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(54) Printing-liquid cartridge and recording apparatus using the same

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Cartouche de liquide d'impression et appareil d'enregistrement l'utilisant

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DescriptionTECHNICAL FIELD

[0001] The present invention relates to a printing-liquid cartridge that is mountable into and removable from a cartridge mounting portion, and to a recording apparatus having the cartridge mounting portion and printing-liquid cartridge.

BACKGROUND

[0002] A known image recording apparatus of a so-called tube-supply system has an ink cartridge that is positioned on the outside of a carriage on which a recording head is mounted, and the ink cartridge and the recording head are connected via a tube. The ink cartridge is configured to insert horizontally into an opening of a cartridge mounting portion positioned in the front of the image recording apparatus. The cartridge may be inserted into and removed from the cartridge mounting portion. When the ink cartridge is inserted into the cartridge mounting portion, an ink channel extending from the ink cartridge to the recording head is formed.

[0003] The cartridge mounting portion may include a hollow needle or the like, which is referred to as an "ink needle," such that the ink stored in the ink cartridge is supplied to the recording head via the tube.

[0004] The mounting portion may include a locking mechanism configured to retain the ink cartridge in its mounted state and a biasing member configured to bias the ink cartridge toward the opening of the cartridge mounting portion.

[0005] In this manner, a reduction in size of the recording apparatus is constrained by an arrangement of the locking mechanism in the cartridge mounting portion.

[0006] US 6 767 075 discloses a cartridge according to the preamble of claim 1.

SUMMARY

[0007] In view of these and other shortcomings of the related art, it is an object of the invention to provide the smaller recording apparatus.

[0008] According to an aspect of the invention, there is provided a print liquid cartridge according to claim 1.

[0009] According to another aspect of the invention, there is provided a recording apparatus according to claim 13.

[0010] Other objects, features, and advantages will be apparent to persons of ordinary skill in the art from the following detailed description of the invention and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] For a more complete understanding of the present invention, needs satisfied thereby, and the ob-

jects, features, and advantages thereof, reference now is made to the following description taken in connection with the accompanying drawings.

Fig. 1 is a conceptual cross-sectional view showing an internal structure of a printer provided with a cartridge mounting unit according to an embodiment of the invention;

Fig. 2 is a perspective view of an ink cartridge;

Fig. 3 is a vertical cross-sectional view showing an internal structure of the ink cartridge of Fig. 2;

Fig. 4 is a vertical cross-sectional view of a cartridge mounting unit;

Fig. 5A is a vertical cross-sectional view of the ink cartridge of Fig. 3 mounted on the cartridge mounting unit of Fig. 4, illustrating a state in which the ink cartridge is initially being inserted into the cartridge mounting unit;

Fig. 5B is a vertical cross-sectional view of the ink cartridge of Fig. 3 mounted on the cartridge mounting unit of Fig. 4, illustrating a state in which the ink cartridge is further being inserted into the cartridge mounting unit after the state of Fig. 5A;

Fig. 6A is a vertical cross-sectional view of the ink cartridge of Fig. 3 mounted on the cartridge mounting unit of Fig. 4, illustrating a state in which the ink cartridge is fully mounted in the cartridge mounting unit;

Fig. 6B is a vertical cross-sectional view of the ink cartridge of Fig. 3 mounted on the cartridge mounting unit of Fig. 4, illustrating a state in which the ink cartridge is initially being removed from the cartridge mounting unit;

Fig. 7 is a perspective view an ink cartridge according to a first variation of the invention;

Fig. 8 is a vertical cross-sectional view showing an internal structure of the ink cartridge of Fig. 7;

Fig. 9A is a vertical cross-sectional view of the ink cartridge of Fig. 7 mounted in the cartridge mounting unit of Fig. 11, illustrating a state in which the ink cartridge is initially being inserted into the cartridge mounting unit;

Fig. 9B is a vertical cross-sectional view of the ink cartridge of Fig. 7 mounted in the cartridge mounting unit, illustrating a state in which the ink cartridge is further being inserted into the cartridge mounting unit after the state of Fig. 5A;

Fig. 10A is a vertical cross-sectional view of the ink cartridge mounted in the cartridge mounting unit, illustrating a state in which the ink cartridge is completely mounted in the cartridge mounting unit;

Fig. 10B is a vertical cross-sectional view of the ink cartridge mounted in the cartridge mounting unit, illustrating a state in which the ink cartridge is being removed from the cartridge mounting unit after the state of Fig. 10A; and

Fig. 11 is a vertical cross-sectional view of the cartridge mounting unit according to the first variation of the present invention.

DETAILED DESCRIPTION

[0012] Embodiments of the present invention, and their features and advantages, may be understood by referring to Figs 1-11, like numerals being used for like corresponding parts in the various drawings. The embodiments described below are examples only, and the embodiments may be modified as needed without changing the scope of the invention.

[0013] An ink cartridge 30 according to an embodiment of the present invention will be described with reference to Figs. 1 through 6B.

<Overview of a Printer 10>

[0014] First, a printer 10 in which the ink cartridge 30 is accommodated will be described with reference to Fig. 1. The ink cartridge 30 corresponds to the printing-liquid cartridge. The printer 10 corresponds to the recording apparatus. The terms "upward", "downward", "upper", "lower", "above", "below", "beneath", "right", "left", "front", "rear" and the like will be used throughout the description assuming that the printer 10 is positioned in an orientation in which it is intended to be used.

[0015] The printer 10 uses an inkjet recording system to record images by selectively ejecting ink droplets onto a recording paper. As shown in Fig. 1, the printer 10 may comprise an ink supply device 100. The ink supply unit 110 may comprise a cartridge mounting unit 110. The cartridge mounting unit 110 allows the ink cartridge 30 to be mounted therein. The cartridge mounting unit 110 includes an opening 112 which opens toward the outside on one surface of the image recording apparatus 10. The ink cartridge 30 may be configured to be inserted into the cartridge mounting unit 110 and removed from the cartridge mounting unit 110 through the opening 112. The ink cartridge 30 is inserted into or removed from the cartridge mounting unit 110 through the opening 112.

[0016] Ink is stored in the ink cartridge. A recording head 21 may connect to the ink cartridge 30 via an ink tube 20. The recording head 21 may have a sub-tank 28 in which temporarily stores ink supplied through the ink tube 20. The recording head 21 may include a plurality of nozzles 29 through which ink supplied from the sub-tank 28 may selectively eject to form a recording image.

[0017] The printer 10 also may comprise a paper tray 15, a sheet supply roller 23, a sheet passage 24, a pair of transfer rollers 25, a platen 26, a pair of discharge roller 22, and a paper discharge tray 16 arranged in this order along a feed direction. The sheet supply roller 23 may supply the sheet from the paper feed tray 15 to the sheet passage 24; and the pair of transfer rollers 25 may further convey the sheet to the platen 26. Then, the recording head 21 may selectively eject the ink onto the sheet passing through the platen 26 to form an image on the sheet. The pair of discharge rollers 22 then may discharge the sheet onto the discharge tray 16.

[0018] Note that the general structure of the printer 10

according to the preferred embodiment is merely one example. Obviously the printer 10 may employ other constructions used in inkjet printers known in the art, such as different methods for feeding and conveying the recording paper and a different shape for the conveying path.

<Ink Supply Device 100>

[0019] As shown in Fig. 1, the ink supply device 100 is provided in the printer 10. The ink supply device 100 functions to supply ink to the recording head 21 provided in the printer 10. The ink supply device 100 includes the cartridge mounting unit 110 in which the ink cartridge 30 may be inserted. Fig. 1 shows the cartridge mounting unit 110 when the ink cartridge 30 is mounted therein.

<Ink Cartridge 30>

[0020] Next, a detailed configuration of the ink cartridge 30 will be described. As shown in Fig. 3, the ink cartridge 30 defines therein an ink chamber 36 in which the ink is stored. As shown in Figs. 2 and 3, the ink cartridge 30 has a casing 31 defining an outer shell of the ink cartridge 30. The ink chamber 36 may be defined inside the casing 31, or may be defined by a member separate from the casing 31 but inside the casing 31. The ink chamber 36 corresponds to the print liquid chamber. The casing 31 corresponds to the body and the casing.

[0021] The ink cartridge 30 may be configured to be installed in and removed from the cartridge mounting unit 110 in an upright position shown in Fig. 2, i.e. along a direction indicated by an arrow 53 with a lower surface in the drawing as a bottom surface and an upper surface in the drawing as an upper surface (hereinafter, referred to as an "insertion and removal directions 53"). Hereinafter, a description will be given assuming that the ink cartridge 30 is in the upright position.

[0022] As shown in Fig. 2, the casing 31 may have a generally flat, rectangular shape with a widthwise in a direction indicated by an arrow 51 (herein after, referred to as a widthwise direction or a horizontal direction), a height in a direction indicated by an arrow 52 that is perpendicular to the widthwise direction 51 (hereinafter, referred to as a vertical direction or a height direction) and a depth in a direction indicated by an arrow 53 that is perpendicular to the vertical direction and widthwise direction 51 (hereinafter, referred to as a depthwise direction 53). The height of casing 31 and the depth of casing 31 are each greater than the width of casing 31. In other words, in the upright position, the depthwise direction 53 is parallel to the insertion direction 56 and the removal direction 55, while the widthwise direction 51 and height direction 52 are respectively orthogonal to the insertion direction 56 and the removal direction 55.

[0023] As shown in Fig. 2, the casing 31 may have a front wall 40, a rear wall 42, a pair of side walls 37, 38,

a top wall 39, and a bottom wall 41. The front wall 40 is positioned at the front side of the printer 10 when the ink cartridge 30 is inserted into the cartridge mounting unit 110, and the rear wall 42 of the ink cartridge 30 is inserted into the cartridge mounting unit 110, and the rear wall 42 of the casing 31 is positioned on the rear side of the casing 31. The front wall 40 and rear wall 42 may be positioned opposite to each other in the depthwise direction 53 (in the insertion direction 56). Four walls may separate the front wall 40 from the rear wall 42: a pair of side walls (not depicted) extending in the insertion and removal directions 50, an upper wall 39 connecting the upper edges of the side walls, and a lower wall 41 also connecting the lower edges of the side walls. The upper wall 39 and lower wall 41 are spaced away from each other by a prescribed distance in the height direction 52. The front wall 40 corresponds to the front side. The rear wall 42 corresponds to the rear side. The top wall 39 corresponds to the upper side of the present invention.

[0024] An ink supply portion 43 may be positioned on the front side of the ink cartridge 30, e.g., the front wall 40 of the casing 31 at a lower end. The ink supply portion 43 may have cylindrical outer shape, and ink supply portion 43 may project frontward from the front wall 40 in the insertion direction 56 (i.e., in the depthwise direction 53). The ink supply portion 43 may have an outer end portion 72 on which an ink supply outlet 71 is formed to provide external communication with the casing 31. As shown in Fig. 3, an ink channel 44 may be formed to extend from the ink supply outlet 71 through an internal space of the ink supply portion 43 to the ink chamber in the depthwise direction 53. The ink supply portion 43 corresponds to the print liquid supply portion.

[0025] As shown in Fig. 3, within the ink supply portion 43, a valve 70 may be configured to be opened or closed by the ink supply outlet 71. The valve 70 may move within the ink channel 44 of the ink supply portion 43 in the depthwise direction 53 (in the insertion direction 56 as well as in the removal direction 55). A coil spring 73 may be provided for biasing the valve 70 toward the ink supply outlet 71. When no external forces may be applied to the valve 70, the coil spring 73 holds the valve 70 in a closed position for tightly sealing the ink supply outlet 71. A portion of the outer end portion 72 of the ink supply portion 43 surrounding the ink supply outlet 71 is formed of an elastic member, such as rubber. The elastic member elastically may deform when contacted by the valve 70 biased by the coil spring 73, tightly sealing the ink supply outlet 71. In this state, part of the valve 70 may be exposed through the ink supply outlet 71 outside of the ink supply portion 43, i.e., outside the ink cartridge 30. The ink supply portion 71 is not limited to a configuration in which the ink supply valve 70 opens and closes the ink supply portion 70. For example, a configuration in which a film, rubber stopper, or the like closes the ink supply outlet 70 when the ink cartridge is inserted into the cartridge mounting unit 110.

