the left side of the body 1 is provided with the operation buttons. By contrast, the right side of the body 1 is provided with no operation button. The components other than the lever 31, the first member 16, the second member 17, and the operation buttons are disposed on the right side of the body 1 as on the left side of the body 1.

[0029] FIG. 3 is a schematic perspective view from the left side of the HMP 100 with the head cover 3 opened.

[0030] When the user presses the upper end of the lever 31, a claw 31a disposed at the lower end of the lever 31 comes off from an engagement hole 3b of the head cover 3. As a result, the head cover 3 is opened in a direction A, which is a direction indicated by arrow A, from the position below the body 1 to the position in front of the body 1 with the head cover shaft 3a proximate to the front side of the upper unit 11 as a fulcrum.

[0031] FIGS. 21A to 21C illustrate an example of how to hold the HMP 100 to open the head cover 3. When opening the head cover 3, the user places the palm on a top side of the HMP 100 (i.e., on the top cover 2) and grips the body 1 as illustrated in FIG. 21A. In this state, the user lifts the HMP 100 as illustrated in FIG. 21B. The head cover 3 is opened when the user presses, with the thumb, the upper end of the lever 31 disposed on the side of the body 1 as illustrated in FIG. 21C.

[0032] FIG. 22 illustrates an example of how to hold the HMP 100 to perform printing on a recording medium. When the user opens the head cover 3 and starts a printing operation, the user moves the thumb from the lever 31 to the print button 14 while gripping the body 1 with the palm placed on the top side of the HMP 100 and presses the print button 14 to cause the HMP 100 to start printing.

[0033] Note that the way of holding the HMP 100 at the time of printing is not limited to the way illustrated in FIG. 22. For example, in a case where the user performs printing on a surface of a recording medium disposed horizontally or in a case where the user performs printing while sitting on a chair, the user may feel easier to operate the HMP 100 with the palm placed on the back side of the body 1 to hold the HMP 100. In some cases, the user may feel easier to operate the HMP 100 with the palm placed on a corner between the top side of the body 1 and the back side of the body 1 to hold the HMP 100. The print button 14 is disposed such that the user can hold the HMP 100 in various ways such as the ways described above.

[0034] FIG. 4 is a schematic perspective view from the right side of the HMP 100 with the head cover 3 opened.

[0035] The head cover 3 includes a head cap 32 inside. When the head cover 3 is closed, the head cap 32 covers the head exposed on the bottom side of the body 1 to moisturize the head and prevent printing failure due to clogging of the head with ink.

[0036] FIG. 5 is a schematic perspective view from the left side of the HMP 100 with the top cover 2 opened.

[0037] When the user presses the switch 21, the top cover 2 is unlocked and opened upward in a direction B, which is a direction indicated by arrow B, with a shaft 2a proximate to the front side of the top cover 2 as a fulcrum.

[0038] When the top cover 2 is opened, an ink cartridge 4 and a battery 5 appear in part. In this state, the user may remove the ink cartridge 4 and the battery 5 from the body 1 as illustrated in FIG. 6 to replace the ink cartridge 4 and the battery 5 with new ones.

[0039] FIG. 7 is a schematic perspective view from the bottom side of the HMP 100 with the head cover 3 opened.

[0040] The lower unit 12 of the body 1 has a rectangular opening 12a in a center portion of the lower unit 12. A face of a nozzle plate of a head 6 that performs inkjet recording and a detection face of a position sensor 7 that detects the position of the HMP 100 during printing are exposed from the opening 12a. As described above, the head cap 32 disposed inside the head cover 3 covers the head 6 when the head cover 3 is closed, to prevent the head 6 from drying. The head 6 serves as a printing device.

[0041] Note that the position sensor 7 is a sensor that detects the distance to the surface of the recording medium, the surface state (e.g., unevenness) of the recording medium, and the moving distance of the HMP 100. The position sensor 7 may be similar to a sensor used in an optical mouse (as a pointing device) for a personal computer, for example.

[0042] The lower unit 12 includes four rollers 18 in an area outside the opening 12a. A roller shaft 18a disposed in the direction perpendicular to the scanning direction (i.e., printing direction) of the HMP 100 supports the rollers 18. The rollers 18 support the movement of the HMP 100 in the scanning direction.

[0043] The lower unit 12 is removable from the upper unit 11. When the user slides a lever 19 disposed in a back portion of the lower unit 12 illustrated in FIG. 8, the upper unit 11 and the lower unit 12 coupled by a hook is disengaged. Thus, the lower unit 12 is removed from the upper unit 11. As illustrated in FIG. 8, the lower unit 12 is provided with the first member 16 on each side of the lower unit 12.

[0044] FIG. 9 is a schematic perspective view from the top side of the lower unit 12.

[0045] The lower unit 12 includes a front hook 12b in a front portion of the lower unit 12. The lower unit 12 also includes a back hook 12c in the back portion of the lower unit 12. When the user slides the lever 19 disposed on each side in the back portion of the lower unit 12, the back hook 12c is disengaged from the upper unit 11. When the front hook 12b is disengaged from the upper unit 11 with the back hook 12c disengaged from the upper unit 11, the lower unit 12 is disengaged from the upper unit 11.

[0046] In order to attach the lower unit 12 to the upper unit 11, the procedure described above is reversed. Specifically, first, the front hook 12b is fitted into an engagement portion of the upper unit 11, then the back hook 12c is fitted into an engagement portion of the upper unit 11.

[0047] As described above, in the present embodiment, the body 1 is divided into two units, namely, the upper unit 11 and the lower unit 12. Specifically, the lower unit 12 is prepared as a plurality of types of attachments corresponding to, e.g., the material and the form (or shape) of the recording medium. The user selects, from the plurality of types of attachments, an attachment most suitable for desired printing and attaches the attachment to the upper unit 11 for use.

[0048] Since the first member 16 keeps projecting from the side of the body 1, the first member 16 may be damaged by an unexpected collision during usage, storage, or carrying, for example. In order to address such a situation, the lower unit 12 is simply replaced with a new one because the lower unit 12 includes the first member 16 in the present embodiment.

[0049] FIG. 10 is a schematic perspective view from the left side of the HMP 100 with the head cover 3 and the second member 17 opened.

[0050] As described above, the upper unit 11 includes the second member 17 that is disposed near the first member 16 and may be housed in the upper unit 11. The second member 17 is drawn from the upper unit 11 in a direction C, which is a direction indicated by arrow C in FIG. 10, by the user at the time of printing, for example. The second member 17 guides the HMP 100 in the scanning direction so that the HMP 100 is correctly moved in a desired printing direction.

[0051] FIG. 11 is a schematic perspective view from the right side of the HMP 100 with the head cover 3 and the second member 17 opened.

[0052] The first member 16 and the second member 17 are disposed on the right side of the HMP 100 as on

the left side of the HMP 100.

[0053] As described above, according to the present embodiment, the HMP 100 includes the head 6 that performs printing on a recording medium and the body 1 that holds the head 6. The HMP 100 performs printing on the recording medium with the head 6 while the body 1 moves on the recording medium. The HMP 100 further includes the first member 16 and the second member 17. The first member 16 projecting from the body 1 in the scanning direction in which the body 1 moves indicates the printing start position of the head 6 on the recording medium. The second member 17 moves between a position at which the second member 17 projects beyond the first member 16 along the scanning direction and a position at which the second member 17 is housed in the body 1. The second member 17 indicates the print width Lh of the head 6 in the direction perpendicular to the scanning direction or in the direction perpendicular to the printing direction in which the HMP 100 performs printing with the head 6.

[0054] A first member projecting longer from the body 1 than the first member 16 of the present embodiment may allow an HMP provided with the first member to move more straight on the recording medium than the HMP 100 provided with the first member 16. However, such a first member projecting longer from the body 1 than the first member 16 of the present embodiment enlarges the entire HMP, which is bulky when stored. In order to prevent such a situation, according to the present embodiment, the second member 17 disposed separately from the first member 16 moves between the position at which the second member 17 projects beyond the first member 16 along the scanning direction and the position at which the second member 17 is housed in the body 1. In short, the second member 17 of the present embodiment downsizes the HMP 100 and enhances the operability of the HMP 100 at the time of printing. Accordingly, the HMP 100 is provided as a printing apparatus that facilitates printing at a desired position on the recording medium.

[0055] As described above, the body 1 includes the upper unit 11 and the lower unit 12 removable from the upper unit 11. The lower unit 12 includes the first member 16.

[0056] Accordingly, when the first member 16 is damaged, the lower unit 12 is simply replaced, instead of replacing the HMP 100 as a whole.

[0057] As described above, the lower unit 12 includes the rollers 18, which includes the roller shaft 18a disposed in the direction perpendicular to the scanning direction of the HMP 100.

[0058] The rollers 18 support the movement of the HMP 100 in the scanning direction, thus facilitating the movement of the HMP 100.

[0059] FIGS. 12A and 12B illustrate the HMP 100 at the time of printing.

[0060] Specifically, FIG. 12A is a top view of the HMP 100. FIG. 12B is a back view of the HMP 100 in a direction

D1, which is a direction indicated by arrow D1 in FIG. 12A.

[0061] FIGS. 12A and 12B illustrate the HMP 100 with the second member 17 housed in the body 1 and the first member 16 projecting from the body 1 in the printing direction (i.e., the scanning direction) of the body 1 at a position proximate to a recording medium M. Note that the printing direction is indicated by arrow D in FIGS. 12A to 13B, FIGS. 14 to 16A, and FIGS. 18A and 18B. The "position proximate to the recording medium M" herein refers to the position of the first member 16 proximate to, but not in touch with, the printing medium M in a height direction of the body 1. In the present embodiment, the first member 16 is located at a distance of 1.0 mm to 4.0 mm from the surface of the recording medium M. The first member 16 thus located allows the user to confirm, from the top side of the body 1, the printing start position on the recording medium M.

[0062] For example, in a case where the printing direction indicated by arrow is rightward in FIGS. 12A and 12B, the user places the HMP 100 on the recording medium M such that an edge 16e of the first member 16 is aligned with a position P1 of the recording medium M. The position P1 is a position at which the user desires to start printing and may be referred to as a print start position P1 in the following description. In this state, when the HMP 100 is moved in the printing direction, printing starts at the time when the head 6 reaches the position with which the edge 16e of the first member 16 is aligned, in other words, the position P1 at which the user desires to start printing.

[0063] The "printing start position" indicated by the first member 16 herein refers to a position at which formation of an image or text starts on the recording medium M. The "printing start position" corresponds to the position indicated by the edge 16e, which is an outermost side of the first member 16.

[0064] Specifically, for example, when a solid image is printed on the recording medium M, an edge position of the solid image coincides with the edge 16e of the first member 16. In the present embodiment, the "printing start position" indicated by the first member 16 is set in an allowance of ± 3 mm from the edge 16e.

[0065] The HMP 100 may perform printing leftward, in other words, in a direction opposite the printing direction described above. In a case where the HMP 100 performs printing leftward, the first member 16 projecting from the left side of the body 1 is used.

[0066] According to the present embodiment, the HMP 100 includes the first member 16 on each of the left and right sides of the body 1 so that the HMP 100 can perform printing leftward and rightward. Alternatively, for example, the first member 16 may be disposed either on the right or left side of the body 1 alone.

[0067] The length of the first member 16 in the direction perpendicular to the printing direction (i.e., the scanning direction) is preferably equal to the print width Lh of the head 6 so that the user can easily ascertain the print width.

[0068] In the present embodiment, since the head 6 is a head for inkjet recording, the print width Lh is defined as the length of a nozzle row formed by a plurality of nozzles disposed on the face of the nozzle plate of the head 6, as illustrated in FIG. 7. However, in a case where the plurality of nozzles forming the nozzle row includes one or more nozzles that are not used for printing, the print width Lh is a length of a nozzle row formed by effective nozzles contributing to actual printing. In short, the first member 16 is disposed at a position to which the head 6 is extended in the scanning direction.

[0069] FIGS. 13A to 13C illustrate the HMP 100 at the time of printing.

[0070] Specifically, FIG. 13A is a top view of the HMP 100. FIG. 13B is a back view of the HMP 100 in a direction D2, which is a direction indicated by arrow D2 in FIG. 13A. FIG. 13C is an enlarged view of a portion of the HMP 100 surrounded by a broken line in FIG. 13B.

[0071] FIGS. 13A to 13C illustrate the HMP 100 with the second member 17 projecting from each side of the body 1. In other words, the second member 17 housed in the body 1 is drawn from the body 1. As described above with reference to FIG. 10, the second member 17 at a housed position is opened outward, thus being drawn from the body 1.

[0072] The second member 17 has a function of guiding the movement of the HMP 100 so that the HMP 100 is correctly moved in a desired printing direction on the recording medium M. In other words, the second member 17 is a member that indicates the printing direction. In particular, the second member 17 is advantageous for printing on a relatively small recording medium or for printing in a given frame F of a fixed format as illustrated in FIG. 13A.

[0073] In the present example, as illustrated in FIG. 13C, the second member 17 drawn from the body 1 is located projecting beyond the first member 16 on an extension line from the first member 16 in the scanning direction (i.e., the printing direction). The second member 17 has a cutout space 171 as illustrated in FIGS. 13A and 13C. The space 171 prevents the second member 17 from interfering with the first member 16 when the second member 17 is opened or closed with respect to the body 1. When the second member 17 is opened from the body 1 and disposed at the position at which the second member 17 projects beyond the first member 16 along the scanning direction, the first member 16 is located in the space 171 of the second member 17.

[0074] As described above, in the present embodiment, the second member 17 is located on the extension line from the first member 16 in the scanning direction at the position at which the second member 17 projects beyond the first member 16 along the scanning direction.

[0075] Accordingly, the second member 17 accurately guides the HMP 100 in the printing direction.

[0076] In a case in which the second member 17 has the cutout space 171 as described above and when the second member 17 is disposed at the position at which

the second member 17 projects beyond the first member 16 along the scanning direction, the first member 16 is located in the space 171.

[0077] Since the first member 16 is located in the space 171, the second member 17 does not interfere with the first member 16 when the second member 17 is opened or closed with respect to the body 1.

[0078] FIG. 14 is a top view of the first member 16 and the second member 17 drawn from the body 1.

[0079] The second member 17 includes arms 17a and 17b, locking portions 17c and 17d, grooves 17e and 17f, and a recess 17j. As described above, the second member 17 has the space 171. The arms 17a and 17b are provided at outermost ends of the second member 17 in the direction perpendicular to the printing direction. The arm 17a has an outer side (or outer edge) facing outward and an inner side (or inner edge) facing the groove 17e. Similarly, the arm 17b has an outer side (or outer edge) facing outward and an inner side (or inner edge) facing the groove 17f. At least one of the outer side and the inner side of the arm 17a is parallel to the printing direction. Similarly, at least one of the outer side and the inner side of the arm 17b is parallel to the printing direction. Thus, the arms 17a and 17b function as a reference (or an index) for the user to confirm the printing direction at the time of printing. Specifically, the user confirms with the arms 17a and 17b whether the printing direction is parallel to a given direction.

[0080] As described above, in the present embodiment, the second member 17 has a side parallel to the scanning direction at the outermost end in the direction perpendicular to the scanning direction.

[0081] Accordingly, the second member 17 accurately guides the HMP 100 in the printing direction.

[0082] The locking portions 17c and 17d are projections disposed on the outer sides of the arms 17a and 17b, respectively. The locking portions 17c and 17d hold a housed state of the second member 17 when the second member 17 is housed in the body 1. Specifically, when the second member 17 is housed in the body 1, the locking portions 17c and 17d contact wall surfaces of a second member storage portion of the body 1 in which the second member 17 is housed, thus preventing the second member 17 from falling down (or opening).

[0083] The grooves 17e and 17f allow the arms 17a and 17b to be bent, respectively. With the grooves 17e and 17f, the locking portions 17c and 17d have a snap-fitting function. Accordingly, when the second member 17 is opened or closed with respect to the body 1, the arms 17a and 17b are bent and generates a contact force by which the locking portions 17c and 17d contact the wall surfaces of the second member storage portion of the body 1.

[0084] The recess 17j helps the user to hook a finger of the user on the second member 17 to draw the second member 17 from the body 1. A semi-circular portion illustrated in FIG. 14 is lower (or thinner) than the surrounding surface of the second member 17.

