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Ozaki et al.

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(54) **PRINTING DEVICE**

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B41J 29/13 (2006.01)
B41J 29/17 (2006.01)

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CPC ***B41J 29/17*** (2013.01); ***B41J 29/13*** (2013.01)

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See application file for complete search history.

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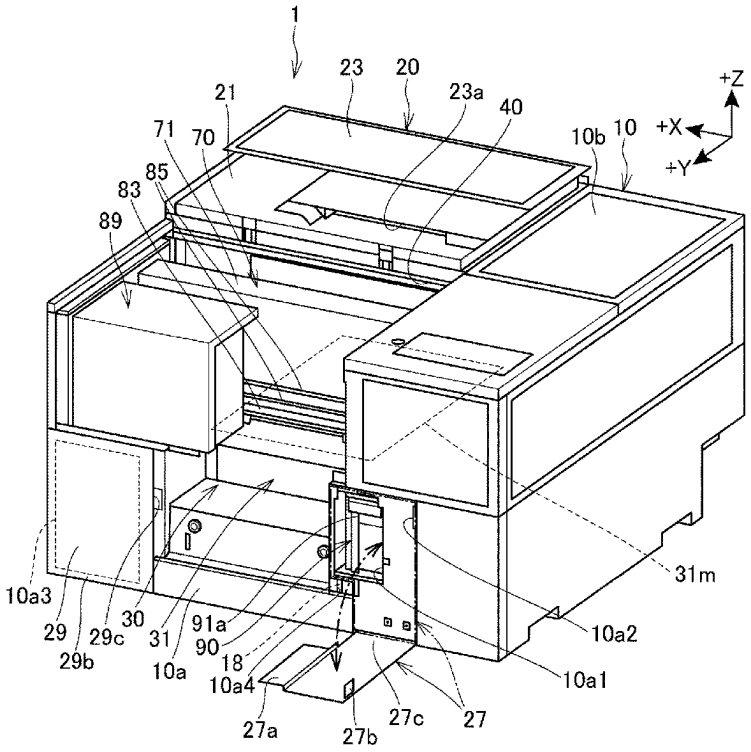
(57) **ABSTRACT**

A printing device includes a printing section that is provided on a first direction side with respect to a medium and that performs printing and a wiper that is detachably attached inside a housing and that is configured to wipe the printing section, wherein the wiper is configured to be pulled out from the housing by being pulled out in a second direction intersecting the first direction.

7 Claims, 6 Drawing Sheets



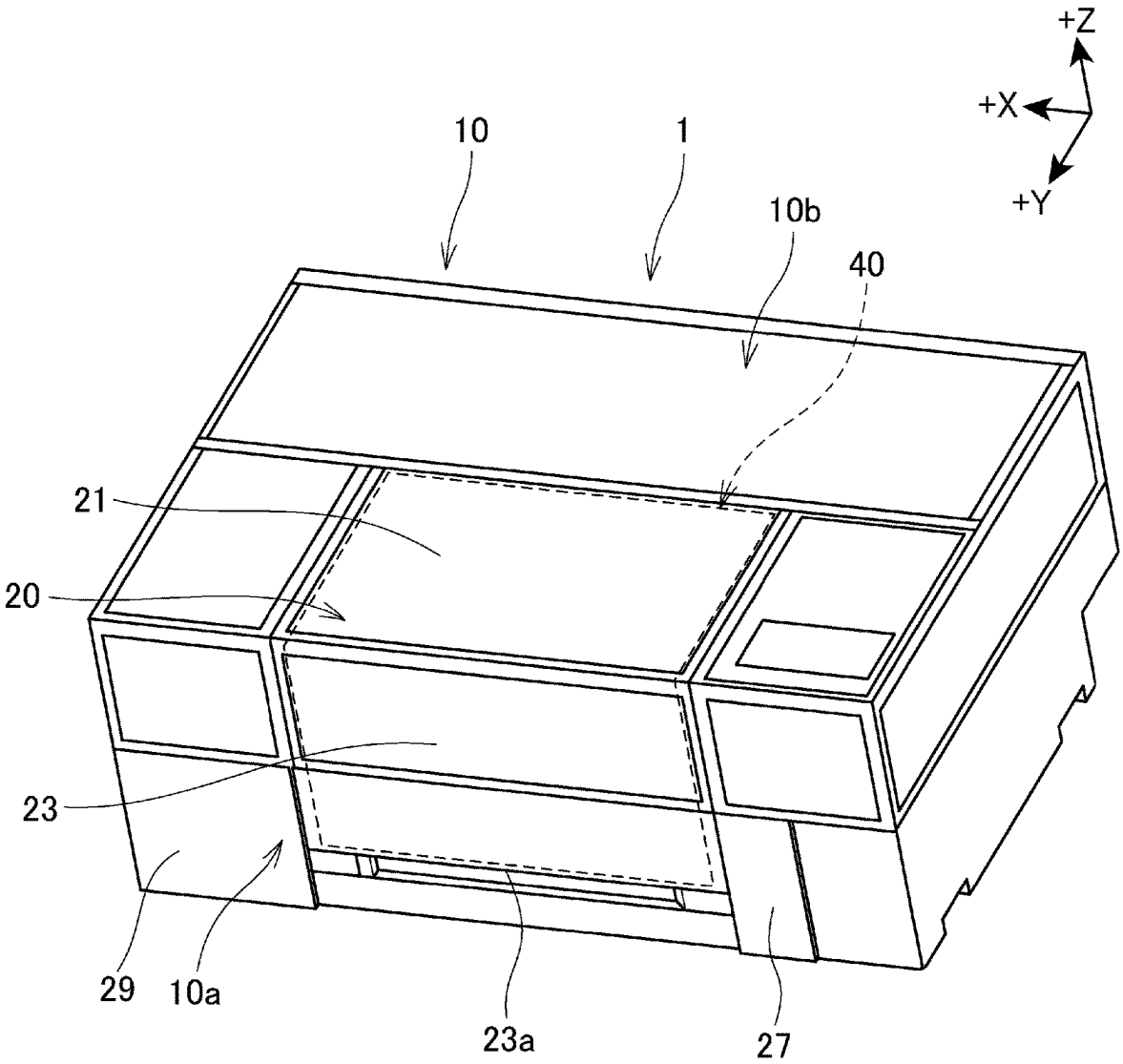
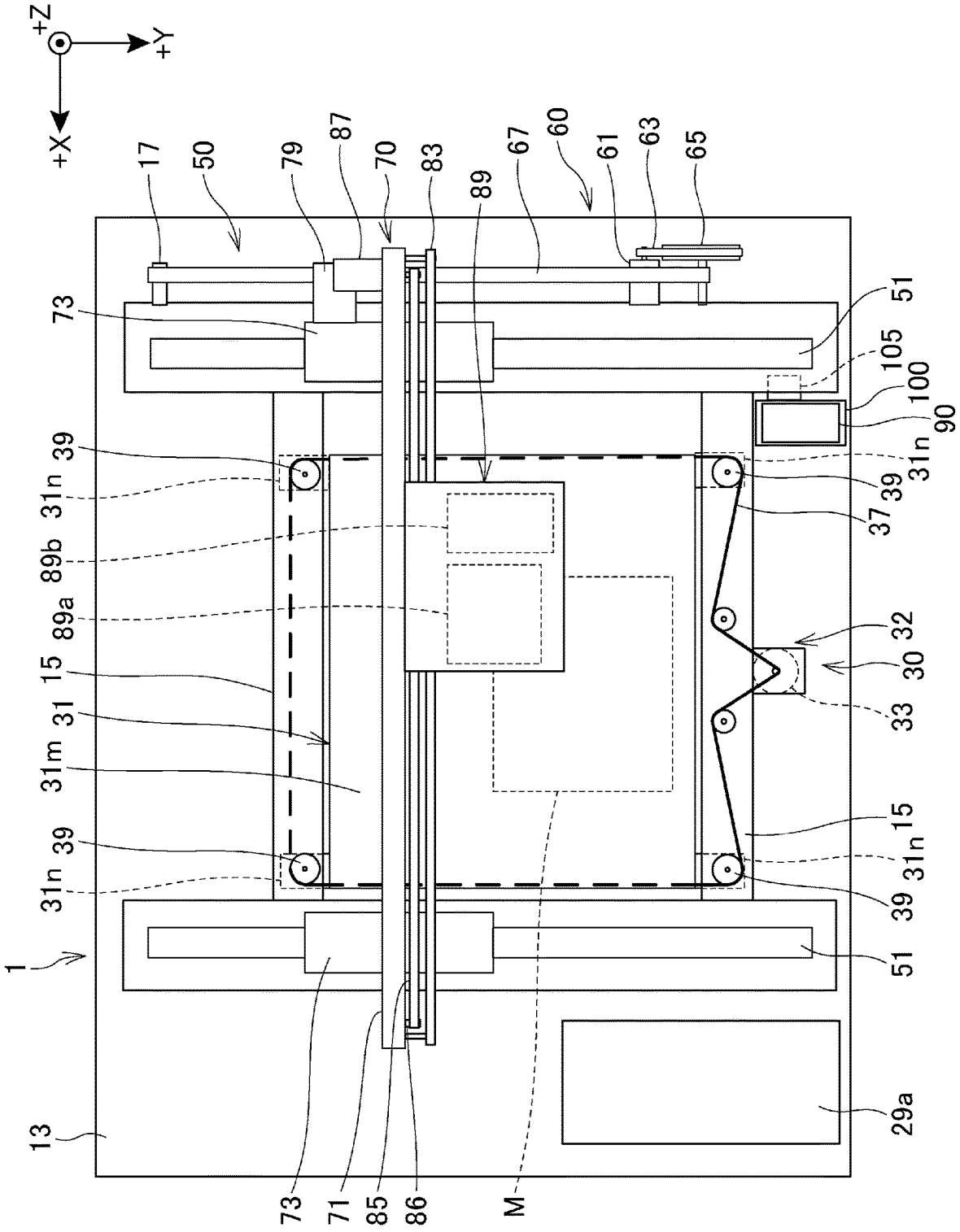


