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Okumura et al.

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(54) **LIQUID CONTAINER DEVICE AND LIQUID EJECTING APPARATUS**

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(51) **Int. Cl.**
B41J 2/175 (2006.01)

(52) **U.S. Cl.**
CPC ***B41J 2/17509*** (2013.01)

(58) **Field of Classification Search**
CPC B41J 2/17509
See application file for complete search history.

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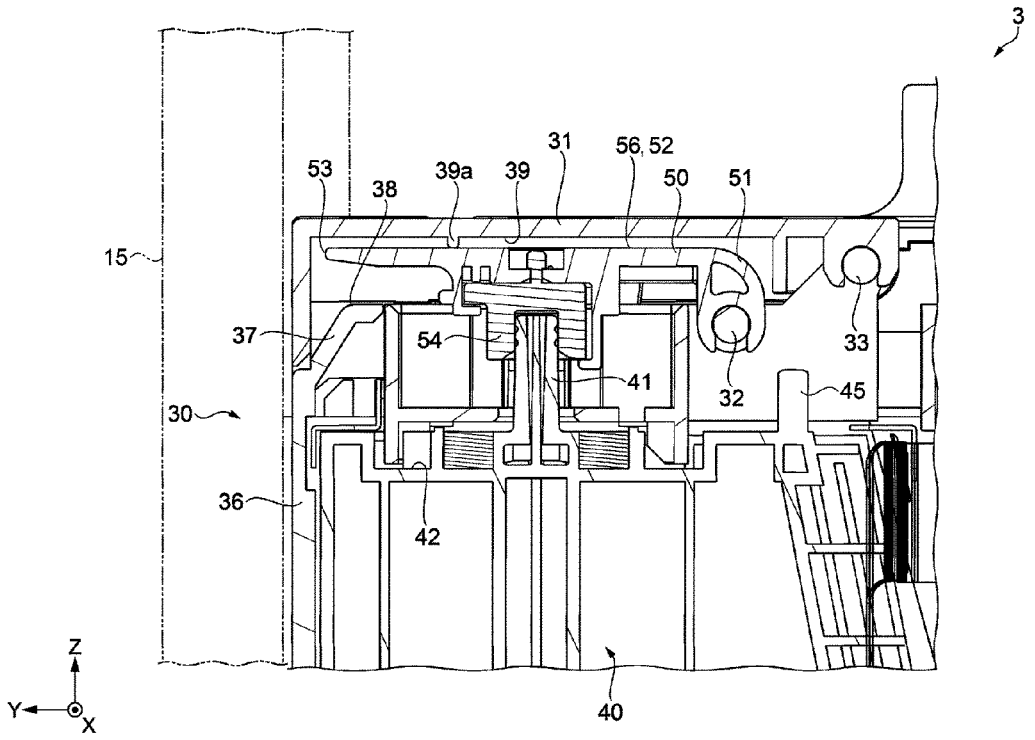
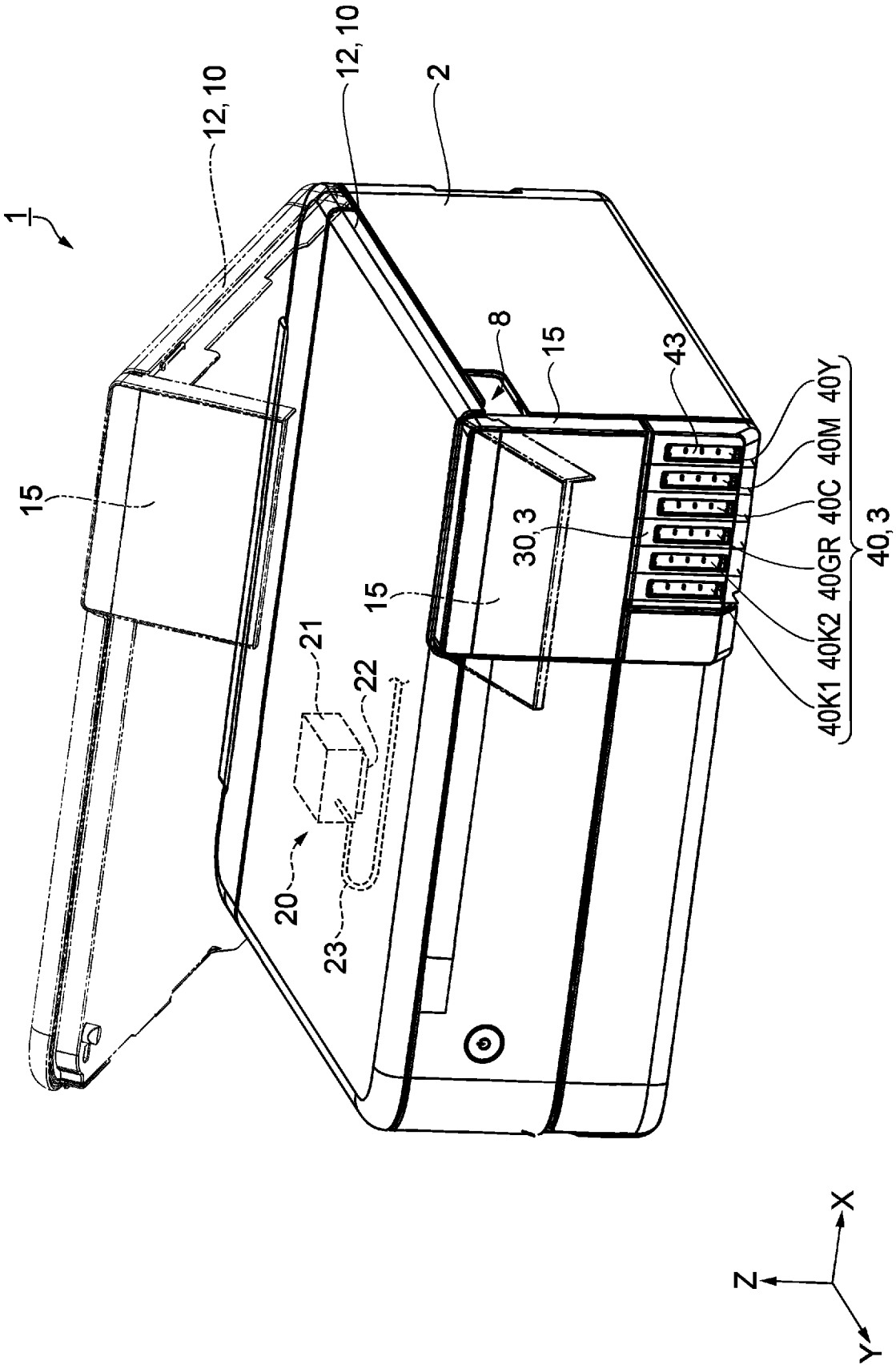
(57) **ABSTRACT**

A liquid container device includes: a liquid container having an inlet; a casing in which the liquid container is housed; and a cap lever having a cap configured to seal the inlet. The liquid container has an upper surface, and a visualization surface. The casing includes a cover configured to pivot and that protects the upper surface, a cap lever-engaging portion, a visualization portion having an opening, and a wall portion disposed on the +Z direction side with respect to the visualization portion. The cap lever includes an engageable portion configured to be engaged with the cap lever-engaging portion, and a body extending in the +Y direction from the engageable portion. A surface disposed so as to face the cover of the body is planar, and an end of the body in the +Y direction is separated from an end of the wall portion in the +Z direction.

6 Claims, 16 Drawing Sheets

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43
40Y
40M
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40K2
40K1
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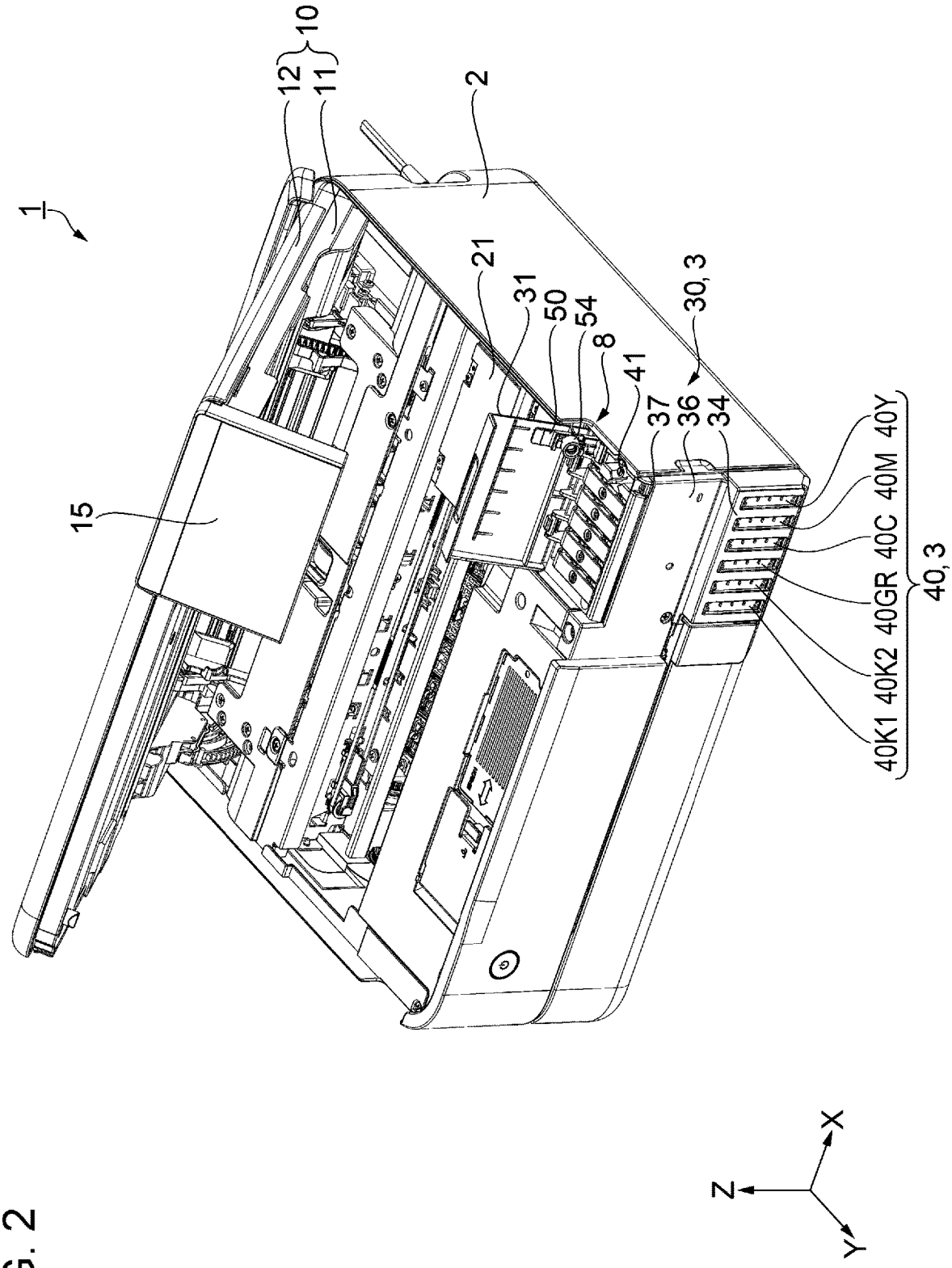
30,3
15
15
21
22
20
23
X
Z
Y

