US012391047B2

(12) **United States Patent**
Yano et al.

(10) **Patent No.: US 12,391,047 B2**
(45) **Date of Patent: Aug. 19, 2025**

(54) **INKJET RECORDING APPARATUS**

(71) Applicant: **KYOCERA Document Solutions Inc.**, Osaka (JP)

(72) Inventors: **Yuko Yano**, Osaka (JP); **Hiroomi Nakatsuji**, Osaka (JP); **Jun Nakano**, Osaka (JP); **Issei Nakano**, Osaka (JP); **Takashi Somete**, Osaka (JP); **Chikara Ishihara**, Osaka (JP); **Noriaki Furukawa**, Osaka (JP); **Takuma Araki**, Osaka (JP)

(73) Assignee: **KYOCERA Document Solutions Inc.**, Osaka (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 213 days.

(21) Appl. No.: **18/553,683**

(22) PCT Filed: **Mar. 25, 2022**

(86) PCT No.: **PCT/JP2022/014462**
§ 371 (c)(1),
(2) Date: **Oct. 2, 2023**

(87) PCT Pub. No.: **WO2022/215552**
PCT Pub. Date: **Oct. 13, 2022**

(65) **Prior Publication Data**

US 2024/0198683 A1 Jun. 20, 2024

(30) **Foreign Application Priority Data**

Apr. 7, 2021 (JP) 2021-065053

(51) **Int. Cl.**
B41J 2/17 (2006.01)
B41J 2/165 (2006.01)
B41J 2/21 (2006.01)

(52) **U.S. Cl.**
CPC ***B41J 2/1714*** (2013.01); ***B41J 2/1652*** (2013.01); ***B41J 2/16552*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC B41J 2/1714; B41J 2/1652; B41J 2/16552; B41J 2/1707; B41J 2/1721; B41J 2/2103;
(Continued)

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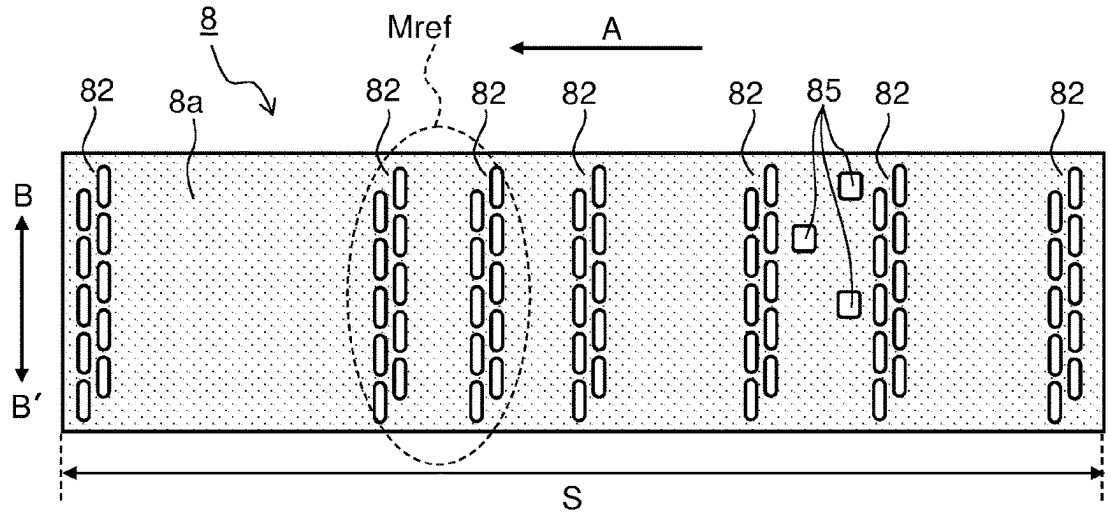
Primary Examiner — Justin Seo
(74) *Attorney, Agent, or Firm* — Stein IP LLC

(57) **ABSTRACT**

An inkjet recording apparatus includes a recording head, a conveyance belt, a control portion, an ink receiver, an ink discharging flow path, and a liquid supply mechanism. The recording head includes a plurality of nozzles for ejecting ink. The conveyance belt has a plurality of first openings and conveys a recording medium. The control portion executes flushing in which the ink is ejected through the nozzles of the recording head to pass through any of the plurality of first openings. The ink receiver is opposite disposed to be opposed to the recording head via the conveyance belt and receives the ink that has passed through the first openings during execution of the flushing. The ink discharging flow path is connected to the ink receiver. The liquid supply mechanism supplies a liquid capable of dissolving the ink into the ink receiver.

7 Claims, 10 Drawing Sheets



(52) **U.S. Cl.**
CPC ***B41J 2/1707*** (2013.01); ***B41J 2/1721*** (2013.01); ***B41J 2/2103*** (2013.01); *B41J 2/16585* (2013.01); *B41J 2002/16591* (2013.01); *B41J 2002/16594* (2013.01)

(58) **Field of Classification Search**
CPC B41J 2/16585; B41J 2002/16591; B41J 2002/16594
See application file for complete search history.