FIG. 1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39
31n
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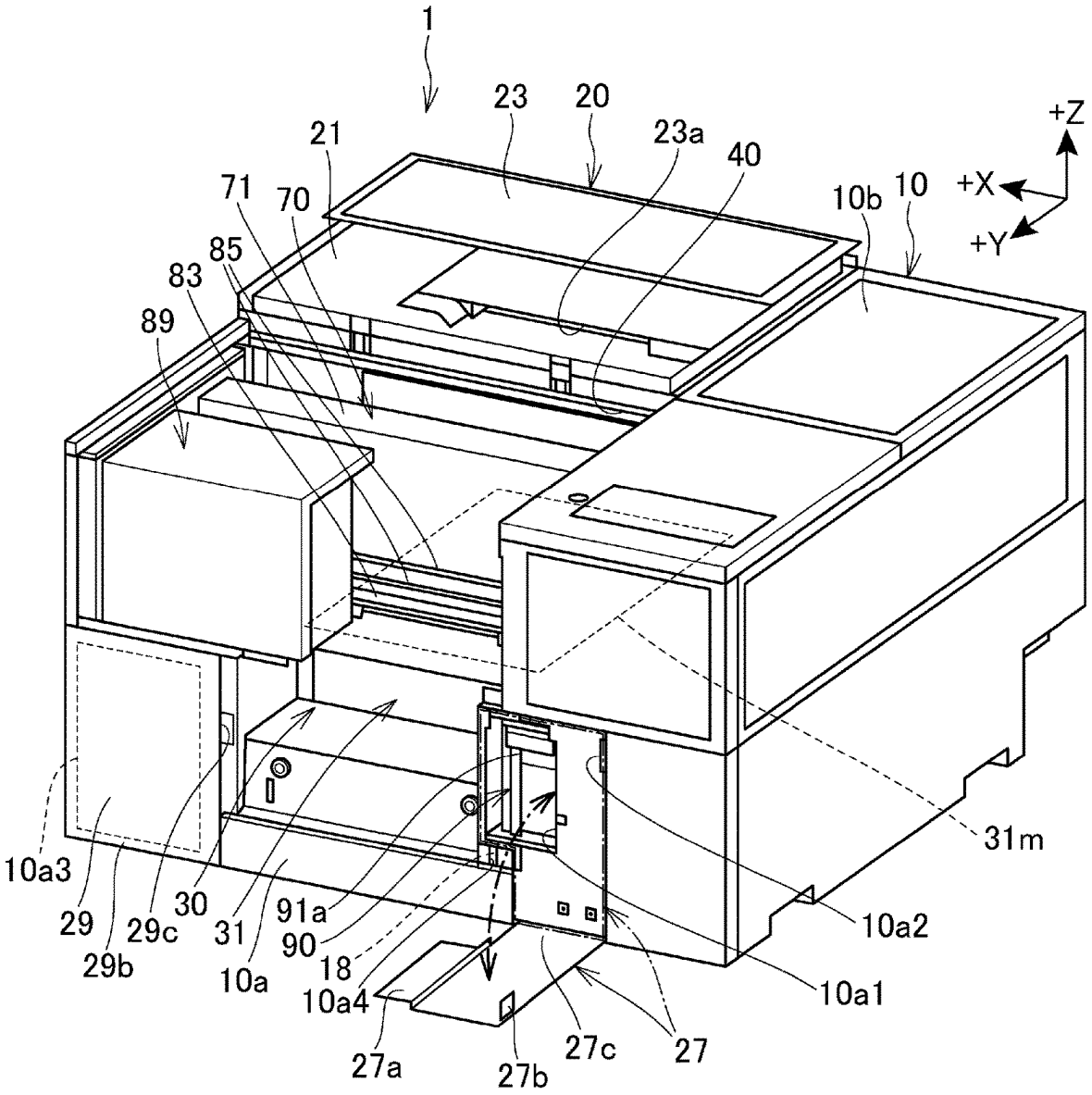
M