[0026] An ink needle 122 (described later) may be also

positioned on the cartridge mounting unit 110. When the ink cartridge 30 is mounted in the cartridge mounting unit 110, the ink needle 122 is inserted into the ink supply outlet 71, elastically deforming the coil spring 73 and moving the valve 70 against the biasing force of the coil spring 73 into an open position separated from the ink supply outlet 71 (see Fig. 6A). In this state, the ink supply outlet 71 is open and ink in the ink chamber 36 can flow into the ink needle 122 through the ink channel 44.

[0027] An air introducing unit (not shown) may also be provided in the casing 31. Accordingly, air is introduced into the ink chamber 36 via the air introducing unit as ink flows from the ink chamber 36 into the ink needle 122. However, the air introducing unit is not an essential component. For example, the ink chamber 36 may be configured of an ink bag whose volume decreases as the amount of ink in the ink chamber 36 decreases.

[0028] As shown in Figs. 2 and 3, a protrusion 32 may be positioned on the lower wall 41 (a lower end of the front wall 40 below the ink supply portion 43). The protrusion 32 may protrude frontward in the insertion direction 56 and may have a protruding length greater than that of the ink supply portion 43 in the insertion direction 56.

[0029] As shown in Figs. 2 and 3, the top wall 39 of the casing 31 may be formed with an engaging recess 45 extending from a position substantially center of the top wall 39 to the rear wall 42 in the depthwise direction 53. The engaging recess 45 may be defined by a vertical engaging surface 46 at the front end in the insertion direction 56, and a pair of ribs 45a, 45b. That is, the engaging surface 46 may occupy a plane extending in the widthwise direction 51 and the height direction 52. When the ink cartridge 30 is mounted in the cartridge mounting unit 110, an engaging member 145 of the cartridge mounting unit 110 (described later) may engage the engaging surface 46. Specifically, the engaging member 145 engages the top end of the engaging surface 46. The top end of the engaging surface 46 corresponds to the stopper.

[0030] As shown in Figs. 2 and 3, a portion of the upper wall 39 that may be positioned frontward of the engaging recess 45 in the insertion direction 56 serves as an upper surface 47 that may contact the engaging member 145 of the cartridge mounting unit 110 when the ink cartridge 30 is inserted into the cartridge mounting unit 110. That is, the upper surface 47 may have a plane extending in the widthwise direction 51 and the depthwise direction 53. The top surface 47 and front wall 40 may be linked by a sloped surface 48 sloping relative to the top surface 47 and front wall 40. The sloped surface 48 serves to guide the engaging member 145 onto the top surface 47. However, the sloped surface 48 may be omitted from this construction. Alternatively, a protrusion similar to the protrusion 32 that protrudes in the insertion direction 56 may be provided in place of the sloped surface 48.

[0031] As shown in Figs. 2 and 3, a pivotal member 60 is provided in the engaging recess 45. The pivotal mem-

ber 60 has a bent plate shape and extends in the depthwise direction 53. Specifically, the pivotal member 60 has a first arm 61, a second arm 62, and a shaft 63 extending in the widthwise direction 51. The shaft 63 is pivotally supported by the top wall 39 at the rearward of the engaging surface 46. The first arm 61 radially may extend from the shaft 63 frontward at the vicinity of or on the engaging surface 46. The second arm 62 also radially may extend rearward from the shaft 63 over the rear wall 42. With this construction, the pivotal member 60 may be pivotally moved about the shaft 63. Note that the casing 31 and the pivotal member 60 may be integrally formed. The pivotal member 60 corresponds to the release member and the lever.

[0032] While an external force (described later) may be not being applied to the pivotal member 60, the first arm 61 may contact a bottom surface 49 of the engaging recess 45 due to its self-weight or a biasing force of a biasing member, e.g., coil spring (not shown). On the other hands, when the second arm 62 may be pushed downward against the weight or the biasing force, the pivotal member 60 may pivot about the shaft 63 in a counterclockwise direction in Fig. 3, thereby the first arm 61 is moved away from the bottom surface 49.

<Cartridge Mounting Unit 110>

[0033] As shown in Fig. 4, the cartridge mounting unit 110 may have a case 101 forming its box-like outer shell. The case 101 has an opening 112. The ink cartridge 30 may be inserted into or removed from the case 101 through the opening 112. The case 101 may be capable of accommodating a plurality of the ink cartridge 30, e.g. four ink cartridges 30 corresponding to the colors cyan, magenta, yellow, and black. However, in the drawings, the cartridge mounting unit 110 is illustrated such that the case 101 can accommodate only one ink cartridge 30.

[0034] The case 101 may have an end surface 102 that faces an internal space of the case 101 and may be positioned on the opposite side of this internal space from the opening 112 in the insertion direction 56. As shown in Fig. 4, a connector 103 may be positioned at a lower portion of a side wall constituting the case 101 on which the end surface 102 is formed. If the case 101 accommodates a plurality of ink cartridges 30, a plurality of connectors 103 may be positioned.

[0035] The connector 103 may include the ink needle 122 and a retaining part 121. While not illustrated in Fig. 4, the ink needle 122 may be connected to the ink tube 20 on an outer surface of the side wall that has the end surface 102. The ink tube 20 connected to each ink needle 122 is also connected to the recording head 21 of the printer 10 and is capable of delivering ink thereto.

[0036] The retaining part 121 may be formed in the end surface 102 of the case 101 by hollowing out a portion of the end surface 102 in a cylindrical shape. The ink needle 122 may be coaxially disposed at the retaining part 121 and may penetrate through the side wall of case

101 having the end surface 102 in the insertion direction 56. When the ink cartridge 30 may be mounted in the cartridge mounting unit 110, as illustrated in Fig. 6A, the cylindrically-shaped ink supply portion 43 may be hermetically inserted into the cylindrically-shaped retaining part 121. At this time, the outer circumferential surface of the ink supply portion 43 may tightly contact and cohere with the surface defining the retaining part 121. When the ink supply portion 43 is inserted into the retaining part 121, the ink needle 122 is also inserted into the ink supply outlet 71 formed in the ink supply portion 43. The ink needle 122 inserted through the ink supply outlet 71 moves the valve 70 from its closed position to its open position against the biasing force of the coil spring 73. Accordingly, ink stored in the ink chamber 36 may now flow outward. The ink flowing out of the ink chamber 36 may flow into the ink needle 122 due to head difference and the like and is delivered to the recording head 21 via the ink tube 20.

[0037] As shown in Fig. 4, the engaging member 145 may be positioned on the case 101. The engaging member 145 may hold the ink cartridge 30 in its mounted state in the cartridge mounting unit 110. The engaging member 145 may be located at a position above the opening 112 formed in the case 101. The engaging member 145 corresponds to the engaging member.

[0038] The engaging member 145 may be pivotally supported to the case 101 by a support shaft 147. The support shaft 147 may be provided at one end of the engaging member 145 nearest the opening 112 and may be mounted on the case 101. With this construction, the engaging member 145 may be pivotally supported above and in proximity to the opening 112 of the case 101 and pivots about the support shaft 147 so as to approach or separate from the opening 112. The engaging end 146 may be formed on another end of the engaging member 145 opposite the support shaft 147. The engaging end 146 may be engageable with the engaging surface 46 of the engaging recess 45 formed in the ink cartridge 30. By engaging with the engaging surface 46, the engaging end 146 may hold the ink cartridge 30 in its mounted position relative to the case 101 against a biasing force (described later) applied from the case 101. A position of the engaging member 145 when the engaging end 146 is engaged with the engaging surface 46 (see Fig. 6A) will be referred to as a "locked position," while another position of the engaging member 145 when the engaging end 146 is not engaged in the engaging surface 46 (see Fig. 6B) will be referred to as an "unlocked position."

[0039] The engaging end 146 may be biased downward due to one's own weight or a biasing force of a coil spring (not shown) to contact the first arm 61 at the locked position. However, when the first arm 61 is pivotally moved upward, the engaging member 145 is also pivotally moved upward about the support shaft 147, moving from the locked position to the unlocked position. Further, while not illustrated in the drawings, the pivoting range

of the engaging member 145 may be restricted so that the engaging member 145 cannot move farther downward than the locked position (the state shown in Fig. 4). Note that, the engaging member 145 is not necessarily biased downward. The engaging member 145 may pivotally move downward due to its self-weight even without being biased to realize its engagement with the engaging surface 46 of the ink cartridge 30.

[0040] As shown in Fig. 4, the interior space of the cartridge mounting unit 110 may be expanded in the insertion direction 56 beneath the end surface 102. Within this expanded space, a slide member 123 may be movably provided. The slide member 123 may be slidable in the insertion direction 56 and the removal direction 55 (horizontally). The slide member 123 may be generally rectangular parallelepiped in shape. The slide member 123 may have a top surface from which a protruding piece 124 protrudes upward. The protruding piece 124 may stand in an insertion path of the protrusion 32 provided on the ink cartridge 30 so that the protrusion 32 may be abutable on the protruding piece 124 while the ink cartridge 30 is mounted in the cartridge mounting unit 110.

[0041] The expanded space in which the slide member 123 may be accommodated is defined by an end surface 125 and a front surface 127 opposing each other in the insertion direction 56. The slide member 123 may be interposed between the end surface 125 and the front surface 127. A coil spring 126 may be positioned in a compressed state between the end surface 125 and slide member 123 and biases the slide member 123 in the removal direction 55. When an external force may be not applied to the slide member 123, the slide member 123 may be placed in contact with the front surface 127 by the biasing force of the coil spring 126. The front surface 127 may restrict the range of movement of the slide member 123 away from the end surface 125. When the ink cartridge 30 is inserted farther into the cartridge mounting unit 110 after the protrusion 32 of the ink cartridge 30 contacts the protruding piece 124, the slide member 123 may move together with the protruding piece 124 toward the end surface 125, compressing the coil spring 126.

[0042] It should be noted that the protrusion 32 may not be provided at the ink cartridge 30. Without the protrusion 32, the ink cartridge 30 may still be applied with a biasing force acting in the removal direction 55 during the mounting process of the ink cartridge 30 into the cartridge mounting unit 110, since the ink cartridge 30 is provided with the coil spring 73 disposed within the ink supply portion 43.

<Mounting the Ink Cartridge>

[0043] Next, operations for mounting the ink cartridge 30 in and removing the ink cartridge 30 from the cartridge mounting unit 110 will be described with reference to Figs. 5A through 6B.

[0044] As shown in Fig. 5A, the ink cartridge 30 may be inserted into the cartridge mounting unit 110 through

the opening 112, leading with the front wall 40 side of the ink cartridge 30. When the ink cartridge 30 is inserted into the cartridge mounting unit 110, the sloped surface 48 of the casing 31 contacts the engaging member 145. As the ink cartridge 30 is farther inserted into the cartridge mounting unit 110, the engaging member 145 slides up the sloped surface 48 onto the upper surface 47. Accordingly, the engaging member 145 may pivot counterclockwise in Fig. 5A, moving from the locked position to the unlocked position.

[0045] As the ink cartridge 30 is mounted into the cartridge mounting unit 110, the ink supply portion 43 may contact the retaining part 121, and the ink needle 122 may be inserted into the ink supply outlet 71 of the ink supply portion 43, as illustrated in Fig. 5B. At this time, the engaging member 145 is not yet engaged in the engaging recess 45 of the casing 31. The ink needle 122 may be inserted into the ink supply outlet 71 to contact the valve 70. As the ink cartridge 30 may move farther in the insertion direction 56, the valve 70 is pressed by the ink needle 122, moving from its closed position to its open position against the biasing force of the coil spring 73, as illustrated in Fig. 6A. After the ink supply portion 43 is inserted into the retaining part 121 and the ink needle 122 is further inserted into the ink supply outlet 71, the ink cartridge 30 may be mounted in its prescribed position relative to the cartridge mounting unit 110 (mounted position). While not shown in the drawings, an ink inlet is formed on a distal end of the ink needle 122. Accordingly, ink in the ink chamber 36 may flow through the ink channel 44 and into the ink needle 122 via this ink inlet.