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FIG.1

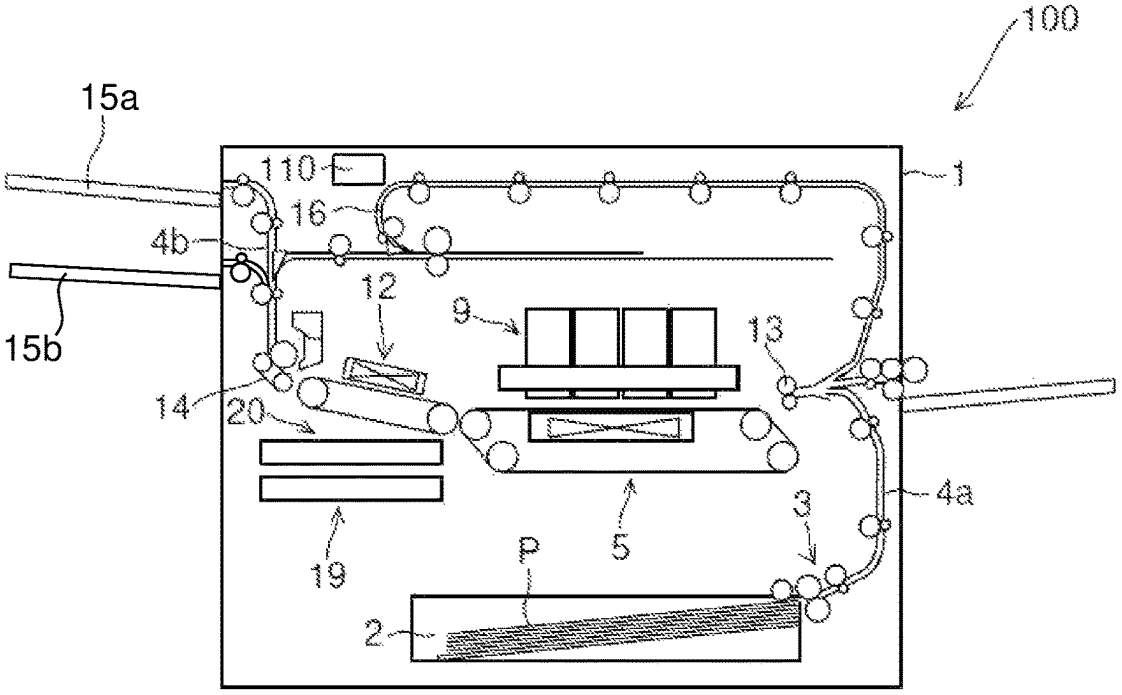

100
15a
110
1
16
4b
12
9
13
15b
14
20
4a
3
19
5
P
2

FIG.2

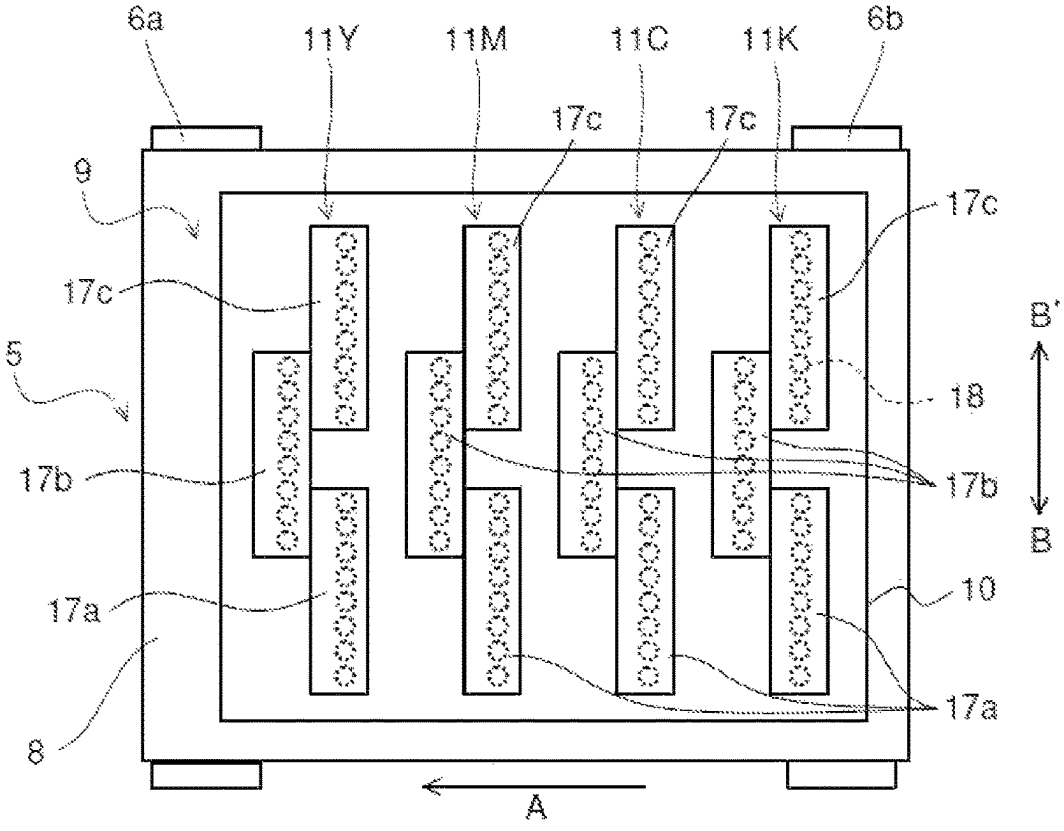

6a
11Y
11M
11C
11K
6b
17c
17c
9
17c
17c
5
18
B'
17b
17b
B
17a
10
17a
8
A

FIG.3

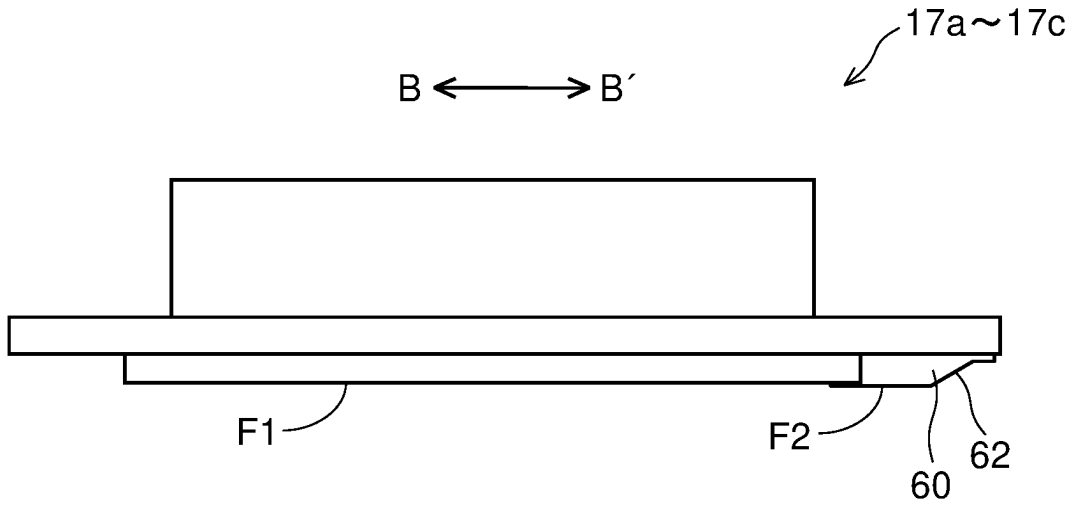