[0085] As described above with reference to FIGS. 13A to 13C, the space 171 prevents the second member 17 from interfering with the first member 16 when the second member 17 is opened or closed with respect to the body 1.

[0086] The length of the first member 16 in the direction perpendicular to the printing direction (i.e., the scanning direction) is equal to the print width Lh of the head 6, thus helping the user to accurately ascertain the print width. A length of the second member 17 from an inner side of the groove 17e to an inner side of the groove 17f in the direction perpendicular to the printing direction is equal to the print width Lh of the head 6. Accordingly, the first member 16 and the second member 17 function as indexes that indicate the print width Lh.

[0087] FIGS. 15A and 15B illustrate an HMP 100A at the time of printing according to a second embodiment.

[0088] Specifically, FIG. 15A is a top view of the HMP 100A. FIG. 15B is a back view of the HMP 100A in a direction D3, which is a direction indicated by arrow D3 in FIG. 15A.

[0089] As described above with reference to FIG. 14, in the first embodiment, the length of the second member 17 from the inner side of the groove 17e to the inner side of the groove 17f in the direction perpendicular to the printing direction is equal to the print width Lh of the head 6. The present embodiment is different from the first embodiment in that a length of a second member 171 from an outer side of an arm 171a to an outer side of an arm 171b in the direction perpendicular to the printing direction is equal to the print width Lh of the head 6.

[0090] In the present embodiment, the second member 171 is shorter than the second member 17 of first embodiment described above in the direction perpendicular to the printing direction. In short, the second member 171 is downsized from the second member 17. On the other hand, since the length of the second member 171 in the direction perpendicular to the printing direction is equal to the print width Lh of the head 6, the second member 171 does not have an enough space as the space 171 of the second member 17.

[0091] In order to address such a situation, in the present embodiment, as illustrated in FIG. 15B, the second member 171 includes a step 1711 at a portion overlapping the first member 16 such that the first member 16 is located in a space defined below the step 1711. Since the first member 16 is located in the space defined below the step 1711, the second member 171 does not interfere with the first member 16 when the second member 171 is opened or closed with respect to the body 1.

[0092] FIGS. 16A and 16B illustrate an HMP 100B at the time of printing according to a third embodiment.

[0093] Specifically, FIG. 16A is a top view of the HMP 100B. FIG. 16B is an enlarged view of a portion of the HMP 100B surrounded by a broken line in FIG. 16A.

[0094] In the third embodiment, a first member 161 includes notches 16a, 16b, and 16c. A second member 172 includes ribs 17g, 17h, and 17i.

[0095] The notches 16a, 16b, and 16c are disposed at

equal intervals on a side (or an edge) of the first member 161 in the direction perpendicular to the printing direction. The ribs 17g, 17h, and 17i are disposed on the second member 172 in parallel with the printing direction and at equal intervals in the direction perpendicular to the scanning direction. In the present embodiment, the rib 17g is disposed facing a front edge of the first member 161. The rib 17h is disposed facing a longitudinal center of the first member 161. The rib 17i is disposed facing a back edge of the first member 161.

[0096] The notches 16a, 16b, and 16c and the ribs 17g, 17h, and 17i serve as marks indicating, e.g., the size of text to be printed, thus assisting a user to print, e.g., the text at a correct position and enhancing the printing accuracy.

[0097] The number and location of the notches 16a, 16b, and 16c of the first member 161 are not limited to the number and location described above. Similarly, the number and location of the ribs 17g, 17h, and 17i of the second member 172 are not limited to the number and location described above. The marks are not limited to the notches or the ribs. Alternatively, for example, the marks may be stickers or stamped marks. FIG. 17 illustrates an example of the marks.

[0098] FIG. 17 is a view of marks of the first member 161 according to a modification.

[0099] Instead of the notches 16a, 16b, and 16c illustrated in FIG. 16B, the first member 161 may be provided with marks 161a, 161b, and 161c as stickers or stamped marks as illustrated in FIG. 17. In the present example, the mark 161b is arranged at the center of the print width Lh of the head 6. The mark 161a is disposed between the mark 161b and the front edge of the first member 161. The mark 161c is disposed between the mark 161b and the back edge of the first member 161.

[0100] The marks 161a, 161b and 161c serve as marks indicating, e.g., the size of text to be printed, thus assisting the user to print, e.g., the text at a correct position and enhancing the printing accuracy.

[0101] As described above, in the present embodiment, at least one of the first member 16 (161) and the second member 17 (171, 172) has a length in the direction perpendicular to the scanning direction equal to the print width Lh of the head 6.

[0102] Accordingly, the user accurately ascertains the print width.

[0103] As described above, the first member 16 (161) has the plurality of notches 16a, 16b, and 16c disposed at equal intervals in the direction perpendicular to the scanning direction.

[0104] The notches 16a, 16b, and 16c serve as marks indicating, e.g., the size of text to be printed, thus assisting the user to print, e.g., the text at a correct position and enhancing the printing accuracy.

[0105] FIGS. 18A and 18B illustrate a second member 173 according to some modifications.

[0106] In the modification illustrated in FIG. 18A, a first member 162 is transparent. The second member 173 is

transparent in a range "b" in the direction perpendicular to the printing direction and is non-transparent in ranges "a" and "c" located before and after the range "b," respectively. A length in the range "b" of the second member 173 is equal to the length of the first member 162 in the direction perpendicular to the printing direction. In other words, the length in the range "b" of the second member 173 is equal to the print width of the head 6.

[0107] Respective portions of the second member 173 in the ranges "a" and "c" are subjected to surface treatment or colored, for example, to be non-transparent areas. In the following description, the respective portions or areas of the second member 173 in the ranges "a" to "c" may be referred to as portions RA to RC. Since the non-transparent portions RA and RC of the second member 173 are visually distinguished from the transparent portion RB of the second member 173, the user easily recognizes the arms 17a and 17b serving as guides located in the ranges "a" and "c," respectively, of the second member 173.

[0108] Note that the transparent portion RB is transparent to such an extent that the user can visually recognize a recording medium located below the first member 162. In other words, the transparent portion RB may be a semi-transparent area provided that the recording medium is visually recognized. In short, the non-transparent portions RA and RC are to be visually distinguished from the transparent portion RB of the second member 173. In other words, the portions RA and RC is lower in transparency than the portion RB of the second member 173.

[0109] The transparent areas of the first member 162 and the second member 173 may be openings, instead of using transparent members. For example, in the modification illustrated in FIG. 18B, openings 17m and 17n are provided in the range "b" of the second member 173 so that a recording medium located below the second member 173 is visually recognized. The configuration of the openings 17m and 17n is not limited to that illustrated in FIG. 18B. According to a modification, the openings may be notches, instead of holes. The shape, location, and the number, for example, of the openings may be changed as appropriate.

[0110] As described above, in the present embodiment, at least one of the first member 162 and the second member 173 has a transparent portion (e.g., the transparent portion RB) or the openings 17m and 17n at least partially.

[0111] In addition, as described above, the transparent portion enables the recording medium located below the first member 162 or the second member 173 having the transparent portion to be visually recognized.

[0112] Further, as described above, the transparent portion or the openings 17m and 17n have a length in the direction perpendicular to the scanning direction substantially equal to the print width Lh of the head 6.

[0113] Such a configuration does not hide, e.g., the recording medium under the first member 162 and the

second member 173, thus assisting the user to perform printing at a correct position and enhancing the printing accuracy.

[0114] FIG. 19 is a diagram illustrating a configuration of the HMP 100 to support the second member 17.

[0115] The second member 17 includes a projection 17k at a portion extending in a direction opposite the direction in which each of the arms 17a and 17b is oriented. On the other hand, the body 1 (specifically, the upper unit 11) includes a U-shaped engagement hole 11a into which the projection 17k of the second member 17 is fitted. The projection 17k fitted in the engagement hole 11a allows the second member 17 to be opened and closed with respect to the body 1. The supporting configuration described above is similarly applied to the second members 171, 172, and 173 described in the embodiments and modifications above.

[0116] In short, the second member 17 is easily attached to and removed from the body 1. Since the second member 17 is a part that is opened and closed by the user, the second member 17 might be damaged or lost. However, the second member 17 as a replaceable part having a structure easy to attach and remove enhances the maintenance of the HMP 100.

[0117] As described above, in the present embodiment, the second member 17 (171, 172, 173) is removable from the upper unit 11.

[0118] Accordingly, even if the second member 17 (171, 172, 173) is damaged or lost, the second member 17 (171, 172, 173) as a replaceable part enhances the maintenance of the HMP 100.

[0119] FIG. 20 is a view of the second member 17 housed in the HMP 100.

[0120] Now, a description is given of a configuration of the HMP 100 to support the second member 17 at the housed position and a configuration of the recess 17j of the second member 17.

[0121] When the second member 17 is housed in the body 1 (specifically, the upper unit 11), the locking portion 17c contacts the wall surface of the second member storage portion of the upper unit 11. Similarly, the other locking portion 17d (on the arm 17b of the second member 17) contacts the wall surface facing the locking portion 17d.

[0122] At this time, since a restoring force is transmitted to the locking portions 17c and 17d from the bending arms 17a and 17b attempting to return to the original positions, respectively, the restoring force serves as the contact force that presses the locking portions 17c and 17d against the respective wall surfaces, thus holding the second member 17 at the housed position.

[0123] As illustrated in FIG. 20, the recess 17j described above with reference to FIG. 14 is lower than the adjacent portions of the second member 17. In other words, the recess 17j is thinner than the adjacent portions of the second member 17. Accordingly, the user can easily hook a finger of the user on the second member 17 to draw the second member 17.

[0124] FIG. 23A to 23C illustrate an HMP 500 according to a first modification of one or more embodiments described above.

[0125] Specifically, FIG. 23A is a schematic side view of the HMP 500. FIG. 23B is a schematic top view of the HMP 500. FIG. 23C is a schematic top view of the HMP 500 from which second members 57 are drawn.

[0126] The HMP 500 of the present example includes a handle 51 at a portion of a body 50. A user grips the handle 51 to move the HMP 500 in a scanning direction.

[0127] A power button 52 is disposed on a top side of the body 50. The handle 51 is provided with a print button 53. The power button 52 switches between ON and OFF of the power of the HMP 500 when the power button 52 is pressed. The print button 53 switches between the start and standby of printing performed by the HMP 500 when the print button 53 is pressed.

[0128] A touch panel 54 is disposed on a side of the body 50. The touch panel 54 displays print data retrieved from, e.g., a memory inside the body 50. The user may change the size and font of text to be printed and edit the print contents, for example, on the touch panel 54.

[0129] The touch panel 54 serves as a display screen. The display screen is not limited to a touch panel. The display screen may include a display panel around or beside which operation buttons and keys are disposed so that, e.g., a user operates the display panel with the operation buttons and keys.

[0130] A head 55 is disposed on a bottom side of the body 50 to perform inkjet recording. A lower portion of the body 50 (below the touch panel 54) is provided with first members 56 projecting from the respective side of the body 50 in the scanning direction of the HMP 500. Note that the first members 56 may have the functions and configurations of the first members 16, 161, and 162 described above, in an appropriately combination.

[0131] An HMP having the above-described configuration may fail to secure an enough space to house a second member because the touch panel 54 occupies a large area on the side of the body 50. In order to address such a situation, in the present example, the second member 57 is divided into a plurality of sub-members 57a and 57b in a size enough for the second member 57 to be housed in the first member 56. When using the second member 57, the user draws the second member 57 from the first member 56.

[0132] Specifically, the first member 56 is higher than the second member 57 to define a space to house the second member 57. In short, the second member 57 is housed in the space. When using the second member 57, the user draws the second member 57 from the space inside the first member 56.

[0133] Note that the second member 57 may have the functions and configurations of the second members 17, 171, 172, and 173 described above, in an appropriately combination.

[0134] As described above, according to the present modification, the HMP 500 includes the head 55 that per-

forms printing on a recording medium and the body 50 that holds the head 55. The HMP 500 performs printing on the recording medium with the head 55 while the body 50 moves on the recording medium. The HMP 500 further includes the first member 56 and the second member 57. The first member 56 projecting from the body 50 in the scanning direction in which the body 50 moves indicates a printing start position of the head 55 on the recording medium. The second member 17 moves between a position at which the second member 57 projects beyond the first member 56 along the scanning direction and a position at which the second member 57 is housed in the first member 56. The second member 17 indicates a print width of the head 55 in a direction perpendicular to the scanning direction or in a direction perpendicular to a printing direction in which the HMP 500 performs printing with the head 55.

[0135] As described above, the first member 56 has a space to house the second member 57. The second member 57 is drawn from the space.

[0136] As described above, the body 50 includes the touch panel 54 on a side of the body 50. The first member 56 and the second member 57 are disposed below the touch panel 54.

[0137] Such a configuration of the first member 56 obviates the need to provide a space to house the second member 57 separately from the first member 56 on a side of the body 50.

[0138] In other words, although the body 50 may have some difficulties in securing an enough space to house the second member 57, the body 50 is provided with the second member 57.

[0139] FIG. 24A to 24C illustrate an HMP 500A according to a second modification of one or more embodiments described above.

[0140] Specifically, FIG. 24A is a schematic side view of the HMP 500A. FIG. 24B is a schematic top view of the HMP 500A. FIG. 24C is a schematic top view of the HMP 500A from which second members 59 are drawn.

[0141] In the present example, each of the second members 59 is a single member. As indicated by broken lines in FIG. 24B, each of the second members 59 passes below a corresponding first member 58 and housed in the body 50 while using a part of the body 50.

[0142] Specifically, the first member 58 and the second member 59 are vertically disposed such that the second member 59 disposed below the first member 58 is housed in the body 50. When using the second member 59, a user draws the second member 59 from the body 50.

[0143] In the present example, the width of the second member 59 is the same as the width of the first member 58. In other words, the width of the second member 59 is the same as the print width of the head 55. Note that the second member 59 may have the functions and configurations of the second members 17, 171, 172, and 173 described above, in an appropriately combination.

[0144] According to the configuration described above, a space used to house the second member 59 has a

reduced height. In other words, although the body 50 may have some difficulties in securing an enough space for the second member 59 to be mounted, the body 50 is provided with the second member 59. Since the respective widths of the first member 58 and the second member 59 are equal to the print width of the head 55, the HMP 500 is accurately guided in the printing direction.

[0145] As described above, in the present modification, the second member 59 is disposed below the first member 58 such that the second member 59 is drawn from the body 50.

[0146] Accordingly, although the body 50 may have some difficulties in securing an enough space for the second member 59 to be mounted, the body 50 is provided with the second member 59.

[0147] FIG. 25A to 25C illustrate an HMP 500B according to a third modification of one or more embodiments described above.

[0148] Specifically, FIG. 25A is a schematic side view of the HMP 500B. FIG. 25B is a schematic top view of the HMP 500B. FIG. 25C is a schematic top view of the HMP 500B from which second members 61 are drawn.

[0149] In the present example, each of the second members 61 having a rod shape is disposed adjacent to a first member 60. When using the second members 61, a user rotates the second members 61 in directions indicated by arrows, thus drawing the second members 61 out of the body 50 as illustrated in FIG. 25C.

[0150] When not using the second members 61, the user folds and houses the second members 61 in the body 50 such that a longitudinal direction of each of the second members 61 is along a direction perpendicular to the scanning direction as indicated by broken lines in FIG. 25B.

[0151] In the state illustrated in FIG. 25C, the interval between the two second members 61 is preferably equal to a length of the first member 60 in the direction perpendicular to the scanning direction. In other words, the interval between the two second members 61 is preferably equal to the print width of the head 55. Note that the second member 61 may have the functions and configurations of the second members 17, 171, 172, and 173 described above, in an appropriately combination.

[0152] According to the configuration described above, a space used to house the second member 61 has a reduced height. In other words, although the body 50 may have some difficulties in securing an enough space for the second member 61 to be mounted, the body 50 is provided with the second member 61. The interval between the two second member 61 equal to the print width of the head 55 allows the HMP 500 to be accurately guided in the printing direction.

[0153] As described above, in the present modification, the second member 61 is a rod-shaped member. When the second member 61 is housed in the body 50, the longitudinal direction of the second member 61 is along the direction perpendicular to the scanning direction.