[0046] When the ink cartridge 30 reaches its mounted position shown in Fig. 6A, the engaging surface 46 formed on the engaging recess 45 of the casing 31 has passed the engaging end 146 of the engaging member 145 in the insertion direction 56. Consequently, since the engaging end 146 of the engaging member 145 is no longer supported on the top surface 47 of the casing 31, the engaging member 145 may pivot clockwise in Fig. 6A into the engaging recess 45, with the engaging end 146 of the engaging member 145 contacting the engaging surface 46. The engaging member 145 may engage in the engaging surface 46 holds the ink cartridge 30 in its mounted position against the biasing forces of the coil spring 73 and coil spring 126. In this state, the top end of the engaging surface 46 is arranged to offset from the first arm 61 in the height direction 52. This completes the operation for mounting the ink cartridge 30 in the cartridge mounting unit 110.

[0047] Note that the external force created by the coil spring 126 acts on the protrusion 32 provided on the front wall 40 side of the casing 31. In place of the coil spring 73 used for opening and closing the valve 70, a coil spring may be provided on an outside of the casing 31 as the external force. This coil spring may be positioned such that its distal end may contact the end surface 102 of the cartridge mounting unit 110, a photosensor, or the like,

and biases the ink cartridge 30 in the removal direction 55.

[0048] In a state where the ink cartridge 30 has been mounted in the cartridge mounting unit 110, the first arm 61 of the pivotal member 60 may be positioned below the engaging end 146 of the engaging member 145, and the second arm 62 of the pivotal member 60 may be apart from the bottom surface 49 of the engaging recess 45 and positioned above the top wall 39 of the casing 31.

[0049] When the ink in the ink chamber 36 of the ink cartridge 30 becomes depleted, the user removes the spent ink cartridge 30 from the cartridge mounting unit 110 and mounts a new ink cartridge 30.

[0050] To remove the ink cartridge 30 from the cartridge mounting unit 110, the user presses the second arm 62 of the pivotal member 60 downward. Since the second arm 62 of the pivotal member 60 is positioned at a downstream of the rear wall 42 in the removal direction 55, the user can operate the pivotal member 60 from the rear wall 42 side of the ink cartridge 30. When the user presses the second arm 62 of the pivotal member 60 downward, the first arm 61 is moved upward to separate from the bottom surface 49 of the engaging recess 45, as illustrated in Fig. 6B. By the movement of the first arm 61 upward, the engaging member 145 may be pushed upward. Through this operation, the engaging member 145 may pivot counterclockwise in Fig. 6B until the engaging end 146 separates from the engaging surface 46. That is, the engaging member 145 may pivotally move from the locked position to the unlocked position, releasing its hold on the ink cartridge 30.

[0051] When the engaging end 146 of the engaging member 145 separates from the engaging surface 46, the external forces applied to the casing 31 (specifically, the biasing forces of the coil spring 73 and/or coil spring 126) move the casing 31 in the removal direction 55. However, at this time, the pivotal member 60 is touched by the user. Accordingly, the user's hand absorbs the biasing forces of the coil springs 73 and 126 through the biasing force or its self-weight and pivotal member 60.

<Effects of the Embodiment>

[0052] When the user pivots the pivotal member 60, the engagement between the engaging member 145 and the engaging surface 46 is released and the ink cartridge 30 may be moved in the removal direction 55 due to the external force, e.g., the biasing force of the coil spring 73 or 126. However, in the embodiment, the pivotal member 60 for disengaging the engagement between the engaging surface 46 and the engaging member 145 is disposed not at the cartridge mounting unit 110 but at the ink cartridge 30. Therefore, the pivotal member 60 (second arm 62) is contacted by the user's hand when the ink cartridge 30 moves in the removal direction 55, and the user's hand reduces the speed of the ink cartridge 30. As the result, the ink cartridge 30 can be prevented from falling through the opening of the printer 10 when removed from the

cartridge mounting unit 110, thereby ink can be prevented from dripping out of the ink needle 122 when the ink cartridge 30 is replaced.

[0053] Further, a user-operated member for operating the engaging member 145 need not be provided in the cartridge mounting unit 110, making it possible to produce a more compact printer 10.

[0054] Further, the second arm 62 is positioned at a downstream of the first arm 61 in the removal direction 55. Therefore, a user can easily identify whether or not the engaging surface 46 and the engaging member 145 are engaged with each other based on the position of the second arm 62.

[0055] The engagement between the ink cartridge 30 and the cartridge mounting unit 110 is performed by the engaging surface 46 and the engaging member 145. The pivotal member 60 is used only to release the engagement between the engaging surface 46 and the engaging member 145. In other words, the pivotal member 60 is separately provided from the engaging surface 46. Therefore, even if the pivotal member 60 is deformed, the engagement between the engaging surface 46 and the engaging member 145 is held.

<Variations of the Embodiments>

[0056] While the invention has been described in detail with reference to the embodiments thereof, it would be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the scope of the invention as claimed.

[0057] For example, as shown in Figs. 7 and 8, the pair of ribs 45a, 45b may extend in the removal direction 55 from the engaging surface 46 to around the shaft 63.

[0058] Further, as shown in Figs. 8 and 9(A)-10(B), it is preferable that a tip end of the first arm 61 does not protrude beyond the pair of ribs 45a, 45b.

[0059] Further, as shown in Figs. 7-10(B), the second arm 62 of the pivotal member 60 may be provided with a bent part 62a that is bent downward. The thickness of the second arm 62 (especially, the bent part 62a) is greater than the thickness of the first arm 61 to provide a high rigidity.

[0060] Further, as shown in Fig. 11, the case 101 may be formed with a first guide groove 108 and a second guide groove 109. The first guide groove 108 extending in the removal direction 55 and insertion direction 56 is formed on the top surface of the case 101, and the second guide groove 109 extending in the removal direction 55 and insertion direction 56 is formed on the bottom surface of the case 101. The pair of ribs 45a, 45b is guided by the guide groove 108 of the case 101 when the ink cartridge 30 is mounted in the cartridge mounting portion 110. The ink cartridge 30 is guided in the insertion direction 56 by the first guide groove 108 and the pair of the ribs 45a, 45b. Note that the bottom surface 41 of the casing 31 is guided by the guide groove 109 of the case 101.

[0061] Further, an engaging member movable in the upper-lower direction may be used instead of the engaging member 145.

[0062] Further, the pivotal member 60 may move the engaging member 145 not directly but via another member.

[0063] In the embodiments described above, the coil springs 73 and 126 apply an external force in the removal direction 55 to the ink cartridge 30 when the ink cartridge 30 is mounted in the cartridge mounting unit 110. In place of the coil springs 73 and 126, a biasing member provided on the ink cartridge 30 may function to apply an external force to the ink cartridge 30 in its mounted state. For example, a coil spring extending in the insertion direction 56 may be provided on the front wall 40 of the casing 31. When the ink cartridge 30 is mounted in the cartridge mounting unit 110, the coil spring contacts the end surface 102 of the case 101 and compresses to apply an external force to the casing 31 in the removal direction 55.

[0064] In the embodiments, a detecting portion configured to detect the amount of residual ink in the ink cartridge 30 has been omitted, such a detecting portion may be provided on the ink cartridge 30. The detection portion may be provided on the middle of the front wall 40 of the ink cartridge 30 and protrudes from the front wall 40 in a direction away from the ink chamber 36. The detection portion is formed of a light transmissive resin. The amount of ink in the ink chamber 36 of the ink cartridge 30 may be detected manually by looking into the ink chamber 36 through the detection portion or automatically with a photo sensor. When using a photosensor, the distance between a pair of side walls constituting the detection portion is set smaller than the gap between the light-emitting element and light-receiving element of the photosensor. A light-shielding plate that moves based on the quantity of ink may be provided in the detection portion. Alternatively, the light-shielding plate may be replaced with a device capable of reducing the amount of light that reaches the light-receiving element by reflecting, diffracting, or attenuating all or a portion of the light emitted from the light-emitting element based on the amount of ink in the ink chamber 36.

[0065] While the preferred embodiments describe the printing liquid as ink stored in the ink cartridge 30 for use with an inkjet-type printer 10, the printing liquid is not limited to ink. The present invention may also be applied to a cartridge that stores toner as the printing liquid for use in an electrophotographic image-forming apparatus, for example.

Claims

1. A printing-liquid cartridge (30) configured to be used in an upright state comprising:

a print liquid chamber (36) configured to store print liquid;

a print liquid supply portion (43) configured to establish a communication between an interior of the print liquid chamber and an exterior of the print liquid chamber, supplying print liquid in a liquid outflow direction;

a stopper (46) configured to prevent the printing-liquid cartridge from moving in a direction opposite to the liquid outflow direction; and

a width in a width direction, a height in a height direction, and a depth in a depth direction being mutually perpendicular and the depth direction being parallel with the liquid outflow direction, **characterized in that** the print-liquid cartridge (30) comprises

a release member (60) configured to release the stopper by moving relative to the stopper, such that the printing-liquid cartridge is permitted to move in a direction opposite to the liquid outflow direction, and comprising a first arm (61) configured to move between a downward position and an upward position,

wherein the stopper (46) is offset from the first arm (61) of the release member (60) in the height direction orthogonal to the liquid outflow direction and the width direction when the first arm (61) is in the downward position.

2. The printing-liquid cartridge according to claim 1, wherein the stopper is arranged to offset from the release member in the liquid outflow direction.
3. The printing-liquid cartridge according to claim 1 or 2, wherein the release member is a lever (60) having a first arm (61) and a second arm (62) opposite of the first arm and being configured to swing around an axis (63) positioned between the first arm and the second arm.
4. The printing-liquid cartridge according to claim 3, wherein the first arm of the lever is positioned on or adjacent to the stopper in the liquid outflow direction.
5. The printing-liquid cartridge according to claim 3, wherein the second arm of the lever is positioned away from an outer perimeter of the printing-liquid cartridge when the stopper prevent the printing-liquid cartridge from moving in the direction opposite to the liquid outflow direction.
6. The printing-liquid cartridge according to claim 1, further comprising a body (31) having:

a front side (40) at which the print liquid supply portion is located;

a rear side (42) located opposite from the front

- side in the depth direction [p. 6,1. 2]; and
 an upper side (39) extending between an upper
 end of the front side and an upper end of the
 rear side,
 wherein the stopper and the release member
 are positioned on the upper side.
7. The printing-liquid cartridge according to claim 6,
 wherein the stopper (46) is located further from the
 rear side (42) than the release member (61) in the
 liquid outflow direction.
8. The printing-liquid cartridge according to claim 1, fur-
 ther comprising a pair of plates (45a, 45b) located
 at an upper end or a lower end of the printing-liquid
 cartridge in the height direction, the release member
 (61) being disposed between the pair of plates (45a,
 45b).
9. The printing-liquid cartridge (30) according to claim
 1 mountable in a cartridge mounting portion (110) of
 a recording apparatus (10) in a first direction in an
 upright state, the printing-liquid cartridge further
 comprising:
- a casing (31) that accommodates the print liquid
 chamber (36), the casing having the print liquid-
 supply portion (43) connectable to a liquid-sup-
 plied portion (122) of the cartridge mounting por-
 tion (110) to supply the print liquid to the record-
 ing apparatus;
 an engaging portion (45), having the stopper
 (46), that is configured to engage with an en-
 gaging member (145) of the cartridge mounting
 portion (145).
10. The printing-liquid cartridge according to claim 9,
 wherein the casing (31) has a first surface (49) ex-
 tending in both the first direction and a second direc-
 tion orthogonal to the first direction, the release
 member (60) being provided on the first surface, and
 wherein the release member has a shaft (63) extend-
 ing in the second direction, the first arm (61), and a
 second arm (62), the first arm (61) and the second
 arm (62) radially extending from the shaft (63), the
 first arm (61) contacting the engaging member (145)
 when the engaging member (145) and the engaging
 portion (45) are engaged with each other, the release
 member (60) being pivotally moved about the shaft
 (63) to release the engagement between the en-
 gagement member (145) and the engaging portion
 (45).
11. The cartridge according to claim 10, wherein the re-
 lease member (60) is configured such that the first
 arm (61) is nearer to the first surface (49) than the
 second arm (62) when the engaging member (145)
 and the engaging portion (45) are engaged with each
 other.
12. The cartridge according to claim 11, wherein the re-
 lease member is configured such that the first arm
 (61) is moved away from the first surface (49) when
 the second arm (62) approaches the first surface
 (49), the engagement between the engagement
 member (145) and the engaging portion (45) being
 released in accordance with the moving of the first
 arm (61) away from the first surface (49).
13. A system of a print liquid cartridge (30) according to
 any of claims 1 to 12 and a recording apparatus (10)
 on which the printing-liquid cartridge (30) is mount-
 able, the recording apparatus (10) comprising the
 engaging member (145) configured to associate with
 the stopper of the printing-liquid cartridge,
 wherein the release member (60) is configured to
 allow the engaging member (145) to move away from
 the stopper (46).
14. The system according to claim 13, wherein the re-
 cording apparatus (10) further comprises a biasing
 member (73) configured to bias the printing-liquid car-
 tridge (30) in the direction opposite to the liquid out-
 flow direction,
 wherein the biasing member (73) is configured to
 move the printing-liquid cartridge (30) in the direction
 opposite to the liquid outflow direction when the re-
 lease member (60) releases the association of the
 stopper (46) and the engaging member (145).
15. The system according to claim 13, wherein the re-
 cording apparatus further comprises:
- a liquid-supplied portion (122) connectable to
 the print liquid-supply portion (43), the print liquid
 being supplied to the recording apparatus (10)
 when the liquid-supplied portion (122) is con-
 nected to the print liquid-supply portion (43);
 wherein
 the biasing member (73) is configured to provide
 an urging force directed to a direction opposite
 to the liquid outflow direction for detaching the
 print liquid-supply portion (43) from the liquid-
 supplied portion (122) when the print liquid-sup-
 ply portion (43) is connected to the liquid-sup-
 plied portion (122); and
 the engaging member (145) is configured to be
 engaged with the engaging portion (45) to resist
 the urging force when the print liquid-supply por-
 tion (43) is connected to the liquid-supplied por-
 tion (122).
16. The system according to claim 15, wherein the en-
 gaging member (145) comprises a shaft (147), the
 engaging member (145) being configured to pivotally
 move about the shaft when the engagement is pro-

vided and when the engagement is released.