FIG. 1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Y

FIG. 2

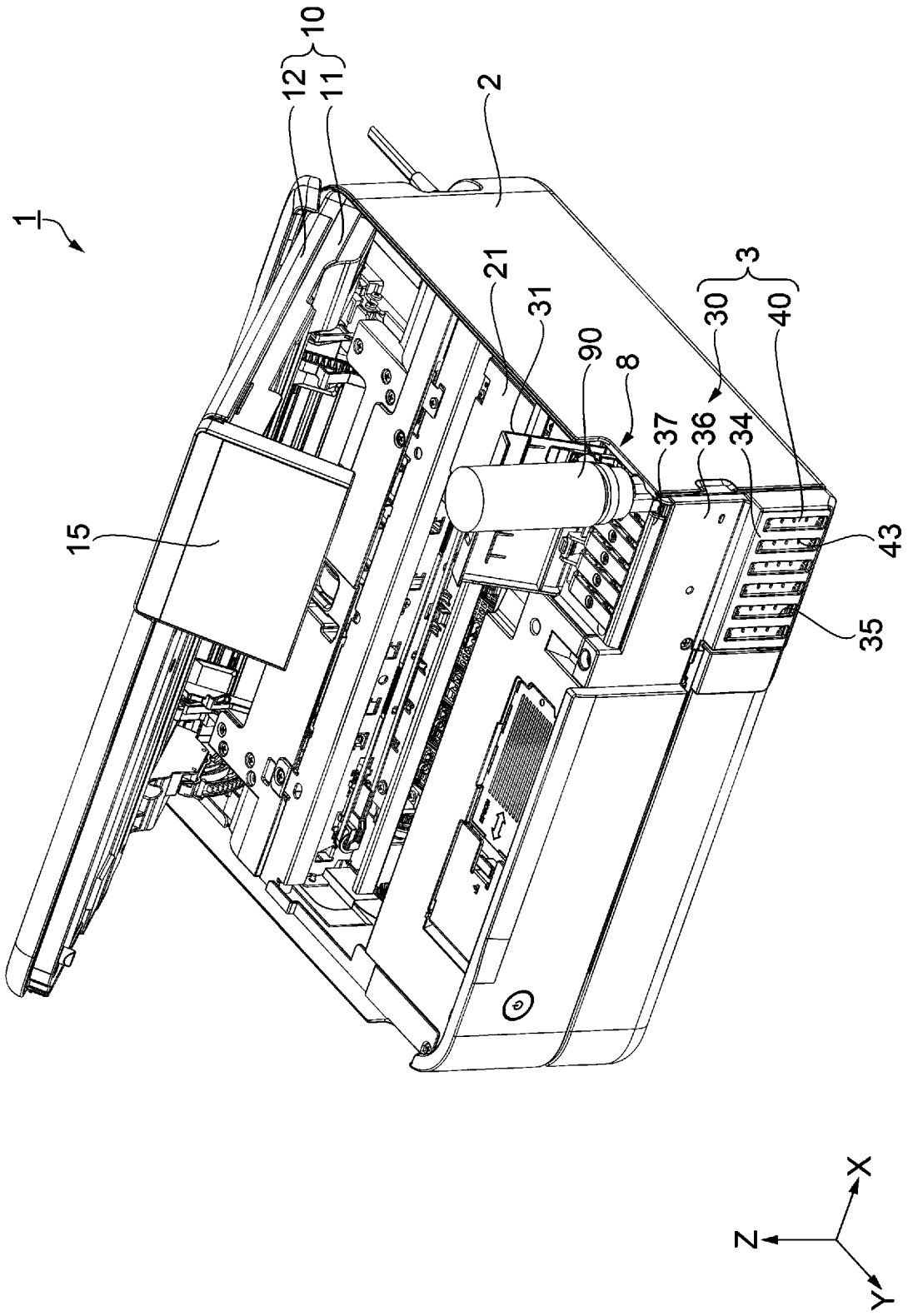
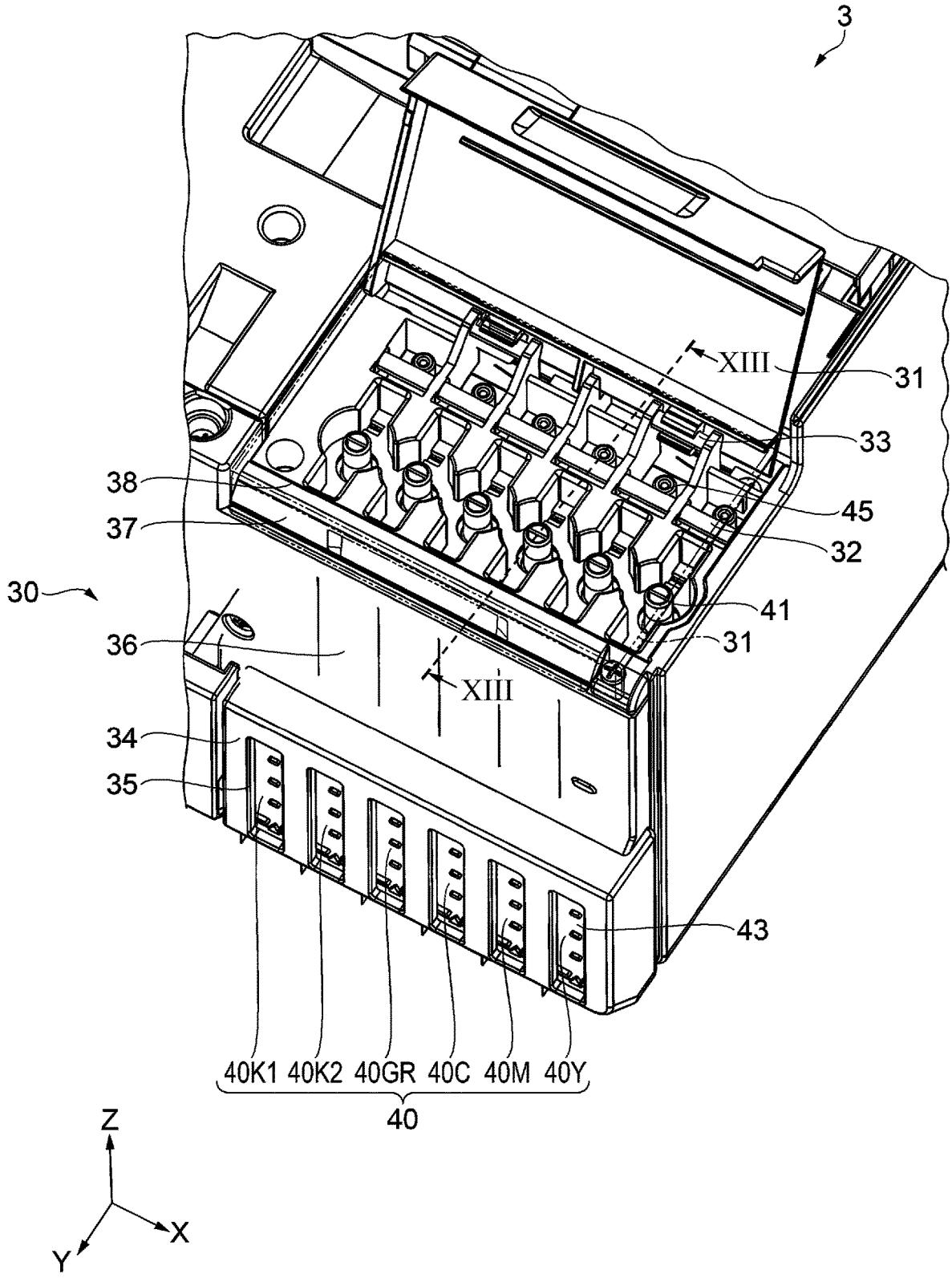


FIG. 3

FIG. 4


3
XIII
31
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38
45
37
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XIII
34
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40K1 40K2 40GR 40C 40M 40Y
40
Z
X
Y

FIG. 5

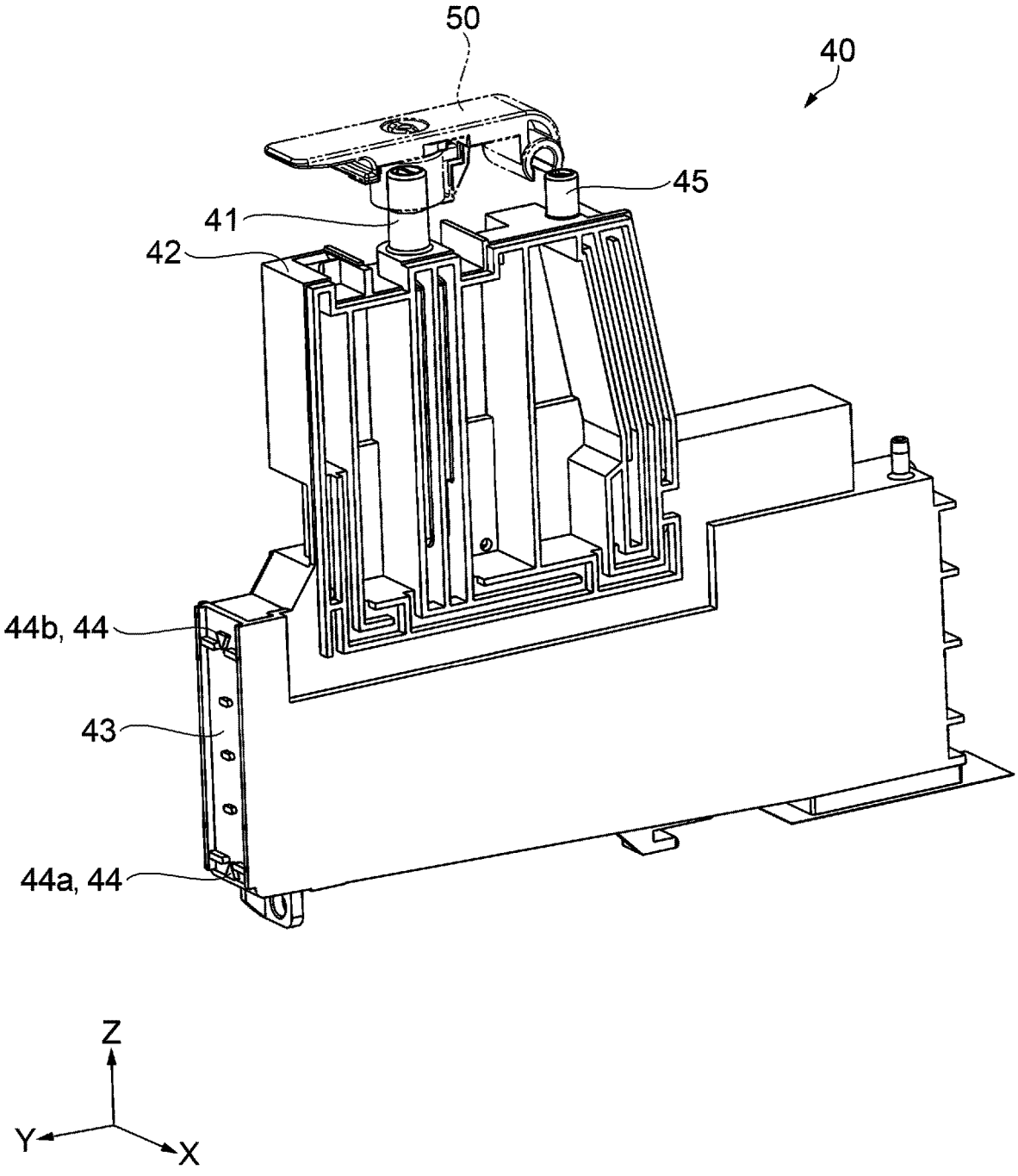
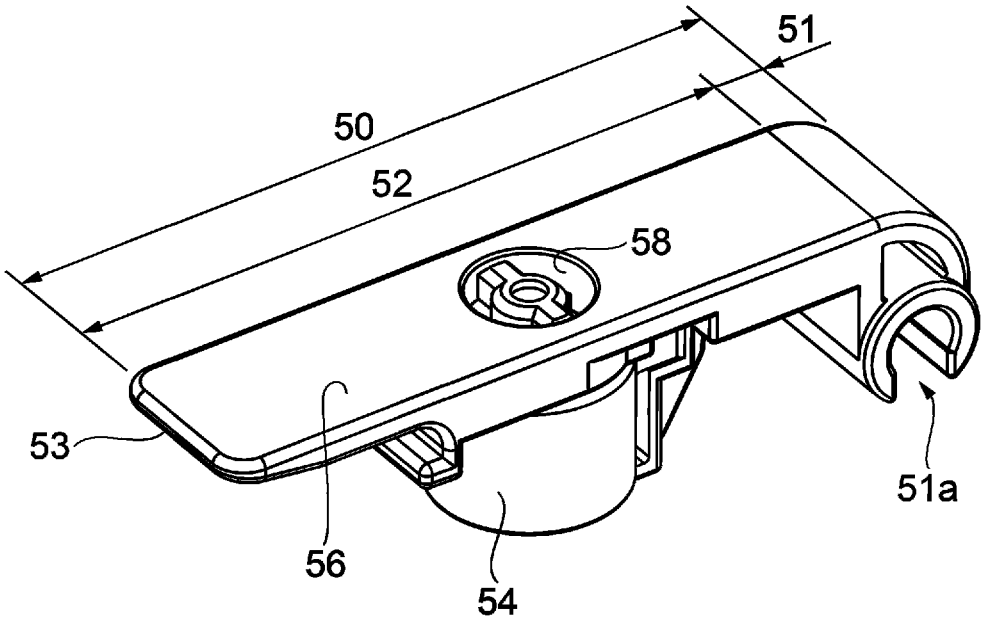