FIG. 2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29
29b
29c
30
31
91a
90
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10a4
10a2
10a1
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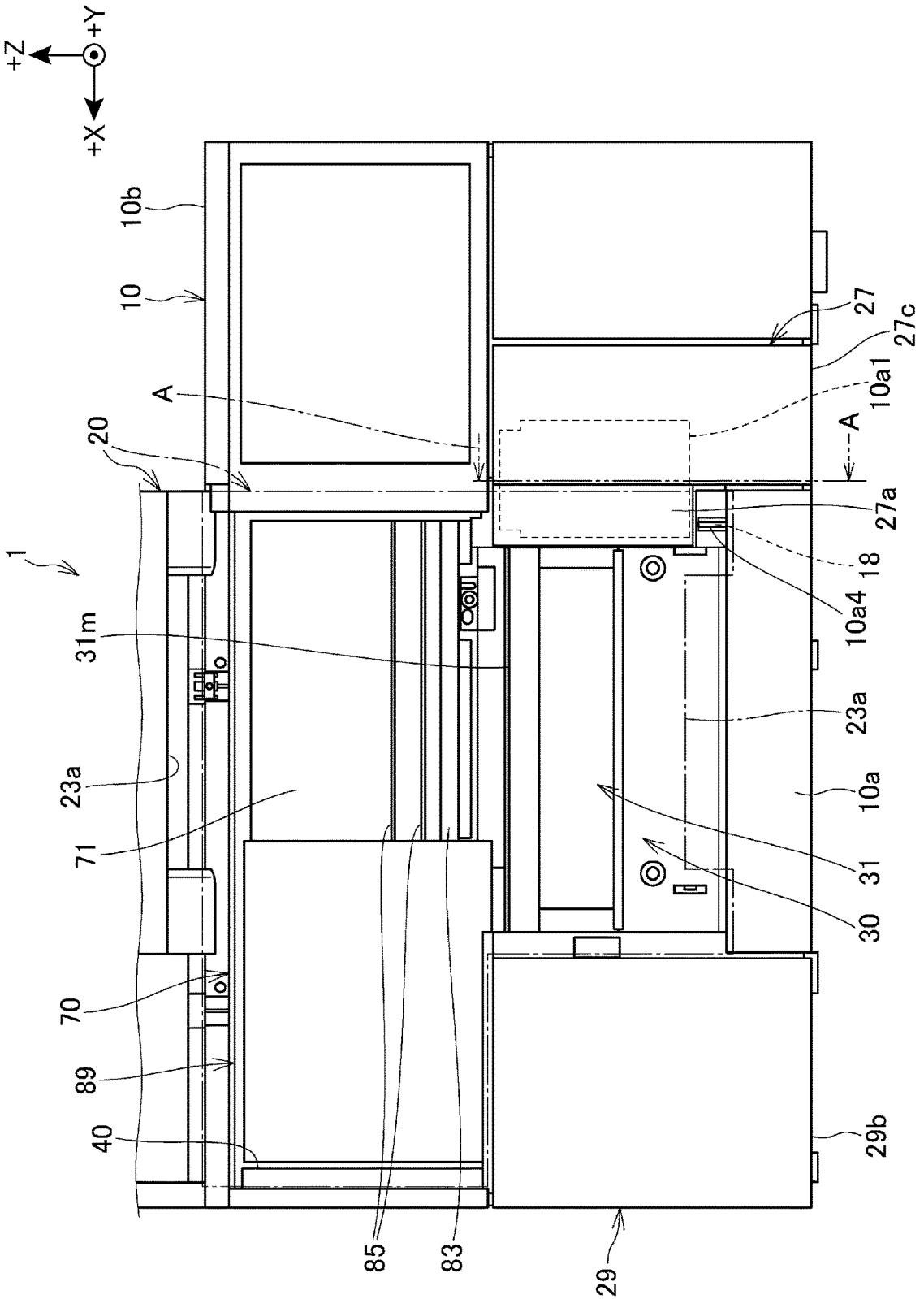
27b
27c
27

FIG. 3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89
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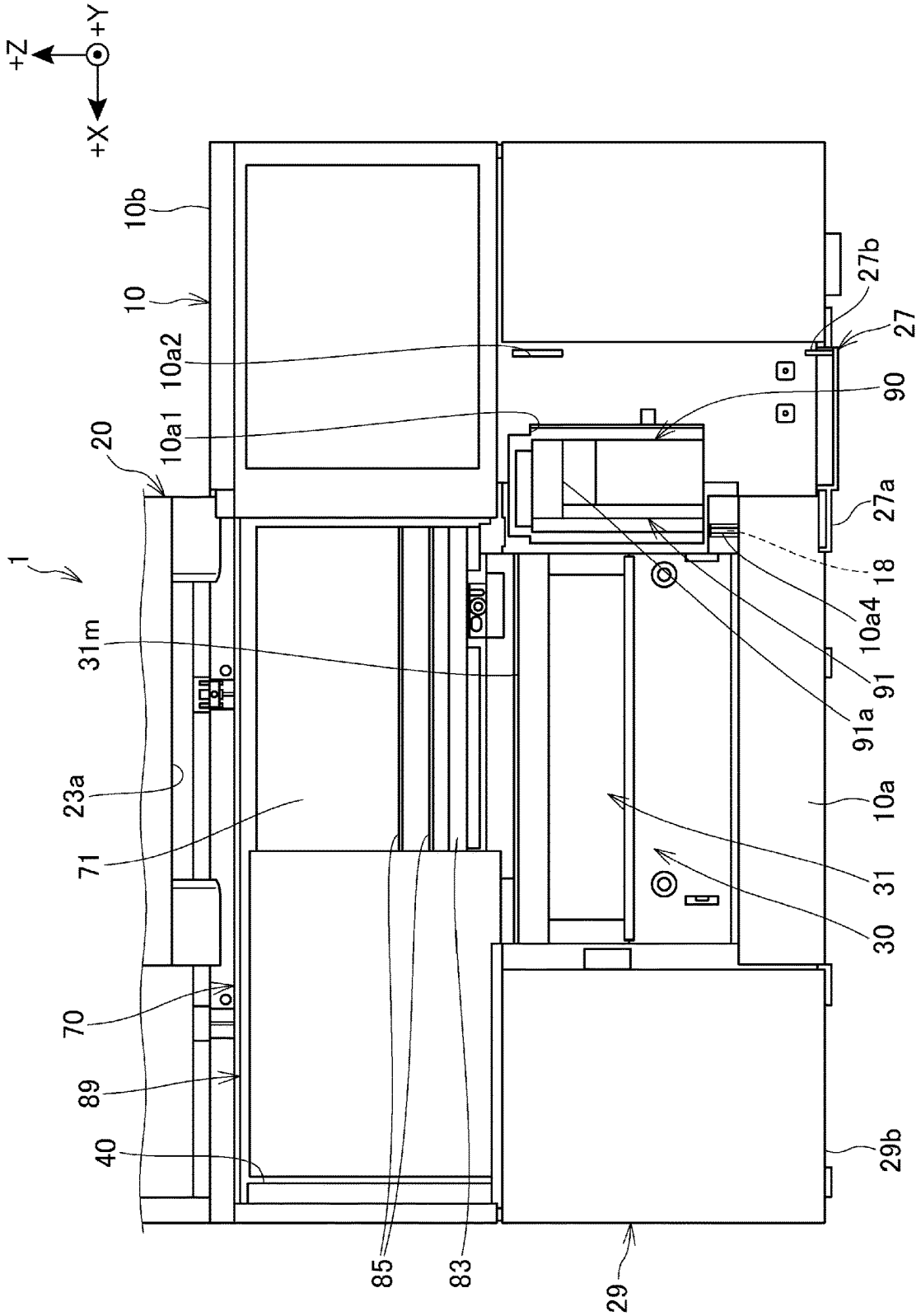
10a4
23a
10a
31
30
29b