17. The system according to claim 13, the cartridge further comprising a pair of plates (45a, 45b) located at an upper end or a lower end of the printing-liquid cartridge in the height direction, the release member (61) being disposed between the pair of plates (45a, 45b), wherein the pair of plates is guided along a guide member (108, 109) provided in the recording apparatus and extending in the liquid outflow direction.

Patentansprüche

1. Druckflüssigkeitskartusche (30), die dazu konfiguriert ist, in einem aufrechten Zustand verwendet zu werden, mit:

einer Druckflüssigkeitskammer (36), die dazu konfiguriert ist, eine Druckflüssigkeit zu speichern;

einem Druckflüssigkeitszuführabschnitt (43), der dazu konfiguriert ist, eine Verbindung zwischen einem Inneren der Druckflüssigkeitskammer und einer Außenseite der Druckflüssigkeitskammer einzurichten, wobei die Druckflüssigkeit in einer Flüssigkeitsausströmrichtung zugeführt wird;

einem Stopper (46), der dazu konfiguriert ist, eine Bewegung der Druckflüssigkeitskartusche in einer Richtung entgegen der Flüssigkeitsausströmrichtung zu verhindern; und

wobei eine Breite in einer Breitenrichtung, eine Höhe in einer Höhenrichtung und eine Tiefe in einer Tiefenrichtung zueinander senkrecht sind und die Tiefenrichtung parallel zu der Flüssigkeitsausströmrichtung ist,

dadurch gekennzeichnet, dass die Druckflüssigkeitskartusche (30) Folgendes aufweist:

ein Löseelement (60), das dazu konfiguriert ist, den Stopper durch eine relative Bewegung zu dem Stopper derart zu lösen, dass sich die Druckflüssigkeitskartusche in einer Richtung entgegen der Flüssigkeitsausströmrichtung bewegen kann, und das einem ersten Arm (61) aufweist, der dazu konfiguriert ist, sich zwischen einer unteren Position und einer oberen Position zu bewegen, wobei der Stopper (46) von dem ersten Arm (61) des Löseelements (60) in der Höhenrichtung versetzt ist, die orthogonal zu der Flüssigkeitsausströmrichtung und der Breitenrichtung ist, wenn der Arm (61) an der unteren Position ist.

2. Druckflüssigkeitskartusche gemäß Anspruch 1, wobei der Stopper so angeordnet ist, dass er von dem Löseelement in der Flüssigkeitsausströmrichtung versetzt ist.

3. Druckflüssigkeitskartusche gemäß Anspruch 1 oder 2, wobei das Löseelement ein Hebel (60) ist, der einen ersten Arm (61) und einen zweiten Arm (62) gegenüber dem ersten Arm hat und dazu konfiguriert ist, um eine Achse (63) zu schwenken, die zwischen dem ersten Arm und dem zweiten Arm positioniert ist.

4. Druckflüssigkeitskartusche gemäß Anspruch 3, wobei der erste Arm des Hebels an oder angrenzend an dem Stopper in der Flüssigkeitsausströmrichtung positioniert ist.

5. Druckflüssigkeitskartusche gemäß Anspruch 3, wobei der zweite Arm des Hebels von einem Außenumfang der Druckflüssigkeitskartusche beabstandet positioniert ist, wenn der Stopper die Bewegung der Druckflüssigkeitskartusche in der Richtung entgegen der Flüssigkeitsausströmrichtung verhindert.

6. Druckflüssigkeitskartusche gemäß Anspruch 1, des Weiteren mit einem Körper (31), der Folgendes aufweist:

eine Vorderseite (40), an der sich der Druckflüssigkeitszuführabschnitt befindet;

eine Rückseite (42), die sich gegenüber der Vorderseite in der Tiefenrichtung [Seite 6, Zeile 2] befindet; und

eine obere Seite (39), die sich zwischen einem oberen Ende der Vorderseite und einem oberen Ende der Rückseite erstreckt, wobei der Stopper und das Löseelement an der oberen Seite positioniert sind.

7. Druckflüssigkeitskartusche gemäß Anspruch 6, wobei sich der Stopper (46) in der Flüssigkeitsausströmrichtung von der Rückseite (42) weiter weg befindet als das Löseelement (61).

8. Druckflüssigkeitskartusche gemäß Anspruch 1, des Weiteren mit einem Paar Platten (45a, 45b), die sich an einem oberen Ende oder einem unteren Ende der Druckflüssigkeitskartusche in der Höhenrichtung befinden, wobei das Löseelement (61) zwischen dem Paar Platten (45a, 45b) angeordnet ist.

9. Druckflüssigkeitskartusche (30) gemäß Anspruch 1, die in einem Kartuschenanbringungsabschnitt (110) eines Aufzeichnungsgerätes (10) in einer ersten Richtung in einem aufrechten Zustand anbringbar ist, wobei die Druckflüssigkeitskartusche des Weiteren Folgendes aufweist:

- ein Gehäuse (31), das die Druckflüssigkeitskammer (36) aufnimmt, wobei das Gehäuse den Druckflüssigkeitszuführabschnitt (43) hat, der mit einem Flüssigkeitszuführabschnitt (122) des Kartuschenanbringungsabschnitts (110) verbindbar ist, um die Druckflüssigkeit zu dem Aufzeichnungsgerät zuzuführen; einem Eingriffsabschnitt (45), der den Stopper (46) hat und dazu konfiguriert ist, mit einem Eingriffselement (145) des Kartuschenanbringungsabschnitts (145) in Eingriff zu gelangen.
10. Druckflüssigkeitskartusche gemäß Anspruch 9, wobei das Gehäuse (31) eine erste Fläche (49) hat, die sich sowohl in der ersten Richtung als auch in einer zweiten Richtung erstreckt, die orthogonal zu der ersten Richtung ist, wobei das Löseelement (60) an der ersten Fläche vorgesehen ist, und wobei das Löseelement einen Schaft (63), der sich in der zweiten Richtung erstreckt, den ersten Arm (61) und einen zweiten Arm (62) hat, wobei sich der erste Arm (61) und der zweite Arm (62) von dem Schaft (63) radial erstrecken, wobei der erste Arm mit dem Eingriffselement (145) in Kontakt ist, wenn das Eingriffselement (145) und der Eingriffsabschnitt (45) miteinander im Eingriff sind, wobei das Löseelement (60) schwenkbar um den Schaft (63) bewegt wird, um den Eingriff zwischen dem Eingriffselement (145) und dem Eingriffsabschnitt (45) zu lösen.
11. Kartusche gemäß Anspruch 10, wobei das Löseelement (60) so konfiguriert ist, dass der erste Arm (61) näher an der ersten Fläche (49) als der zweite Arm (62) ist, wenn das Eingriffselement (145) und der Eingriffsabschnitt (45) miteinander im Eingriff sind.
12. Kartusche gemäß Anspruch 11, wobei das Löseelement so konfiguriert ist, dass der erste Arm (61) von der ersten Fläche (49) weg bewegt wird, wenn sich der zweite Arm (62) der ersten Fläche (49) annähert, wobei der Eingriff zwischen dem Eingriffselement (145) und dem Eingriffsabschnitt (45) gemäß der Bewegung des ersten Arms (61) von der ersten Fläche (49) weg gelöst wird.
13. System einer Druckflüssigkeitskartusche (30) gemäß einem der Ansprüche 1 bis 12 und eines Aufzeichnungsgerätes (10), an dem die Druckflüssigkeitskartusche (30) anbringbar ist, wobei das Aufzeichnungsgerät (10) das Eingriffselement (145) aufweist, das dazu konfiguriert ist, mit dem Stopper der Druckflüssigkeitskartusche zusammenzuwirken, wobei das Löseelement (60) dazu konfiguriert ist, eine Bewegung des Eingriffselements (145) von dem Stopper (46) weg zu ermöglichen.
14. System gemäß Anspruch 13, wobei das Aufzeichnungsgerät (10) des Weiteren ein Vorspannelement (73) aufweist, das dazu konfiguriert ist, die Druckflüssigkeitskartusche (30) in der Richtung entgegen der Flüssigkeitsausströmrichtung vorzuspannen, wobei das Vorspannelement (73) dazu konfiguriert ist, die Druckflüssigkeitskartusche (30) in der Richtung entgegen der Flüssigkeitsausströmrichtung zu bewegen, wenn das Löseelement (60) das Zusammenwirken des Stoppers (46) und des Eingriffselements (145) löst.
15. System gemäß Anspruch 13, wobei das Aufzeichnungsgerät des Weiteren Folgendes aufweist:
- einen Flüssigkeitszuführabschnitt (122), der mit dem Druckflüssigkeitszuführabschnitt (43) verbindbar ist, wobei die Druckflüssigkeit zu dem Aufzeichnungsgerät (10) zugeführt wird, wenn der Flüssigkeitszuführabschnitt (122) mit dem Druckflüssigkeitszuführabschnitt (43) verbunden ist; wobei das Vorspannelement (73) dazu konfiguriert ist, eine Druckkraft bereitzustellen, die in einer Richtung entgegen der Flüssigkeitsausströmrichtung gerichtet ist, um den Druckflüssigkeitszuführabschnitt (43) von dem Flüssigkeitszuführabschnitt (122) zu beseitigen, wenn der Druckflüssigkeitszuführabschnitt (43) mit dem Flüssigkeitszuführabschnitt (122) verbunden ist; und wobei das Eingriffselement (145) dazu konfiguriert ist, mit dem Eingriffsabschnitt (45) in Eingriff zu gelangen, um der Druckkraft standzuhalten, wenn der Druckflüssigkeitszuführabschnitt (43) mit dem Flüssigkeitszuführabschnitt (122) verbunden ist.
16. System gemäß Anspruch 15, wobei das Eingriffselement (145) einen Schaft (147) aufweist, wobei das Eingriffselement (145) dazu konfiguriert ist, schwenkbar um den Schaft bewegt zu werden, wenn der Eingriff vorhanden ist und wenn der Eingriff beseitigt ist.
17. System gemäß Anspruch 13, wobei die Kartusche des Weiteren ein Paar Platten (45a, 45b) aufweist, die sich an einem oberen Ende oder einem unteren Ende der Druckflüssigkeitskartusche in der Höhenrichtung befinden, wobei das Löseelement (61) zwischen dem Paar Platten (45a, 45b) angeordnet ist, wenn das Paar Platten entlang einem Führungselement (108, 109) geführt wird, das in dem Aufzeichnungsgerät vorgesehen ist und sich in der Flüssigkeitsausströmrichtung erstreckt.