FIG.4

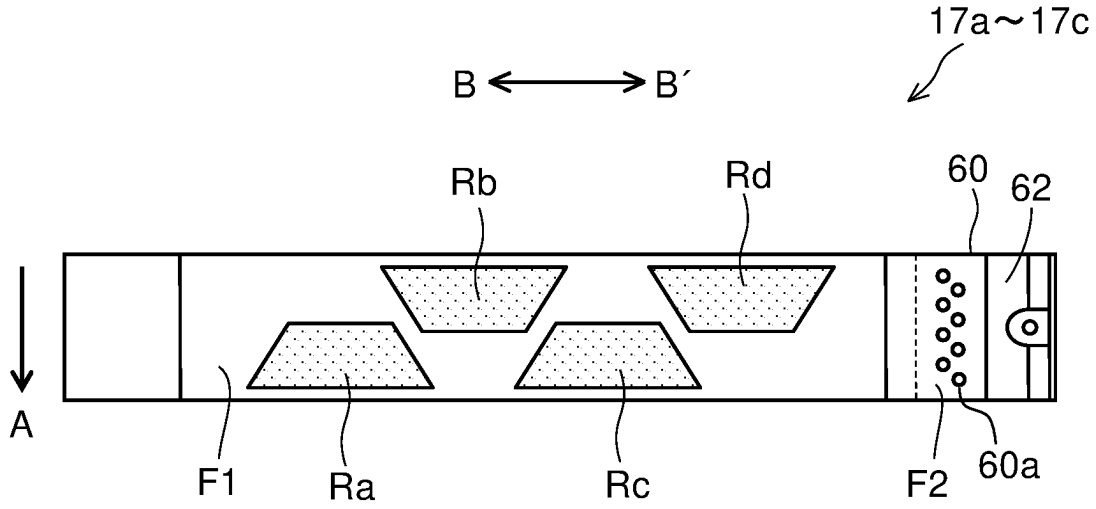


FIG.5

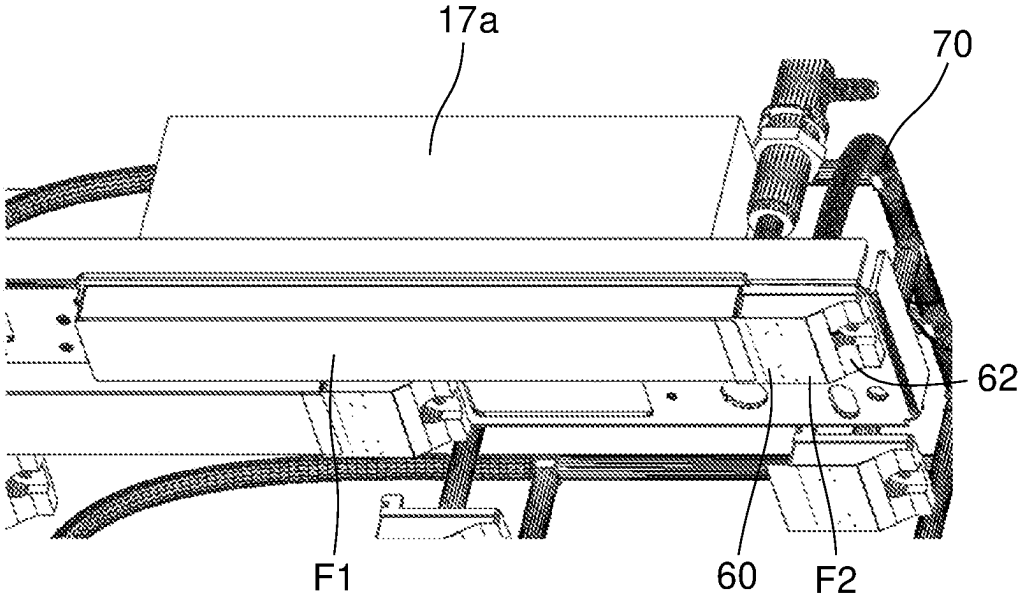
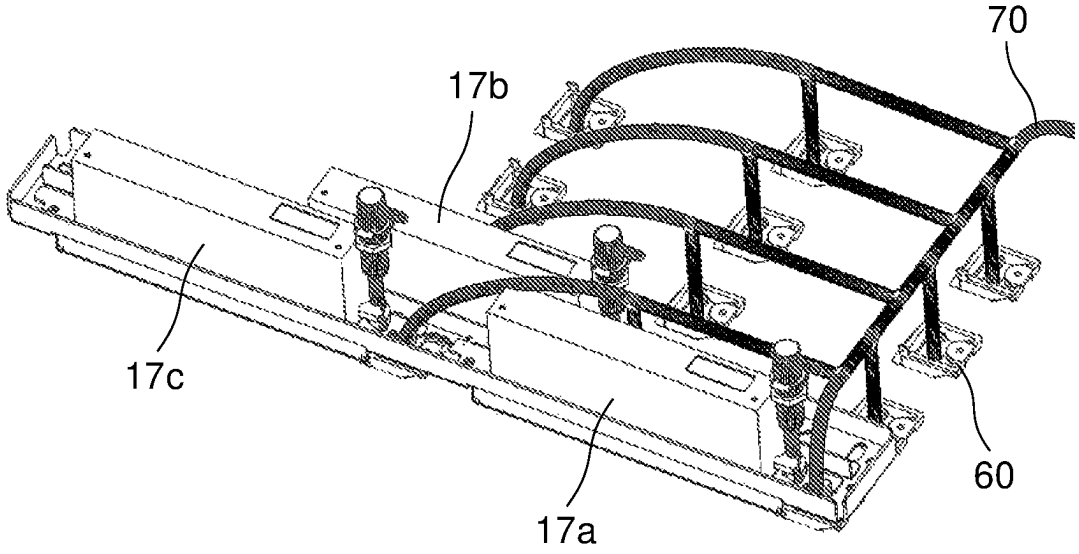


FIG.6



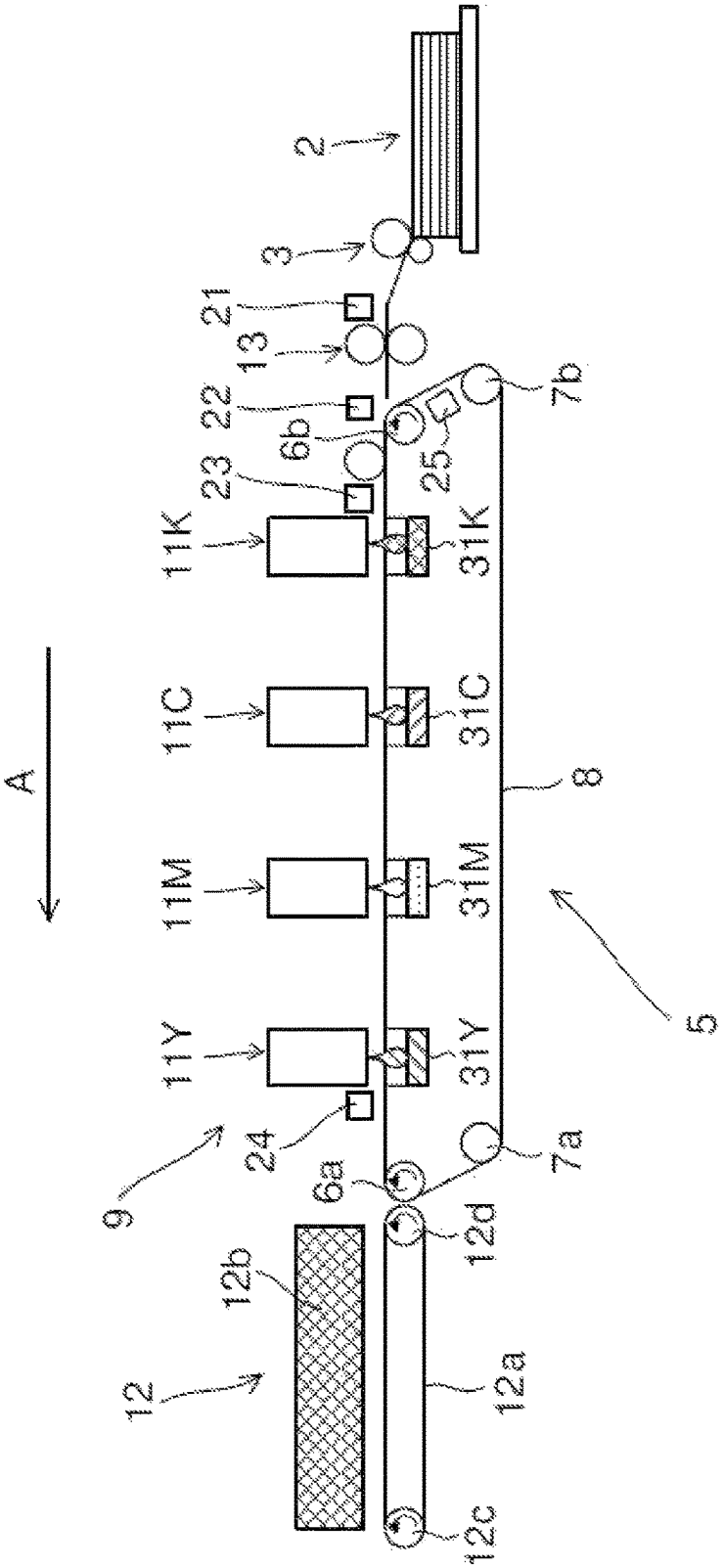

2
3
21
13
22
6b
23
25
7b
11K
31K
11C
31C
A
8
11M
31M
5
11Y
31Y
24
9
6a
7a
12d
12b
12
12a
12c