FIG. 4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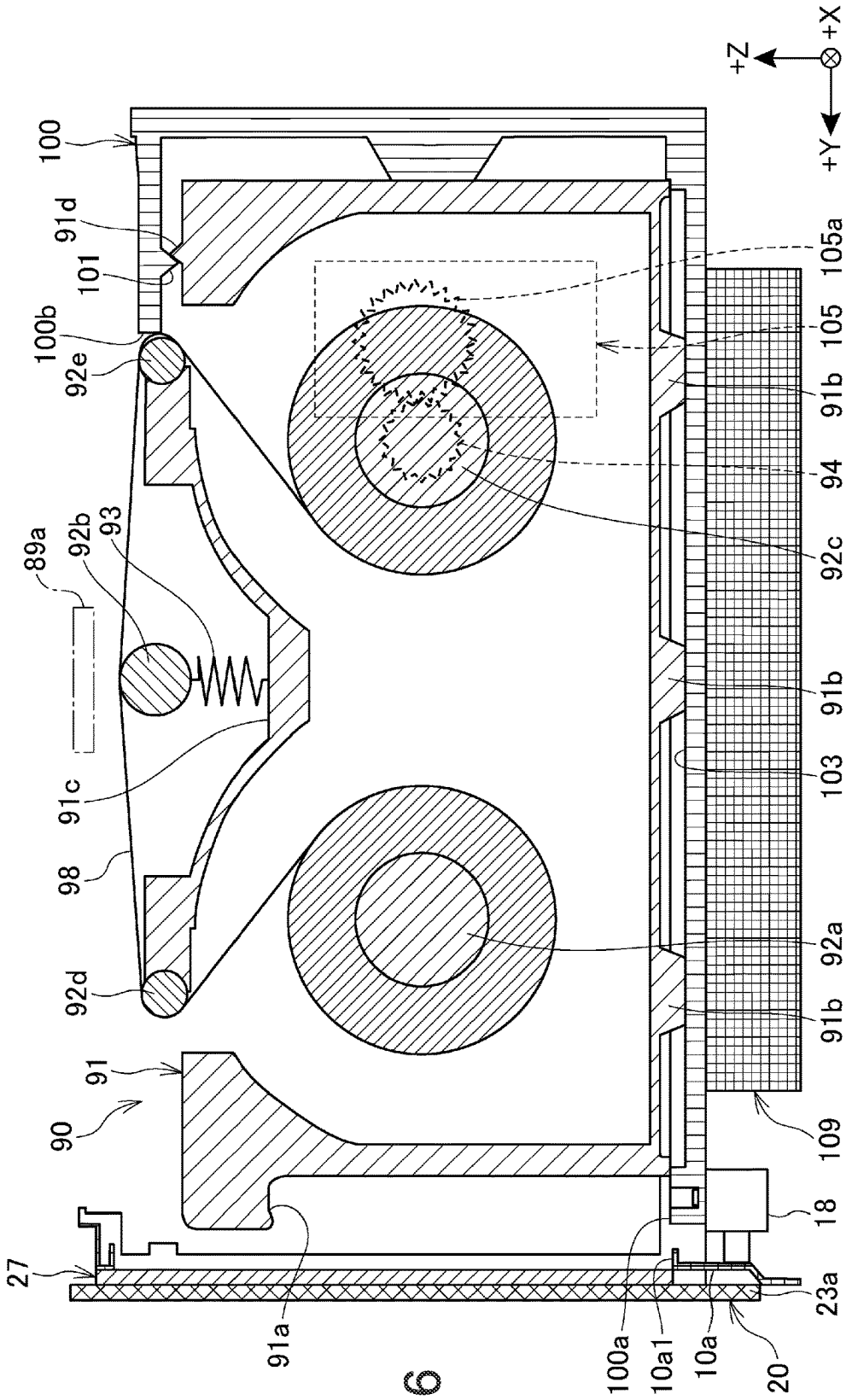
29b
10a
31
30
91a
91
10a4
18
27a
90
27
27b

FIG. 5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91a
100a
10a1
10a
20
23a
18
109
91b
92a
103
91b
92c
94
91b
105
105a

FIG. 6

PRINTING DEVICE

The present application is based on, and claims priority from JP Application Serial Number 2022-133480, filed Aug. 24, 2022, the disclosure of which is hereby incorporated by reference herein in its entirety.

BACKGROUND

1. Technical Field

The present disclosure relates to a printing device.

2. Related Art

JP-A-2021-170731 discloses a recording device including a recording section that is provided inside a housing and that has a head ejecting ink onto a sheet and a movable carriage on which is mounted the head, and recording is performed on the sheet by the recording section. The recording device performs recording on a sheet placed lower by a recording section positioned higher.

In this type of recording device, a wiper may be provided for wiping off ink mainly adhering to the head in the recording section. Since ink from the recording section adheres to the wiper every time the wiper is wiped, the user needs to periodically remove the wiper from the recording device and perform maintenance. Since it is necessary to install the wiper at a position facing the head, the wiper is disposed at a position lower than the recording section in a case of a configuration in which recording is performed on a lower sheet from the higher recording section as in JP-A-2021-170731. Therefore, in a case of the configuration in which the wiper is removed from the direction in which the recording section is located, it is necessary to put a hand deeper into the housing by the dimension of the recording section, and it is easy to touch the portion of the wiper for wiping the ink of the recording section, and there is room for improvement in workability.

SUMMARY

According to an aspect to solve the above-described problem, a printing device includes a printing section that is provided on a first direction side with respect to a medium and that performs printing and a wiper that is detachably attached inside a housing and that is configured to wipe the printing section, wherein the wiper is configured to be pulled out from the housing by being pulled out in a second direction intersecting the first direction.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a printing device according to a present embodiment.

FIG. **2** is a plan view of a printing device.

FIG. **3** is a perspective view of a printing device.

FIG. **4** is a side view of a printing device.

FIG. **5** is a side view of a printing device.

FIG. **6** is a sectional view taken along a line A-A of FIG. **4**.

DESCRIPTION OF EMBODIMENTS

1. Overall Configuration

FIG. **1** is a perspective view of a printing device **1** according to a present embodiment. The printing device **1** is an apparatus that performs printing on the medium M supported by a medium support section **30** by ejecting liquid from a print head **89***a*. The medium M is a sheet, a fabric, or a three dimensional object. The sheet may be made of paper or synthetic resin. The fabric may be any of nonwoven, knit, and woven. The three dimensional object includes ornaments such as clothes and shoes, daily necessities, machine parts, and other various objects. The types of liquids to be ejected onto the medium M by the printing device **1** are not limited as long as the liquids have fluidity. For example, the printing device **1** is a printer that forms an image on the medium M by ejecting ink of one or a plurality of colors toward the surface of the medium M using the print head **89***a*. In this case, the medium M corresponds to a print medium.

FIG. **1** shows an X axis, a Y axis, and a Z axis. The X axis, the Y axis and the Z axis are orthogonal to each other. The Z axis is an axis extending in the up-down direction, and can also be referred to as an axis extending in the vertical direction. The X axis and the Y axis are parallel to a horizontal plane. In the following description, a direction along an X axis is referred to as a right-left direction, and a direction along a Y axis is referred to as a front-rear direction. Specifically, a positive direction along the Z axis is an upward direction, a positive direction along the X axis is a rightward direction, and a positive direction along the Y axis is a forward direction. The upward direction corresponds to an example of a "first direction". The forward direction corresponds to an example of a "second direction". The downward direction corresponds to an example of a "third direction". The rearward direction corresponds to an example of a "fourth direction".