Revendications

1. Cartouche de liquide d'impression (30) configurée pour être utilisée dans un état vertical, comprenant :

une chambre de liquide d'impression (36) configurée pour stocker un liquide d'impression ;
une portion d'alimentation de liquide d'impression (43) configurée pour établir une communication entre un intérieur de la chambre de liquide d'impression et un extérieur de la chambre de liquide d'impression, en fournissant un liquide d'impression dans un sens d'écoulement de sortie de liquide ;

une butée (46) configurée pour empêcher que la cartouche de liquide d'impression se déplace dans un sens opposé au sens d'écoulement de sortie de liquide ; et

une largeur dans un sens de largeur, une hauteur dans un sens de hauteur et une profondeur dans un sens de profondeur qui sont perpendiculaires l'une à l'autre, le sens de profondeur étant parallèle au sens d'écoulement de sortie de liquide,

caractérisée en ce que la cartouche de liquide d'impression (30) comprend :

un organe de libération (60) configuré pour libérer la butée en se déplaçant par rapport à la butée, de sorte que la cartouche de liquide d'impression soit autorisée à se déplacer dans un sens opposé au sens d'écoulement de sortie de liquide, et comprenant un premier bras (61) configuré pour se déplacer entre une position vers le bas et une position vers le haut, dans laquelle la butée (46) est décalée par rapport au premier bras (61) de l'organe de libération (60) dans le sens de hauteur orthogonal au sens d'écoulement de sortie de liquide et au sens de largeur lorsque le premier bras (61) se trouve à la position vers le bas.

2. Cartouche de liquide d'impression selon la revendication 1, dans laquelle la butée est agencée pour être décalée par rapport à l'organe de libération dans le sens d'écoulement de sortie de liquide.

3. Cartouche de liquide d'impression selon la revendication 1 ou 2, dans laquelle l'organe de libération est un levier (60) comportant un premier bras (61) et un deuxième bras (62) à l'opposé du premier bras et étant configuré pour osciller autour d'un axe (63) positionné entre le premier bras et le deuxième bras.

4. Cartouche de liquide d'impression selon la revendication 3, dans laquelle le premier bras du levier est

positionné sur la butée ou adjacent à celle-ci dans le sens d'écoulement de sortie de liquide.

5. Cartouche de liquide d'impression selon la revendication 3, dans laquelle le deuxième bras du levier est positionné à l'écart d'un périmètre extérieur de la cartouche de liquide d'impression lorsque la butée empêche que la cartouche de liquide d'impression se déplace dans le sens opposé au sens d'écoulement de sortie de liquide.

6. Cartouche de liquide d'impression selon la revendication 1, comprenant en outre un corps (31) ayant :

un côté avant (40) auquel la portion d'alimentation de liquide d'impression est située ;
un côté arrière (42) situé à l'opposé du côté avant dans le sens de profondeur [p. 6,1.2] ; et
un côté supérieur (39) s'étendant entre une extrémité supérieure du côté avant et une extrémité supérieure du côté arrière, dans lequel la butée et l'organe de libération sont positionnés sur le côté supérieur.

7. Cartouche de liquide d'impression selon la revendication 6, dans laquelle la butée (46) est située plus loin du côté arrière (42) que l'organe de libération (61) dans le sens d'écoulement de sortie de liquide.

8. Cartouche de liquide d'impression selon la revendication 1, comprenant en outre une paire de plaques (45a, 45b) situées à une extrémité supérieure ou à une extrémité inférieure de la cartouche de liquide d'impression dans le sens de la hauteur, l'organe de libération (61) étant disposé entre la paire de plaques (45a, 45b).

9. Cartouche de liquide d'impression (30) selon la revendication 1, pouvant être montée dans une portion de montage de cartouche (110) d'un appareil d'enregistrement (10) dans un premier sens dans un état vertical, la cartouche de liquide d'impression comprenant en outre :

un logement (31) qui loge la chambre de liquide d'impression (36), le logement comportant la portion d'alimentation de liquide d'impression (43) pouvant être reliée à une portion alimentée en liquide (122) de la portion de montage de cartouche (110) pour fournir le liquide d'impression à l'appareil d'enregistrement ;
une portion de mise en prise (45), comportant la butée (46), qui est configurée pour se mettre en prise avec un organe de mise en prise (145) de la portion de montage de cartouche (145).

10. Cartouche de liquide d'impression selon la revendication 9, dans laquelle le logement (31) comporte

- une première surface (49) s'étendant à la fois dans le premier sens et dans un deuxième sens orthogonal au premier sens, l'organe de libération (60) étant fourni sur la première surface, et
 dans laquelle l'organe de libération comporte un arbre (63) s'étendant dans le deuxième sens, le premier bras (61), et un deuxième bras (62), le premier bras (61) et le deuxième bras (62) s'étendant radialement à partir de l'arbre (63), le premier bras entrant en contact avec l'organe de mise en prise (145) lorsque l'organe de mise en prise (145) et la portion de mise en prise (45) sont mis en prise l'un avec l'autre, l'organe de libération (60) étant déplacé en pivotant autour de l'arbre (63) pour libérer la mise en prise entre l'organe de mise en prise (145) et la portion de mise en prise (45).
11. Cartouche selon la revendication 10, dans laquelle l'organe de libération (60) est configuré de manière à ce que le premier bras (61) soit plus proche de la première surface (49) que le deuxième bras (62) lorsque l'organe de mise en prise (145) et la portion de mise en prise (45) sont mis en prise l'un avec l'autre.
12. Cartouche selon la revendication 11, dans laquelle l'organe de libération est configuré de manière à ce que le premier bras (61) s'éloigne de la première surface (49) lorsque le deuxième bras (62) se rapproche de la première surface (49), la mise en prise entre l'organe de mise en prise (145) et la portion de mise en prise (45) étant libérée en fonction de l'éloignement du premier bras (61) par rapport à la première surface (49).
13. Système d'une cartouche de liquide d'impression (30) selon l'une quelconque des revendications 1 à 12 et d'un appareil d'enregistrement (10) sur lequel la cartouche de liquide d'impression (30) peut être montée, l'appareil d'enregistrement (10) comprenant l'organe de mise en prise (145) configuré pour s'associer à la butée de la cartouche de liquide d'impression, dans lequel l'organe de libération (60) est configuré pour permettre à l'organe de mise en prise (145) de s'éloigner de la butée (46).
14. Système selon la revendication 13, dans lequel l'appareil d'enregistrement (10) comprend en outre un organe de polarisation (73) configuré pour polariser la cartouche de liquide d'impression (30) dans le sens opposé au sens d'écoulement de sortie de liquide, dans lequel l'organe de polarisation (73) est configuré pour déplacer la cartouche de liquide d'impression (30) dans le sens opposé au sens d'écoulement de sortie de liquide lorsque l'organe de libération (60) libère l'association de la butée (46) et de l'organe de

mise en prise (145).

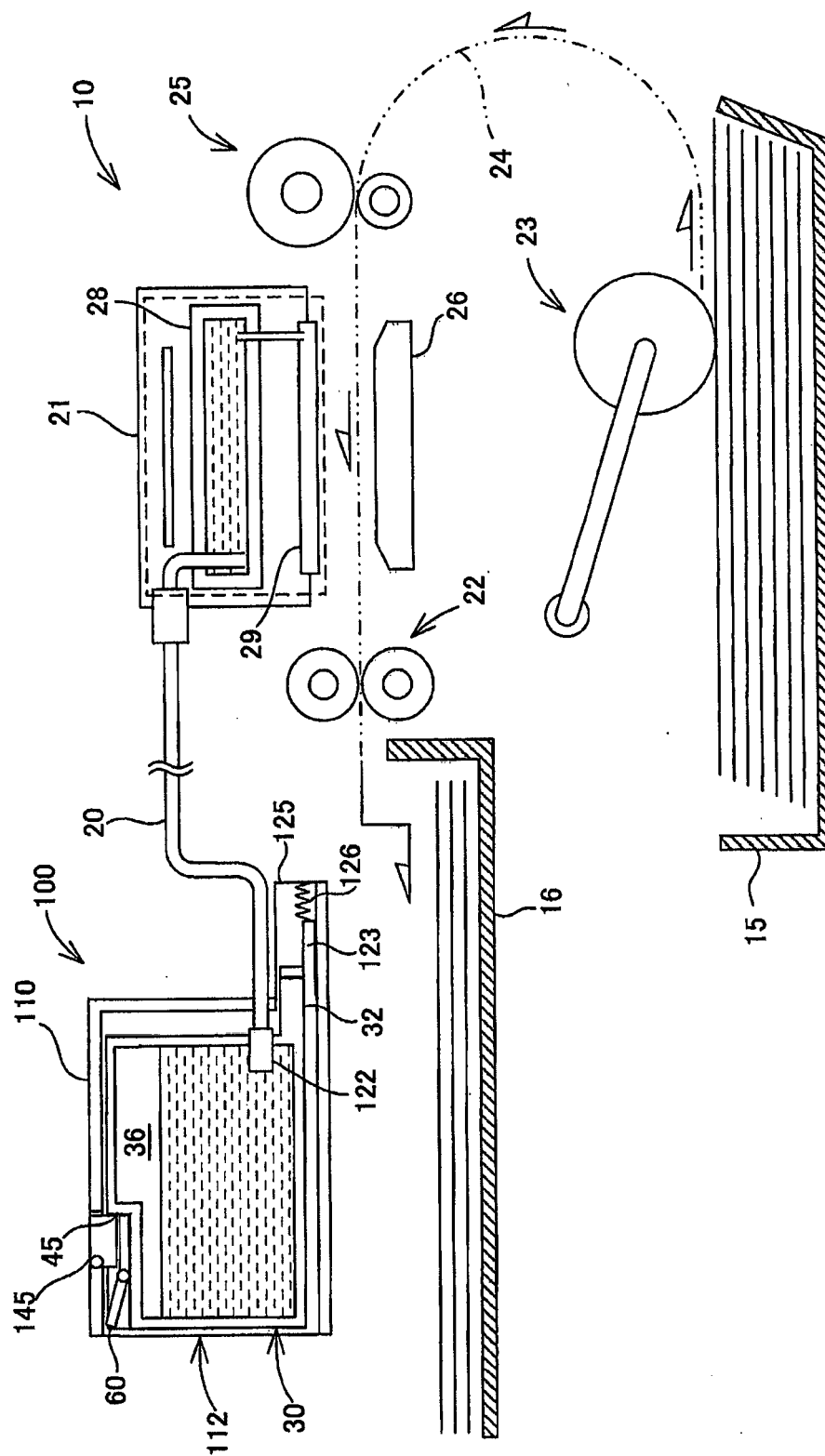
15. Système selon la revendication 13, dans lequel l'appareil d'enregistrement comprend en outre :

une portion alimentée en liquide (122) pouvant être reliée à la portion d'alimentation de liquide d'impression (43), le liquide d'impression étant fourni à l'appareil d'enregistrement (10) lorsque la portion alimentée en liquide (122) est reliée à la portion d'alimentation de liquide d'impression (43) ; dans lequel l'organe de polarisation (73) est configuré pour fournir une force de poussée dirigée dans un sens opposé au sens d'écoulement de sortie du liquide pour détacher la portion d'alimentation de liquide d'impression (43) de la portion alimentée en liquide (122) lorsque la portion d'alimentation de liquide d'impression (43) est reliée à la portion alimentée en liquide (122) ; et l'organe de mise en prise (145) est configuré pour être mis en prise avec la portion de mise en prise (45) pour résister à la force de poussée lorsque la portion d'alimentation de liquide d'impression (43) est reliée à la portion alimentée en liquide (122).

16. Système selon la revendication 15, dans lequel l'organe de mise en prise (145) comprend un arbre (147), l'organe de mise en prise (145) étant configuré pour se déplacer en pivotant autour de l'arbre lorsque la mise en prise est fournie et lorsque la mise en prise est libérée.

17. Système selon la revendication 13, dans lequel la cartouche comprend en outre une paire de plaques (45a, 45b) situées à une extrémité supérieure ou à une extrémité inférieure de la cartouche de liquide d'impression dans le sens de hauteur, l'organe de libération (61) étant disposé entre la paire de plaques (45a, 45b), dans lequel la paire de plaques est guidée le long d'un organe de guidage (108, 109) fourni dans l'appareil d'enregistrement et s'étendant dans le sens d'écoulement de sortie de liquide.