[0154] Accordingly, although the body 50 may have some difficulties in securing an enough space for the second member 61 to be mounted, the body 50 is provided with the second member 61.

[0155] FIG. 26A to 26C illustrate an HMP 700 according to a fourth modification of one or more embodiments described above.

[0156] Specifically, FIG. 26A is a schematic side view of the HMP 700. FIG. 26B is a schematic top view of the HMP 700. FIG. 26C is a schematic top view of the HMP 700 from which second members 77 are drawn.

[0157] The HMP 700 includes, e.g., a body 70 and a top cover 71. The top cover 71 is opened and closed with respect to the body 70. Opening the top cover 71 allows access to, e.g., an ink cartridge and a battery accommodated in the body 70.

[0158] A power button 72 and a print button 73 are disposed on different sides of the body 70 in the present example. The power button 72 switches between ON and OFF of the power of the HMP 700 when the power button 72 is pressed. The print button 73 switches between the start and standby of printing performed by the HMP 700 when the print button 73 is pressed. A bottom side of the body 70 is provided with, e.g., a head 74 that performs inkjet recording and rollers 75 that support the movement of the HMP 700 in a scanning direction, which may be referred to as a printing direction.

[0159] In the present embodiment, the body 70 is a single unit of the HMP 700, without being divided into an upper unit and a lower unit. First members 76 and the second members 77 are disposed below the integral body 70. Each of the first members 76 projects from a corresponding side of the body 70 in the scanning direction of the HMP 700.

[0160] The second members 77 are opened and closed with respect to the body 70. The second members 77 are opened in directions indicated by arrows in FIG. 26C at the time of printing, for example. The first member 76 may be replaced with one of the first members 16, 161, and 162 described above. Similarly, the second member 77 may be replaced with one of the second members 17, 171, 172, and 173 described above.

[0161] According to the aforementioned configuration, the HMP 700 including the body 70 as an integral unit is accurately guided in the printing direction.

[0162] In the embodiments described above, the second member moves between a position at which the second member projects beyond the first member along the scanning direction and a position at which the second member is housed in the body or the first member. Alternatively, the second member may be fixed at the position at which the second member projects beyond the first member along the scanning direction, provided that the printing apparatus is bulky due to the second member when the printing apparatus is stored.

[0163] In the embodiments of the present invention, the recording medium M is not limited to a sheet of paper. The recording medium M may be any printing object such

as a corrugated cardboard, a cloth, a film made of resin, an object made of glass, rubber, or metal, a package, or an electronic substrate.

[0164] In the embodiments and the modifications described above, an inkjet recording system is exemplified as a printing system. However, the printing system is not limited to the inkjet recording system. Alternatively, the printing apparatus may employ another system such as a heat sensitive system or a thermal transfer system.

[0165] The embodiments described above are given as an example, and unique advantageous effects are achieved for each of the following aspects given below.

[0166] Initially, a description is given of a first aspect of the present invention.

[0167] A printing apparatus (e.g., the HMP 100) according to the first aspect includes a printing device (e.g., the head 6) that performs printing on a recording medium and a body (e.g., the body 1) that holds the printing device. The printing apparatus performs printing on the recording medium with the printing device while the body moves on the recording medium. The printing apparatus further includes a first member (e.g., the first member 16) and a second member (e.g., the second member 17). The first member projecting from the body in a scanning direction in which the body moves indicates a printing start position (e.g., the printing start position PI) of the printing device on the recording medium. The second member moves between a position at which the second member projects beyond the first member along the scanning direction and a position at which the second member is housed in the body or the first member. The second member indicates a print width (e.g., the print width Lh) of the printing device in a direction perpendicular to the scanning direction or in a direction perpendicular to a printing direction in which the printing apparatus performs printing with the printing device.

[0168] According to the first aspect, the printing apparatus is provided that facilitates printing at a desired position on the recording medium.

[0169] Now, a description is given of a second aspect of the present invention.

[0170] According to the second aspect, in the printing apparatus of the first aspect, the body (e.g., the body 1) includes an upper unit (e.g., the upper unit 11) and a lower unit (e.g., the lower unit 12) removable from the upper unit. The lower unit includes the first member (e.g., the first member 16).

[0171] According to the second aspect, when the first member is damaged, the printing apparatus is repaired by simply replacing the lower unit, not by replacing the entire printing apparatus.

[0172] Now, a description is given of a third aspect of the present invention.

[0173] According to the third aspect, in the printing apparatus of the second aspect, the lower unit (e.g., the lower unit 12) includes a roller (e.g., the roller 18), which includes a shaft (e.g., the roller shaft 18a) disposed in the direction perpendicular to the scanning direction.

[0174] According to the third aspect, the roller supports the movement of the printing apparatus in the scanning direction, thus facilitating the movement of the printing apparatus.

5 **[0175]** Now, a description is given of a fourth aspect of the present invention.

[0176] According to the fourth aspect, in the printing apparatus of any one of the first to third aspects, at least one of the first member (e.g., the first member 16) and the second member (e.g., the second member 17) has a length in the direction perpendicular to the scanning direction equal to a print width (e.g., the print width Lh) of the printing device (e.g., the head 6).

10 **[0177]** According to the fourth aspect, a user accurately ascertains the print width.

[0178] Now, a description is given of a fifth aspect of the present invention.

[0179] According to the fifth aspect, in the printing apparatus of any one of the first to fourth aspects, at least one of the first member (e.g., the first member 162) and the second member (e.g., the second member 173) has a transparent portion (e.g., the transparent portion RB) or an opening (e.g., the openings 17m and 17n) at least partially.

20 **[0180]** Now, a description is given of a sixth aspect of the present invention.

[0181] According to the sixth aspect, in the printing apparatus of the fifth aspect, the transparent portion (e.g., the transparent portion RB) enables the recording medium located below the first member 162 or the second member 173 having the transparent portion to be visually recognized.

25 **[0182]** Now, a description is given of a seventh aspect of the present invention.

[0183] According to the seventh aspect, in the printing apparatus of the fifth or sixth aspect, the transparent portion (e.g., the transparent portion RB) or the opening (e.g., the openings 17m and 17n) has a length in the direction perpendicular to the scanning direction substantially equal to a print width (e.g., the print width Lh) of the printing device (e.g., the head 6).

30 **[0184]** The fifth to seventh aspects do not hide, e.g., the recording medium under the first member and the second member, thus assisting a user to perform printing at a correct position and enhancing the printing accuracy.

35 **[0185]** Now, a description is given of an eighth aspect of the present invention.

[0186] According to the eighth aspect, in the printing apparatus of the second aspect, the second member (e.g., the second member 17) is removable from the upper unit (e.g., the upper unit 11).

[0187] According to the eighth aspect, even if the second member is damaged or lost, the second member as a replaceable part enhances the maintenance of the printing apparatus.

40 **[0188]** Now, a description is given of a ninth aspect of the present invention.

45 **[0189]** According to the ninth aspect, in the printing ap-

paratus of any one of the first to eighth aspects, the second member (e.g., the second member 17) is located on an extension line from the first member (e.g., first member 16) in the scanning direction at the position at which the second member projects beyond the first member along the scanning direction.

[0190] According to the ninth aspect, the printing apparatus is accurately guided in the printing direction.

[0191] Now, a description is given of a tenth aspect of the present invention.

[0192] According to the tenth aspect, in the printing apparatus of any one of the first to eighth aspects, the second member (e.g., the second member 17) has a cut-out space (e.g., the space 171). The first member (e.g., the first member 16) is located in the space with the second member disposed at the position at which the second member projects beyond the first member along the scanning direction.

[0193] According to the tenth aspect, the second member does not interfere with the first member when the second member is opened or closed with respect to the body 1.

[0194] Now, a description is given of an eleventh aspect of the present invention.

[0195] According to the eleventh aspect, in the printing apparatus of any one of the first to eighth aspects, the second member (e.g., the second member 17) has a side parallel to the scanning direction (e.g., the outer side of each of the arms 17a and 17b) at an outermost end in the direction perpendicular to the scanning direction.

[0196] According to the eleventh aspect, the printing apparatus is accurately guided in the printing direction.

[0197] Now, a description is given of a twelfth aspect of the present invention.

[0198] According to the twelfth aspect, in the printing apparatus of any one of the first to eighth aspects, the first member (e.g., the first member 16 or 161) includes a plurality of marks (e.g., the notches 16a, 16b, and 16c) disposed at equal intervals in the direction perpendicular to the scanning direction.

[0199] According to the twelfth aspect, the marks assist a user to print a printing object at a correct position, thus enhancing the printing accuracy.

[0200] Now, a description is given of a thirteenth aspect of the present invention.

[0201] According to the thirteenth aspect, in the printing apparatus of any one of the first to eighth aspects, the first member (e.g., the first member 56) has a space to house the second member (e.g., the second member 57). The second member is drawn from the space.

[0202] Now, a description is given of a fourteenth aspect of the present invention.

[0203] According to the fourteenth aspect, in the printing apparatus of any one of the first to eighth aspects, the second member (e.g., the second member 59) is disposed below the first member (e.g., the first member 58). The second member is drawn from the body (e.g., the body 50).

[0204] Now, a description is given of a fifteenth aspect of the present invention.

[0205] According to the fifteenth aspect, in the printing apparatus of any one of the first to eighth aspects, the second member (e.g., the second member 61) is a rod-shaped member. The second member housed in the body (e.g., the body 50) has a length along the direction perpendicular to the scanning direction.

[0206] Now, a description is given of a sixteenth aspect of the present invention.

[0207] According to the sixteenth aspect, in the printing apparatus of any one of the first to eighth aspects, the body (e.g., the body 50) includes a display screen (e.g., the touch panel 54) on a side of the body. The first member (e.g., the first member 56) and the second member (e.g., the second member 57) are disposed below the display screen.

[0208] According to the thirteenth to sixteenth aspects, even in a case in which it is difficult to secure an enough space to house the second member in the body, the body is provided with the second member.

[0209] The above-described embodiments are illustrative and do not limit the present invention. Thus, numerous additional modifications and variations are possible in light of the above teachings. For example, elements and/or features of different illustrative embodiments may be combined with each other and/or substituted for each other within the scope of the present invention.

Claims

1. A printing apparatus (100) comprising:

- a printing device (6) configured to perform printing on a recording medium;
- a body (1) configured to hold the printing device (6);
- a first member (16) projecting from the body (1) in a scanning direction in which the body (1) moves,
- the first member (16) being configured to indicate a printing start position of the printing device (6) on the recording medium; and
- a second member (17) configured to:

move between a position at which the second member (17) projects beyond the first member (16) along the scanning direction and a position at which the second member (17) is housed in the body (1) or the first member (16), and
indicate a print width of the printing device (6) in a direction perpendicular to the scanning direction or in a direction perpendicular to a printing direction in which the printing apparatus (100) performs printing with the printing device (6).

2. The printing apparatus (100) according to claim 1,
 wherein the body (1) includes:
 an upper unit (11); and
 a lower unit (12) removable from the upper unit (11), and
 wherein the lower unit (12) includes the first member (16).
3. The printing apparatus (100) according to claim 2, wherein the lower unit (12) includes a roller (18) including a shaft disposed in the direction perpendicular to the scanning direction.
4. The printing apparatus (100) according to any one of claims 1 to 3, wherein at least one of the first member (16) and the second member (17) has a length in the direction perpendicular to the scanning direction equal to a print width of the printing device (6).
5. The printing apparatus (100) according to any one of claims 1 to 4, wherein at least one of the first member (162) and the second member (173) has a transparent portion (RB) or an opening (17m, 17n) at least partially.
6. The printing apparatus (100) according to claim 5, wherein the transparent portion (RB) enables the recording medium located below the first member (162) or the second member (173) having the transparent portion (RB) to be visually recognized.
7. The printing apparatus (100) according to claim 5 or 6, wherein the transparent portion (RB) or the opening has a length in the direction perpendicular to the scanning direction substantially equal to a print width of the printing device (6).
8. The printing apparatus (100) according to claim 2, wherein the second member (17) is removable from the upper unit (11).
9. The printing apparatus (100) according to any one of claims 1 to 8, wherein the second member (17) is located on an extension line from the first member (16) in the scanning direction at the position at which the second member (17) projects beyond the first member (16) along the scanning direction.
10. The printing apparatus (100) according to any one of claims 1 to 8, wherein the second member (17) has a cutout
- space (171), and wherein the first member (16) is located in the space (171) with the second member (17) disposed at the position at which the second member (17) projects beyond the first member (16) along the scanning direction.
11. The printing apparatus (100) according to any one of claims 1 to 8, wherein the second member (17) has a side parallel to the scanning direction at an outermost end in the direction perpendicular to the scanning direction.
12. The printing apparatus (100) according to any one of claims 1 to 8, wherein the first member (56) has a space to house the second member (57), and wherein the second member (57) is configured to be drawn from the space.
13. The printing apparatus (100) according to any one of claims 1 to 8, wherein the second member (59) is disposed below the first member (58), and wherein the second member (59) is configured to be drawn from the body (50).
14. The printing apparatus (100) according to any one of claims 1 to 8, wherein the second member (61) is a rod-shaped member, and wherein the second member (61) housed in the body (50) has a length along the direction perpendicular to the scanning direction.
15. The printing apparatus (100) according to any one of claims 1 to 8, wherein the body (50) includes a display screen (54) on a side of the body (50), and wherein the first member (56) and the second member (57) are disposed below the display screen (54).