The printing device **1** includes a housing **10**. The housing **10** is a substantially rectangular parallelepiped box having a plurality of surfaces including a front surface **10***a* and a top surface **10***b*, and houses the medium support section **30**, the print head **89***a*, and the like, which will be described later. The front surface **10***a* and the top surface **10***b* cross each other at a substantially right angle. An opening **40** is formed on the housing **10**. The opening **40** is an opening formed across the top surface **10***b* and the front surface **10***a* of the housing **10**, and brings the outside and the inside of the housing **10** into communication with each other.

The housing **10** includes a printer cover **20**. The printer cover **20** is disposed along the top surface **10***b* and the front surface **10***a*. In detail, the printer cover **20** includes a first cover **21** that is disposed along the top surface **10***b* of the housing **10** and that covers the opening **40** of the top surface **10***b*, and a second cover **23** that is disposed along the front surface **10***a* of the housing **10** and that covers the opening **40** of the front surface **10***a*. A handle **23***a* for opening and closing the second cover is formed on the second cover **23**. A user who uses the printing device **1** can access the respective sections housed in the housing **10** from the front and upper direction by opening the printer cover **20** by gripping the handle **23***a* from the front of the printing device **1**.

FIG. **2** is a plan view of the printing device **1**, and schematically shows the internal structure of the printing device **1**. FIG. **3** shows a perspective view of the printing device **1**, in a state where the printer cover **20** is open.

As shown in FIG. **2**, the printing device **1** includes a pair of base members **15**, a pair of guide shafts **51**, a medium supporting section **30**, a drive mechanism **50**, and a moving section **70**. The base member **15** is a member extending in the left-right direction. Two base members **15** are arranged side by side in the front-rear direction on the bottom plate **13**

and fixed to the bottom plate **13**. The guide shafts **51** are shafts extending in the front-rear direction, and the two guide shafts **51** are arranged side by side in the left-right direction so as to straddle the two base members **15**.

The medium support section **30** supports the medium M which is a printing target in the printing device **1**. As shown in FIG. **2**, the medium support section **30** includes a table **31** and a height movement mechanism **32**. The table **31** is disposed at a position surrounded by the pair of base members **15** and the pair of guide shafts **51** in plan view. The table **31** has a support surface **31***m* which is a rectangular surface extending along the X axis and the Y axis and facing upward.

The support surface **31***m* supports the medium M placed on the support surface **31***m*. As shown in FIG. **3**, when the opening **40** is not closed by the printer cover **20**, the support surface **31***m* is exposed to the front and upper sides of the housing **10**. That is, the opening **40** exposes the medium supporting section **30** to outside the housing **10**. Therefore, in a state in which the printer cover **20** is open, the user can set the medium M outside the housing **10** on the support surface **31***m* of the medium support section **30** from the front. Further, in the state in which the printer cover **20** is open, the user can take out the medium M placed on the support surface **31***m* of the medium support section **30** to outside the housing **10** from the front.

Further, the table **31** is provided at the lower portions of the four corners of the support surface **31***m* with protrusions **31***n* that protrude outward from the support surface **31***m* in plan view. The table **31** is supported so as to be movable up and down with respect to the base member **15** by fixing the protrusion **31***n* to an elevator mechanism **39** (to be described later).

The height movement mechanism **32** is a mechanism that can raise and lower the support surface **31***m* and the medium M supported by the support surface **31***m* by raising and lowering the table **31** in the vertical direction. The height movement mechanism **32** includes an elevator motor **33**, an elevator belt **37**, and the elevator mechanism **39**. The elevator mechanism **39** includes a ball screw arranged along the vertical direction, a nut screwed onto the ball screw, and a pulley. The ball screw of the elevator mechanism **39** is rotatably supported by the base member **15**. The nut of the elevator mechanism **39** is fixed to the protrusion **31***n* of the table **31**. The pulley of the elevator mechanism **39** is fixed to the upper portion of the ball screw. When the pulley of the elevator mechanism **39** rotates, the ball screw rotates, and the protrusion **31***n* moves along the vertical direction together with the nut with the rotation of the ball screw.

The elevator motor **33** is a motor that rotates under the control of a control section (not shown). The control section controls the rotation direction and the rotation amount of the elevator motor **33**. The elevator belt **37** is an annular belt stretched around the output shaft of the elevator motor **33** and the pulleys of the four elevator mechanisms **39**. By the rotation of the elevator motor **33**, the elevator belt **37** is driven to circulate. The elevator belt **37** transmits rotation of the elevator motor **33** to the pulleys of the four elevator mechanisms **39**. As a result, the ball screw of the elevator mechanism **39** rotates to move the table **31** in the vertical direction.

The rotation direction of the elevator motor **33** can be switched between a forward direction for moving the table **31** upward and a reverse direction for moving the table **31** downward. The printing device **1** moves the table **31** up and down by operating the elevator motor **33**.

The drive mechanism **50** has the pair of guide shafts **51** and a frame driving section **60**. The guide shaft **51** is a shaft-shaped member that spans across the pair of base members **15**, and that is arranged along the front-rear direction.

The frame driving section **60** includes a frame moving motor **61**, a transmission belt **63**, a transmission mechanism **65**, and a transmission belt **67**. The frame moving motor **61** is a motor that rotates under the control of a control section (not shown). The transmission belt **63** is an annular belt stretched between the output shaft of the frame moving motor **61** and the transmission mechanism **65**, and it transmits the driving force of the frame moving motor **61** to the transmission mechanism **65**. The transmission mechanism **65** includes a first pulley and a second pulley. The transmission belt **63** is wound around the first pulley, and the transmission belt **67** is wound around the second pulley. The transmission mechanism **65** drives the transmission belt **67** by rotating the second pulley by the driving force transmitted from the transmission belt **63** to the first pulley. The transmission mechanism **65** transmits the driving force of the frame moving motor **61** to the transmission belt **67** at a speed reduction ratio corresponding to the ratio of the diameters of the first pulley and the second pulley.

The transmission belt **67** is an annular belt wrapped around the transmission mechanism **65** and a frame moving pulley **17** disposed at the rear end of the base member **15**. The frame moving pulley **17** is a pulley rotatably installed on the base member **15**. The transmission belt **67** is disposed along the guide shaft **51**.

The moving section **70** includes a mainframe **71**, a pair of leg sections **73**, and a carriage **89**. The mainframe **71** is a plate-shaped member that is elongated in the left-right direction. The pair of leg sections **73** are fitted to the pair of guide shafts **51** and are movable along the guide shafts **51**. The mainframe **71** is fixed on the pair of leg sections **73** and is supported from below by the pair of leg sections **73**. The mainframe **71** moves in the front-rear direction together with the pair of leg sections **73** while being guided by the pair of guide shafts **51**.

Of the pair of leg sections **73**, the transmission belt **67** is fixed via a belt coupler **79** to the leg section **73** supporting the left end of the mainframe **71**. Therefore, when the transmission belt **67** is driven to circulate, a power for moving the leg section **73** in the front-rear direction acts on the leg section **73**. Thus, the moving section **70** moves in the front-rear direction. The lower end of the mainframe **71** is located above the support surface **31***m* when the table **31** is located at the uppermost position. Therefore, the mainframe **71** moves in the front-rear direction above the support surface **31***m* without interfering with the support surface **31***m*.