FIG. 1



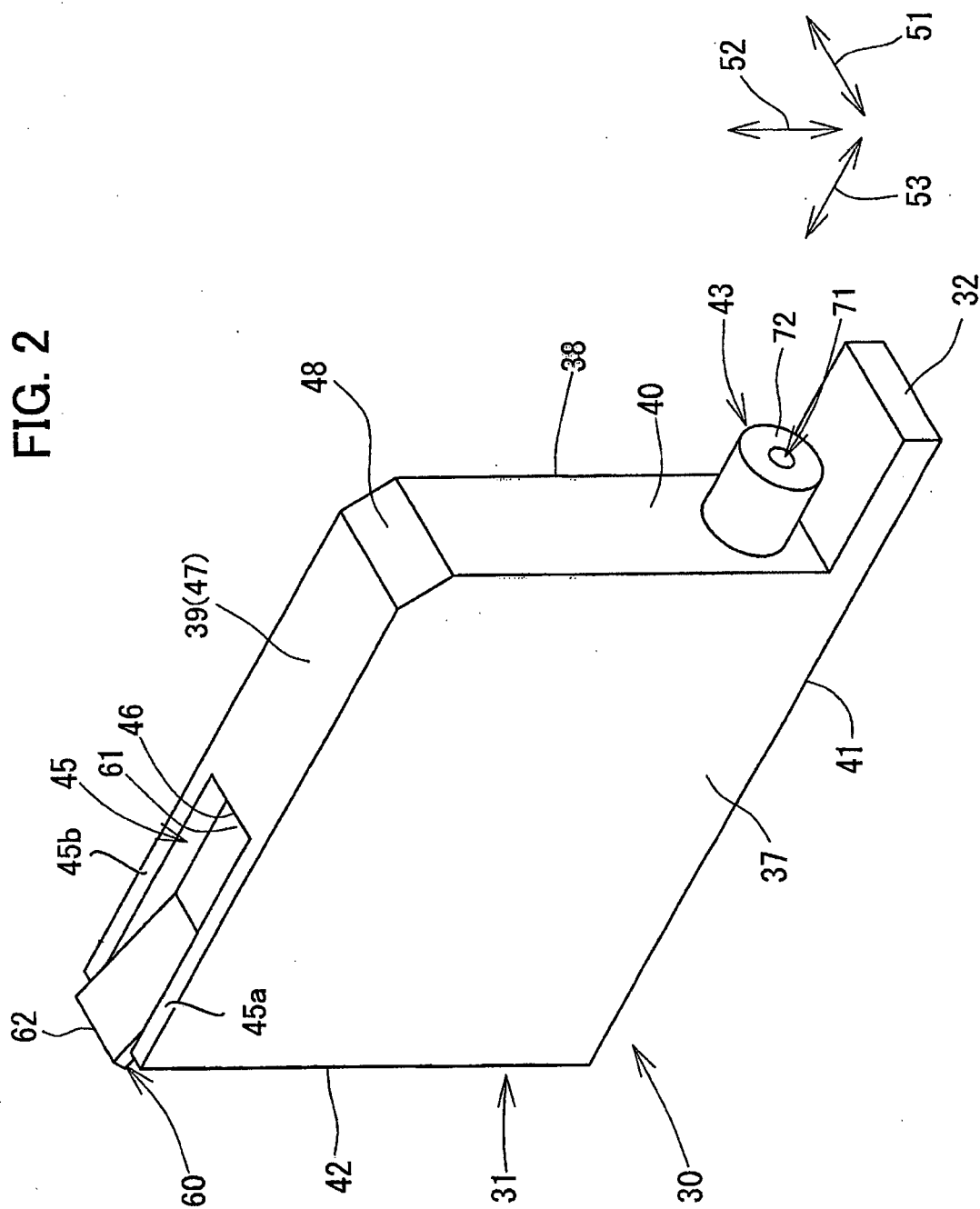


FIG. 3

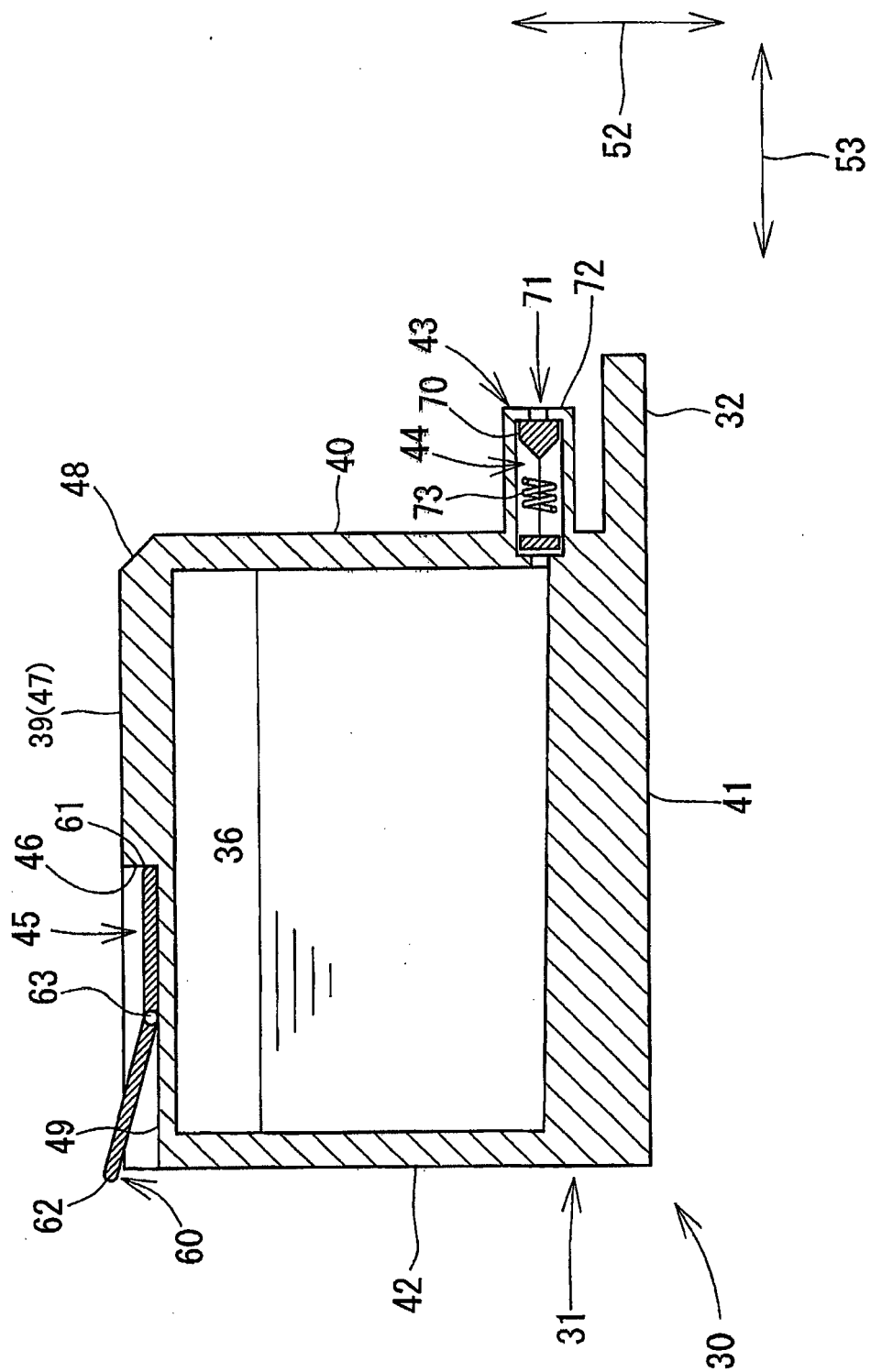


FIG. 4

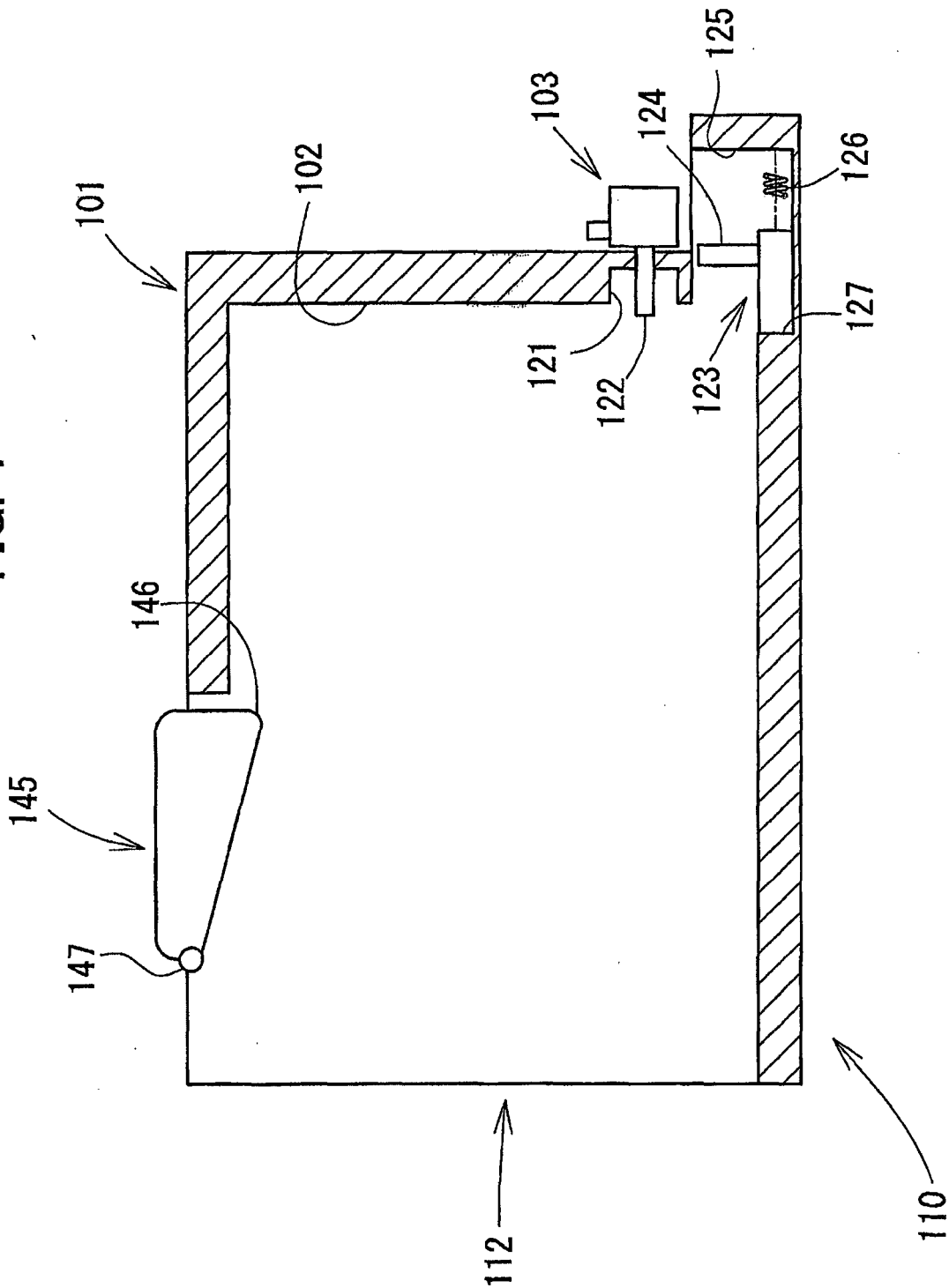


FIG. 5A

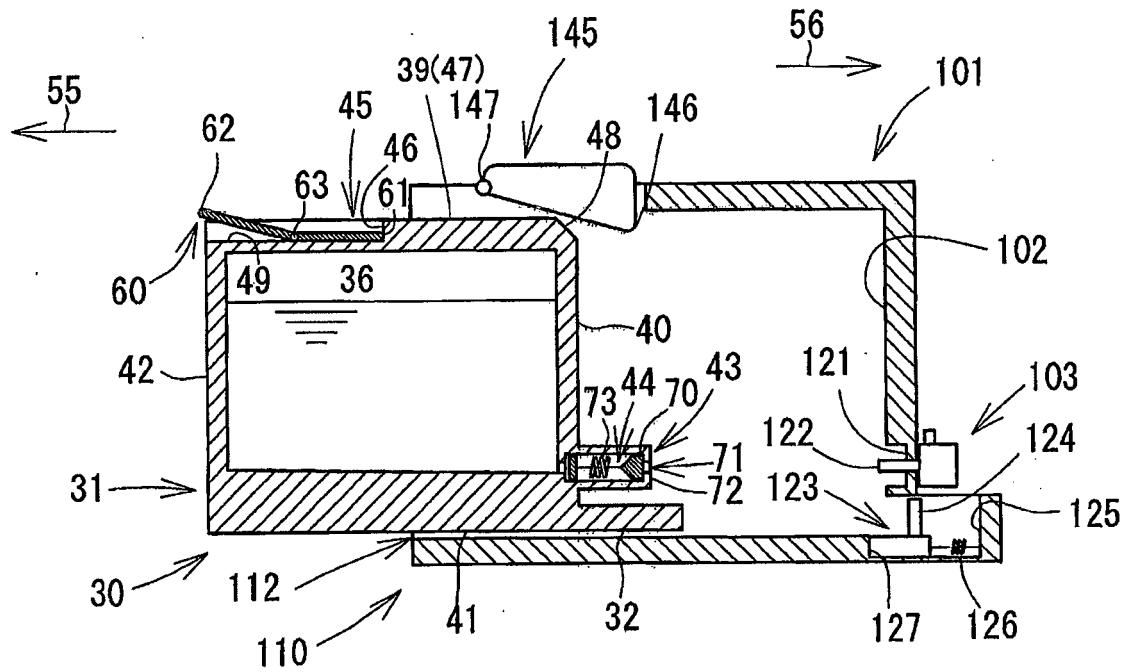


FIG. 5B

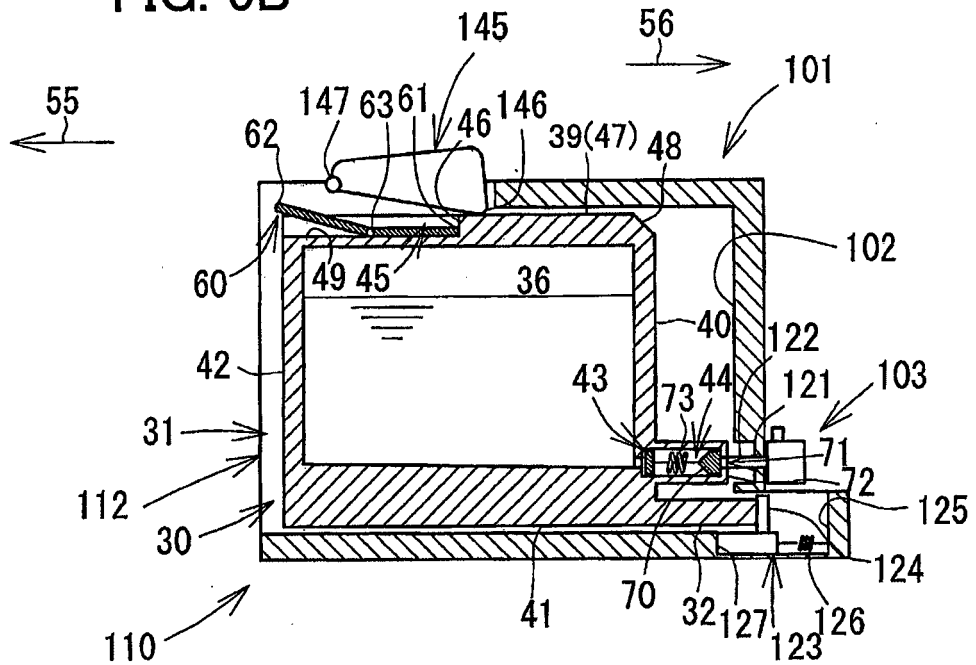