FIG. 1

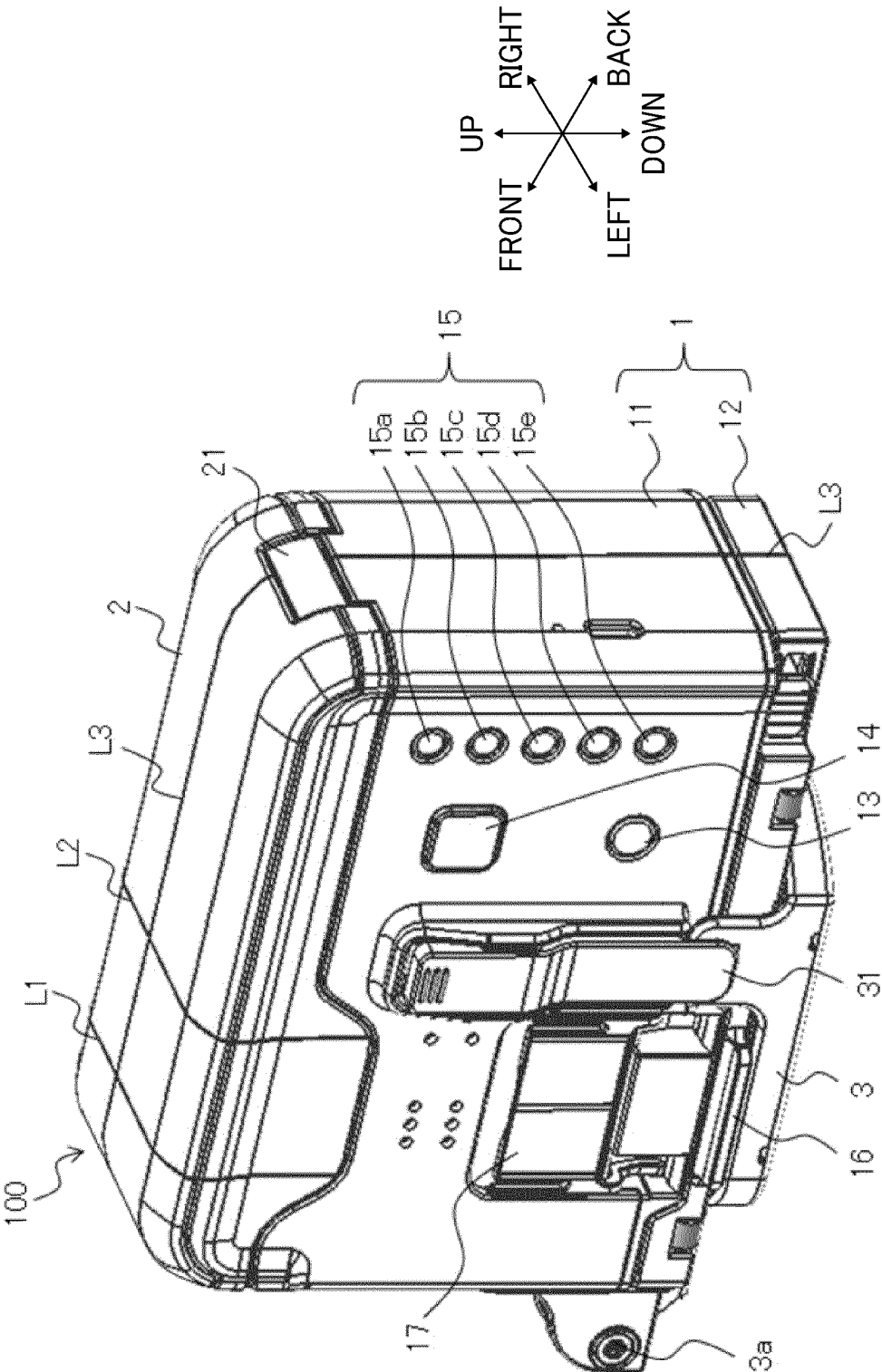


FIG. 2

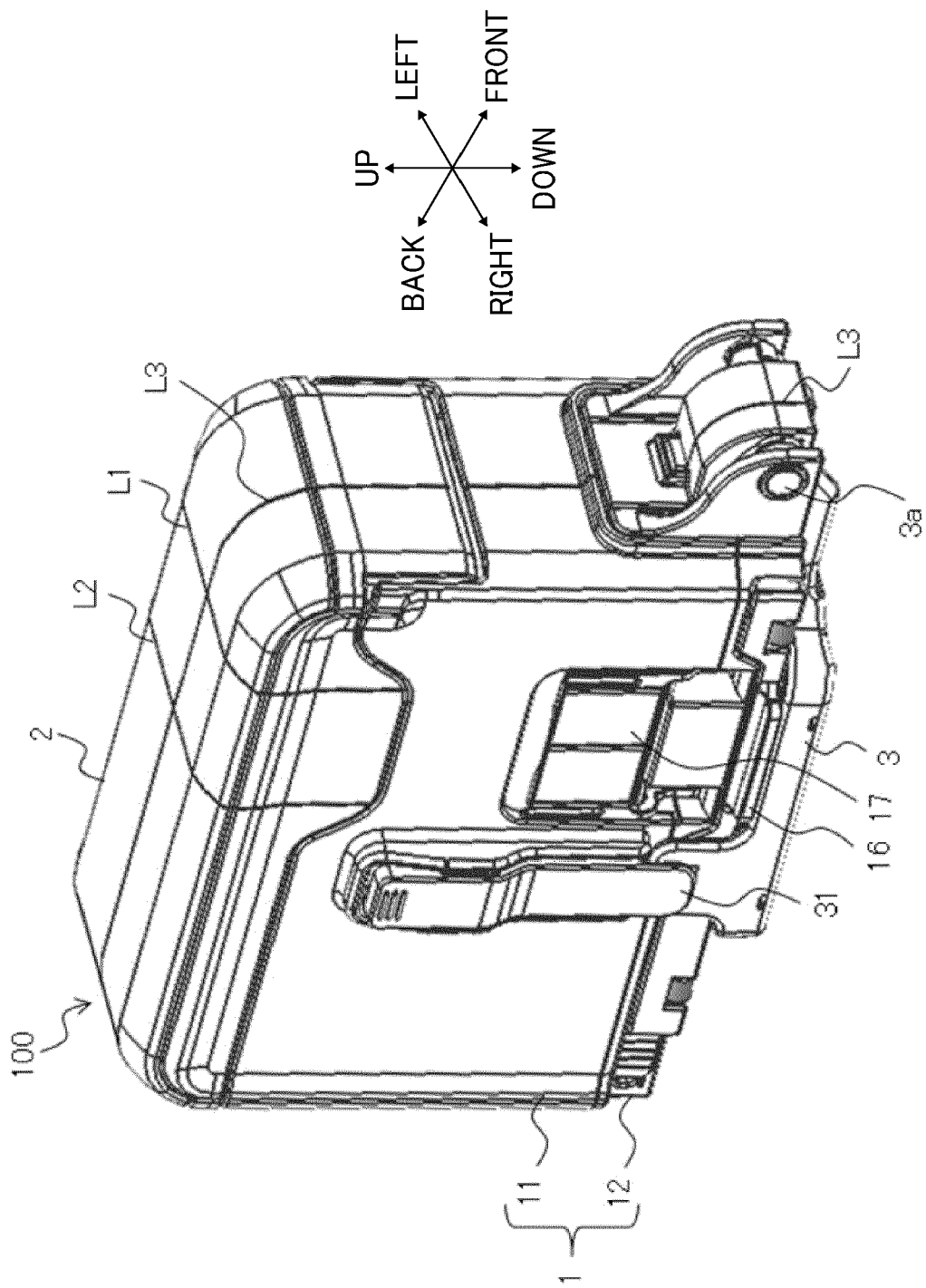


FIG. 3

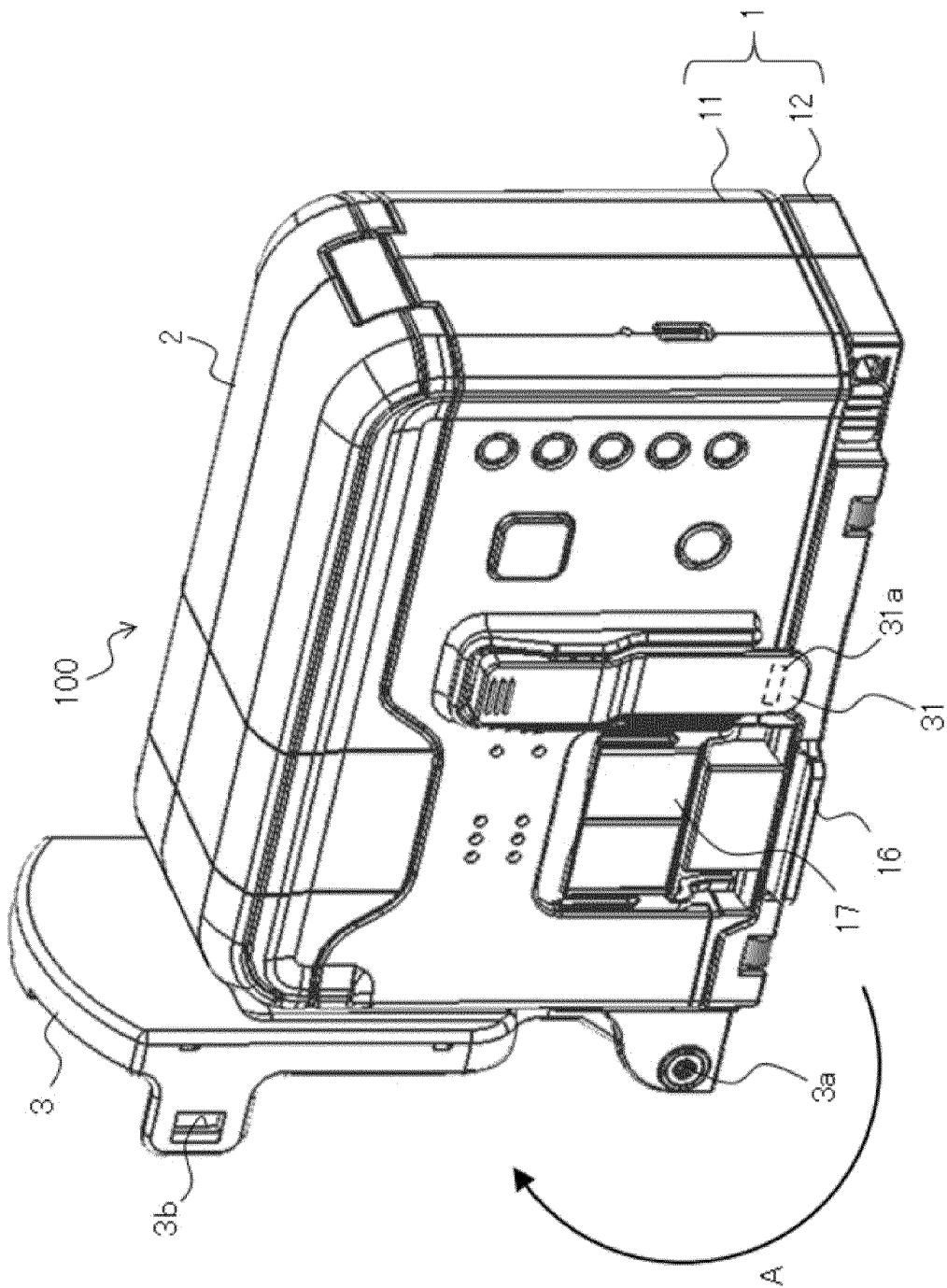


FIG. 4

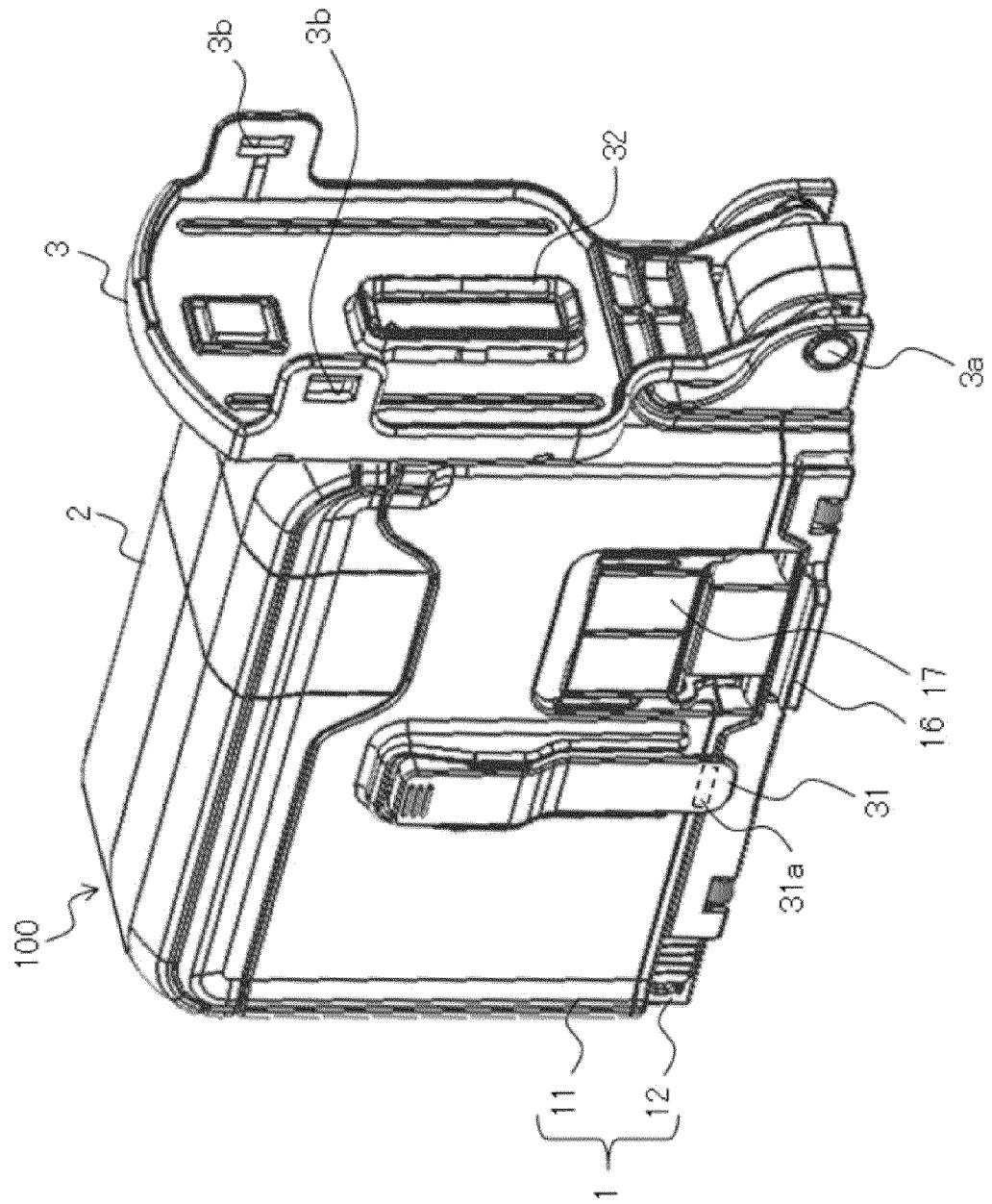


FIG. 5

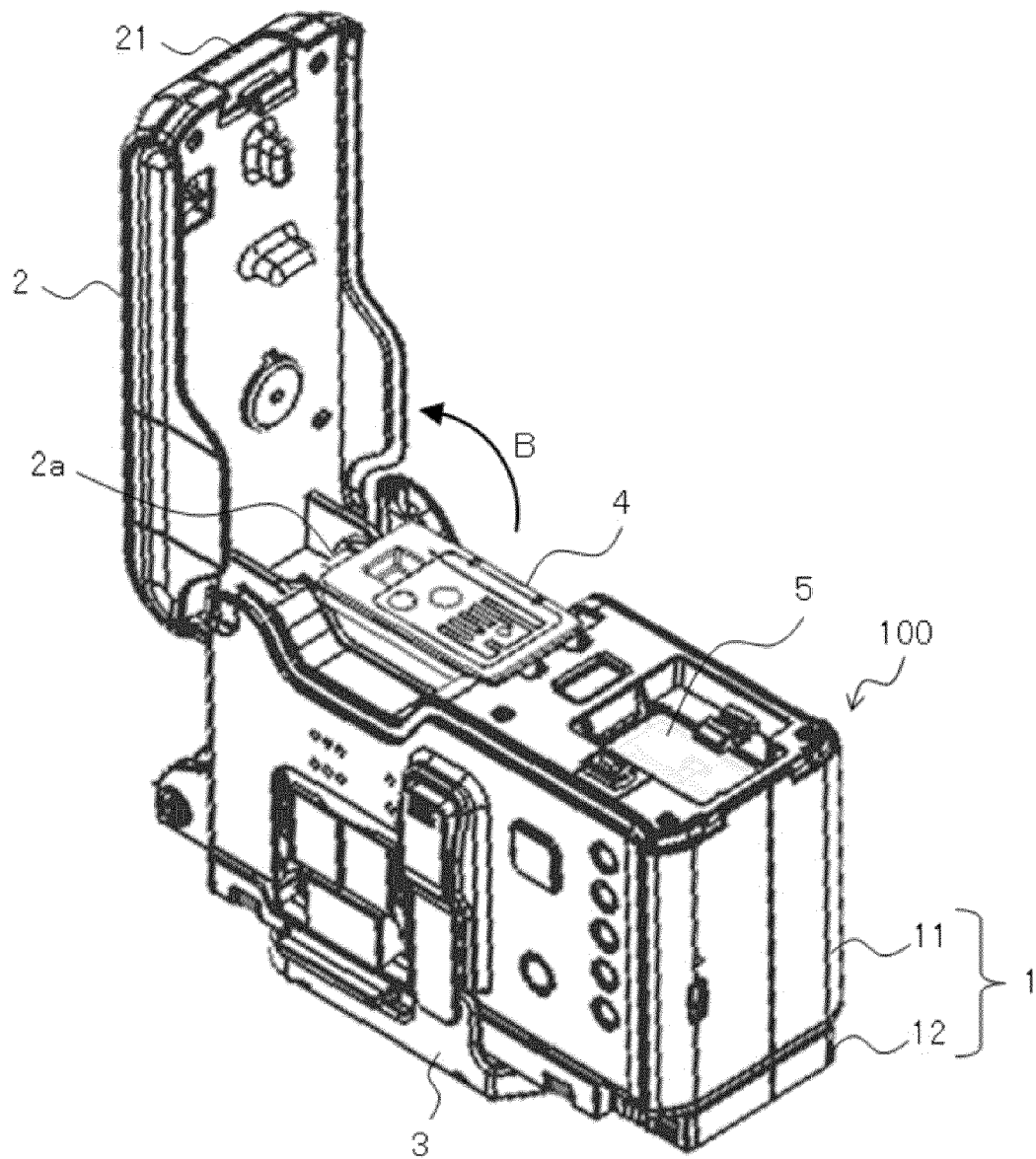


FIG. 6

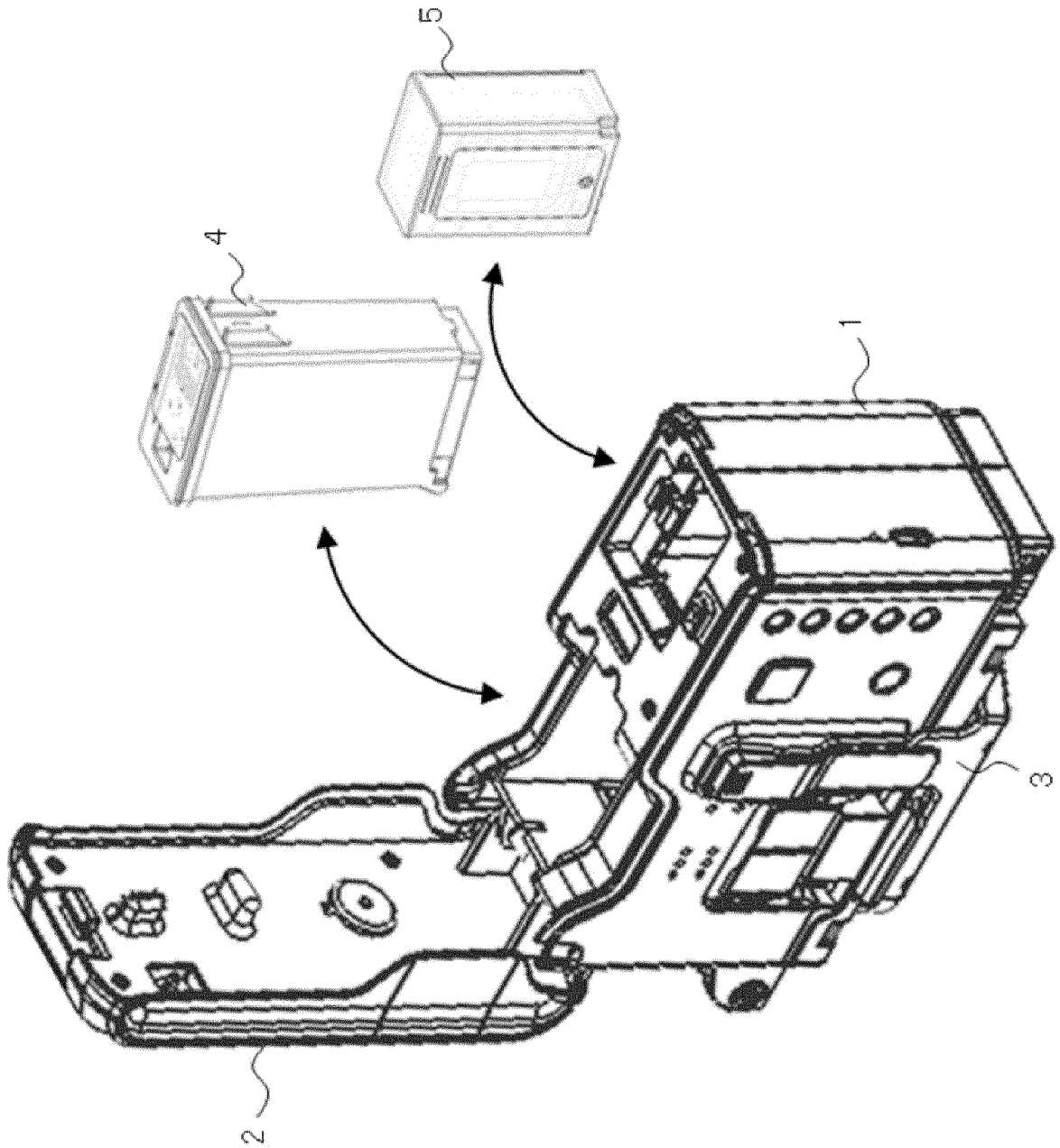


FIG. 7

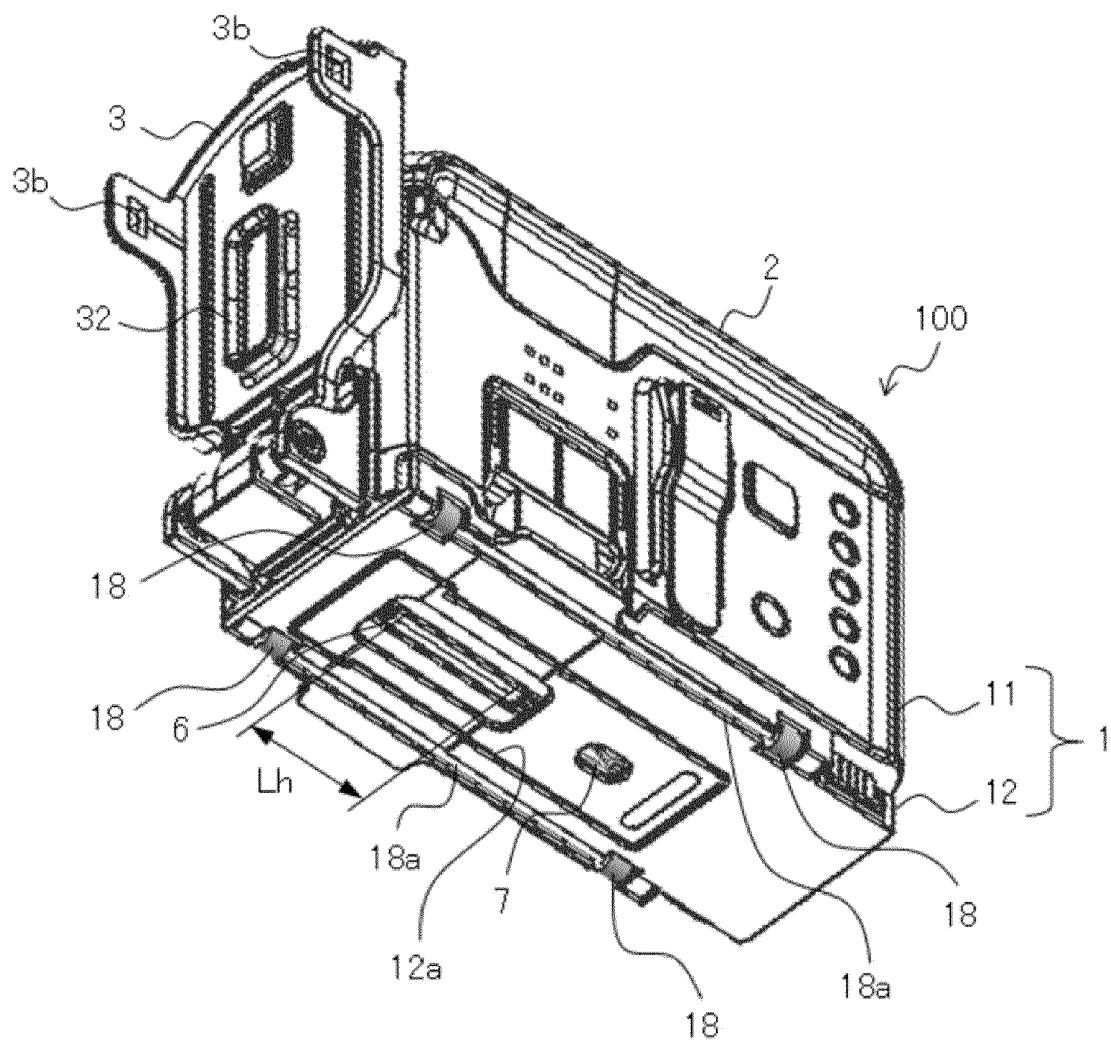


FIG. 8

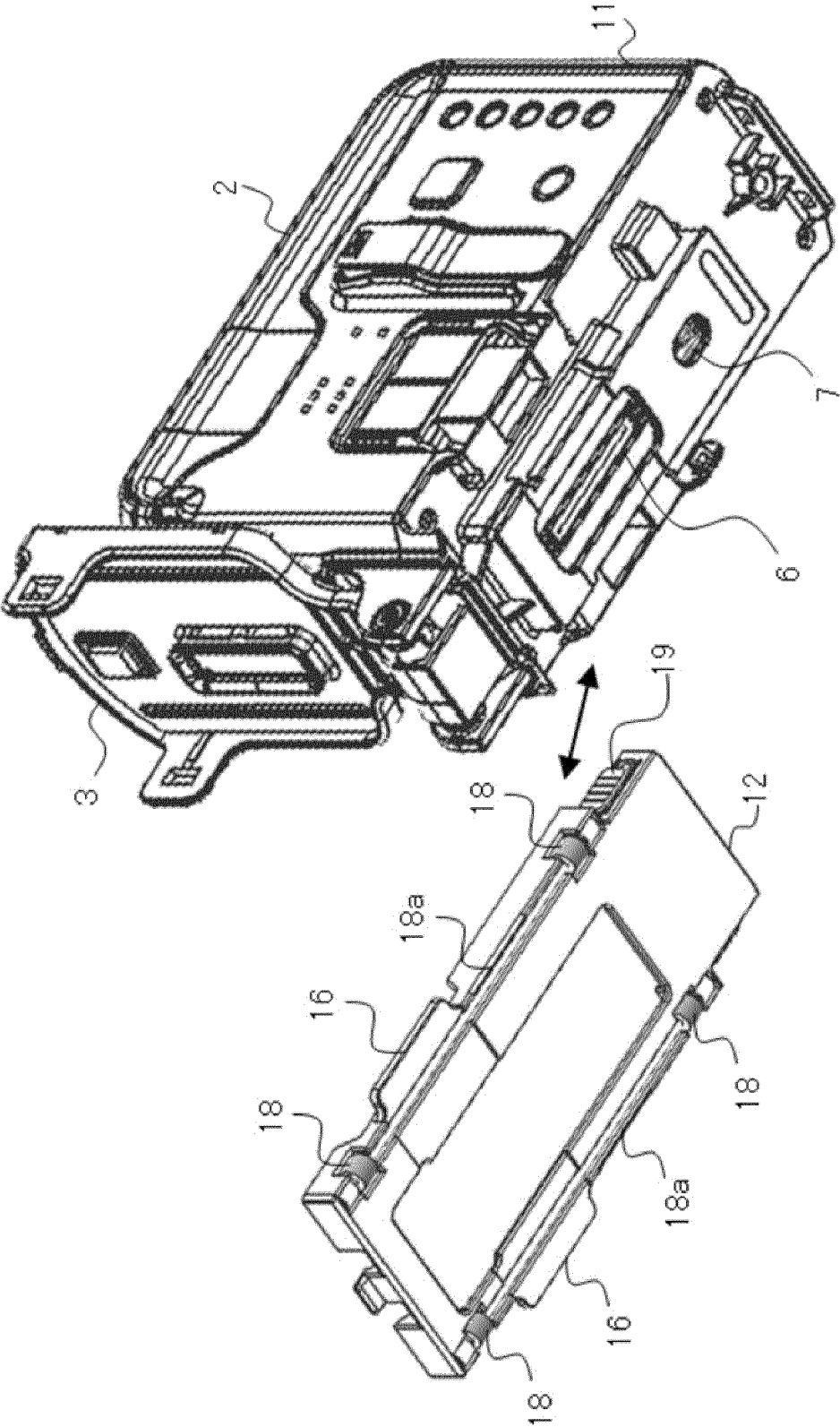


FIG. 9

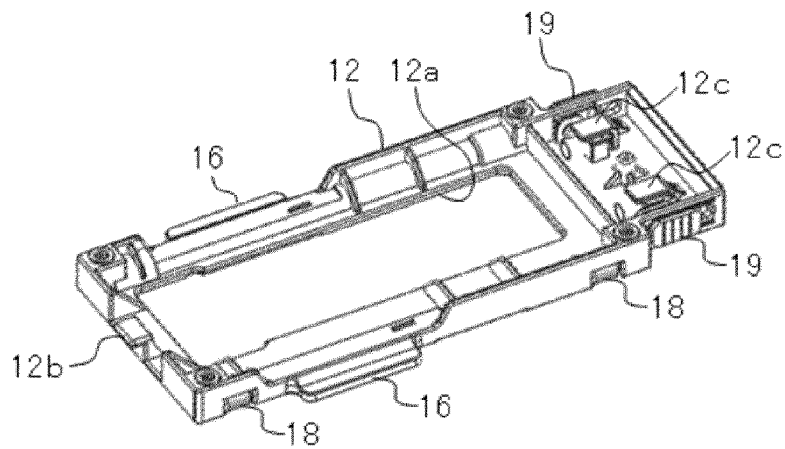


FIG. 10

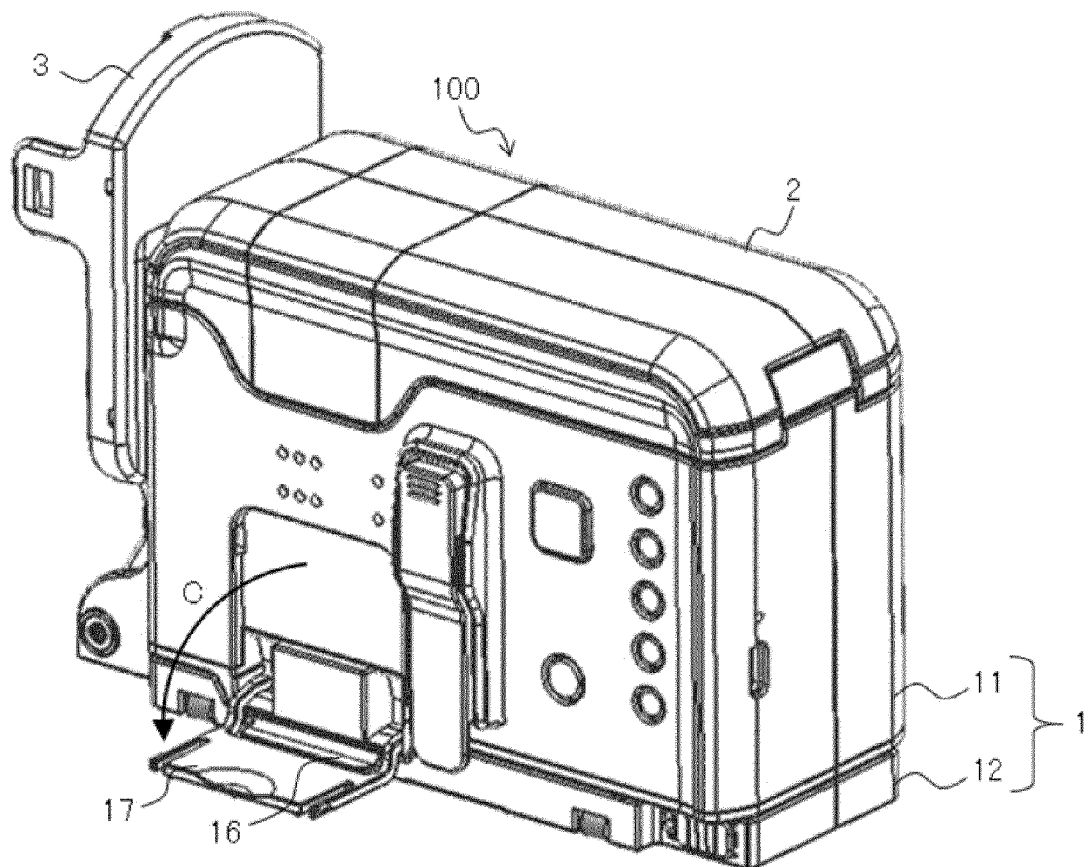


FIG. 11

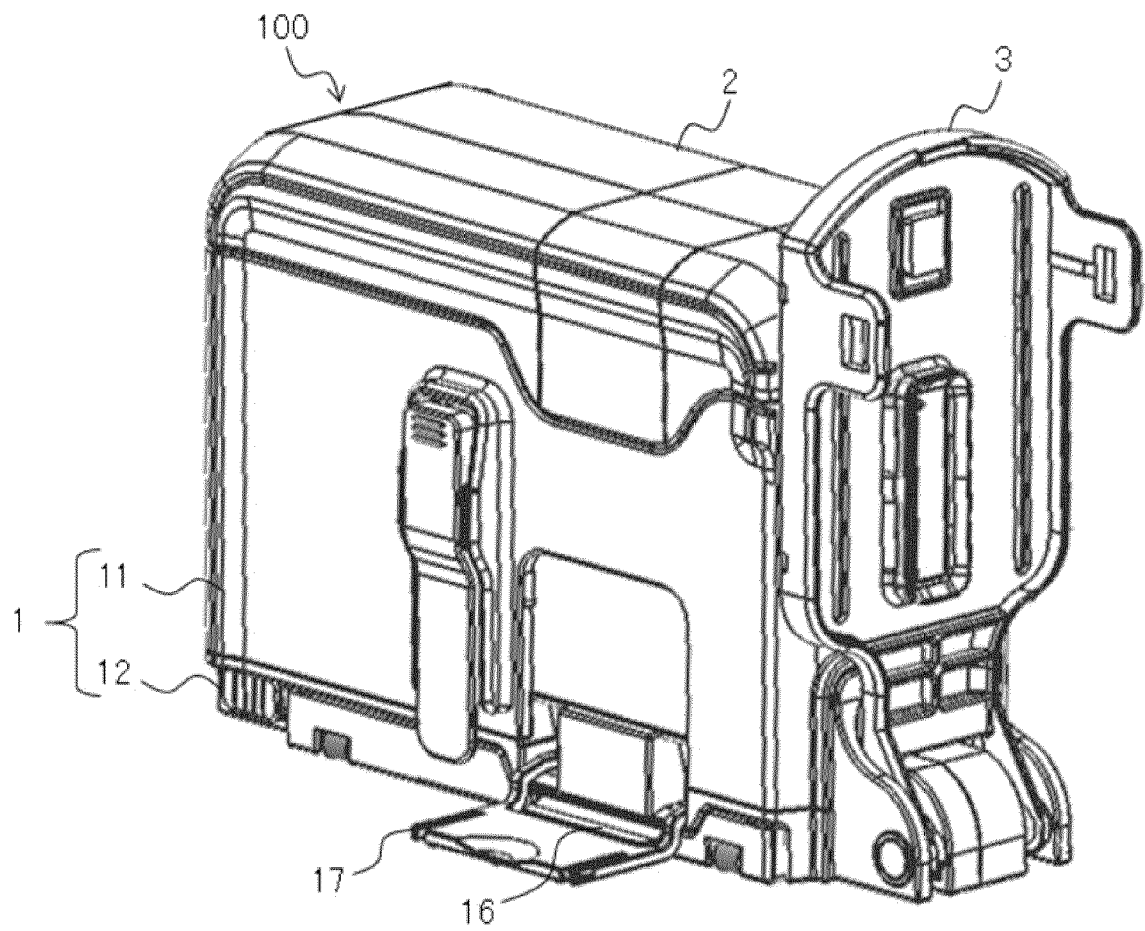


FIG. 12B

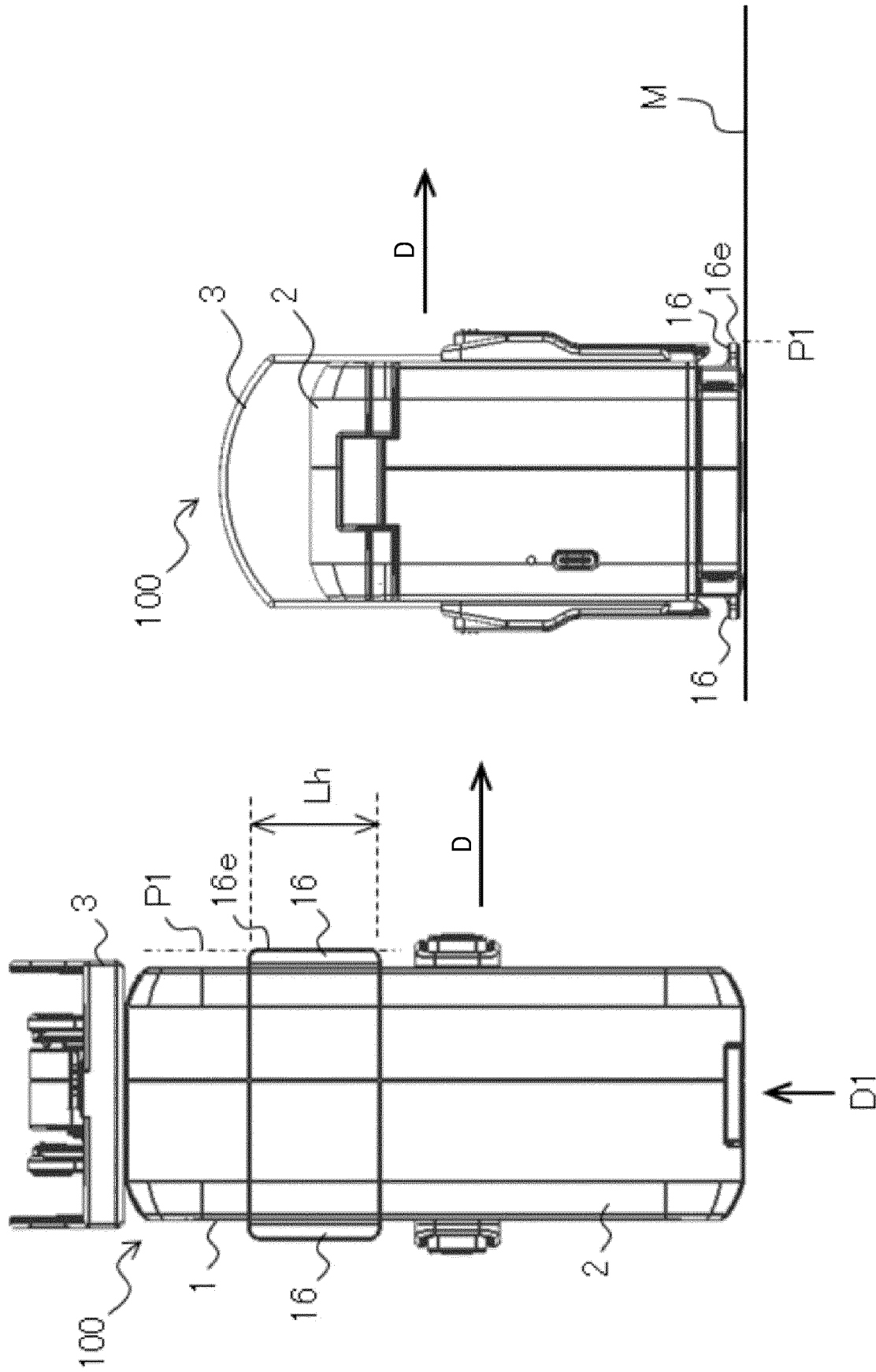


FIG. 13A

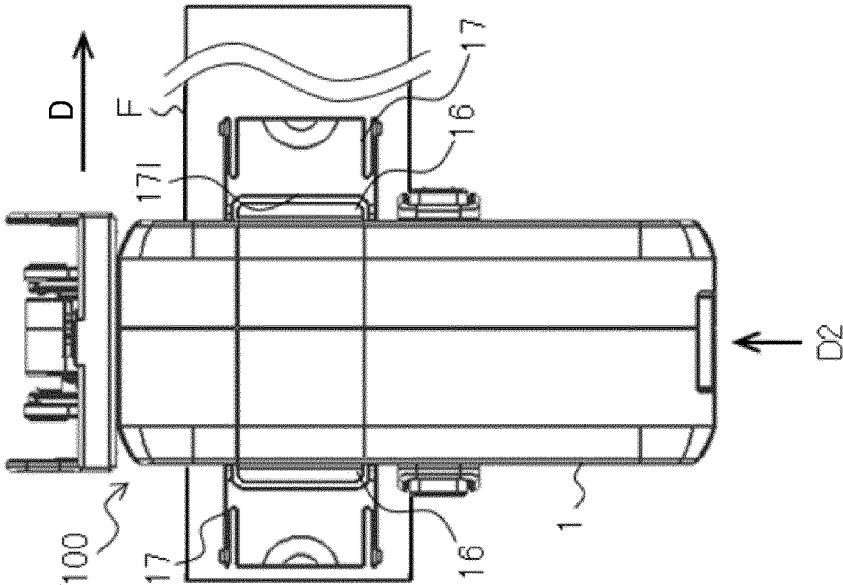


FIG. 13B