FIG.7

FIG.8

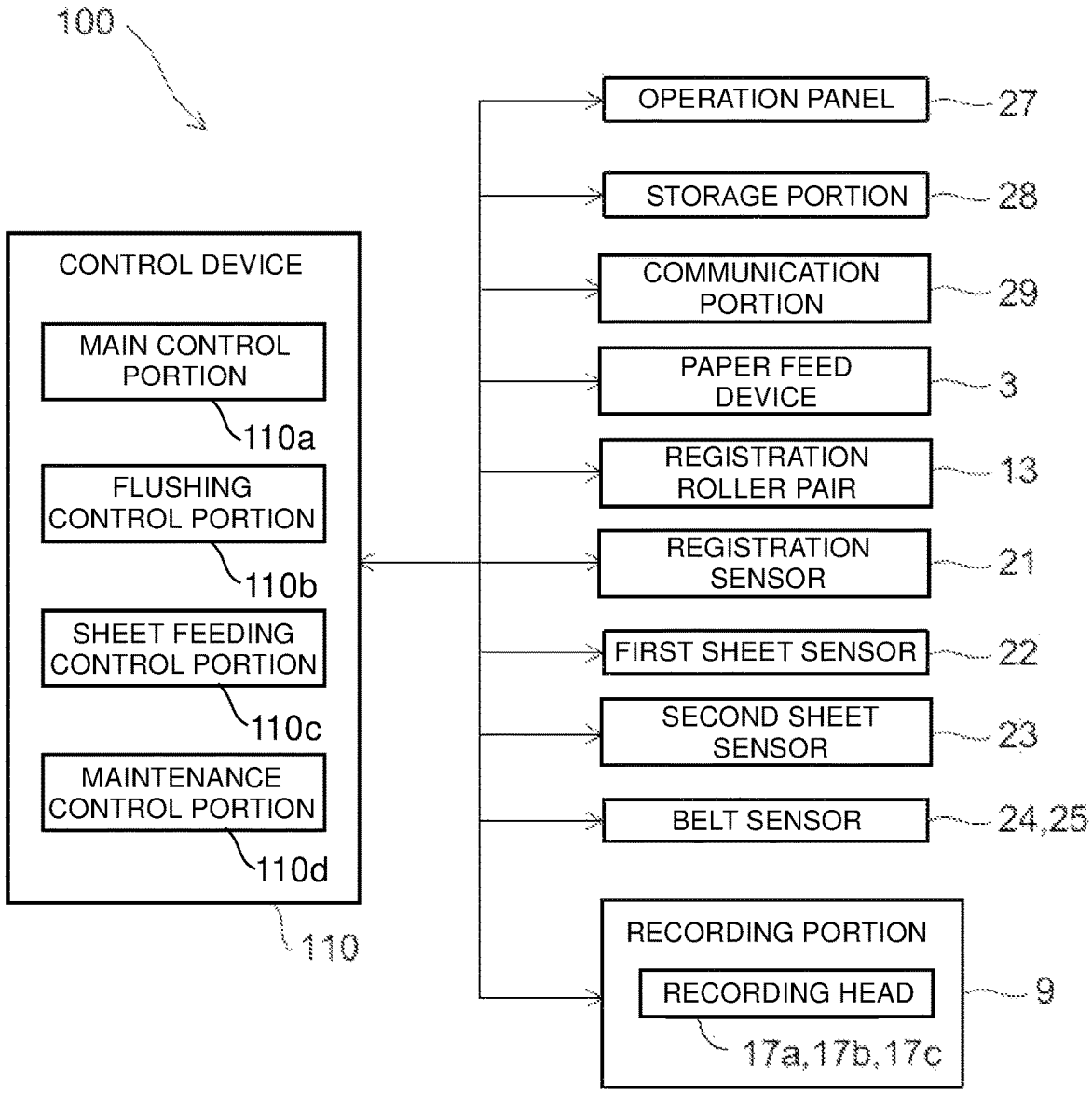

100
CONTROL DEVICE
MAIN CONTROL PORTION
110a
FLUSHING CONTROL PORTION
110b
SHEET FEEDING CONTROL PORTION
110c
MAINTENANCE CONTROL PORTION
110d
110
OPERATION PANEL
27
STORAGE PORTION
28
COMMUNICATION PORTION
29
PAPER FEED DEVICE
3
REGISTRATION ROLLER PAIR
13
REGISTRATION SENSOR
21
FIRST SHEET SENSOR
22
SECOND SHEET SENSOR
23
BELT SENSOR
24,25
RECORDING PORTION
RECORDING HEAD
17a,17b,17c
9