FIG. 6



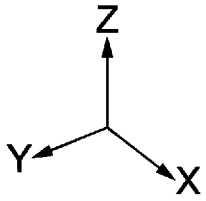


FIG. 7

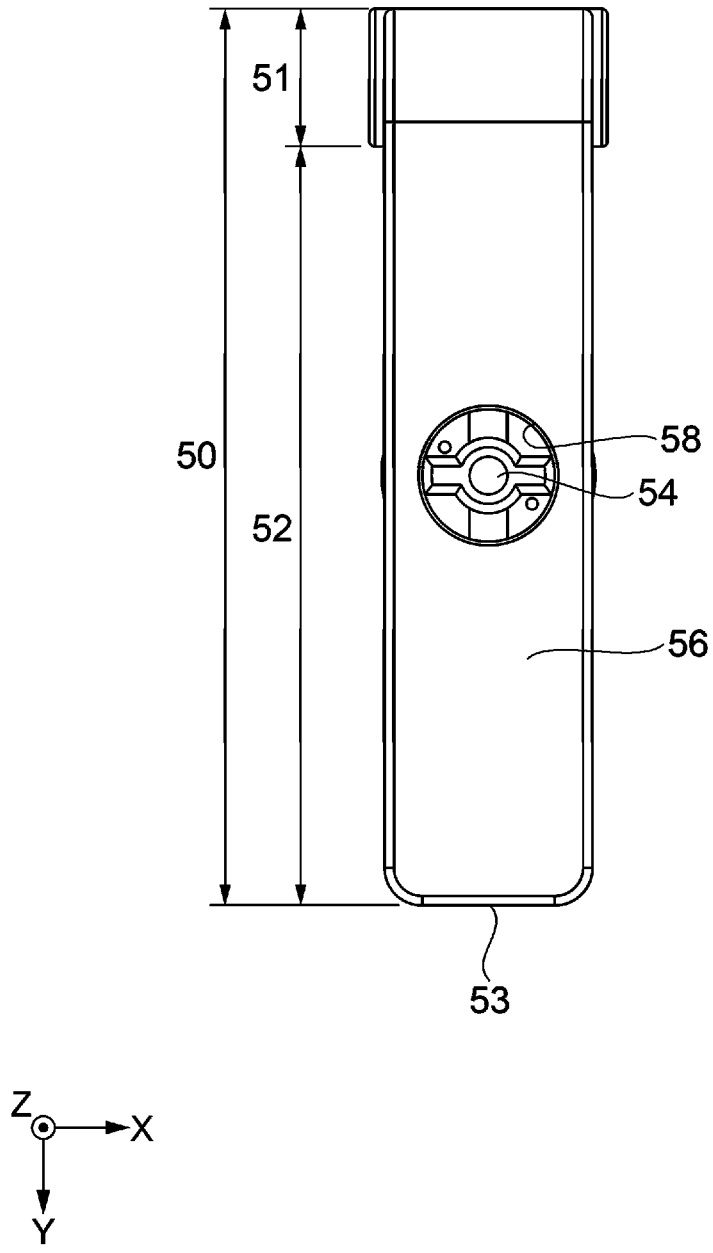


FIG. 8

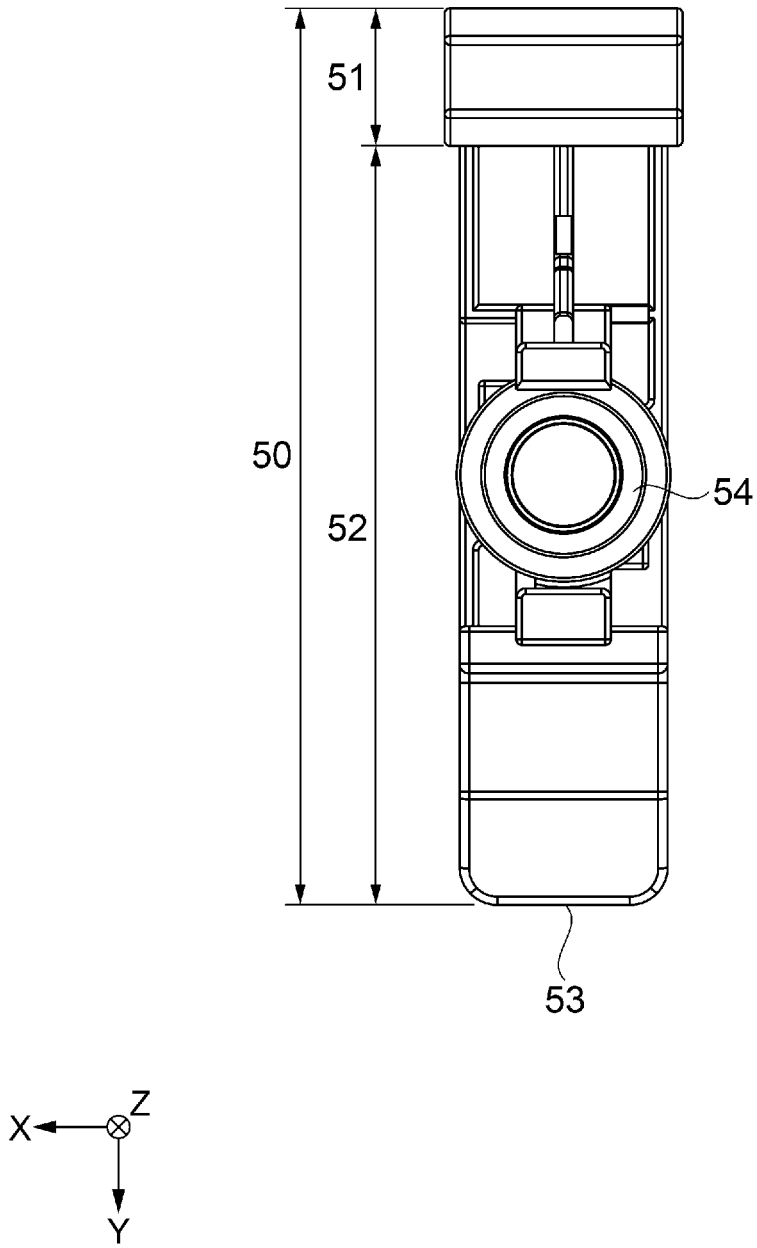


FIG. 9

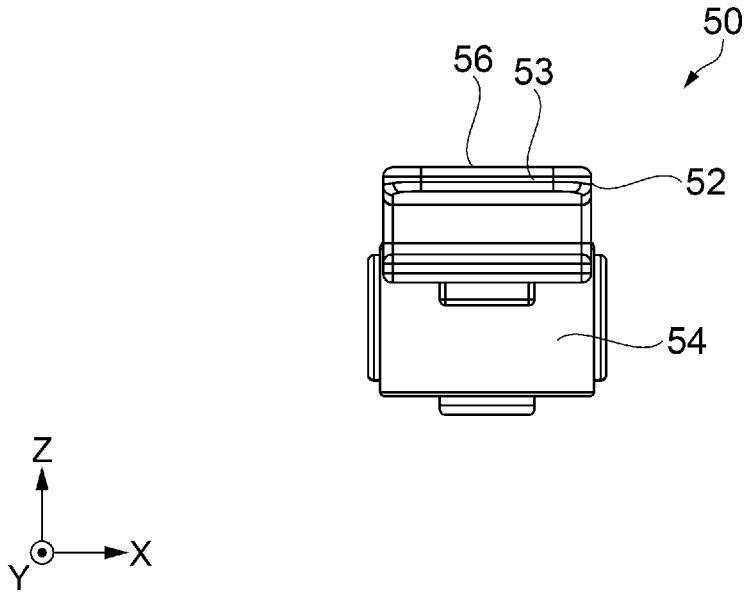


FIG. 10

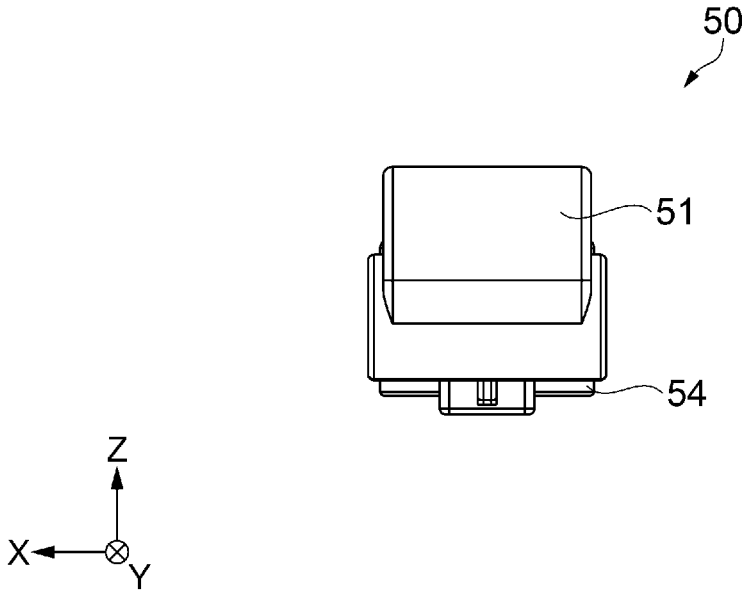


FIG. 11

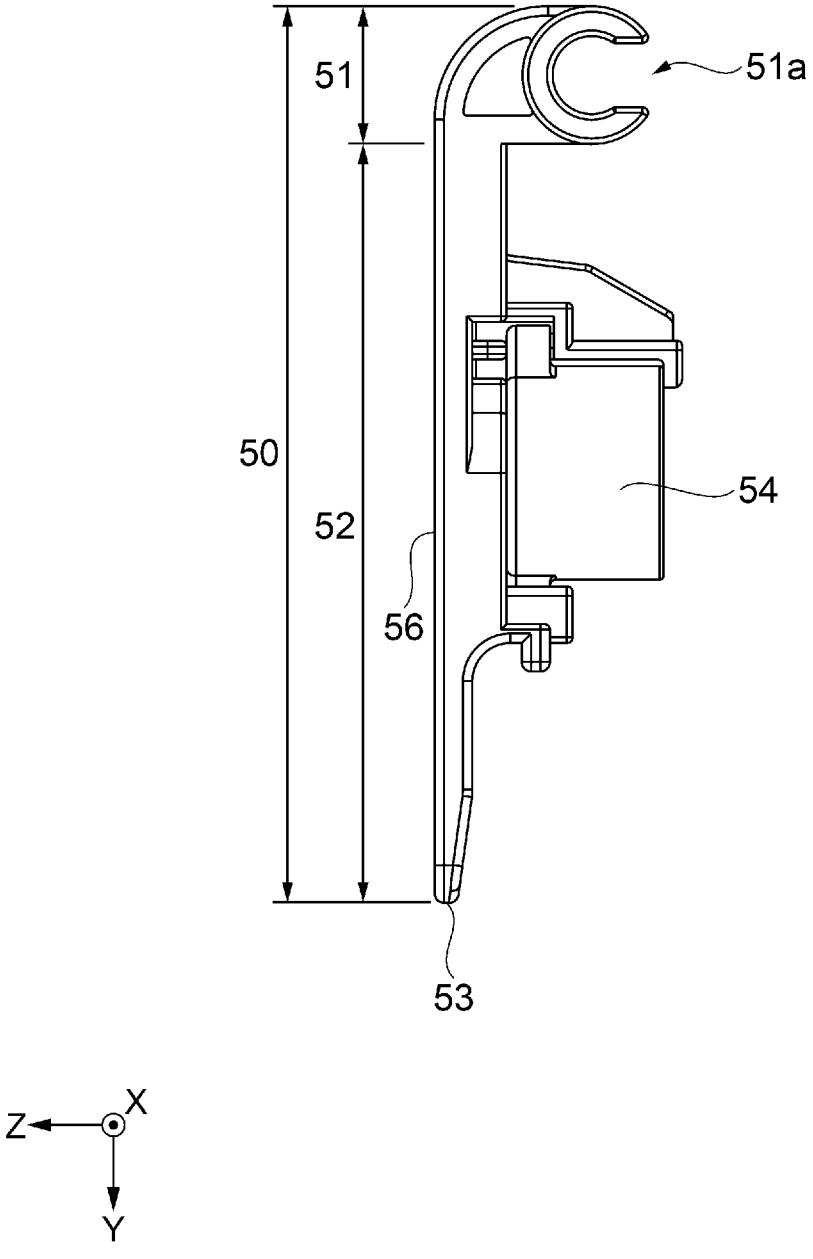
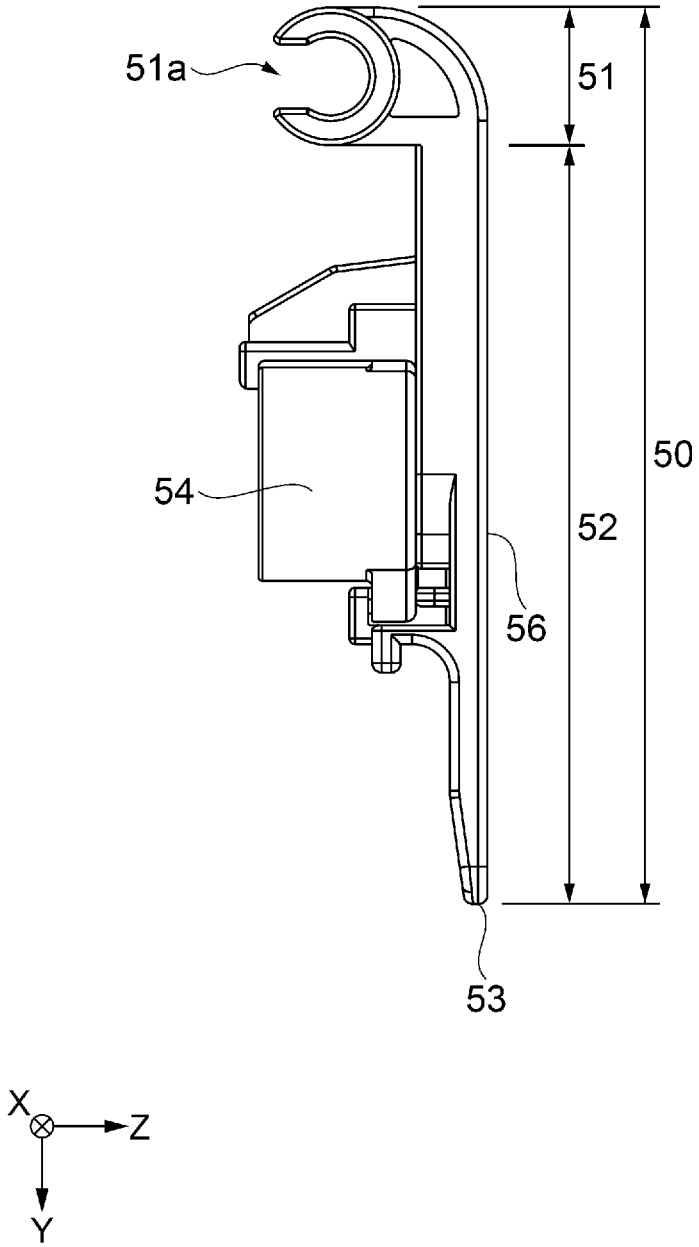