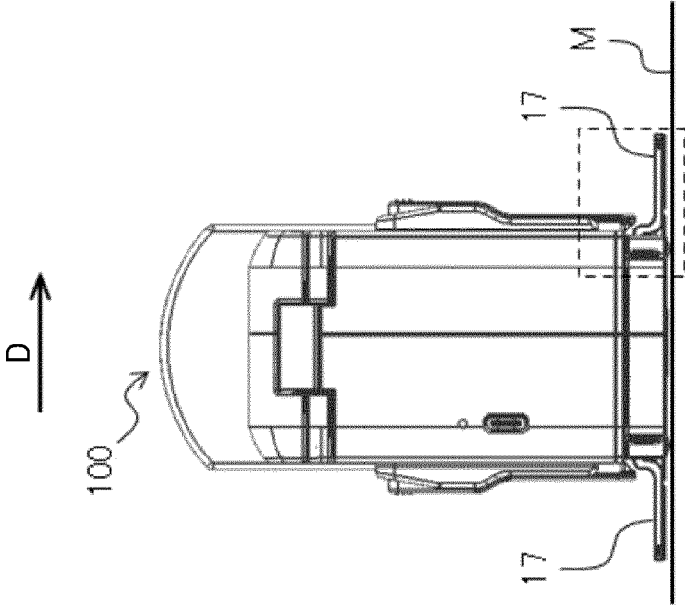


FIG. 13C

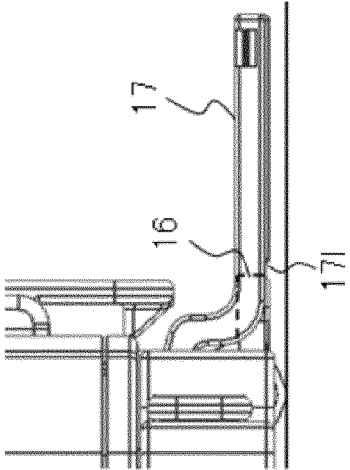


FIG. 14

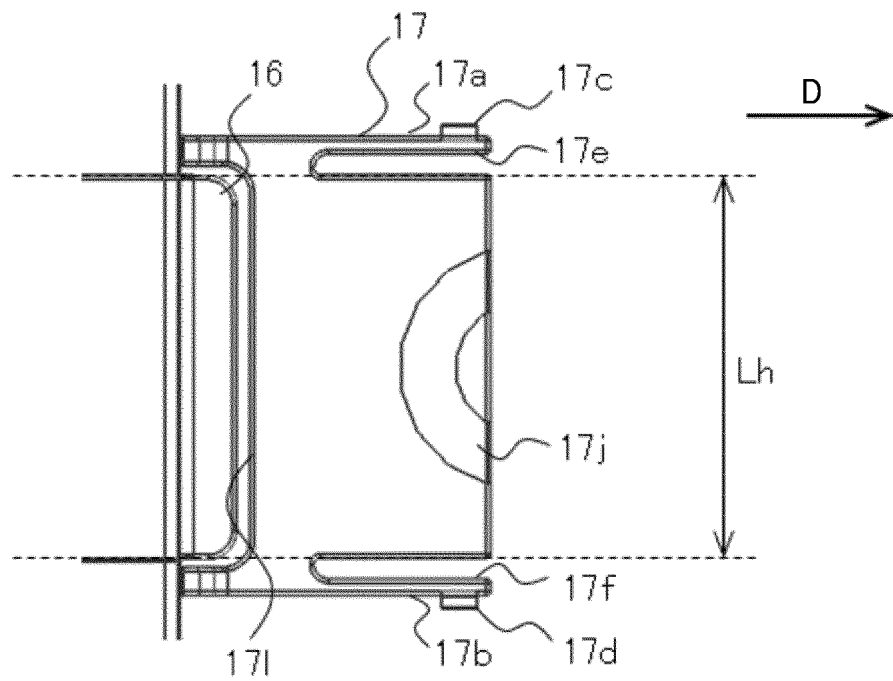


FIG. 15A

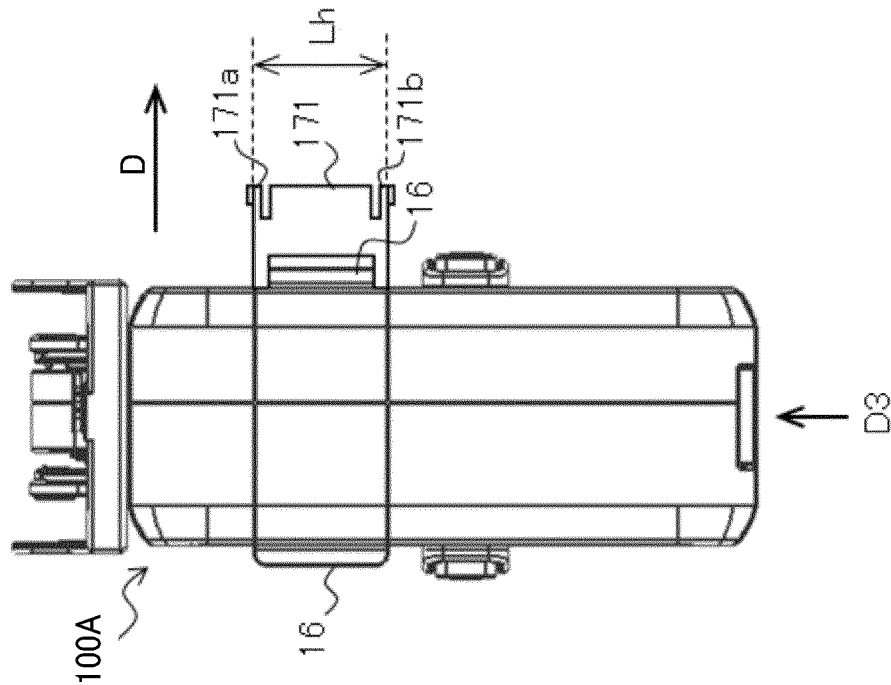


FIG. 15B

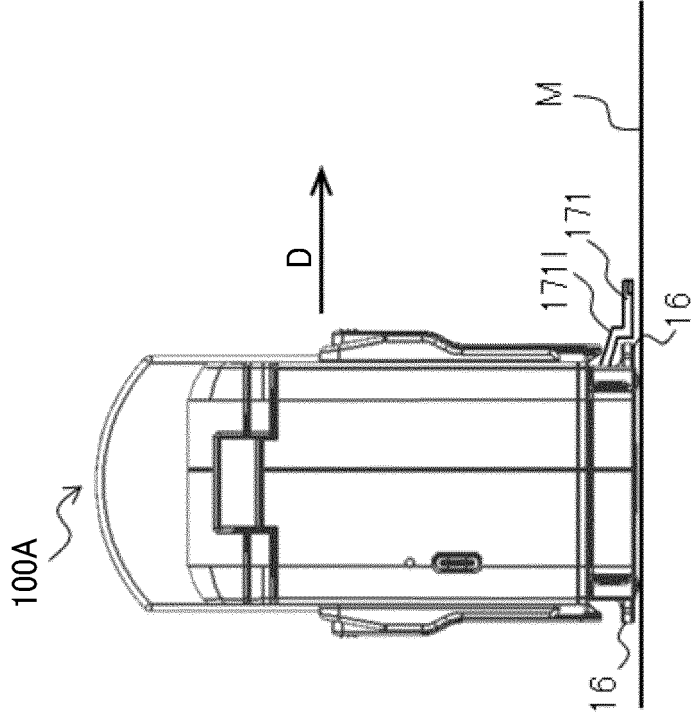


FIG. 16A

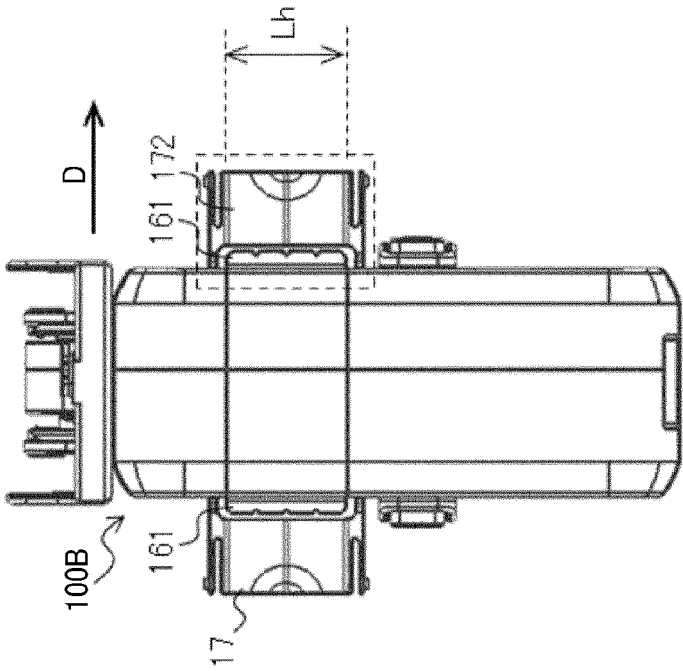


FIG. 16B

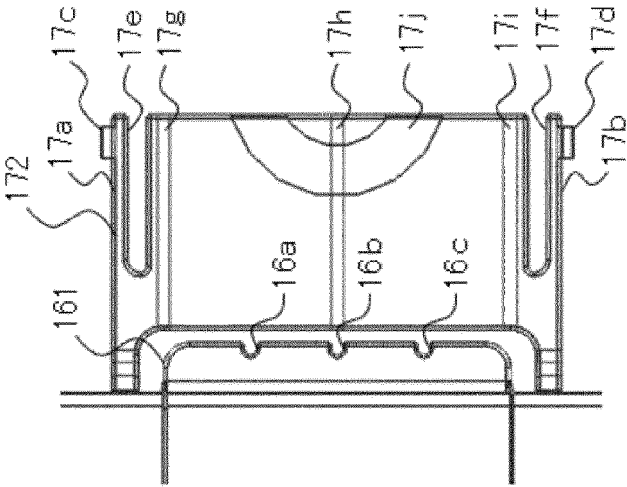


FIG. 17

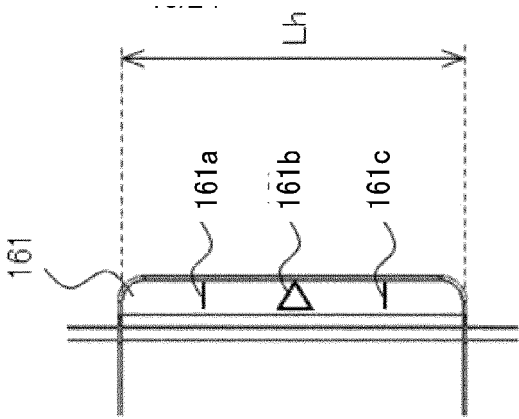


FIG. 18A

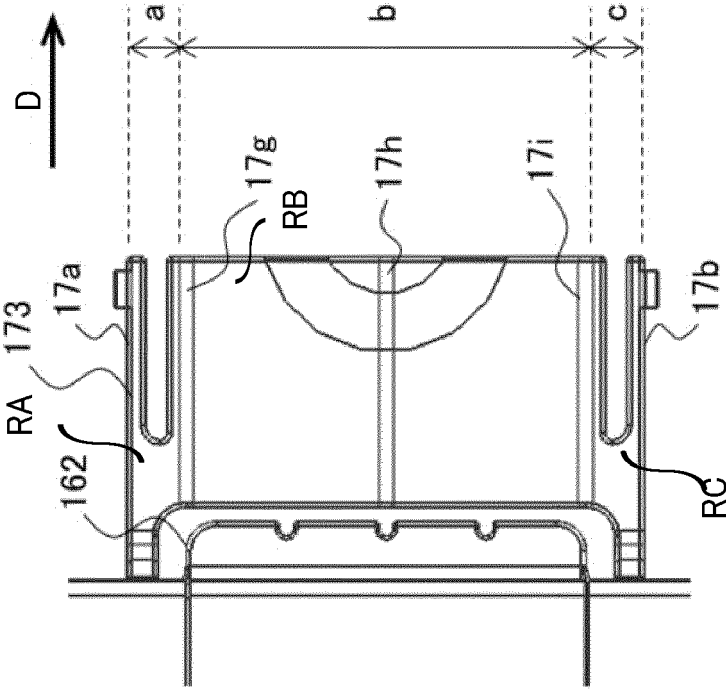


FIG. 18B

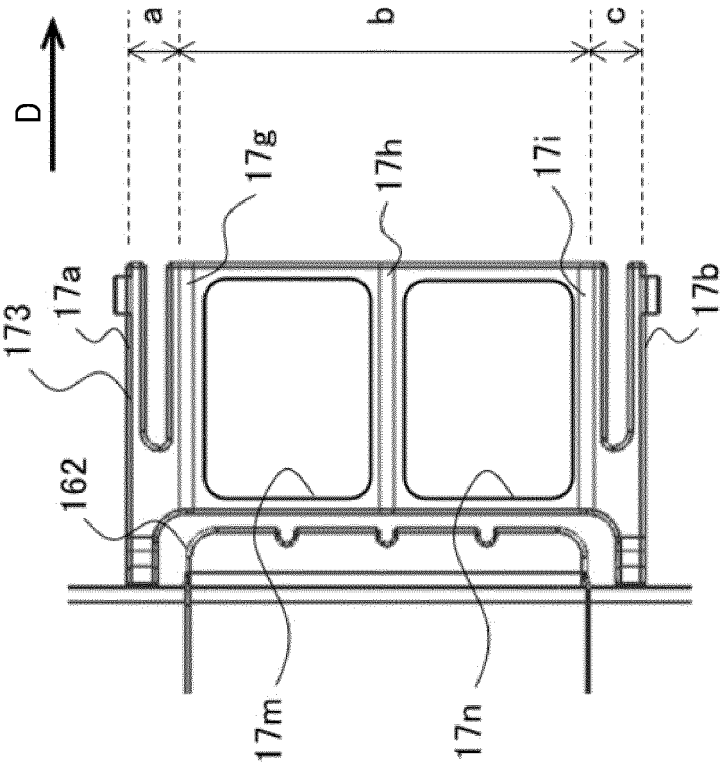


FIG. 19

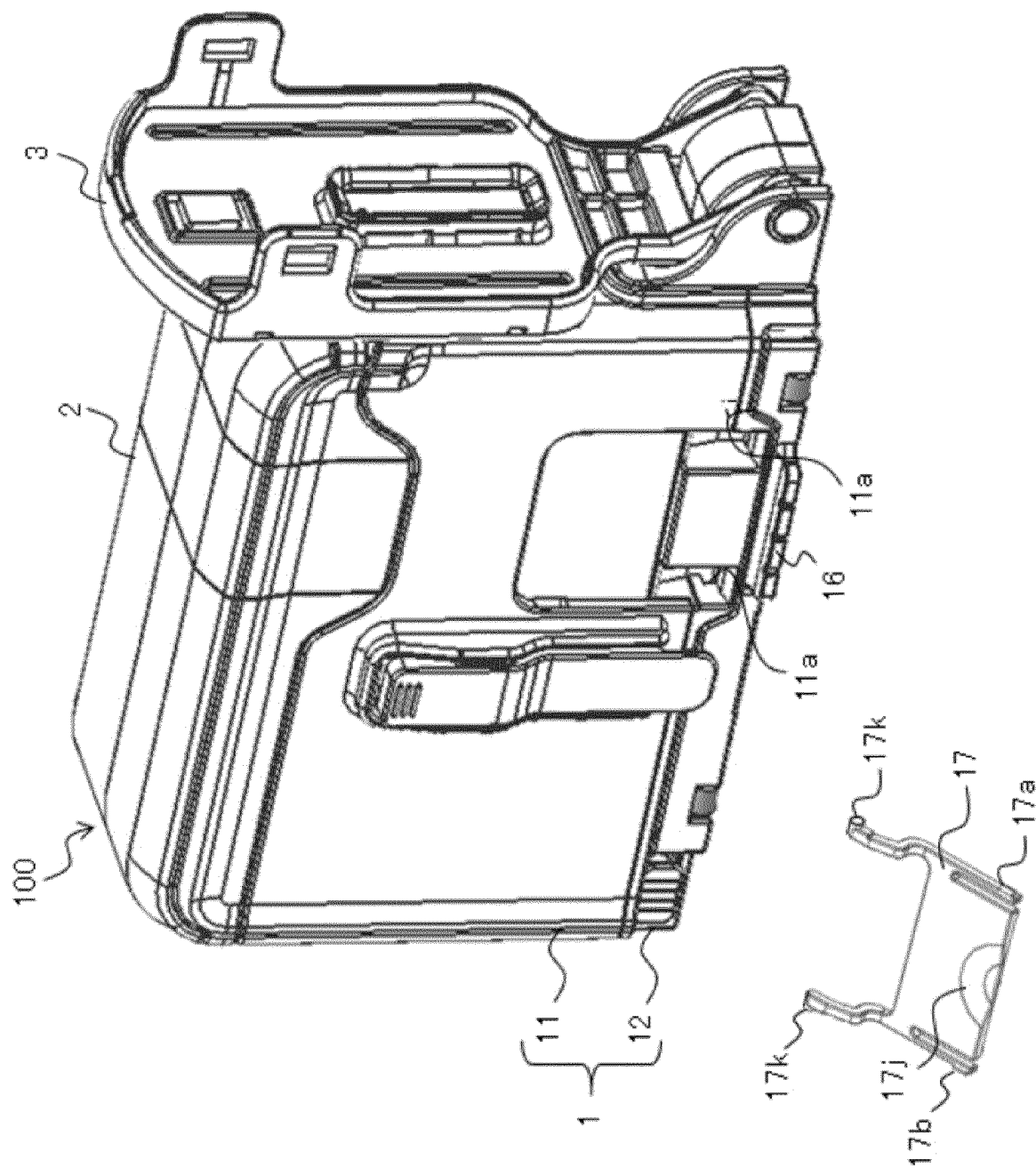


FIG. 20

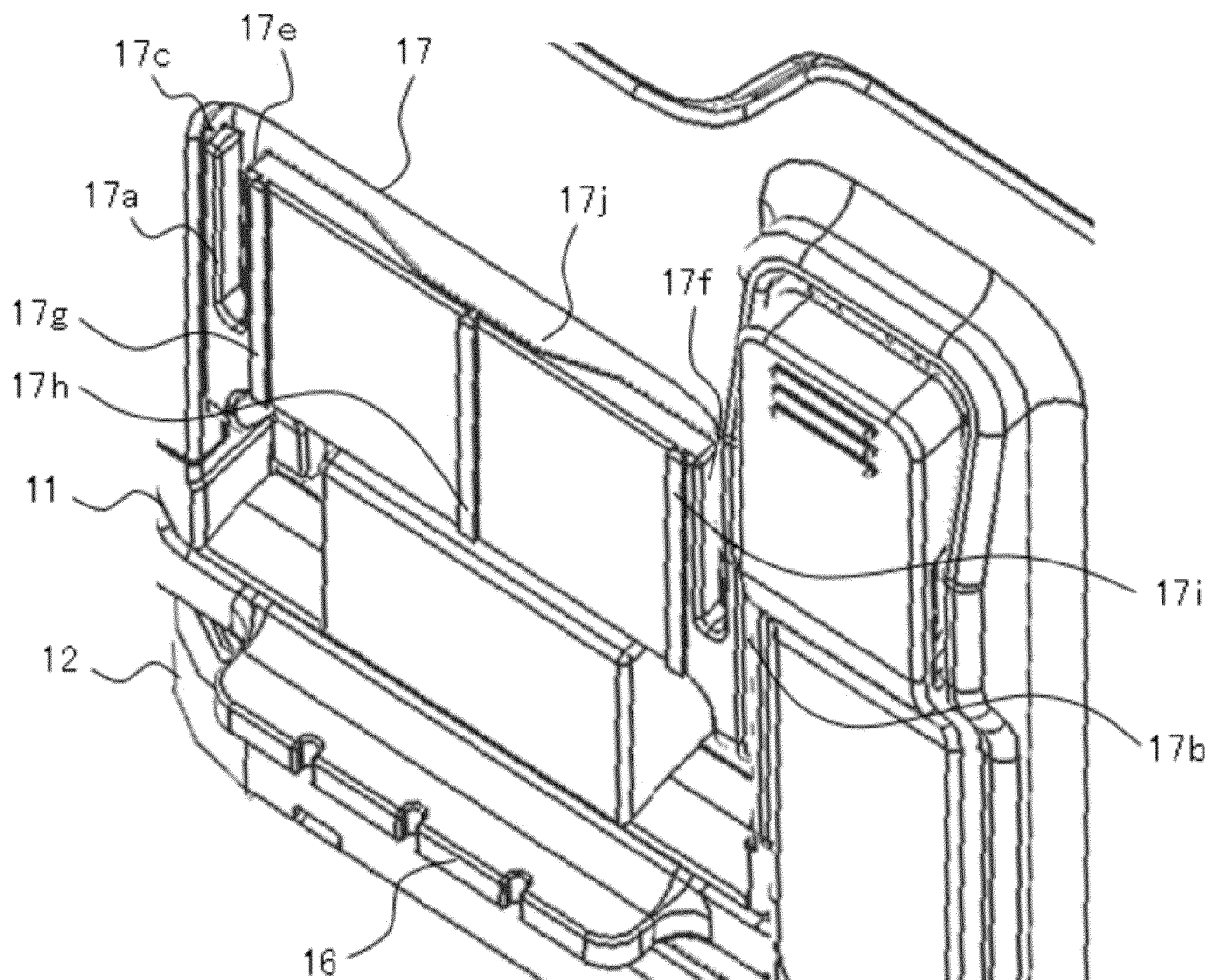


FIG. 21A

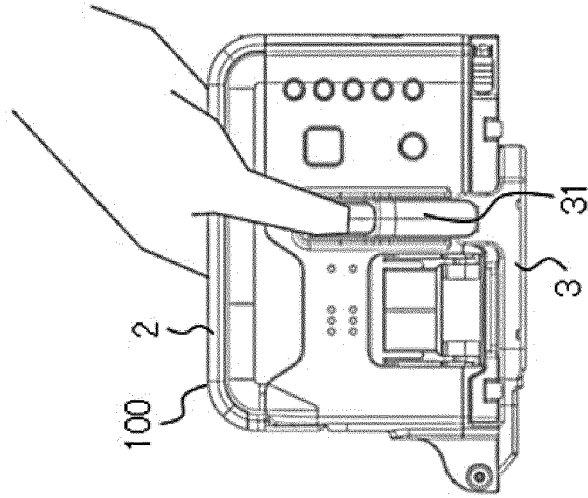


FIG. 21B