The rotational direction of the frame moving motor **61** can be switched between a forward direction in which the mainframe **71** is moved forward and an opposite direction in which the mainframe **71** is moved rearward. The printing device **1** moves the mainframe **71** forward and rearward by operating the frame moving motor **61**.

The carriage **89** is a box of a substantially rectangular parallelepiped shape, and is supported by the mainframe **71** via a carriage guide shaft **83**. The carriage guide shaft **83** is a shaft-shaped member fixed to the mainframe **71**, and extends in the left-right direction along the mainframe **71**. The carriage guide shaft **83** supports the carriage **89** so as to be movable in the left-right direction. The lower end of the carriage **89** is located above the support surface **31***m* when the table **31** is located at the uppermost position. Therefore,

the carriage **89** moves in the front-rear direction and the left-right direction above the support surface **31***m* without interfering with the support surface **31***m*.

The carriage **89** is coupled to a carriage drive belt **85**. The carriage drive belt **85** is an annular belt disposed along the carriage guide shaft **83** and is wrapped around a carriage drive pulley **86** at one end and the output shaft of a carriage drive motor **87** at the other end. The carriage drive pulley **86** is a pulley rotatably fixed to the right end of the mainframe **71**. The carriage drive motor **87** is a motor that is fixed to the left end of the mainframe **71** and that rotates an output shaft thereof under the control of a control section (not shown). The carriage drive motor **87** drives the carriage drive belt **85** to circulate by rotating the output shaft. By this, the carriage drive motor **87** moves the carriage **89** coupled to the carriage drive belt **85** in the left-right direction along the carriage guide shaft **83**.

The carriage **89** includes the print head **89***a* and an irradiation section **89***b*. The print head **89***a* has a plurality of nozzles (not shown) that are provided on the upper side of the medium M and that open downward from the lower end surface of the carriage **89**. The print head **89***a* ejects liquid from these nozzles by driving a Piezo actuator (not shown) according to the control of the control section. When the print head **89***a* ejects liquid from the nozzles, the ejected liquid flies between the nozzles and the medium M supported on the table **31** and lands on the medium M. In the present embodiment, the liquid ejected from the nozzles of the print head **89***a* is ink that is cured by ultraviolet rays. The print head **89***a* prints characters and images formed by liquid on the medium M from above by causing the liquid to land on the medium M supported by the medium support section **30**. The print head **89***a* corresponds to an example of a "printing section".

The irradiation section **89***b* includes an irradiation window (not shown) facing downward from the lower end surface of the carriage **89**. The irradiation window is formed of a plate made of a translucent material. The irradiation section **89***b* emits irradiation light from a light source unit (not shown) via an irradiation window. The irradiation light emitted from the irradiation section **89***b* passes between the irradiation window and the medium M placed on the table **31**, and irradiates the medium M printed on by the print head **89***a*. In the present embodiment, the irradiation section **89***b* includes an UltraViolet Light Emitting Diode (UV-LED) that emits ultraviolet rays, and the irradiation light is ultraviolet rays. That is, in the present embodiment, the irradiation section **89***b* irradiates the ink, which is cured by ultraviolet rays, that landed on the medium M with ultraviolet rays to fix the ink to the medium M.

The ink ejected by the print head **89***a* is supplied from a cartridge-type ink replacement mechanism **29***a*. As shown in FIG. **3**, the ink replacement mechanism **29***a* holds a cartridge inserted via an opening **10***a***3** in the front surface **10***a* of the housing **10**, and supplies ink in the cartridge to the print head **89***a*. The opening **10***a***3** is covered by an ink replacement cover **29** from the front. A lower end **29***b* of the ink replacement cover **29** is coupled to the housing **10** by a hinge, and a handle **29***c* is pulled forward to open the ink replacement cover **29**.

As shown in FIG. **3**, a hole **10***a***4** is formed in the front surface **10***a* of the housing **10**, and it brings the outside of the housing **10** into communication with an open-and-closed sensor **18** inside the housing **10**. The hole **10***a***4** is located at a position covered from the front by the handle **23***a* of the second cover **23** when the printer cover **20** is closed. In a state where the printer cover **20** is closed, a protrusion (not shown) formed on the handle **23***a* is inserted into the hole **10***a***4**, and the switch of the open-and-closed sensor **18** is pressed by the protrusion. The open-and-closed sensor **18** is a contact type sensor, detects whether the printer cover **20** is open or closed depending on whether or not the switch is pressed, and sends a signal corresponding to the detected open or closed state to the control section. When the open-and-closed sensor **18** detects that the printer cover **20** is in the open state, the control section stops the operation of all actuators provided in the printing device **1**. Accordingly, it is possible to prevent the user from erroneously putting a hand or the like into the housing **10** during the operation of any of the actuators of the printing device **1**.

The control section includes a processor such as a Central Processing Unit (CPU) or a Micro Processing Unit (MPU), and a storage unit. The storage unit of the control section has a volatile memory and a nonvolatile storage section. The volatile memory is, for example, a Random Access Memory (RAM). The nonvolatile storage section is composed of a Read Only Memory (ROM), a hard disk, a flash memory, or the like. The control section controls each section of the printing device **1** by executing a program stored in the storage section.

2. Configuration of Wiper Cover

As shown in FIGS. **2** and **3**, in the printing device **1**, a wiper **90** that wipes the print head **89***a* is disposed in front of the front end of the support surface **31***m*. The Y axis and X axis position occupied by the wiper **90** does not overlap the Y axis and the X axis position occupied by the support surface **31***m*. The wiper **90** is detachably attached to a wiper holder **100** provided inside the housing **10**, and is inserted into and removed from the housing **10** in the front-rear direction via the opening **10***a***1** of the front surface **10***a*.

The opening **10***a***1** and the wiper **90** are covered from the front by a wiper cover **27** that can be opened and closed. The wiper cover **27** is a plate-shaped member that, by closing, closes the opening **10***a***1** from the front. In other words, the wiper cover **27** is brought into a closed state by moving rearward to cover the wiper **90**. A lower end **27***c* of the wiper cover **27** is couple to the housing **10** via a hinge, and the wiper cover **27** opens forward by being rotated forward about the hinge around the X axis. As shown in FIG. **3**, the wiper cover **27** can be rotated by about 90 degrees. The wiper cover **27**, in the open state, is positioned below the opening **10***a***1** and the lower end of the wiper **90**. The wiper cover **27** has a protrusion **27***b* fitted into a hole **10***a***2** of the front surface **10***a*. When the protrusion **27***b* is fitted into the hole **10***a***2**, the wiper cover **27** is held in a closed state.

FIG. **4** is a side view of the printing device **1**, and shows the printing device **1** with the wiper cover **27** closed as viewed from the front. FIG. **5** is a side view of the printing device **1**, and shows the printing device **1**, viewed from the front with the wiper cover **27** open.

As shown in FIG. **4**, the wiper cover **27** in the closed state covers the entire opening **10***a***1** from the front.

The wiper cover **27** includes an extension section **27***a* that extends to the right side and covers the opening **10***a***1** from the front side. As indicated by an imaginary line in FIG. **4**, the printer cover **20** in the closed state overlaps the extension section **27***a* from the front in a state where the wiper cover **27** is closed. In other words, the printer cover **20** enters a closed state by moving rearward to cover the extension section **27***a*. Therefore, in a state where the printer cover **20** is closed, when the wiper cover **27** rotates, the extension section **27***a* interferes with the printer cover **20**. Therefore,

when the printer cover **20** is closed, the opening and closing of the wiper cover **27** is regulated.