FIG. 12



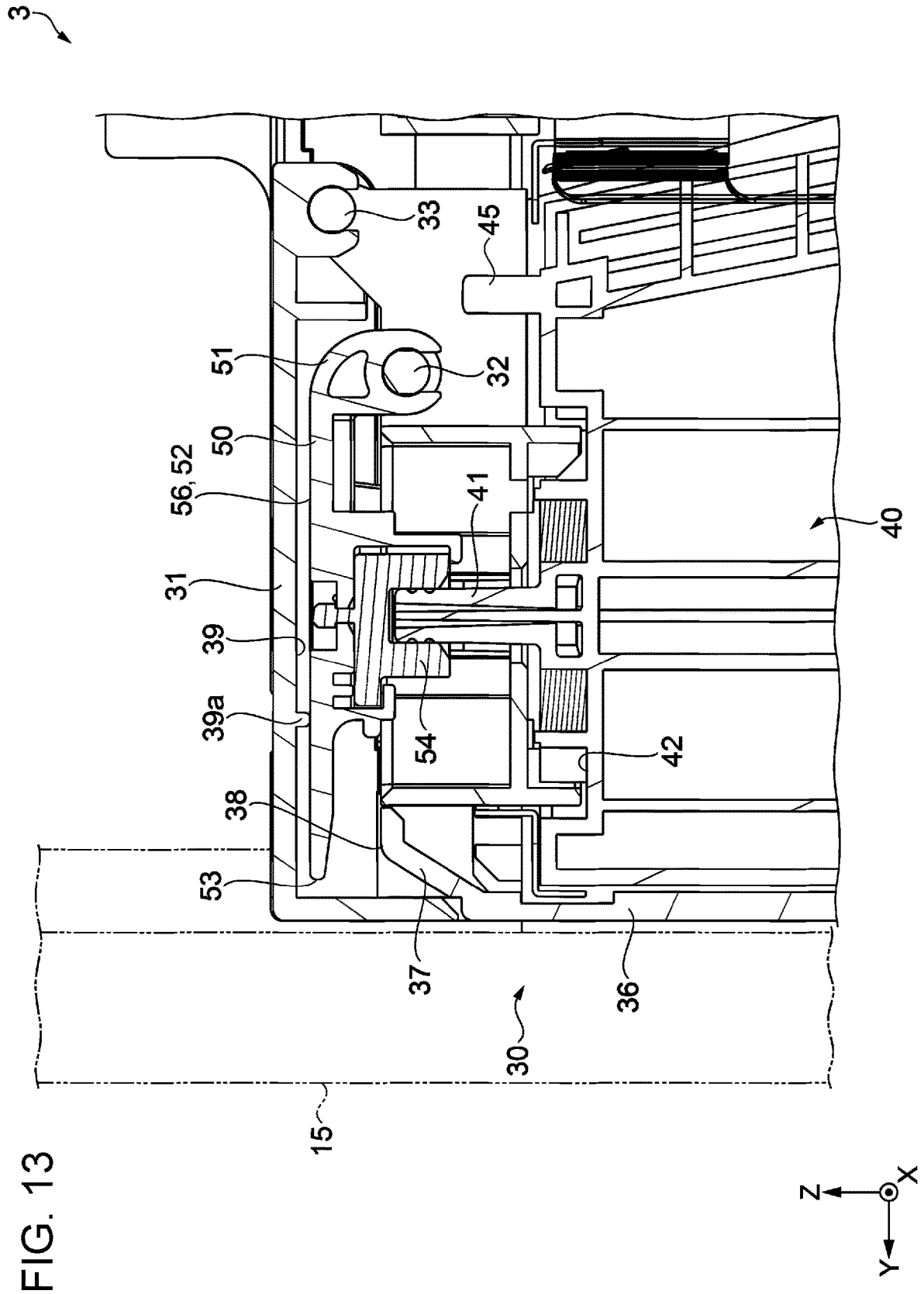


FIG. 13

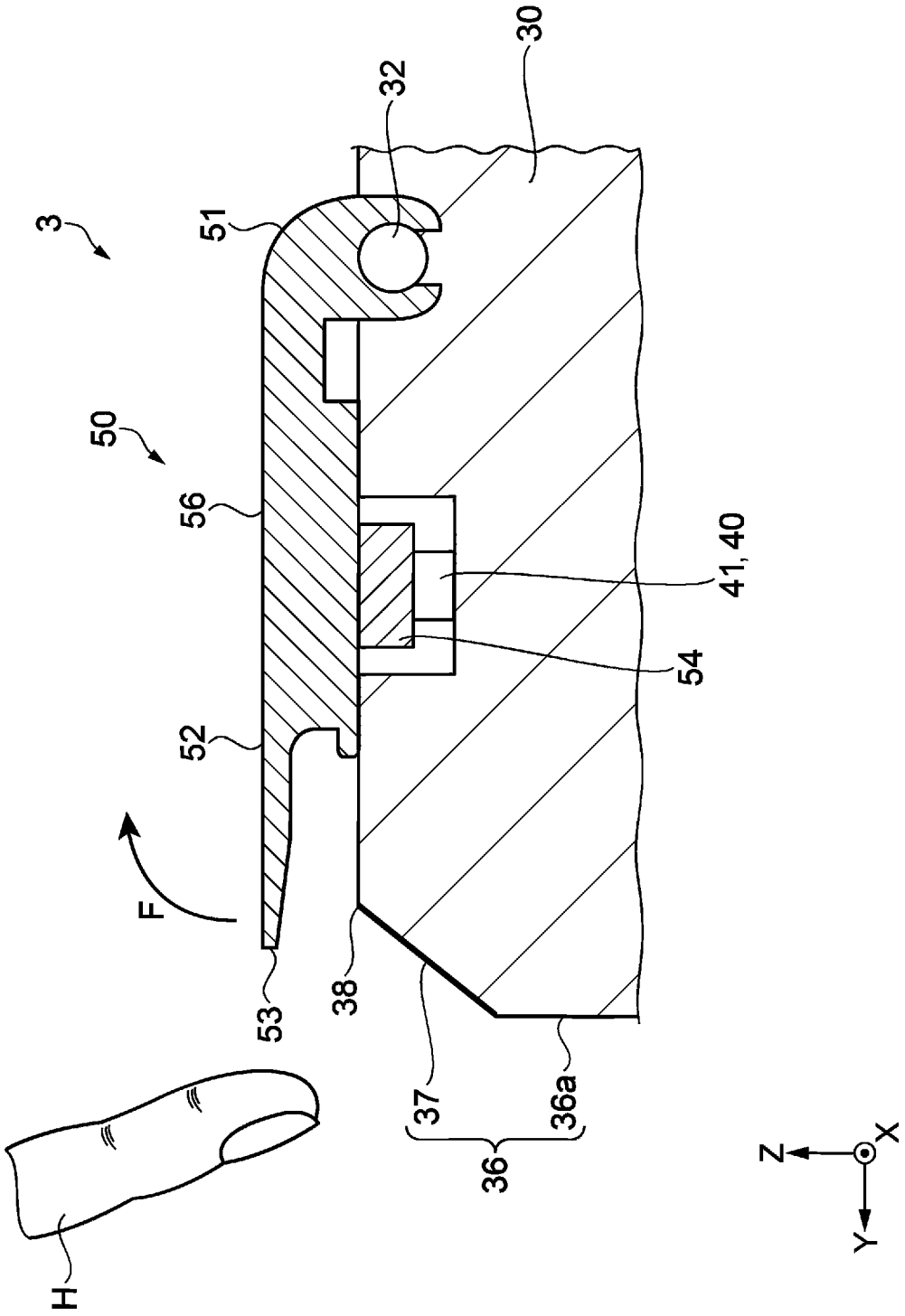


FIG. 14

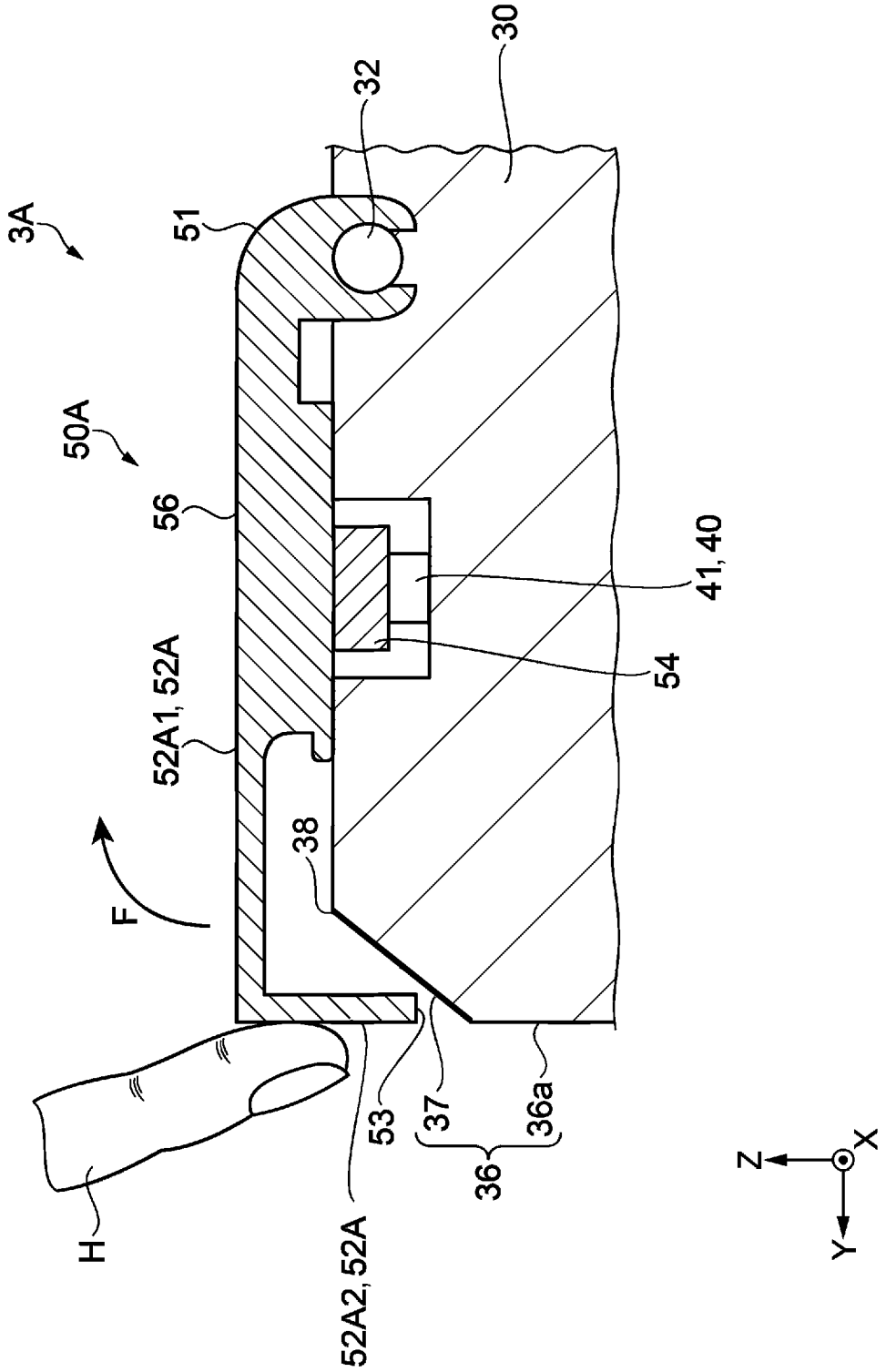


FIG. 15

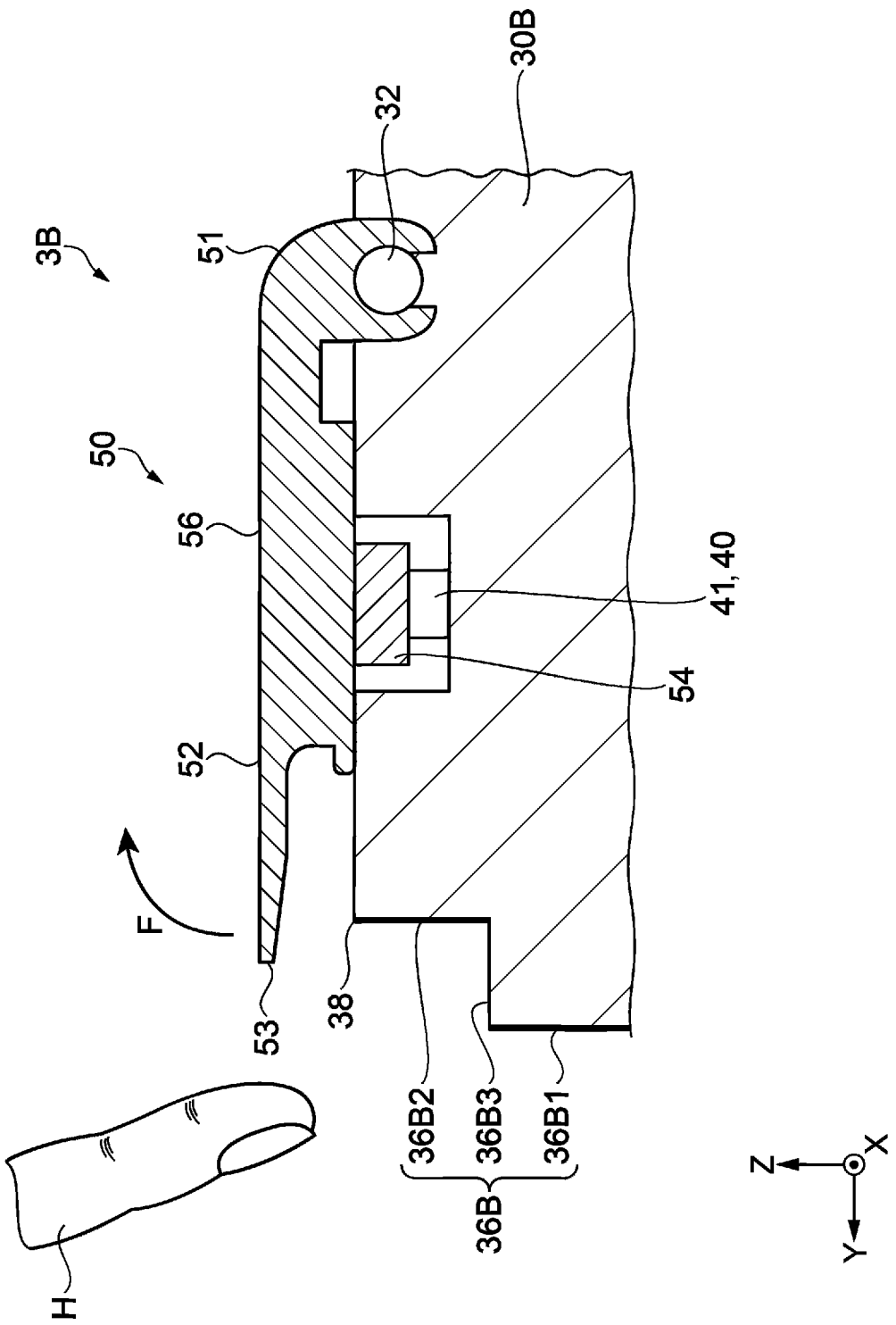
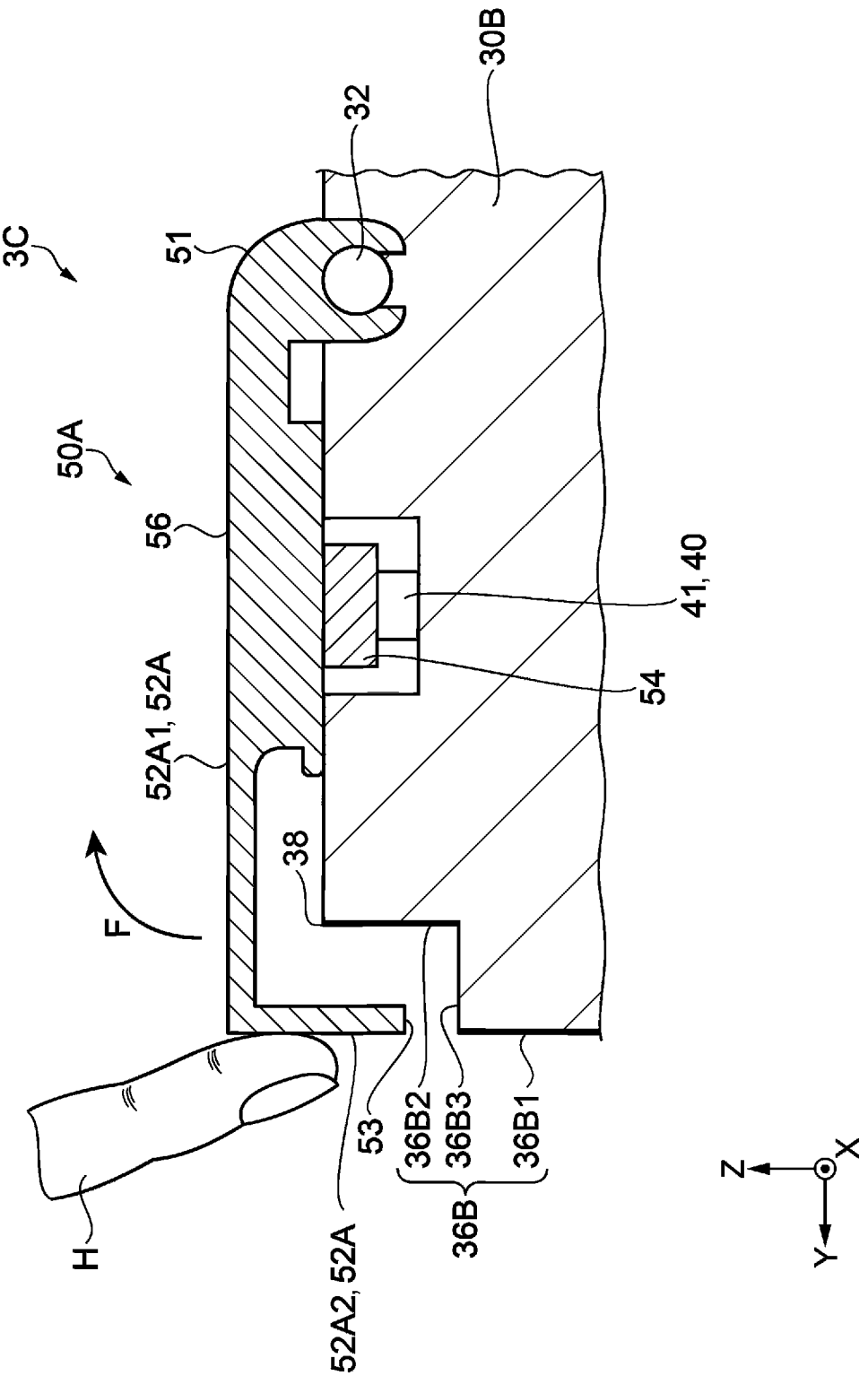


FIG. 16


30B
32
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50A
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41, 40
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52A1, 52A
38
F
H
52A2, 52A
53
36B2
36B3
36B1
36B
Z
X
Y

FIG. 17

LIQUID CONTAINER DEVICE AND LIQUID EJECTING APPARATUS

The present application is based on, and claims priority from JP Application Serial Number 2019-228030, filed Dec. 18, 2019, the disclosure of which is hereby incorporated by reference herein in its entirety.

BACKGROUND

1. Technical Field

The present disclosure relates to a liquid container device and a liquid ejecting apparatus including the liquid container device.

2. Related Art

For example, a known liquid ejecting apparatus includes a liquid container unit (liquid container device) capable of being replenished with a liquid, and a liquid ejecting unit configured to print an image onto a medium by ejecting a liquid supplied from the liquid container device (for example, JP-A-2018-069705).

The liquid container device described in JP-A-2018-069705 includes a liquid container configured to contain a liquid, a casing configured to contain the liquid container, an inlet through which a liquid is poured into the liquid container, and a stopper (cap lever) configured to open and close the inlet. The cap lever includes a grip projecting vertically upward.

In the liquid container device described in JP-A-2018-069705, a user holds the grip, opens the cap lever, and pours a liquid into the liquid container.

However, in the liquid container device described in JP-A-2018-069705, the grip projecting vertically upward is disposed on the cap lever, and a user opens or closes the cap lever by holding the grip. Thus, an additional space has to be formed in the vicinity of the inlet. Accordingly, it is difficult to reduce the length in the vertical direction (height direction) of the liquid container device and to reduce the size of the liquid container device in the height direction.