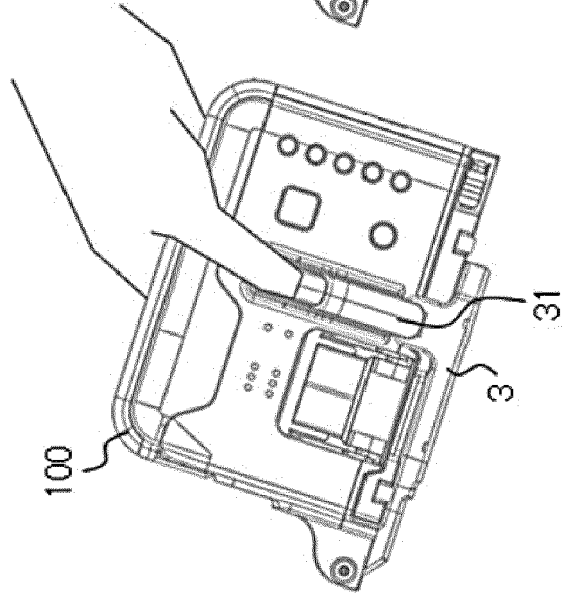


FIG. 21C

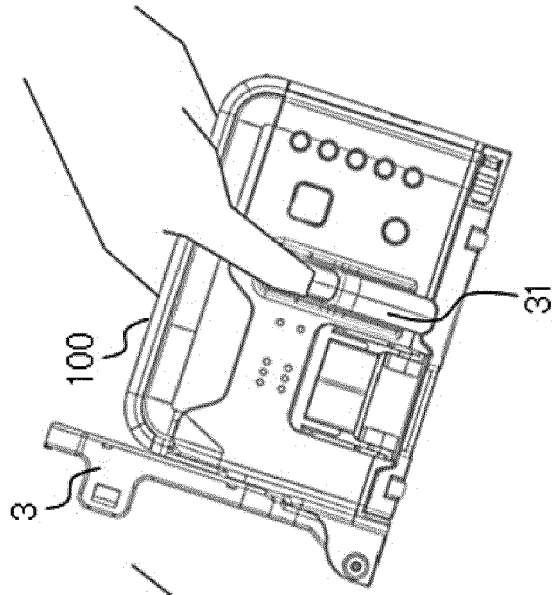


FIG. 22

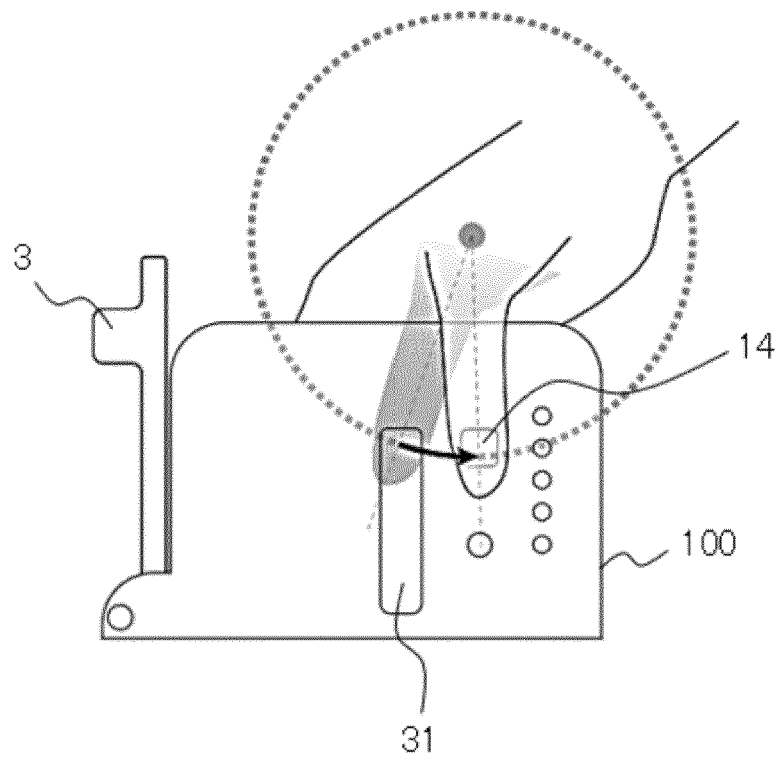


FIG. 23A

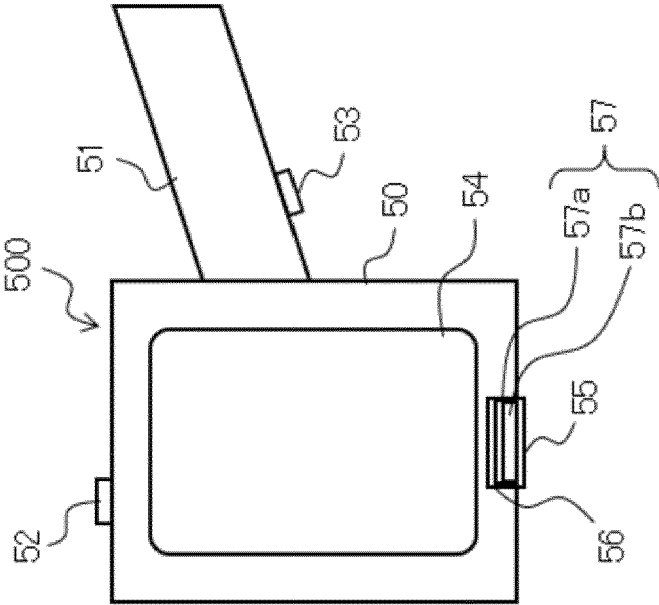


FIG. 23B

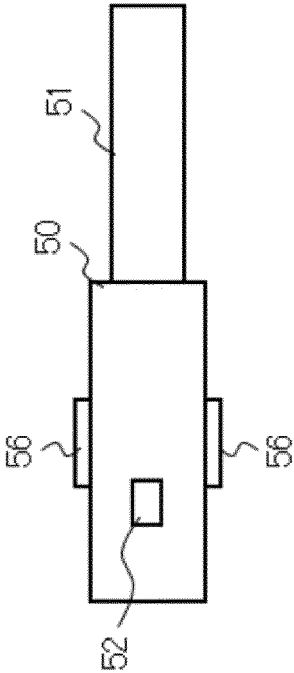


FIG. 23C

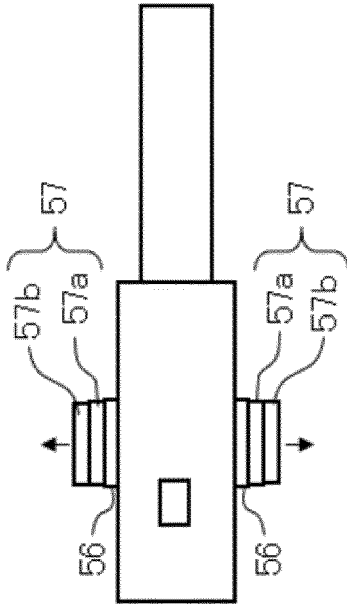


FIG. 24A

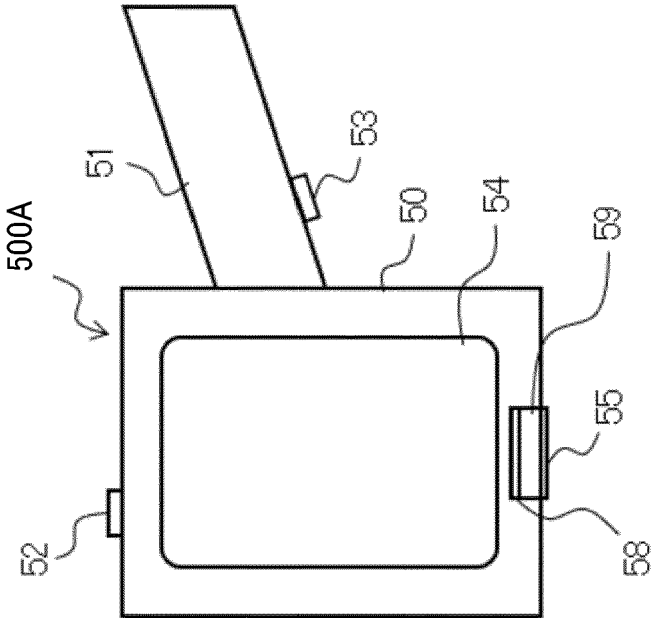


FIG. 24B

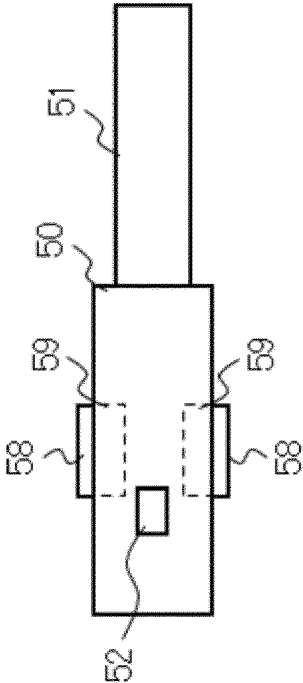


FIG. 24C

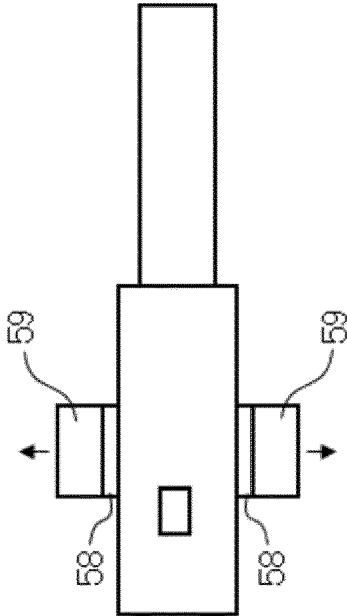


FIG. 25A

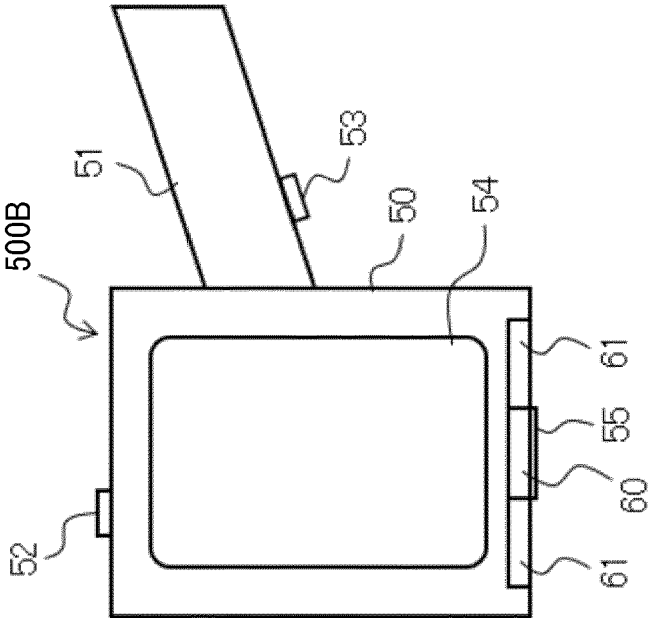


FIG. 25B

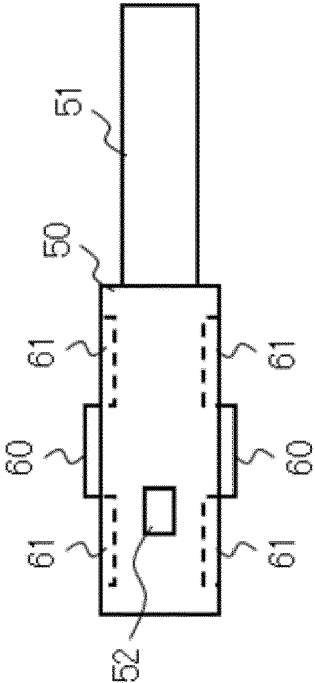


FIG. 25C

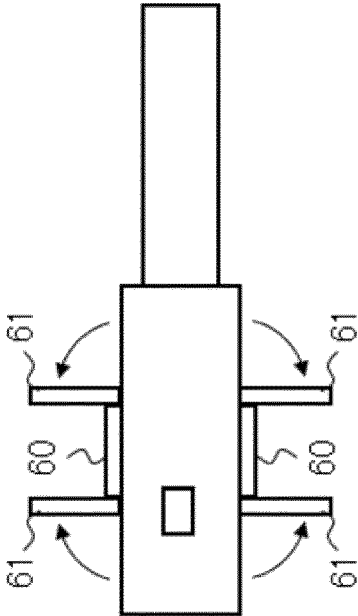


FIG. 26A

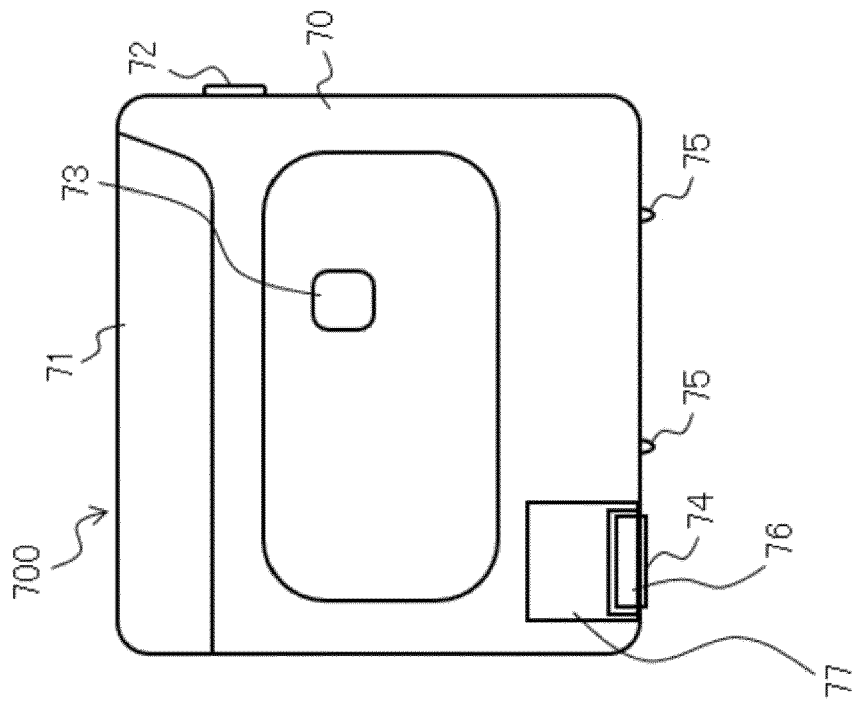


FIG. 26B