3. Configuration of Wiper

FIG. **6** is a cross-sectional view taken along a line A-A in FIG. **4**, and shows configuration of the wiper **90**.

As shown in FIG. **6**, the wiper **90** includes a box-shaped case **91** and rollers **92***a* to **92***e* rotatably supported by the case **91**. The case **91** has a substantially rectangular parallelepiped outer shape, and stores therein a belt-like fabric **98** for wiping the print head **89***a*. The fabric **98** stored in the case **91** is wound around the rollers **92***a* to **92***e*. The case **91** has a handle **91***a* protruding forward. The handle **91***a* is a section on which the user hooks his or her finger when the user moves the wiper **90** in and out from the opening **10***a***1** in the front-back direction.

The roller **92***a* is a roller on which an unused roll-shaped fabric **98** is mounted. The roller **92***b* is a roller around which is wound the fabric **98** pulled out from the roller **92***a*. The roller **92***b* is movable in the vertical direction with respect to the case **91** and is urged upward by a compression spring **93**. The upper end of the roller **92***b* is located above a top surface **91***c* of the case **91**, and is located above the other rollers **92***a* and **92***c* to **92***e*. The wiper **90** removes ink adhering to the print head **89***a* by wiping the print head **89***a* with a portion of the fabric **98** wound around the roller **92***b*. The roller **92***c* is a roller for winding up the used fabric **98**. The roller **92***c* is fixed to the same shaft as a gear **94** provided on the left outer surface of the case **91**, and the gear **94** and the roller **92***c* rotate in synchronization with each other. When the roller **92***c* rotates and winds up the used fabric **98**, the unused fabric wound around the roller **92***a* is drawn out up to the roller **92***b* at the same time. The fabric **98** between the roller **92***a* and the roller **92***b* winds around the roller **92***d*. The fabric **98** between the roller **92***b* and the roller **92***c* winds around a roller **92***e*.

As shown in FIG. **6**, the wiper **90** is detachably attached to the inside of the box-shaped wiper holder **100** in the housing **10**. Openings **100***a* and **100***b* are formed in the front surface and the top surface of the wiper holder **100**, respectively. While attached to the wiper holder **100**, the wiper **90** is pulled out from the housing **10** by being pulled out in the front direction via the opening **100***a* and the opening **10***a***1** of the front surface **10***a* of the housing **10**. While outside the housing **10**, the wiper **90** is attached to the wiper holder **100** by being pushed rearward via the opening **10***a***1** and the opening **100***a*. In a state where the wiper **90** is attached to the wiper holder **100**, the roller **92***b* protrudes upward from the top surface of the wiper holder **100** via the opening **100***b*.

The wiper holder **100** has a protrusion **101**, a groove **103**, and a wiper drive mechanism **105**.

The protrusion **101** protrudes downward from the inner top surface of the wiper holder **100**. The protrusion **101** is brought into contact from the front side with a protrusion **91***d* protruding upward from the top surface **91***c* of the case **91**, thereby making it difficult for the wiper **90** to pull out forward from the wiper holder **100**.

The groove **103** is formed on the inner bottom surface of the wiper holder **100** and extends in the front-rear direction. A protrusion **91***b* protruding downward from the outer bottom surface of the case **91** is inserted into the groove **103**. The width of the groove **103** in the left-right direction is substantially equal to the width of the protrusion **91***b* in the left-right direction. When the wiper **90** is attached to or detached from the wiper holder **100**, the protrusion **91***b* slides in the front-rear direction along the groove **103**.

The wiper drive mechanism **105** includes a motor (not shown) controlled by a control section, a transmission mechanism (not shown), and an output gear **105***a* to which a driving force from the motor is transmitted via the transmission mechanism. The gear **105***a* is positioned on the left inner surface of the wiper holder **100**, and engages with the gear **94** of the wiper **90** from the rear. The wiper drive mechanism **105** rotates the gear **105***a* by rotation of the motor, and rotates the roller **92***c* via the gear **94** engaged with the gear **105***a*. That is, the control section controls the operation of the wiper **90** by operating the motor of the wiper drive mechanism **105**.

The wiper holder **100** is supported by an elevator **109** fixed to the housing **10**. The elevator **109** has an air cylinder that operates according to the control of the control section, and moves the wiper holder **100**, which is supported via the air cylinder, in the vertical direction. When the elevator **109** moves the wiper holder **100** to the uppermost position, the upper end of the roller **92***b* is located above the lower end of the print head **89***a*. While the upper end of the roller **92***b* is located above the lower end of the print head **89***a*, the print head **89***a* and the roller **92***b* will overlap each other in a plan view by movement of the carriage **89**, so that the wiper **90** wipes the print head **89***a* with the fabric **98**.

When the elevator **109** moves the wiper holder **100** to the lowermost position, the upper end of the roller **92***b* is positioned below the lower end of the print head **89***a*. In this state, even when the print head **89***a* and the roller **92***b* overlap each other in a plan view due to the movement of the carriage **89**, the fabric **98** and the print head **89***a* do not come into contact with each other. In the present embodiment, the upper end of the roller **92***b* is located below the lower end of the print head **89***a* except when the wiper **90** wipes the print head **89***a* with the fabric **98**.

4. Operation in Maintenance of Wiper

Next, an operation when the user performs maintenance of the wiper **90** inside the housing **10** will be described. The maintenance work of the wiper **90** is performed, for example, when the remaining amount of the unused roll-shaped fabric **98** mounted on the roller **92***a* runs out.

In the maintenance of the wiper **90**, first, the user detaches the wiper **90** from the wiper holder **100** and takes the wiper **90** out of the housing **10**.

To be specific, first, the user holds the handle **23***a* from the front of the housing **10** and pulls the printer cover **20** forward. As a result, the printer cover **20** opens forward. Thereafter, the user lifts upward the printer cover **20** that was opened forward. Thus, the extension section **27***a* of the wiper cover **27**, which was covered from the front by a second cover **23** of the printer cover **20**, is exposed. Therefore, when the wiper cover **27** is rotated, the extension section **27***a* and the printer cover **20** do not interfere with each other.

Next, the user pulls the wiper cover **27** forward, and pivots the wiper cover **27** around the lower end **27***c* of the wiper cover **27** with the left-right direction as the axis. By this, the wiper cover **27** opens forward by about 90 degrees so as to be oriented substantially horizontal, and the opening **10***a***1** of the front surface **10***a* is exposed forward. Further, the handle **91***a* of the wiper **90** is exposed forward to outside the housing **10** via the opening **10***al*.

Next, the user grips the handle **91***a* of the wiper **90** and pulls the wiper **90** forward. When the user pulls the wiper **90** forward with a force equal to or greater than a predetermined load, the protrusion **91***d* of the wiper **90** moves forward over

the protrusion **101** of the wiper holder **100**. Thus, the wiper **90** is removed from the wiper holder **100**. When the user continues to pull the wiper **90** forward, the wiper **90** is taken out from the housing **10** via the opening **100***a* of the wiper holder **100** and the opening **10***a***1** of the housing **10**.