SUMMARY

A liquid container device includes: a liquid container having an inlet through which a liquid is poured from a replenishment container; a casing in which the liquid container is housed; and a cap lever configured to pivot and having a cap configured to seal the inlet. The liquid container has an upper surface on which the inlet is disposed, and a visualization surface via which the liquid is visible and that is positioned on a side of a first direction with respect to the upper surface. The casing includes a cover that is configured to pivot and that protects the upper surface, an engaging portion disposed between the cover and the upper surface, a visualization portion having an opening exposing the visualization surface, and a wall portion disposed on a side of a direction opposite to the first direction with respect to the visualization portion. The cap lever includes an engageable portion configured to be engaged with the engaging portion, and a body extending in a second direction crossing the first direction from the engageable portion. A surface disposed so as to face the cover of the body is planar, and an end of the body in the second direction is separated from an end of the wall portion in the direction opposite to the first direction.

A liquid ejecting apparatus includes: a liquid ejecting unit configured to eject a liquid; and the liquid container device in which the liquid is contained.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a recording apparatus according to Embodiment 1.

FIG. **2** is another perspective view of the recording apparatus according to Embodiment 1.

FIG. **3** is still another perspective view of the recording apparatus according to Embodiment 1.

FIG. **4** is a perspective view of a liquid container device according to Embodiment 1.

FIG. **5** is a perspective view of a liquid container.

FIG. **6** is a perspective view of a cap lever.

FIG. **7** is a top view of the cap lever.

FIG. **8** is a bottom view of the cap lever.

FIG. **9** is a front view of the cap lever.

FIG. **10** is a rear view of the cap lever.

FIG. **11** is a right side view of the cap lever.

FIG. **12** is a left side view of the cap lever.

FIG. **13** is a sectional view of a main part of the liquid container device according to Embodiment 1.

FIG. **14** is a sectional view of the liquid container device in a state in which a cover is open and the cap lever is closed.

FIG. **15** is a sectional view of a liquid container device according to Embodiment 2.

FIG. **16** is a sectional view of a liquid container device according to Embodiment 3.

FIG. **17** is a sectional view of a liquid container device according to Embodiment 4.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

1. Embodiment 1

1.1 Overview of Recording Apparatus

FIGS. **1** to **3** are perspective views of a recording apparatus **1** according to Embodiment 1. FIG. **1** illustrates a state in which a scanner unit **10** is closed with respect to an apparatus body **2**. FIGS. **2** and **3** each illustrate a state in which the scanner unit **10** is open with respect to the apparatus body **2**.

First, an overview of the recording apparatus **1** according to the present embodiment is described with reference to FIGS. **1** to **3**. The recording apparatus **1** is an example of a liquid ejecting apparatus in the present application.

As illustrated in FIGS. **1** to **3**, the recording apparatus **1** according to the present embodiment includes the apparatus body **2**, which has a cuboid shape, and the scanner unit **10**, which is attached to an upper portion of the apparatus body **2**. The recording apparatus **1** is disposed on a horizontal plane.

In the following description, a long-side direction (width direction) of the apparatus body **2**, which has a cuboid shape, is defined as the X direction, a short-side direction (depth direction) of the apparatus body **2** is defined as the Y direction, and a height direction of the apparatus body **2** is defined as the Z direction. In addition, the directions toward the tips of arrows indicating the corresponding directions are defined as the + directions, and the directions toward the base ends of the arrows indicating the corresponding directions are defined as the − directions. The plane (XY-plane) formed by the X direction and the Y direction is a horizontal plane. The −Z direction is the direction of gravity.

The −Z direction is an example of a first direction in the present application. The +Z direction is an example of the direction opposite to the first direction in the present application. The +Y direction is an example of a second direction in the present application. The −Y direction is an example of the direction opposite to the second direction in the present application.

The scanner unit **10** is disposed on an upper portion of the apparatus body **2** and is attached to and configured to pivot with respect to the apparatus body **2** (see FIGS. **1** and **2**). In the scanner unit **10**, a scanner housing **11**, on which a document is mounted and which reads the document, and a document cover **12** are stacked in this order.

The document cover **12** is a cover that protects the scanner housing **11**. As illustrated in FIG. **1** with chain double-dashed lines, the document cover **12** is configured to pivot with respect to the scanner housing **11**. In addition, a display unit **15** is attached to the end of the document cover **12** in the +Y direction.

As illustrated in FIG. **1** with solid lines and chain double-dashed lines, the display unit **15** is configured to pivot, together with the document cover **12**, with respect to the scanner housing **11** and is configured to be tilted with respect to the document cover **12**. That is, the display unit **15** is attached to an end of the scanner unit **10** and is configured to pivot together with the scanner unit **10** and to be tilted.

The display unit **15** is formed by a liquid crystal display module having a touch screen function. The display unit **15** has a mechanism for guiding operation of the recording apparatus **1** (display function) and a function of performing various settings on the recording apparatus **1**. A user can tilt the display unit **15** to a position at which the display unit **15** is easily visible to the user and can perform various settings on the recording apparatus **1** while referring to images displayed on the display unit **15**. In addition, a user can tilt the display unit **15** to a position at which the user can easily touch the display unit **15** and can perform various settings on the recording apparatus **1** via the display unit **15**.

In addition, a liquid container device **3** (liquid containers **40**) can be replenished with a liquid from a replenishment container **90** by pivoting the display unit **15** together with the scanner unit **10** and by opening the scanner unit **10**, to which the display unit **15** is attached, with respect to the apparatus body **2** (see FIG. **3**).

A recording unit **20** is disposed inside the apparatus body **2**. The recording unit **20** is configured to record an image onto a medium (not illustrated) by using a liquid. The recording unit **20** includes a carriage **21**, a recording head **22**, which is mounted on the carriage **21** and ejects a liquid onto a medium, and a tube **23**, through which a liquid is supplied to the recording head **22** (see FIG. **1**).

The recording head **22** is an example of a liquid ejecting unit in the present application.

A liquid to be supplied to the recording head **22** is contained in the liquid container device **3**. The recording head **22** and the liquid container device **3** are coupled by the tube **23**.

As described above, the recording apparatus **1**, which is an example of the liquid ejecting apparatus, includes the recording head **22** (liquid ejecting unit), which ejects a liquid, and the liquid container device **3**, in which a liquid is contained.

The carriage **21** is supported by a guide shaft (not illustrated) and is configured to move in a width direction of a medium crossing a transport direction in which a medium is transported. In the present embodiment, the width direction of a medium is the +X direction or the −X direction, and the transport direction of a medium is the +Y direction.

The recording head **22** is configured to move in the width direction of a medium together with the carriage **21**. The recording head **22** includes a common liquid chamber (not illustrated), a pressure generating chamber (not illustrated), a piezoelectric element (not illustrated), and a nozzle (not illustrated). The recording head **22** ejects a liquid onto a medium.

The recording apparatus **1** according to the present embodiment records a desired image onto a medium by alternately repeating the operation in which the recording head **22** ejects a liquid onto the medium while moving in the width direction of the medium and the operation in which the medium is transported in the transport direction.

1.2 Overview of Liquid Container Device

FIG. **4** is a perspective view of the liquid container device **3** according to the present embodiment. FIG. **5** is a perspective view of the liquid container **40**. FIG. **6** is a perspective view of a cap lever **50**. FIGS. **7** to **12** are plan and elevation views of the cap lever **50** when viewed in the X direction, the Y direction, or the Z direction. FIG. **13** is a sectional view taken along line XIII-XIII in FIG. **4** and a sectional view of a main part of the liquid container device **3** according to the present embodiment.

FIG. **4** illustrates a casing **30** and the liquid containers **40**, which are components of the liquid container device **3**, but does not illustrate the cap lever **50**, which is a component of the liquid container device **3**. FIG. **5** illustrates the cap lever **50** with chain double-dashed lines.

FIG. **7** is a top view of the cap lever **50** when viewed from the +Z direction side. FIG. **8** is a bottom view of the cap lever **50** when viewed from the −Z direction side. FIG. **9** is a front view of the cap lever **50** when viewed from the +Y direction side. FIG. **10** is a rear view of the cap lever **50** when viewed from the −Y direction side. FIG. **11** is a right side view of the cap lever **50** when viewed from the +X direction side. FIG. **12** is a left side view of the cap lever **50** when viewed from the −X direction side.

As illustrated in FIGS. **4** and **5**, the liquid container device **3** includes the liquid containers **40** each having an inlet **41**, through which a liquid can be poured from the replenishment container **90**, the casing **30**, in which the liquid containers **40** are housed, and the cap levers **50**, each of which is configured to pivot and has a cap **54** configured to seal the corresponding inlet **41**.

Six liquid containers **40** are contained in the casing **30**. The six liquid containers **40** are composed of liquid containers **40**K**1**, **40**K**2**, **40**GR, **40**C, **40**M, and **40**Y. The liquid container **40**K**1** is configured to contain a black liquid containing a black pigment as a color material. The liquid container **40**K**2** is configured to contain a black liquid containing a black dye as a color material. The liquid container **40**GR is configured to contain a gray liquid containing a gray dye as a color material. The liquid container **40**C is configured to contain a cyan liquid containing a cyan pigment as a color material. The liquid container **40**M is configured to contain a magenta liquid containing a magenta pigment as a color material. The liquid container **40**Y is configured to contain a yellow liquid containing a yellow pigment as a color material.

The liquid containers **40**K**1**, **40**K**2**, **40**GR, **40**C, **40**M, and **40**Y are disposed in this order in the +X direction.

The number of the liquid containers **40** contained in the casing **30** is not limited to six and may be less than or more than six. The color materials contained in the liquids contained in the liquid containers **40** may be pigments or dyes.

In addition, the liquids contained in the liquid containers **40** may be liquids that do not contain color materials.

Black liquids containing a black pigment as a color material are resistant to spreading and are thus suitable for recording of, for example, characters and markers. Black liquids containing a black dye as a color material have good color reproducibility and are thus suitable for recording of, for example, photographs.

Thus, black liquids containing a black pigment as a color material are used for monochrome printing and for printing of, for example, markers. Black liquids containing a black dye as a color material are used for printing of, for example, photographs. In addition, when a color between white and black is recorded by using a gray liquid containing a gray dye as a color material, the color exhibits improved color reproducibility. Thus, gray liquids containing a gray dye as a color material are used for printing of, for example, photographs.

The inlet **41**, through which a liquid can be poured from the replenishment container **90**, and an air inlet **45**, into which air can be taken, are disposed on an upper surface (surface on the +Z direction side) **42** of each of the liquid containers **40**. In addition, the liquid containers **40** each have a visualization surface **43**, which projects in the +Y direction and is positioned on the −Z direction side with respect to the upper surface **42**. The visualization surface **43** has a graduation portion **44** including a graduation **44***a* indicating that the liquid container **40** is empty of liquid and a graduation **44***b* indicating that the liquid container **40** is full of liquid.

The liquid containers **40** are made of a translucent or transparent material. The liquid contained in each of the liquid containers **40** can be checked from the outside. A user grasps the state of the liquid contained in each of the liquid containers **40** via the visualization surface **43**.

As described above, the liquid containers **40** each have the upper surface **42**, on which the inlet **41** is disposed, and the visualization surface **43**, via which a liquid is visible and which is positioned on the −Z direction side with respect to the upper surface **42**.

The casing **30** includes a cover **31**, which protects the upper surfaces **42** of the liquid containers **40**, a cover-engaging portion **33** and a cap lever-engaging portion **32**, which are disposed between the cover **31** and the upper surfaces **42**, a visualization portion **34**, which has openings **35** exposing the visualization surfaces **43**, and a wall portion **36**, which is disposed on the +Z direction side with respect to the visualization portion **34**. A user can grasp the amounts of remaining liquids contained in the liquid containers **40** by checking the visualization surfaces **43** of the liquid containers **40** via the visualization portion **34** of the casing **30**.

The wall portion **36** has an inclined surface **37**, which is inclined in the −Y direction toward the +Z direction. An end **38** of the wall portion **36** in the +Z direction is disposed at the end of the inclined surface **37** in the +Z direction.