FIG. 6A

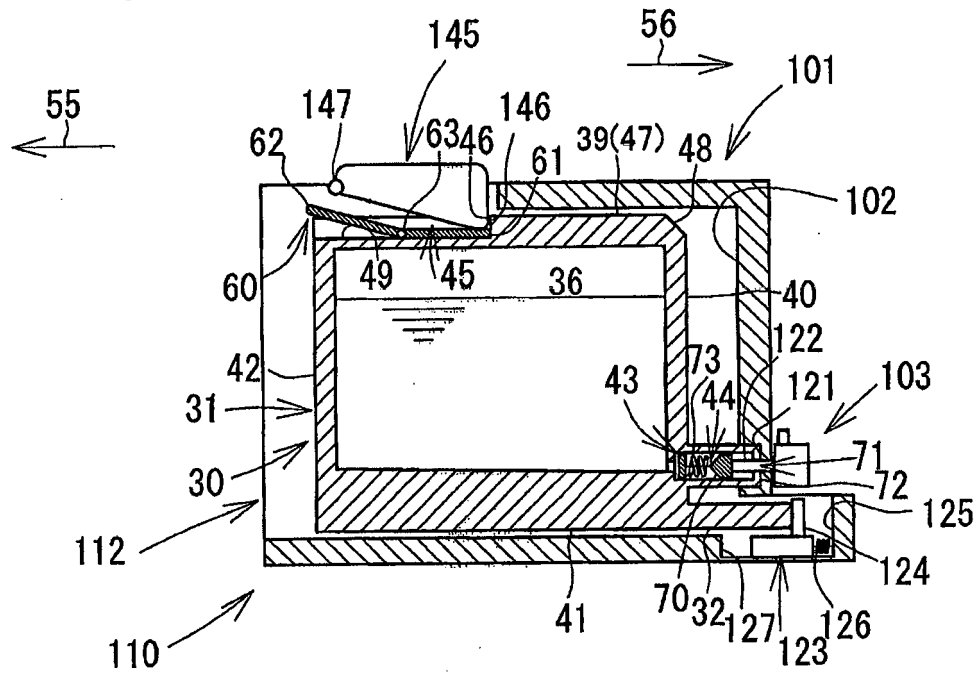


FIG. 6B

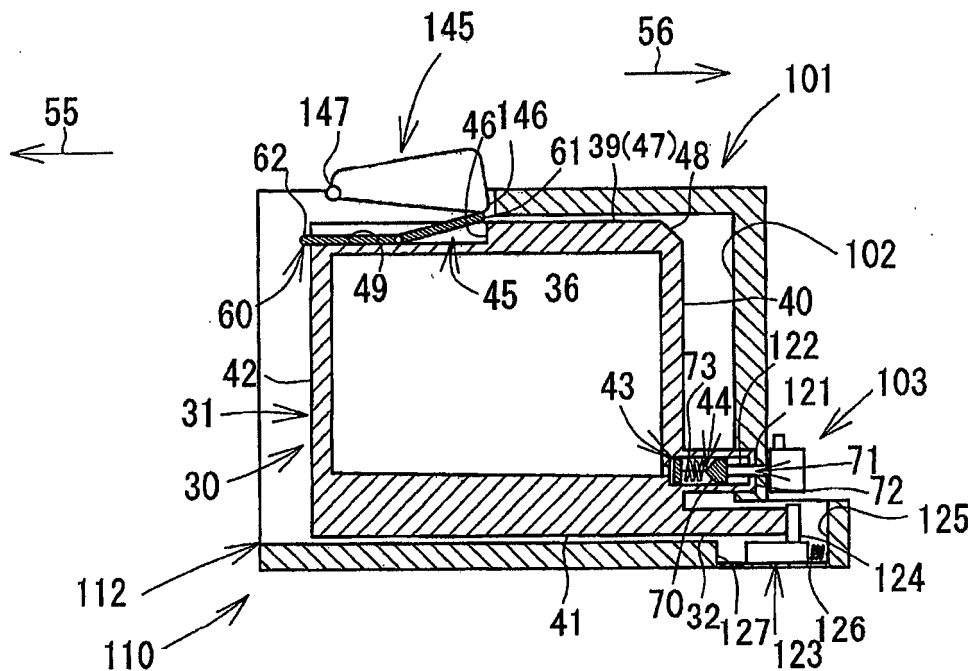


FIG. 7

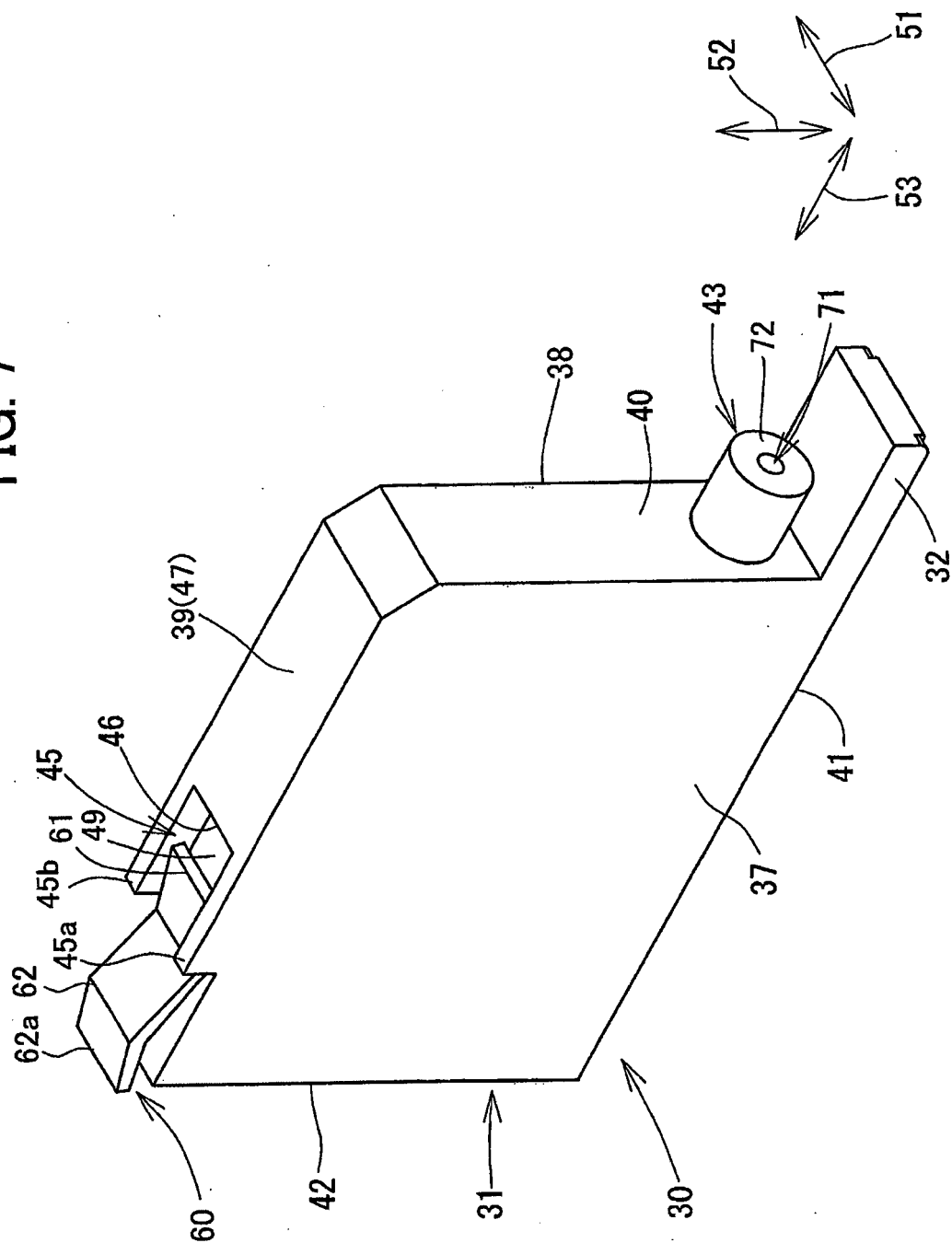


FIG. 9A

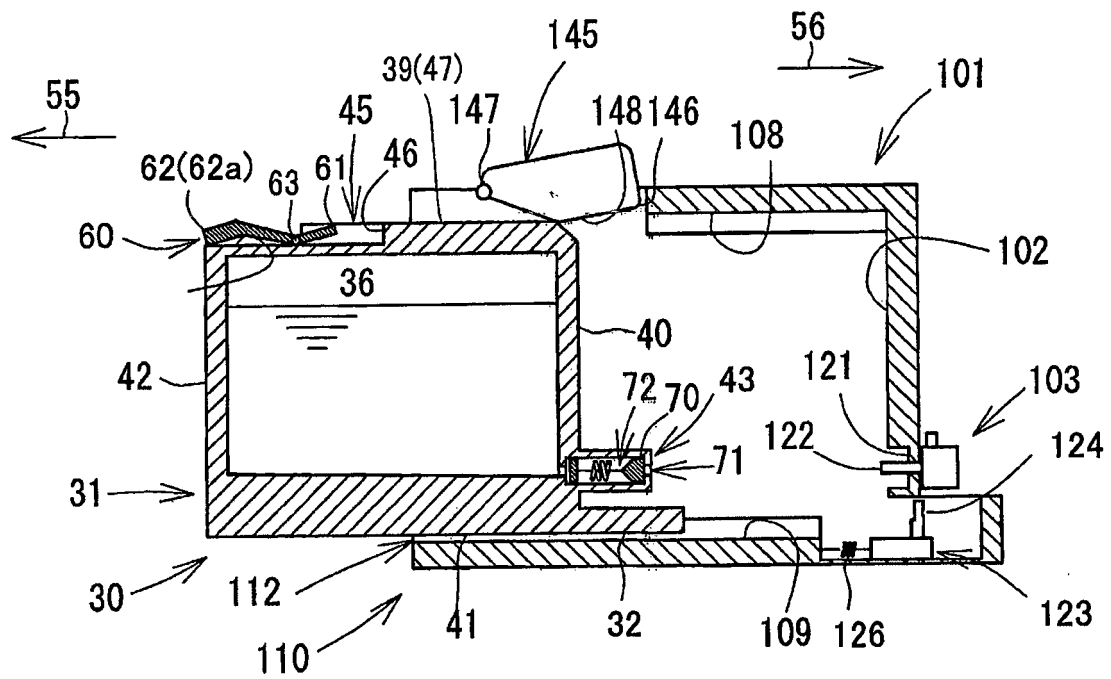


FIG. 9B

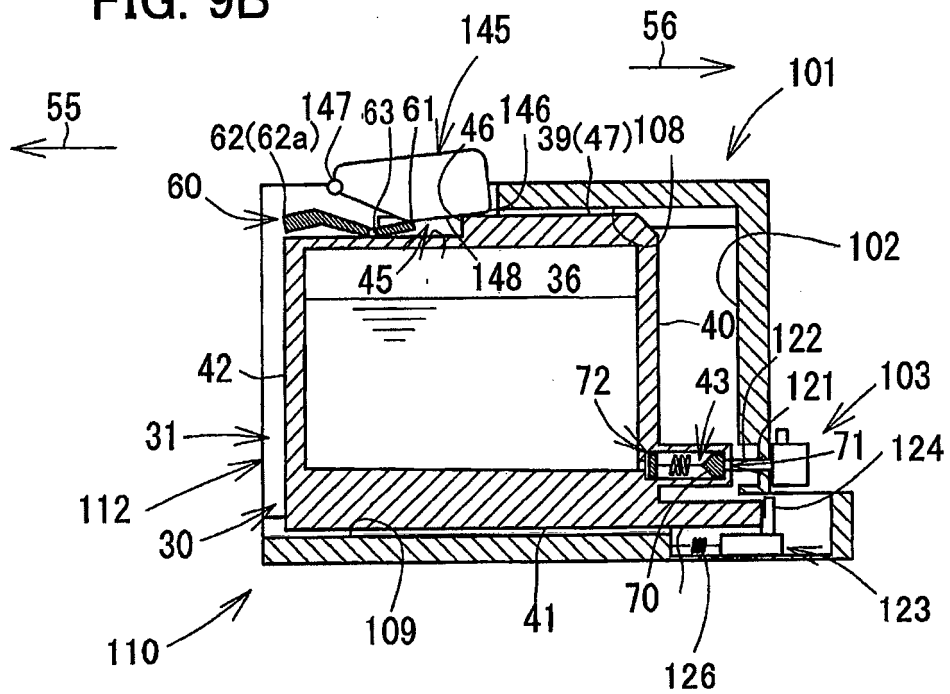