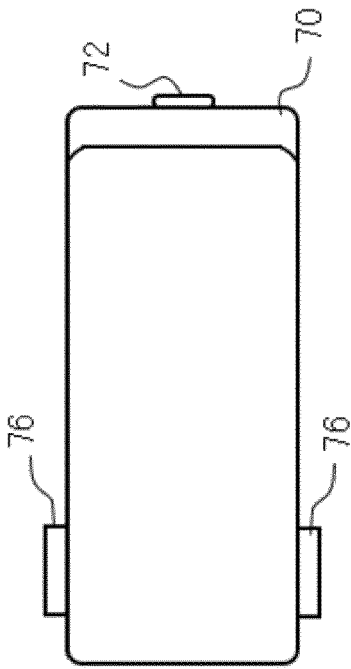
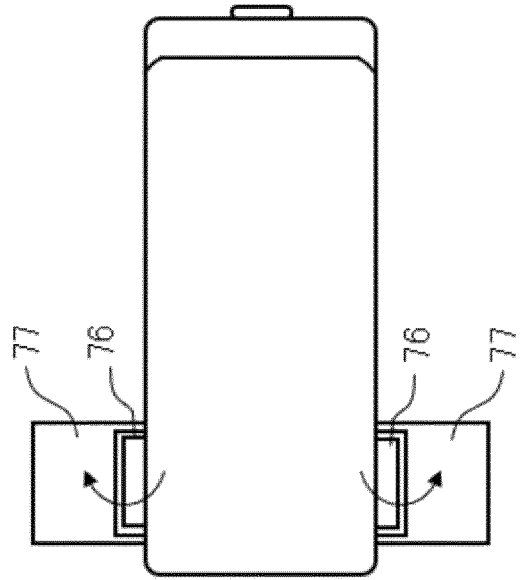


FIG. 26C





EUROPEAN SEARCH REPORT

Application Number

EP 22 15 0782

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EPO FORM 1503 03.82 (P04C01)

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 10 427 426 B2 (RICOH CO LTD [JP]) 1 October 2019 (2019-10-01) * column 1, lines 17-26; figures 1, 2, 3a, 3b, 8-10 * * column 2, line 21 - column 7, line 62 * * column 3, lines 17-26 * * column 4, lines 11-19 * * column 4, lines 44-54 * * column 5, lines 15-32 * * column 11, lines 43-45 * -----	1-15	INV. B41J2/175
X	US 2020/094548 A1 (NISHIOKA KUNIHICO [JP] ET AL) 26 March 2020 (2020-03-26) * paragraphs [0045] - [0050]; figure 3 * -----	1	
X	US 2002/140765 A1 (OKAMURA YOSHITAKA [JP] ET AL) 3 October 2002 (2002-10-03) * paragraphs [0085], [0093], [0108], [0139], [0151], [0263]; claim 1; figures 1, 4-6 * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC) B41J
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 20 June 2022	Examiner Adam, Emmanuel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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ON EUROPEAN PATENT APPLICATION NO.**

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20-06-2022

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		US 2002140765 A1	03-10-2002

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