The end **38** of the wall portion **36** in the +Z direction (end **38** of the inclined surface **37** in the +Z direction) is an example of the end of the wall portion in the direction opposite to the first direction in the present application and is hereinafter referred to as the end **38** of the wall portion **36** in the direction opposite to the first direction.

The wall portion **36** and the liquid containers **40** are disposed so as to overlap each other in the Y direction. As illustrated in FIG. **1**, in the state in which the scanner unit **10** is closed, the wall portion **36** and the display unit **15** are disposed so as to overlap each other in the Y direction. In other words, the wall portion **36** is disposed so as to be interposed between the display unit **15** and the liquid containers **40** in the Y direction.

The side surface on the +X direction side of the casing **30** (side surface on the +X direction side of the apparatus body **2**) has a cutout portion **8**. The length in the Y direction of the cutout portion **8** is substantially equal to the length in the Y direction of the cover **31**. The cutout portion **8** is formed so as to be substantially equal in height in the Z direction to the cover **31** in a closed state. As illustrated in FIG. **3**, the disposition of the cutout portion **8** in such a manner enables a space in which the replenishment container **90** is inserted into the liquid container **40**Y, which is positioned on the +X direction side with respect to the other liquid containers, to be made when the liquid container **40**Y is replenished with a liquid. The cutout portion **8** may be formed so as to be substantially equal in height in the Z direction to the surfaces disposed so as to face the cover **31** of the cap levers **50** (described later) in a state in which the cover **31** is open.

The cover-engaging portion **33** is positioned on the +Z direction side with respect to the cap lever-engaging portion **32**. Engaging one end of the cover **31** with the cover-engaging portion **33** enables the cover **31** to pivot around the cover-engaging portion **33** as a pivot axis. Specifically, the cover **31** is configured to pivot around the cover-engaging portion **33** as a pivot axis to be in the open state illustrated in FIG. **4** with solid lines or in the closed state illustrated in FIG. **4** with chain double-dashed lines.

When the cover **31** is in the open state, the liquid containers **40** are exposed and can be replenished with a liquid from the replenishment container **90**. When the cover **31** is in the closed state, the liquid containers **40** are protected by the cover **31**. When the cover **31** is in the closed state, the cover **31** is disposed parallel to the XY-plane (horizontal plane).

The cap lever-engaging portion **32** is an example of an engaging portion in the present application.

As illustrated in FIGS. **6** to **12**, the cap lever **50** includes an engageable portion **51**, which is positioned on the −Y direction side, and a body **52**, which is positioned on the +Y direction side. The body **52** extends in the +Y direction from the engageable portion **51**.

The engageable portion **51** is curved in the −Z direction toward the −Y direction, and an end **51***a* of the engageable portion **51** in the −Y direction is engaged with the cap lever-engaging portion **32** of the casing **30**. Engaging the end **51***a* of the engageable portion **51** in the −Y direction with the cap lever-engaging portion **32** of the casing **30** enables the cap lever **50** to pivot around the cap lever-engaging portion **32** as a pivot axis.

As described above, the cap lever **50** includes the engageable portion **51**, which is configured to be engaged with the cap lever-engaging portion **32**, and the body **52**, which extends in the +Y direction from the engageable portion **51**.

In FIG. **2**, the cap levers **50** are disposed so as to seal the respective inlets **41** of the liquid containers **40**K**1**, **40**K**2**, **40**GR, **40**C, and **40**M, and the cap lever **50** is disposed such that the inlet **41** of the liquid container **40**Y is open. As illustrated in FIG. **2**, the cap levers **50** are each configured to pivot around the cap lever-engaging portion **32** as a pivot axis to be in the closed state in which the inlet **41** of the liquid container **40** is sealed or in the open state in which the inlet **41** of the liquid container **40** is open.

As illustrated in FIG. **3**, when the cap lever **50** is in the open state, the inlet **41** of the liquid container **40** is open, and the liquid container **40** can be replenished with a liquid from

the replenishment container **90**. When the cap lever **50** is in the closed state, the cap lever **50** is disposed parallel to the XY-plane (horizontal plane).

Returning to FIGS. **6** to **12**, the body **52** of the cap lever **50** has a surface **56**, which is disposed on the +Z direction side, and an end **53**, which is on the +Y direction side. The surface **56** of the body **52** of the cap lever **50** is planar. When the cap lever **50** is in the closed state, the surface **56** of the body **52** of the cap lever **50** is disposed parallel to the XY-plane (horizontal plane). When the cover **31** and the cap lever **50** are each in the closed state, the surface **56** of the body **52** of the cap lever **50** is disposed so as to face the cover **31**.

As described above, the surface **56** of the body **52** of the cap lever **50** is disposed so as to face the cover **31** and is an example of the surface disposed so as to face the cover of the body in the present application. The end **53** on the +Y direction side of the body **52** of the cap lever **50** is an example of the end of the body in the second direction in the present application and is hereinafter referred to as the end **53** of the body **52** in the second direction.

The body **52** of the cap lever **50** has a hole **58** passing through the body **52**. The cap **54** is fit into the hole **58** of the body **52** and is fixed to the body **52**. In the state in which the cap **54** is fit into the hole **58**, the cap **54** is disposed on the surface opposite to the surface **56**, and the end on the +Z direction side of the cap **54** does not project from the surface **56**.

When the cap lever **50** is in the closed state, the cap **54** is disposed on the −Z direction side with respect to the surface **56** of the body **52**. In addition, the engageable portion **51** is curved in the −Z direction toward the −Y direction. Thus, when the cap lever **50** is in the closed state, the engageable portion **51** is disposed on the −Z direction side with respect to the surface **56** of the body **52**.

As described above, when the cap lever **50** is in the closed state, the cap **54** and the engageable portion **51** are disposed on the −Z direction side with respect to the surface **56** of the body **52** and do not project in the +Z direction with respect to the surface **56** of the body **52**. Thus, compared with the configuration in which the cap **54** and the engageable portion **51** project in the +Z direction with respect to the surface **56** of the body **52**, it is possible to reduce the length in the height direction (length in the Z direction) of the liquid container device **3** and to reduce the size of the liquid container device **3** in the height direction (Z direction).

FIG. **13** illustrates a state in which the cover **31** and the cap lever **50** are closed.

As illustrated in FIG. **13**, when the cover **31** and the cap lever **50** are each in the closed state, the surface **56** of the body **52** is disposed so as to face the cover **31**.

When a component projecting in the +Z direction from the surface **56** of the body **52** is disposed, for example, when a knob that can be held is disposed so as to project from the surface **56** of the body **52**, it is difficult to dispose the cap lever **50** close to the cover **31**. The component projecting in the +Z direction from the surface **56** of the body **52** is an obstacle that hinders the reduction of the length in the height direction of the liquid container device **3**. Thus, it is difficult to reduce the size of the liquid container device **3** in the height direction.

In the present embodiment, the surface **56**, which is disposed so as to face the cover **31**, is planar. In addition, a component projecting in the +Z direction from the surface **56** of the body **52** is not disposed. Thus, it is possible to dispose the cap lever **50** close to the cover **31** and to reduce the length in the height direction of the liquid container device **3**. As a result, it is possible to reduce the size of the liquid container device **3** in the height direction.

A surface **39** of the cover **31**, which is disposed so as to face the surface **56** of the body **52**, is planar. In addition, a projection **39***a*, which projects from the surface **39**, is disposed on the surface **39** of the cover **31**.

When the cover **31** and the cap lever **50** are each in the closed state, the projection **39***a* of the cover **31** is in line contact with the surface **56** of the body **52**, the cover **31** and the cap lever **50** are disposed with a uniform distance therebetween, and the surface **39** of the cover **31** and the surface **56** of the body **52** are disposed along a horizontal plane. When a user has forgotten to close the cap lever **50**, the cap lever **50** can be securely closed by closing the cover **31** having the projection **39***a*. In addition, the cover **31** having the projection **39***a* can inhibit lifting of the cap lever **50** that may occur due to vibrations generated during, for example, transportation.

FIG. **14** corresponds to FIG. **13** and is a sectional view schematically illustrating the liquid container device **3** in a state in which the cover **31** is open and the cap lever **50** is closed. FIG. **14** does not illustrate the cover **31**.

When the amount of remaining liquid contained in the liquid container **40** becomes small, and a user replenishes the liquid container **40** with a liquid from the replenishment container **90**, the user first opens the cover **31** in the closed state. Then, the user opens the cap lever **50** in the closed state, opens the inlet **41** of the liquid container **40** in the sealed state, inserts the tip (inlet) of the replenishment container **90** into the inlet **41** of the liquid container **40**, and replenishes the liquid container **40** with a liquid from the replenishment container **90**.

FIG. **14** illustrates a case in which a user opens the cap lever **50** in the closed state to replenish the liquid container **40** with a liquid from the replenishment container **90**.

As illustrated in FIG. **14**, the wall portion **36** of the casing **30** has a body **36***a*, which is disposed in the Z direction, and the inclined surface **37**, which extends in the +Z direction from the body **36***a*. FIG. **14** illustrates the body **36***a* with a thin solid line and the inclined surface **37** with a thick solid line.

The body **36***a* is a portion projecting in the +Y direction of the wall portion **36**. The inclined surface **37** is inclined in the −Y direction toward the +Z direction. That is, the surface inclined in the −Y direction toward the +Z direction of the wall portion **36** is the inclined surface **37**. The end of the inclined surface **37** in the +Z direction is the end **38** of the wall portion **36** in the direction opposite to the first direction. That is, the end **38** of the wall portion **36** in the direction opposite to the first direction is disposed at the end of the inclined surface **37** in the +Z direction.

The end **53** of the body **52** of the cap lever **50** in the second direction is positioned on the +Z direction side with respect to the end **38** of the wall portion **36** of the casing **30** in the direction opposite to the first direction. The end **53** of the body **52** of the cap lever **50** in the second direction is separated from the end **38** of the wall portion **36** in the direction opposite to the first direction. In addition, the end **53** of the body **52** in the second direction projects in the +Y direction with respect to the end **38** of the wall portion **36** in the direction opposite to the first direction.

The end **53** of the body **52** in the second direction does not project in the +Y direction with respect to the body **36***a* of the wall portion **36**. The end **53** of the body **52** in the second direction is disposed, in the Y direction, between the body **36***a* of the wall portion **36** and the end **38** of the wall portion **36** in the direction opposite to the first direction.

Compared with the configuration in which the end **53** of the body **52** in the second direction projects in the +Y direction with respect to the body **36***a* of the wall portion **36**, the configuration in which the end **53** of the body **52** in the second direction does not project in the +Y direction with respect to the body **36***a* of the wall portion **36** can reduce the length in the Y direction (depth direction) of the liquid container device **3** and can reduce the size of the liquid container device **3** in the depth direction.

The inclined surface **37** of the wall portion **36** is inclined in the −Z direction toward the +Y direction relative to the end **38** of the wall portion **36** in the direction opposite to the first direction. As a result, toward the +Y direction, the wall portion **36** is more separated from the body **52** of the cap lever **50**, and the space between the wall portion **36** and the body **52** becomes wider.

Compared with the configuration in which the wall portion **36** does not have the inclined surface **37**, the configuration in which the wall portion **36** has the inclined surface **37** enables a wide space to be formed on the +Y direction side with respect to the cap lever **50**.

A user inserts a finger H, from the +Y direction side with respect to the cap lever **50**, into the wide space formed on the +Y direction side with respect to the cap lever **50**, and the finger H comes into contact with the end **53** of the body **52** in the second direction. Since the space between the wall portion **36** and the body **52** becomes wider toward the +Y direction, the finger H of the user can come into contact with the end **53** of the body **52** in the second direction without coming into contact with the wall portion **36** (casing **30**). Subsequently, the user applies force F, whose direction is represented by an arrow in FIG. **14**, to the end **53** of the body **52** in the second direction, pivots the cap lever **50**, and opens the cap lever **50** in the closed state.

The end **53** of the body **52** in the second direction, to which the force F is applied, is a point of application to which force for pivoting the cap lever **50** is applied. The cap lever-engaging portion **32**, which supports the cap lever **50**, is a fulcrum for pivoting the cap lever **50**.