FIG. 10A

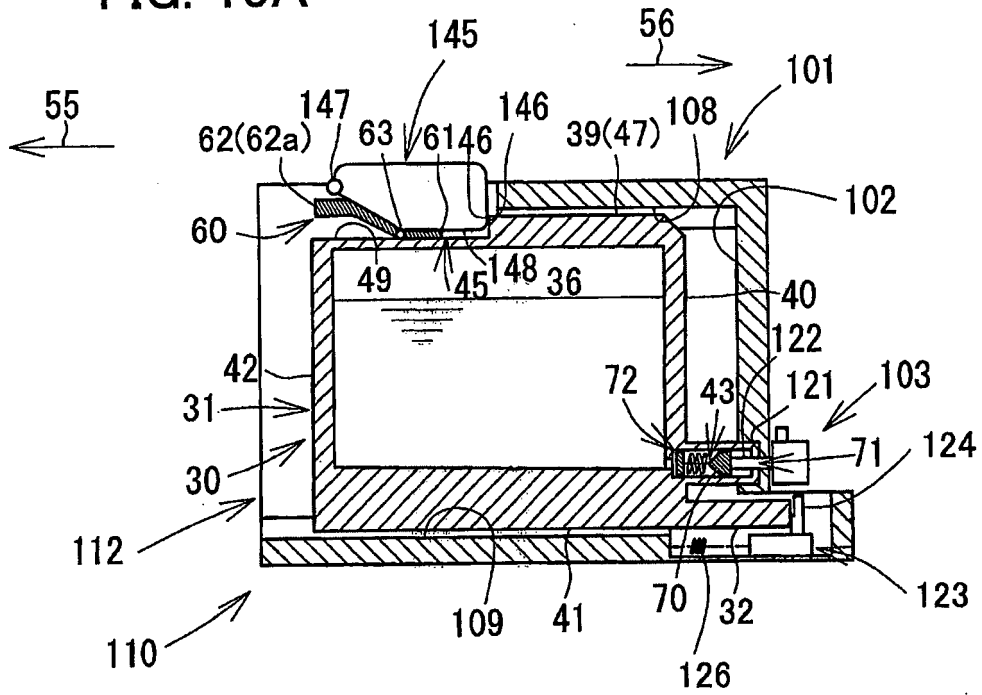


FIG. 10B

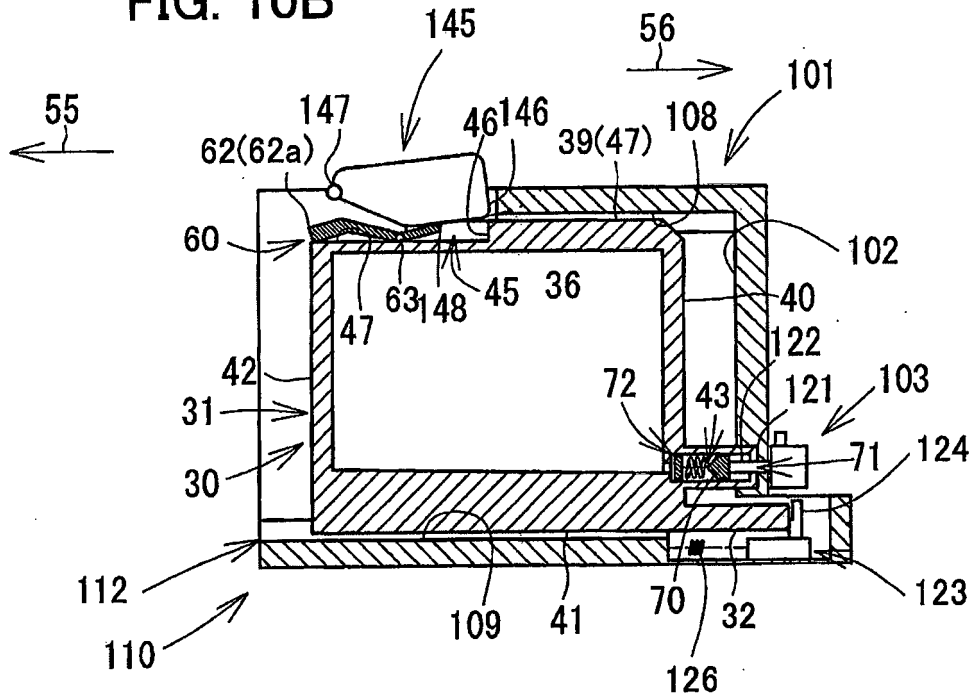
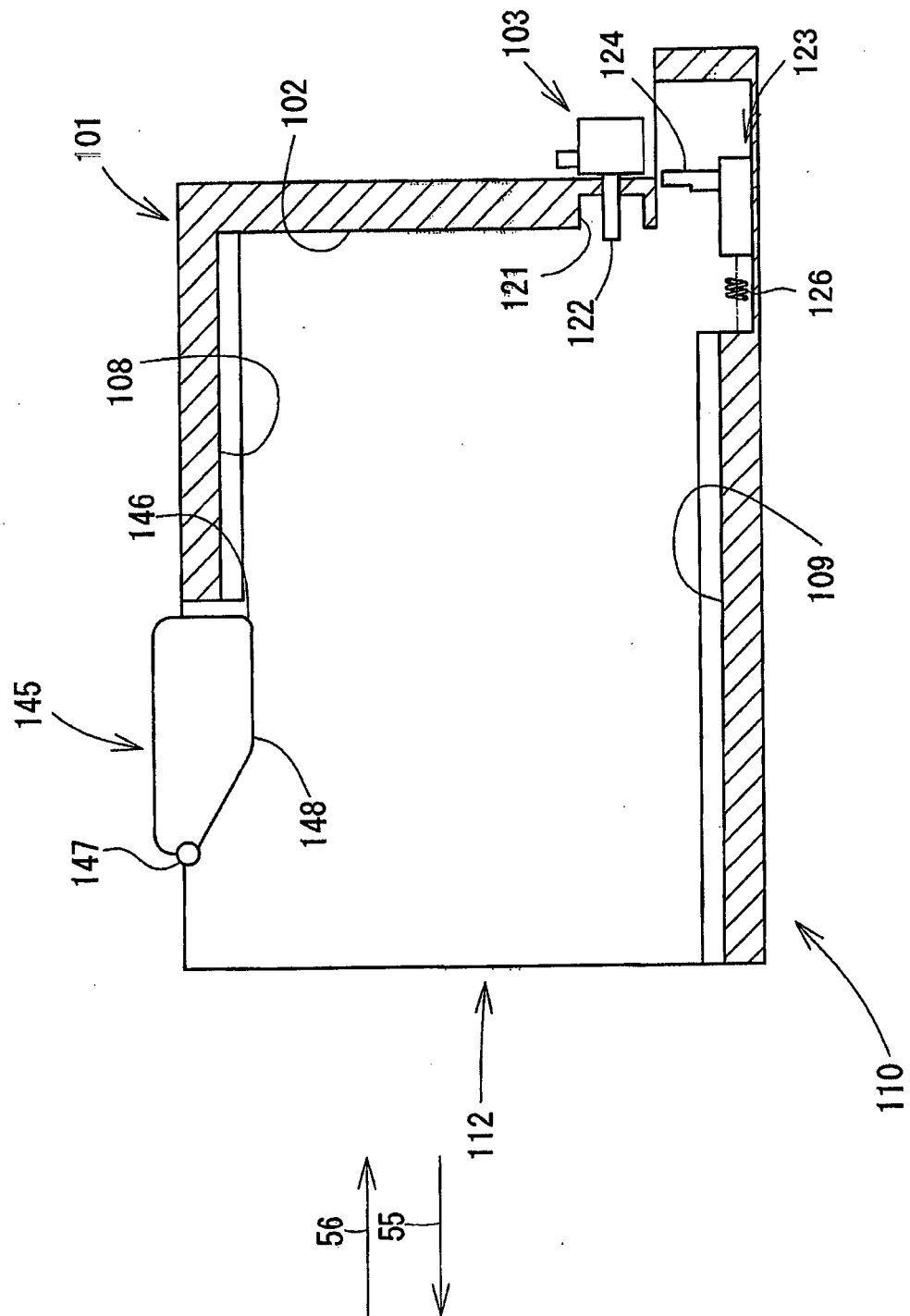


FIG. 11



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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