FIG.9

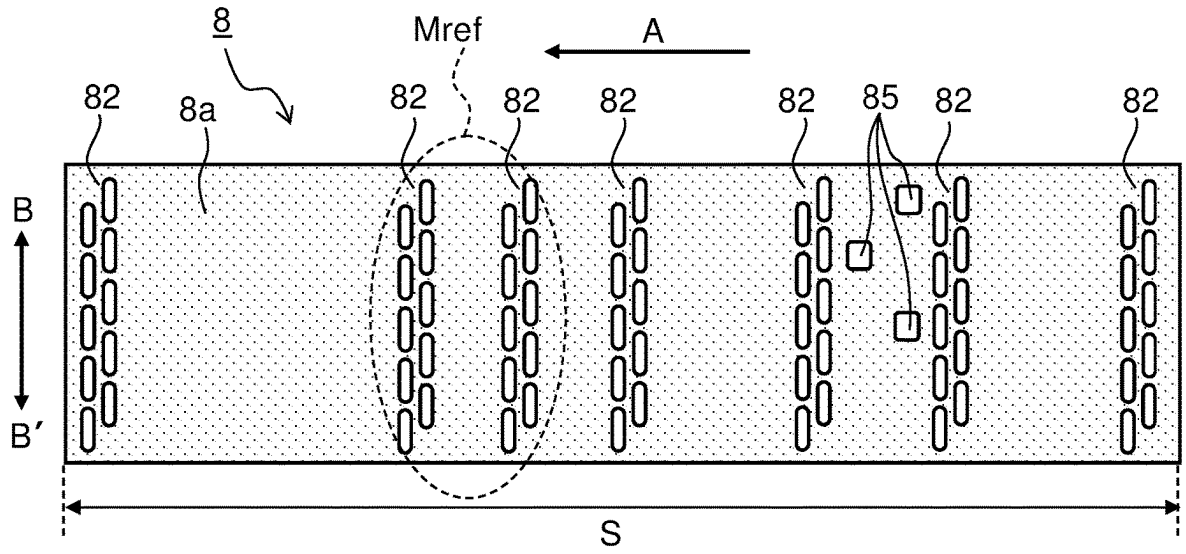

8
Mref
A
82
8a
82
82
82
82
85
82
82
B
B′
S

FIG.10

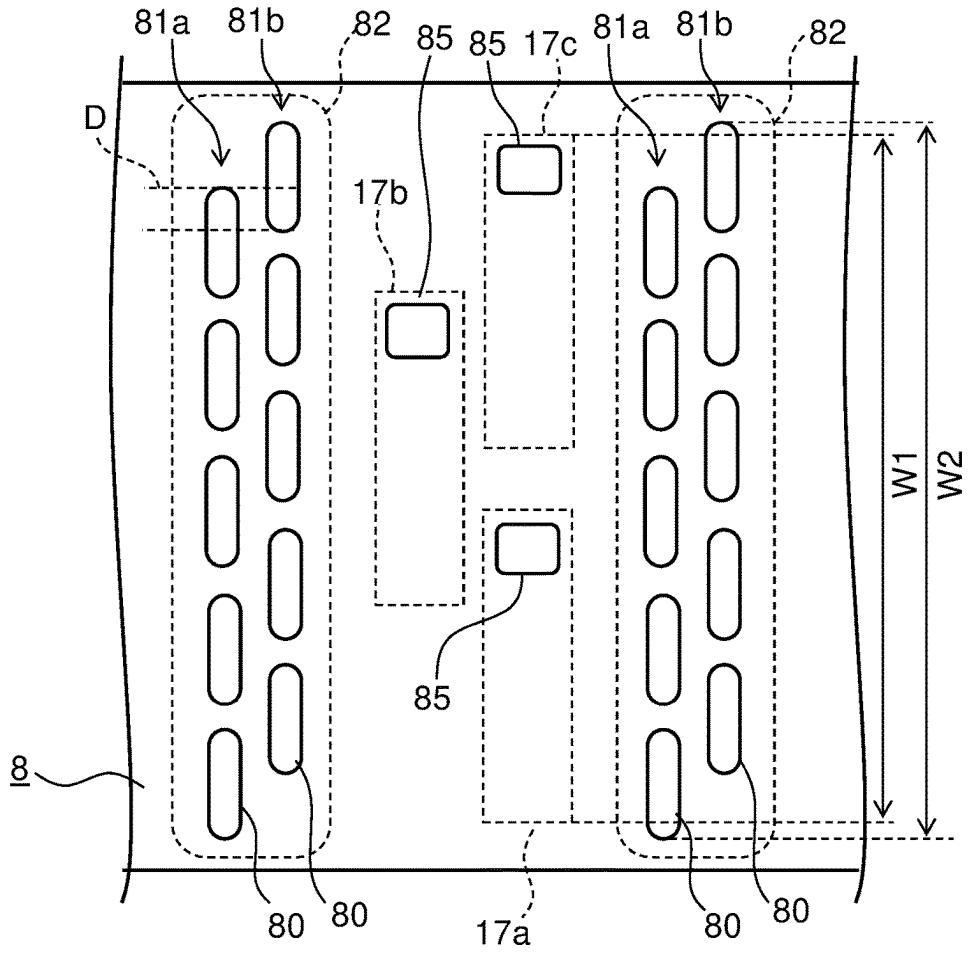

81a
81b
82
85
85
17c
81a
81b
82
D
17b
85
W1
W2
8
80
80
17a
80
80

FIG.11

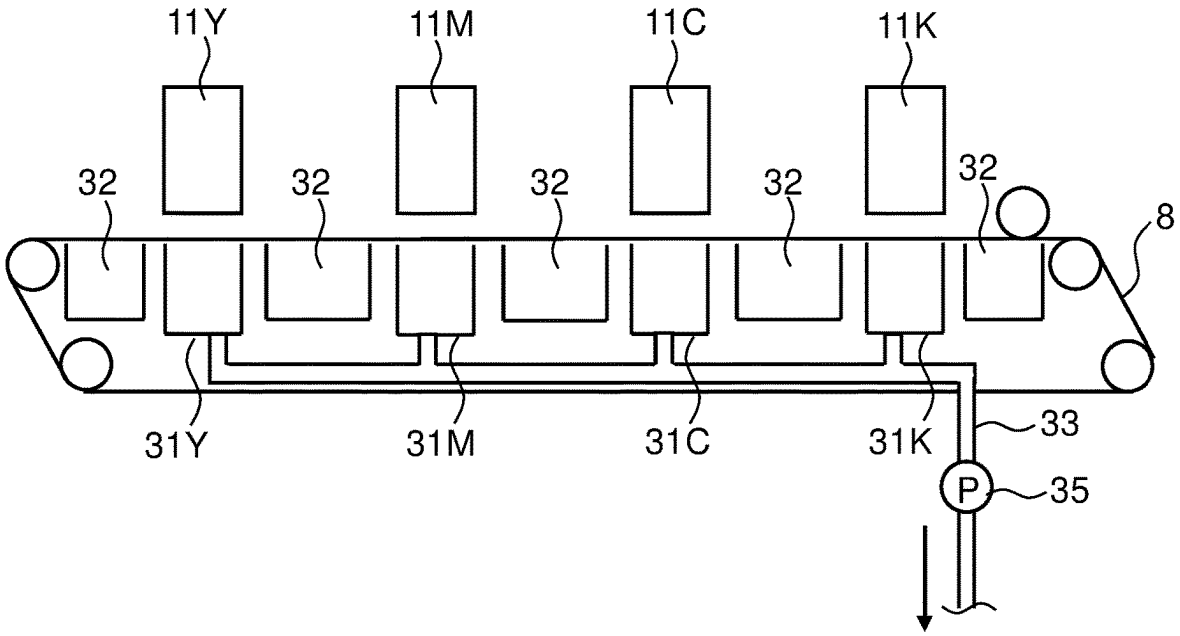

11Y
11M
11C
11K
32
32
32
32
32
8
31Y
31M
31C
31K
33
P
35

FIG.12

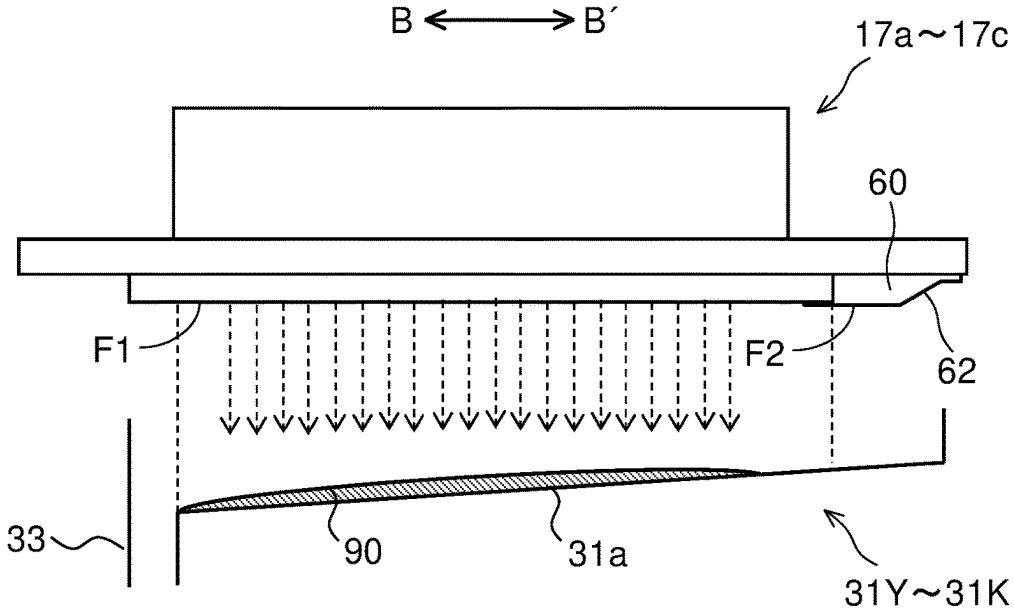

B ⟷ B´
17a～17c
60
F1
F2
62
33
90