In the present embodiment, the point of application to which force for pivoting the cap lever **50** is applied (end **53** of the body **52** in the second direction) is farthest from the fulcrum for pivoting the cap lever **50** (cap lever-engaging portion **32**). Thus, by using the principle of the lever, the user can easily pivot the cap lever **50** with small force and open and close the cap lever **50**. As a result, the usability of the liquid container device **3** is improved.

In addition, when the user pivots and opens or closes the cap lever **50**, the finger H does not come into contact with the casing **30**. Thus, excessive force is not applied to the casing **30**, and failures due to application of excessive force (for example, deformation of the casing **30**) are unlikely to occur. As a result, the reliability of the liquid container device **3** is improved.

A user opens or closes the cap lever **50** by utilizing the space formed on the +Y direction side with respect to the cap lever **50**, that is, the space formed on the lateral direction (Y direction) side with respect to the cap lever **50**. Thus, compared with a case in which a user opens or closes the cap lever **50** by utilizing a space formed on the height direction (Z direction) side with respect to the cap lever **50**, adverse effect is unlikely to be caused to the opening and closing operation of the cap lever **50** even if the space on the height direction side is small. As a result, it is possible to reduce the length in the height direction of the liquid container device **3** and to reduce the size of the liquid container device **3** in the height direction.

As described above, the liquid container device **3** according to the present embodiment has the following configuration. The liquid container **40** has the upper surface **42**, on which the inlet **41** is disposed, and the visualization surface **43**, via which a liquid is visible. The casing **30** includes the cover **31**, which is configured to pivot, the cap lever-engaging portion **32**, the visualization portion **34**, and the wall portion **36**. The cap lever **50** includes the engageable portion **51**, which is configured to be engaged with the cap lever-engaging portion **32**, and the body **52**. The surface **56**, which is disposed so as to face the cover **31**, of the body **52** is planar. The end **53** of the body **52** in the second direction is separated from the end **38** of the wall portion **36** in the direction opposite to the first direction.

Such a configuration can reduce the length in the height direction of the liquid container device **3** and can reduce the size of the liquid container device **3** in the height direction.

In addition, the liquid container device **3** according to the present embodiment has the following configuration. The wall portion **36** has the inclined surface **37**, which is inclined in the −Y direction toward the +Z direction. The end **38** of the wall portion **36** in the direction opposite to the first direction is disposed at the end of the inclined surface **37** in the direction opposite to the first direction. In addition, the liquid container device **3** according to the present embodiment has the following configuration. The end **53** of the body **52** in the second direction projects in the +Y direction with respect to the end **38** of the wall portion **36** in the direction opposite to the first direction.

Such a configuration enables a user to easily open and close the cap lever **50** when the user replenishes the liquid container **40** with a liquid from the replenishment container **90**. Thus, failures due to application of excessive force (for example, deformation of the casing **30**) are unlikely to occur. As a result, the usability and the reliability of the liquid container device **3** are improved.

2. Embodiment 2

An overview of a liquid container device **3**A in Embodiment 2 is described with reference to FIG. **15** below with the focus on the differences between Embodiment 1 and Embodiment 2. The same components as those in Embodiment 1 have the same reference signs, and duplicate descriptions are omitted.

The liquid container device **3**A in the present embodiment differs from the liquid container device **3** in Embodiment 1 in the shape of the cap lever. The other configurations of the liquid container device **3**A are the same as those of the liquid container device **3**.

As illustrated in FIG. **15**, the liquid container device **3**A in the present embodiment includes a cap lever **50**A, the casing **30** in Embodiment 1, and the liquid container **40** in Embodiment 1.

The cap lever **50**A includes the engageable portion **51**, which is configured to be engaged with the cap lever-engaging portion **32**, and a body **52**A, which extends in the +Y direction from the engageable portion **51**. The body **52**A includes a portion **52**A**1**, which extends in the +Y direction from the engageable portion **51**, and a portion **52**A**2**, which is bent in the −Z direction from the portion **52**A**1**. The end of the portion **52**A**2** in the −Z direction is the end **53** of the body **52**A in the second direction.

As described above, in the present embodiment, the end **53** of the body **52**A of the cap lever **50**A in the second direction is bent in the −Z direction.

Such a configuration enables a user to insert a finger H from the +Y direction side with respect to the cap lever **50**A, make the finger H come into contact with the portion **52**A2 of the body **52**A without the finger H coming into contact with the wall portion **36**, apply force F, whose direction is represented by an arrow in FIG. **15**, to the portion **52**A2 of the body **52**A, pivot the cap lever **50**A, and open or close the cap lever **50**A. The point of application to which force for pivoting the cap lever **50**A is applied (portion **52**A2 of the body **52**A) is farthest from the fulcrum for pivoting the cap lever **50**A (cap lever-engaging portion **32**). Thus, by using the principle of the lever, the user can easily open and close the cap lever **50**A with small force. As a result, the usability of the liquid container device **3**A is improved. In addition, the reliability of the liquid container device **3**A is improved, and thus it is possible to achieve an effect similar to that in Embodiment 1 in which the liquid container device **3**A can be reduced in size in the height direction of the liquid container device **3**A.

3. Embodiment 3

An overview of a liquid container device **3**B in Embodiment 3 is described with reference to FIG. **16** below with the focus on the differences between Embodiment 1 and Embodiment 3. The same components as those in Embodiment 1 have the same reference signs, and duplicate descriptions are omitted.

The liquid container device **3**B in the present embodiment differs from the liquid container device **3** in Embodiment 1 in the shape of a wall portion **36**B. The other configurations of the liquid container device **3**B are the same as those of the liquid container device **3**.

As illustrated in FIG. **16**, the liquid container device **3**B in the present embodiment includes the cap lever **50** in Embodiment 1, a casing **30**B, and the liquid container **40** in Embodiment 1.

The wall portion **36**B of the casing **30**B includes a first portion **36**B1, which projects in the +Y direction, and a second portion **36**B2, which is positioned on the +Z direction side and recessed in the −Y direction with respect to the first portion **36**B1. FIG. **16** illustrates the first portion **36**B1 and the second portion **36**B2 with thick solid lines. The second portion **36**B2, which is recessed in the −Y direction, is separated from the first portion **36**B1 and positioned on the +Z direction side. The end **38** of the wall portion **36**B in the direction opposite to the first direction is disposed at the end of the second portion **36**B2 in the +Z direction.

By disposing the first portion **36**B1 and the second portion **36**B2, which is positioned on the +Z direction side with respect to the first portion **36**B1, a third portion **36**B3, which is recessed in the −Z direction with respect to the second portion **36**B2, is formed between the first portion **36**B1 and the second portion **36**B2.

As a result, a wide space is formed on the +Y direction side with respect to the cap lever **50**.

A user inserts a finger H, from the +Y direction side with respect to the cap lever **50**, into the wide space formed on the +Y direction side with respect to the cap lever **50**, and the finger H comes into contact with the end **53** of the body **52** in the second direction. Since the wide space is formed on the +Y direction side with respect to the cap lever **50**, the finger H of the user can come into contact with the end **53** of the body **52** in the second direction without coming into contact with the wall portion **36**B (casing **30**B). Subsequently, the user applies force F, whose direction is represented by an arrow in FIG. **16**, to the end **53** of the body **52** in the second direction, pivots the cap lever **50**, and opens the cap lever **50** in the closed state.

As a result, when the user replenishes the liquid container **40** with a liquid from the replenishment container **90**, the user easily opens or closes the cap lever **50**. Thus, it is possible to achieve an effect similar to that in Embodiment 1 in which the usability of the liquid container device **3**B is improved.

In addition, when the user pivots and opens or closes the cap lever **50**, the finger H does not come into contact with the casing **30**B. Thus, excessive force is not applied to the casing **30**B, and failures due to application of excessive force (for example, deformation of the casing **30**B) are unlikely to occur. As a result, the reliability of the liquid container device **3**B is improved.

In addition, it is possible to achieve an effect similar to that in Embodiment 1 in which the liquid container device **3**B can be reduced in size in the height direction of the liquid container device **3**B.

4. Embodiment 4

The same components as those in Embodiment 1 to Embodiment 3 have the same reference signs, and duplicate descriptions are omitted.

As illustrated in FIG. **17**, a liquid container device **3**C in Embodiment 4 includes the cap lever **50**A in Embodiment 2, the casing **30**B in Embodiment 3, and the liquid container **40** in Embodiment 1.

Such a configuration also enables a user to insert a finger H from the +Y direction side with respect to the cap lever **50**A, make the finger H come into contact with the portion **52**A2 of the body **52**A without the finger H coming into contact with the wall portion **36**B, apply force F, whose direction is represented by an arrow in FIG. **17**, to the body **52**A, pivot the cap lever **50**A, and open the cap lever **50**A in the closed state.

As a result, when the user replenishes the liquid container **40** with a liquid from the replenishment container **90**, the user easily opens or closes the cap lever **50**A. Thus, the usability of the liquid container device **3**C is improved. In addition, the reliability of the liquid container device **3**C is improved, and thus it is possible to achieve an effect similar to that in Embodiment 1 to Embodiment 3 in which the liquid container device **3**C can be reduced in size in the height direction of the liquid container device **3**C.

5. Embodiment 5

In the above embodiments, the wall portion **36**, which has the inclined surface **37**, or the wall portion **36**B, which includes the first portion **36**B1 and the second portion **36**B2, is disposed on the casing **30**. The following configuration may also be applied. The wall portion **36**, which has the inclined surface **37**, or the wall portion **36**B, which includes the first portion **36**B1 and the second portion **36**B2, is not disposed on the casing **30** but is disposed on the liquid container **40**.

For example, when a component (for example, the wall portion **36** in Embodiment 1) that hinders a finger H from being inserted from the +Y direction side with respect to the liquid container **40** is not disposed on the casing **30**, and the wall portion **36**, which has the inclined surface **37**, or the wall portion **36**B, which includes the first portion **36**B1 and the second portion **36**B2, is disposed on the liquid container **40**, the usability and the reliability of the liquid container device are improved. Thus, it is possible to achieve an effect

similar to that in Embodiment 1 to Embodiment 4 in which the liquid container device can be reduced in size in the height direction of the liquid container device.

What is claimed is:

1. A liquid container device comprising:

a liquid container having an inlet through which a liquid is poured from a replenishment container;

a casing in which the liquid container is housed; and

a cap lever configured to pivot and having a cap configured to seal the inlet, wherein

the liquid container has

an upper surface on which the inlet is disposed, and

a visualization surface via which the liquid is visible and that is positioned on a side of a first direction with respect to the upper surface,

the casing includes

a cover that is configured to pivot and that protects the upper surface,

an engaging portion disposed between the cover and the upper surface,

a visualization portion having an opening exposing the visualization surface, and

a wall portion disposed on a side of a direction opposite to the first direction with respect to the visualization portion,

the cap lever includes

an engageable portion configured to be engaged with the engaging portion, and

a body extending in a second direction crossing the first direction from the engageable portion,

a surface of the body is planar and is disposed so as to face the cover, and

an end of the body in the second direction is separated from an end of the wall portion in the direction opposite to the first direction,

wherein the wall portion has an inclined surface inclined in a direction opposite to the second direction toward the direction opposite to the first direction, and

the end of the wall portion in the direction opposite to the first direction is disposed at an end of the inclined surface in the direction opposite to the first direction.

2. The liquid container device according to claim **1**, wherein

the wall portion includes

a first portion projecting in the second direction, and

a second portion that is positioned on the side of the direction opposite to the first direction with respect to the first portion and that is recessed in a direction opposite to the second direction with respect to the first portion, and

the end of the wall portion in the direction opposite to the first direction is disposed at an end of the second portion in the direction opposite to the first direction.

3. The liquid container device according to claim **1**, wherein

the end of the body in the second direction projects in the second direction with respect to the end of the wall portion in the direction opposite to the first direction.

4. The liquid container device according to claim **1**, wherein

the end of the body in the second direction is bent in the first direction.

5. The liquid container device according to claim **1**, wherein

the engageable portion is curved in the first direction toward a direction opposite to the second direction, and

an end of the engageable portion in the direction opposite to the second direction is engaged with the engaging portion.

6. A liquid ejecting apparatus comprising:

a liquid ejecting unit configured to eject a liquid; and

the liquid container device according to claim **1**, in which the liquid is contained.

* * * * *