In this way, the wiper **90** can be taken out from the housing **10** by being pulled out forward, not upward where the fabric **98** to which ink adheres passes. Therefore, when the user takes out the wiper **90** to the outside of the housing **10**, the user's hand is less likely to be stained. In addition, since it is not necessary to secure a space for the print head **89***a* to move in front of the wiper **90**, the wiper **90** is easily disposed in the vicinity of the front surface **10***a* of the housing **10**. Therefore, when the user pulls out the wiper **90**, there is no need to insert his/her hand deep inside the housing **10**, so the wiper **90** can be easily pulled out. Further, the wiper cover **27** is opened by pivoting about the lower end **27***c* with the left-right direction as an axis, and the wiper cover **27** in the opened state is positioned below the opening **10***a***1** and the wiper **90**. Therefore, when the user pulls the wiper **90** out from the housing **10**, the fabric **98** to which the ink is attached is unlikely to come into contact with the wiper cover **27**, and the wiper cover **27** is unlikely to be contaminated.

After the wiper **90** is taken out to the outside of the housing **10**, the user performs maintenance of the wiper **90**, including replacement of the fabric **98**. The user mounts the wiper **90** into the wiper holder **100** again after finishing the maintenance of the wiper **90**.

To be specific, the user inserts the wiper **90** for which maintenance has been completed into the wiper holder **100** via the opening **10***a***1** and the opening **100***a*. At this time, when the user inserts the wiper **90** rearward with a predetermined load or more, the protrusion **91***d* of the wiper **90** rides over the protrusion **101** of the wiper holder **100** rearward. By this, the wiper **90** is mounted into the wiper holder **100**. Thereafter, the user sequentially closes the wiper cover **27** and the printer cover **20**, thereby completing the maintenance work of the wiper **90**.

5. Other Embodiments

The above embodiment is merely a specific example of the present disclosure. The present disclosure is not limited to the configuration of the above embodiment, but can be implemented in various forms to the extent that it does not depart from the scope of the disclosure.

In the above embodiment, the printing device **1** has been described as having the open-and-closed sensor **18** for detecting whether the printer cover **20** is open or closed, but this is an example. For example, the printing device **1** may further include a sensor that detects whether the wiper cover **27** is open or closed, and the control section may be configured to stop various actuators of the printing device **1** while the sensor detects the open state of the wiper cover **27**. In this case, it is possible to further prevent the user from putting his/her hand or the like inside the housing **10** while any of the actuators of the printing device **1** is operating. In addition, the open-and-closed sensor **18** is not limited to a contact sensor, and may be a non-contact sensor such as an optical sensor or a magnetic sensor.

In the above embodiment, the wiper **90** is described as a device for wiping the print head **89***a* with the fabric **98**, but this is an example. For example, the wiper **90** may be a device that wipes the print head **89***a* with rolled paper. In addition, for example, the printing device **1** may have a configuration in which the print head **89***a* is scanned in a state of being in contact with a blade made of rubber, and the ink attached to the print head **89***a* is scraped off by the blade.

In the above-described embodiment, the direction in which the wiper **90** is pulled out via the opening **10***a***1** was described as the front direction, which is the second direction orthogonal to the upward direction, which is the first direction. This configuration is an example, and the direction in which the wiper **90** is pulled out may be any direction that intersects the first direction. For example, the wiper **90** may be configured to be pulled out in a direction inclined with respect to the front side and to be taken out to the outside of the housing **10**. In addition, the direction in which the printer cover **20** and the wiper cover **27** are opened may be any direction in which the wiper **90** can be pulled out, and for example, may be a direction different from the front direction.

6. Configurations Described by Embodiment

According to the above embodiment, the following configurations are described.

(Configuration 1) A printing device includes a printing section that is provided on a first direction side with respect to a medium and that performs printing and a wiper that is detachably attached inside a housing and that is configured to wipe the printing section, wherein the wiper is configured to be pulled out from the housing by being pulled out in a second direction intersecting the first direction.

According to this configuration, when the wiper is taken out to the outside of the housing, it is not necessary to insert a hand to the inside of the housing from the first direction side where the printing section is provided, and the wiper can be taken out from the second direction side. Therefore, it is easy to take out the wiper from the inside of the housing.

(Configuration 2) The printing device, according to the configuration 1, further includes an openable and closable wiper cover, wherein the wiper cover enters a closed state by moving in a fourth direction opposite to the second direction to cover the wiper.

According to this configuration, the wiper can be covered by the wiper cover moving in the direction opposite to the direction in which the wiper is pulled out.

(Configuration 3) The printing device, according to the configuration 2, further includes a medium support section configured to support the medium and a printer cover configured to open a part of the housing to expose the medium support section, wherein the printer cover enters a closed state by moving in the fourth direction to cover at least a part of the wiper cover and the wiper cover opens in the second direction.

According to this configuration, opening and closing of the wiper cover can be regulated by the printer cover. Therefore, it is possible to prevent the wiper cover from opening due to factors other than the operation of the user.

(Configuration 4) The printing device, according to the configuration 3, wherein the printer cover opens in the second direction. According to this configuration, since both the printer cover and the wiper cover open in the second direction, it is possible to easily be open and closed the wiper cover from the second direction side.

(Configuration 5) The printing device, according to the configurations 3 or 4, further includes a control section controlling the printing section and the wiper and an open-and-closed sensor configured to detect whether the printer cover is open or closed, wherein the control section stops operation of the printing section and the

wiper when the open-and-closed sensor detects a state in which the printer cover is open.

According to this configuration, the operation of the wiper in the state where the wiper cover is open can be regulated by using only one open-and-closed sensor.

(Configuration 6) The printing device, according to the configurations 2 to 5, wherein the wiper cover in an open state is positioned toward a third direction, which is a direction opposite to the first direction with respect to the wiper.

According to this configuration, when the wiper is attached or detached, a portion of the wiper that wipes the printing section is unlikely to come into contact with the wiper cover. Therefore, the wiper cover is unlikely to become dirty when the wiper are inserted and removed from the housing.

What is claimed is:

1. A printing device comprising:

a printing section that is provided on a first direction side with respect to a medium and that performs printing;

a wiper that is detachably attached inside a housing and that is configured to wipe the printing section;

a printer cover configured to open a part of the housing; and

a wiper cover, which is openable and closable, wherein

the wiper is configured to be pulled out from the housing by being pulled out in a second direction intersecting the first direction, and

when the printer cover is closed in a closed state, a portion of the wiper cover interferes with a portion of the printer cover so that the wiper cover is not openable.

2. The printing device, according to claim **1**, wherein

the wiper cover enters a closed state by moving in a fourth direction opposite to the second direction to cover the wiper.

3. The printing device, according to claim **2**, further comprising:

a medium support section configured to support the medium, wherein

the printer cover enters the closed state by moving in the fourth direction to cover at least a part of the wiper cover and

the wiper cover opens in the second direction.

4. The printing device, according to claim **3**, wherein

the printer cover opens in the second direction.

5. The printing device, according to claim **3**, further comprising:

a control section controlling the printing section and the wiper; and

an open-and-closed sensor configured to detect whether the printer cover is open or closed, wherein

the control section stops operation of the printing section and the wiper when the open-and-closed sensor detects a state in which the printer cover is open.

6. The printing device, according to claim **1**, wherein

the wiper cover in an open state is positioned toward a third direction, which is a direction opposite to the first direction with respect to the wiper.

7. The printing device, according to claim **1**, wherein, when the printer cover is in an open state, the wiper cover is not covered by the portion of the printer cover so that the wiper cover is openable.

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