31a
31Y～31K

FIG.13

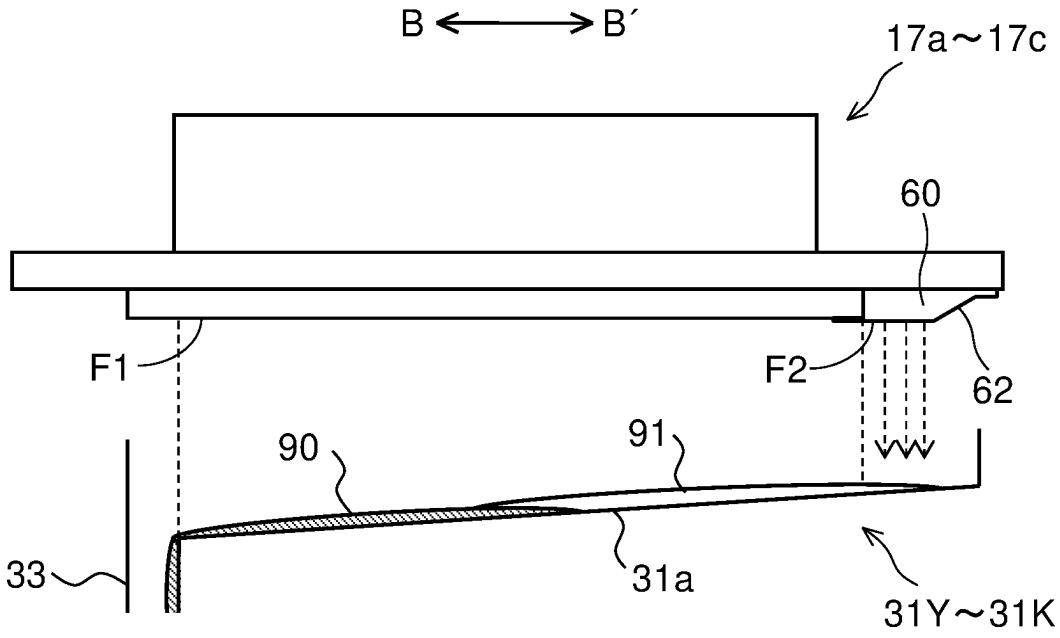

B ⟷ B´
17a～17c
60
F1
F2
62
90
91
33
31a
31Y～31K

FIG.14

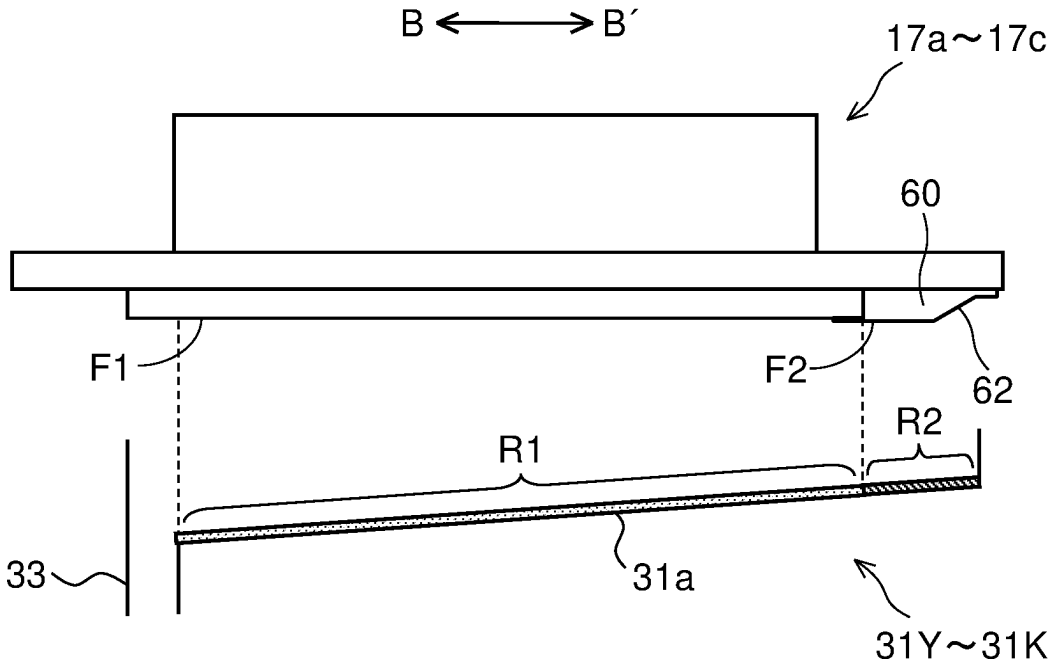

B ⟷ B´
17a～17c
60
F1
F2
62
R2
R1
33
31a
31Y～31K

FIG.15

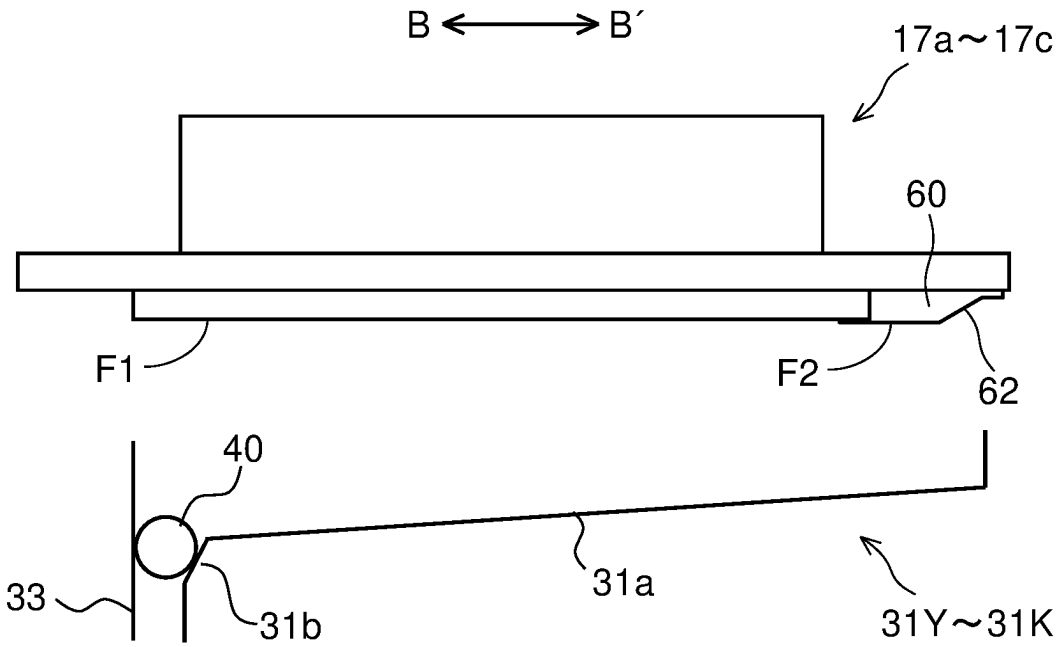

B ⟷ B´
17a～17c
60
F1
F2
62
40
33
31b
31a
31Y～31K

FIG.16

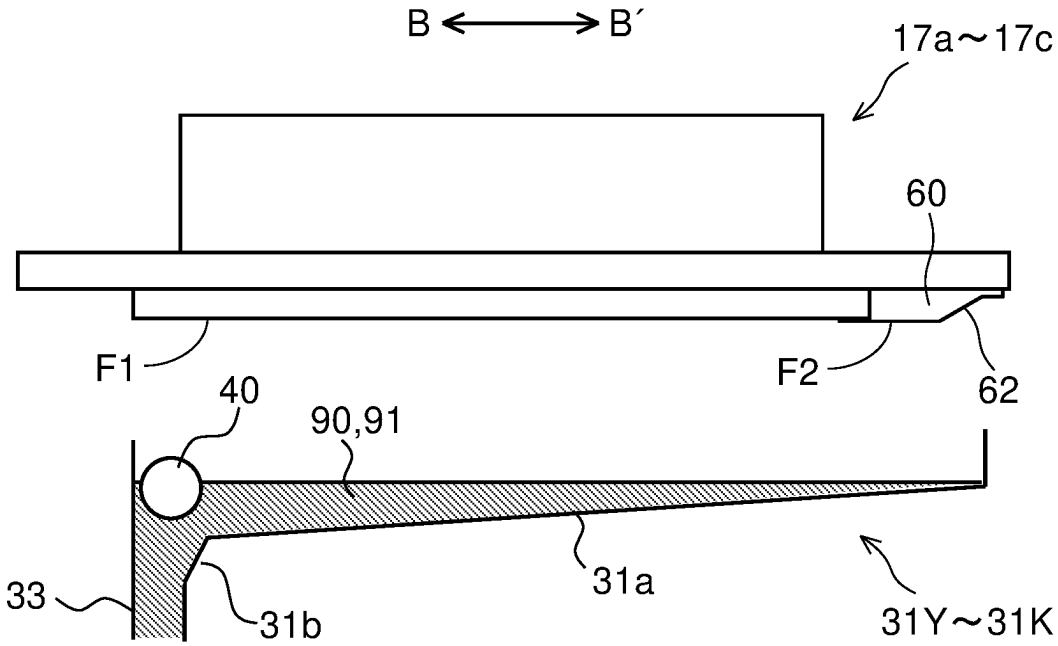
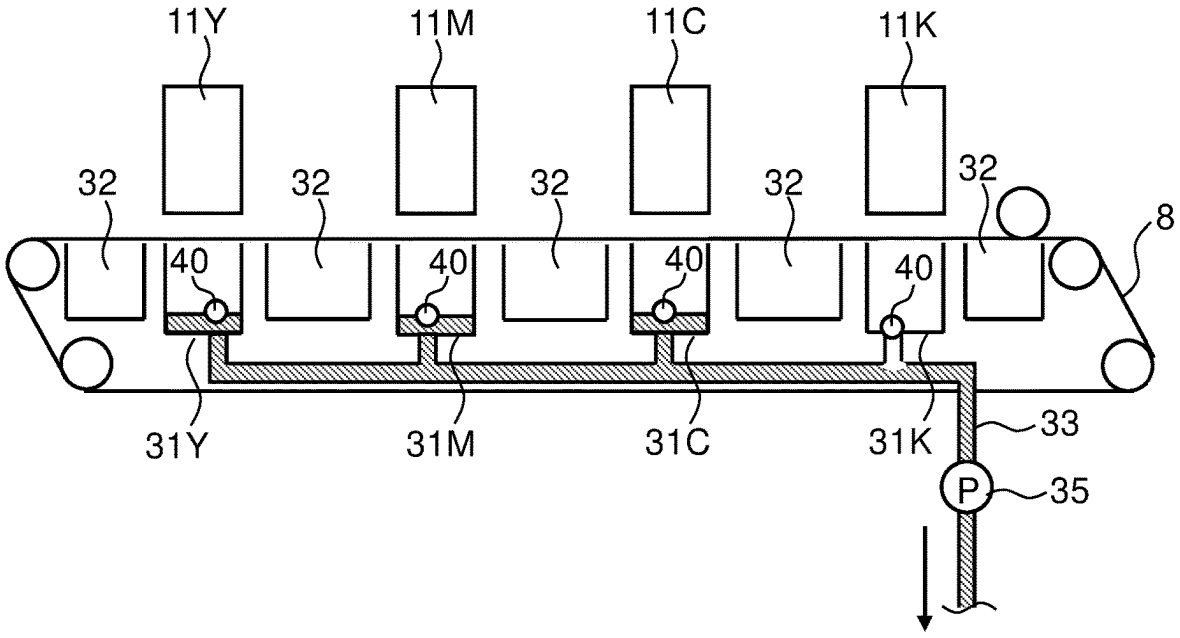

B ⟷ B´
17a～17c
60
F1
F2
62
40
90,91
33
31b
31a
31Y～31K

FIG.17



INKJET RECORDING APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a national stage of International Application No. PCT/JP2022/014462, filed Mar. 25, 2022, which claims the benefit of Japanese Application No. 2021-065053, filed Apr. 7, 2021, in the Japanese Patent Office, the disclosures of which are incorporated herein by reference.

TECHNICAL FIELD

The present invention relates to an inkjet recording apparatus.

BACKGROUND ART

Conventionally, in an inkjet recording apparatus such as an inkjet printer, in order to reduce or prevent clogging of nozzles due to drying of ink, flushing (idle ejection) is performed in which the ink is periodically ejected through the nozzles. For example, in an inkjet recording apparatus described in Patent Document 1, a conveyance belt that conveys a recording medium has openings provided therein, and ink is ejected through nozzles of a recording head to pass through the openings of the conveyance belt.

In the inkjet recording apparatus described above, the ink that has passed through the openings of the conveyance belt as a result of the flushing normally arrives on an ink receiver that receives the ink and is collected to be discharged as a waste liquid from the ink receiver. The ink arriving on the ink receiver, however, often becomes dried to have decreased flowability. The ink having the decreased flowability is deposited on the ink receiver and adheres to the conveyance belt, causing the recording medium to be contaminated. Furthermore, solidified ink causes clogging of an ink discharging flow path, resulting in contamination inside the apparatus or a breakdown of the apparatus.

There are disclosed methods for improving efficiency in collecting ejected ink as follows. For example, Patent Document 2 discloses an image forming apparatus in which an idle ejection receiver is provided so as to be inclinable with respect to an ejection direction of idle ejection droplets ejected from a recording head toward openings of a conveyance belt, and when a flying direction of the idle ejection droplets is bent, the idle ejection receiver is also inclined so as to reduce a phenomenon in which the droplets land at a position shifted to one side.

Furthermore, Patent Document 3 discloses an inkjet recording apparatus in which a fixed plate is provided along a circumferential surface of a conveyance belt in an inner circumferential region of the conveyance belt, the fixed plate has an opening formed at a position thereon corresponding to ink spraying nozzles and an air suction through-hole formed therein, and an idle ejection ink receiver is provided in tight contact with the fixed plate with no gap therebetween so that an internal space of the idle ejection ink receiver is an enclosed space except for an opening thereof corresponding to the opening of the fixed plate.

CITATION LIST

Patent Literature

Patent Document 1: Japanese Unexamined Patent Application Publication No. 2011-213095

Patent Document 2: Japanese Unexamined Patent Application Publication No. 2010-167586

Patent Document 3: Japanese Unexamined Patent Application Publication No. 2010-241109

SUMMARY OF INVENTION

Technical Problem

In each of the methods described in Patent Documents 2 and 3, while it is possible for ejected ink to reliably arrive on the ink receiver, drying and a decrease in flowability of the ink that has arrived on the ink receiver cannot be suppressed.

In view of the above-described problem, it is an object of the present invention to provide an inkjet recording apparatus capable of suppressing drying and a decrease in flowability of ink that has arrived on an ink receiver as a result of flushing.

Solution to Problem

In order to achieve the above-described object, a first configuration of the present invention relates to an inkjet recording apparatus including a recording head, a conveyance belt, a control portion, an ink receiver, an ink discharging flow path, and a liquid supply mechanism. The recording head includes a plurality of nozzles for ejecting ink. The conveyance belt has a plurality of first openings and conveys a recording medium. The control portion controls driving of the recording head and the conveyance belt so as to execute flushing in which, at a timing different from a timing contributing to image recording, the ink is ejected through the nozzles of the recording head to pass through any of the plurality of first openings. The ink receiver is disposed to be opposed to the recording head via the conveyance belt and receives the ink that has passed through the first openings during execution of the flushing. The ink discharging flow path is connected to the ink receiver. The liquid supply mechanism supplies a liquid capable of dissolving the ink into the ink receiver.

Advantageous Effects of Invention

According to the first configuration of the present invention, the liquid supply mechanism is used to supply the liquid capable of dissolving the ink into the ink receiver so that residual ink remaining in the ink receiver is washed away, and thus it is possible to efficiently collect ink that has become dried on the ink receiver and thus has decreased flowability. Accordingly, it is possible to suppress contamination of the recording medium and the conveyance belt due to deposition of the ink on the ink receiver and clogging of the ink discharging flow path.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is an explanatory view showing a schematic configuration of a printer as an inkjet recording apparatus according to an embodiment of the present invention.

FIG. **2** is a plan view of a recording portion included in the above-described printer.

FIG. **3** is a side view of each of recording heads constituting each of line heads in the recording portion.

FIG. **4** is a plan view of the each of recording heads as viewed from an ink ejection surface side thereof.

FIG. **5** is a perspective view of a vicinity of one of the recording heads as viewed from diagonally below.

FIG. **6** is a perspective view of a vicinity of one of the recording heads as viewed from diagonally above.

FIG. **7** is an explanatory view schematically showing a configuration in a vicinity of a conveyance path along which a sheet is conveyed from a paper feed cassette to a second conveyance unit via a first conveyance unit in the above-described printer.

FIG. **8** is a block diagram showing a hardware configuration of a main part of the above-described printer.

FIG. **9** is a plan view showing a configuration example of a first conveyance belt included in the above-described first conveyance unit.

FIG. **10** is a partially enlarged view of a vicinity of second openings of the first conveyance belt shown in FIG. **9**.

FIG. **11** is a schematic view showing an ink discharging path including ink receivers in a printer according to a first embodiment of the present invention.

FIG. **12** is a sectional side view showing a configuration of the ink receivers used in the printer of the first embodiment, illustrating a state where ink droplets are ejected into each of the ink receivers.

FIG. **13** is a view showing a state where, from the state shown in FIG. **12**, a cleaning liquid is ejected to the each of the ink receivers.

FIG. **14** is a sectional side view showing a configuration of ink receivers used in a printer according to a second embodiment of the present invention.

FIG. **15** is a sectional side view showing a configuration of ink receivers used in a printer according to a third embodiment of the present invention, illustrating a state where there are no ink and no cleaning liquid in each of the ink receivers.

FIG. **16** is a sectional side view showing the configuration of the ink receivers used in the printer of the third embodiment, illustrating a state where ink and a cleaning liquid have been ejected in respective given amounts into each of the ink receivers.

FIG. **17** is a schematic view showing an ink discharging path including the ink receivers in the printer of the third embodiment.

DESCRIPTION OF EMBODIMENTS

1. Configuration of Inkjet Recording Apparatus

With reference to the appended drawings, the following describes embodiments of the present invention. FIG. **1** is an explanatory view showing a schematic configuration of a printer **100** as an inkjet recording apparatus according to an embodiment of the present invention. The printer **100** includes a paper feed cassette **2** that is a sheet housing portion. The paper feed cassette **2** is disposed on a lower side in a printer main body **1**. A sheet P that is an example of a recording medium is housed in the paper feed cassette **2**.

A paper feed device **3** is disposed on a downstream side of the paper feed cassette **2** in a sheet conveyance direction, i.e., at an upper right part of the paper feed cassette **2** in FIG. **1**. By the paper feed device **3**, the sheet P is fed out one by one separately toward an upper right side of the paper feed cassette **2** in FIG. **1**.

The printer **100** includes therein a first sheet conveyance path **4***a*. With respect to the paper feed cassette **2**, the first sheet conveyance path **4***a* is positioned on the upper right side, which corresponds to a paper feed direction of the paper feed cassette **2**. Via the first sheet conveyance path **4***a*, the sheet P fed out from the paper feed cassette **2** is conveyed vertically upward along a side surface of the printer main body **1**.

A registration roller pair **13** is provided at a downstream end of the first sheet conveying path **4***a* in the sheet conveyance direction. Moreover, a first conveyance unit **5** and a recording portion **9** are disposed in immediate proximity to a downstream part of the registration roller pair **13** in the sheet conveyance direction. The sheet P fed out from the paper feed cassette **2** passes through the first sheet conveyance path **4***a* to reach the registration roller pair **13**. While correcting oblique feeding of the sheet P, the registration roller pair **13** feeds out the sheet P toward the first conveyance unit **5** (particularly, an after-mentioned first conveyance belt **8**) in synchronization with an ink ejection operation executed by the recording portion **9**.

The sheet P fed out to the first conveyance unit **5** by the registration roller pair **13** is conveyed to an opposed position to the recording portion **9** (particularly, after-mentioned recording heads **17***a* to **17***c*) by the first conveyance belt **8**. Ink is ejected from the recording portion **9** to the sheet P so that an image is recorded thereon. At this time, ejection of the ink in the recording portion **9** is controlled by a control device **110** in the printer **100**.

A second conveyance unit **12** is disposed on a downstream side of the first conveyance unit **5** in the sheet conveyance direction (a left side in FIG. **1**). The sheet P on which the image has been recorded by the recording portion **9** is sent to the second conveyance unit **12**. The ink ejected to a surface of the sheet P is dried while the sheet P passes through the second conveyance unit **12**.

A decurler portion **14** is provided on a downstream side of the second conveyance unit **12** in the sheet conveyance direction and in a neighborhood of a left side surface of the printer main body **1**. The sheet P on which the ink has been dried by the second conveyance unit **12** is sent to the decurler portion **14** where a curl generated in the sheet P is corrected.

A second sheet conveyance path **4***b* is provided on a downstream side of the decurler portion **14** in the sheet conveyance direction (an upper side in FIG. **1**). When duplex recording is not performed, the sheet P that has passed through the decurler portion **14** passes through the second sheet conveyance path **4***b* to be discharged onto a sheet discharge tray **15***a* provided outside a left side surface of the printer **100**. Below the sheet discharge tray **15***a*, there is provided a sub-discharge tray **15***b* onto which, as the sheet P, a sheet (a waste sheet) on which a printing failure or the like has occurred is discharged.

An inversion conveyance path **16** for performing duplex recording is provided in an upper part of the printer main body **1** and above the recording portion **9** and the second conveyance unit **12**. When duplex recording is performed, the sheet P that has passed through the second conveyance unit **12** and the decurler portion **14** after completion of recording on one side (a first side) thereof passes through the second sheet conveyance path **4***b* to be sent to the inversion conveyance path **16**.

The conveyance direction for conveying the sheet P sent to the inversion conveyance path **16** is switched for subsequent recording on the other side (a second side) of the sheet P. Then, the sheet P passes through the upper part of the printer main body **1** to be sent rightward and is further sent, with the second side up, again to the first conveyance unit **5** via the registration roller pair **13**. In the first conveyance unit **5**, the sheet P is conveyed to the opposed position to the recording portion **9**, and the ink is ejected from the recording

portion **9** thereto so that an image is recorded on the second side. The sheet P after being subjected to the duplex recording sequentially passes through the second conveyance unit **12**, the decurler portion **14**, and the second sheet conveyance path **4***b* to be discharged onto the sheet discharge tray **15***a*.

Furthermore, a maintenance unit **19** and a cap unit **20** are disposed below the second conveyance unit **12**. When executing purging, the maintenance unit **19** horizontally moves to below the recording portion **9** to wipe off the ink extruded through ink ejection ports of each of recording heads and to collect the ink thus wiped off. The purging refers to an operation of forcibly extruding the ink through the ink ejection ports of each the recording heads so as to discharge thickened ink, foreign matter, and air bubbles in the ink ejection ports. When capping ink ejection surfaces of the recording heads, the cap unit **20** horizontally moves to below the recording portion **9** and further moves upward so as to be attached to lower surfaces of the recording heads.

FIG. **2** is a plan view of the recording portion **9**. The recording portion **9** includes a head housing **10** and line heads **11**Y, **11**M, **11**C, and **11**K. In the head housing **10**, the line heads **11**Y to **11**K are held at a prescribed distance (for example, 1 mm) in level from a conveyance surface of the first conveyance belt **8**, which is an endless belt stretched over a plurality of rollers including a driving roller **6***a*, a driven roller **6***b*, and tension rollers **7***a* and **7***b* (see FIG. **7**). The driving roller **6***a* causes the first conveyance belt **8** to travel in the conveyance direction for conveying the sheet P (an arrow A direction). Driving of the driving roller **6***a* is controlled by a main control portion **110***a* (see FIG. **8**) of the control device **110**. The above-described plurality of rollers are disposed along a travelling direction of the first conveyance belt **8** in an order of the tension roller **7***a*, the tension roller **7***b*, the driven roller **6***b*, and the driving roller **6***a* (see FIG. **7**).

The line heads **11**Y to **11**K each include the plurality of (herein, three) recording heads **17***a* to **17***c*. The recording heads **17***a* to **17***c* are arrayed in a staggered manner along an intersecting direction intersecting the sheet conveyance direction (the arrow A direction). In this embodiment, the intersecting direction is identical to a sheet width direction (an arrow B-B' direction) orthogonal to the sheet conveyance direction (the arrow A direction). The recording heads **17***a* to **17***c* each have a plurality of ink ejection ports **18** (nozzles). The ink ejection ports **18** are arranged at equal intervals in the intersecting direction (the arrow B-B' direction). From the line heads **11**Y to **11**K, ink of respective colors of yellow (Y), magenta (M), cyan (C), and black (K) is ejected through the ink ejection ports **18** of the recording heads **17***a* to **17***c* toward the sheet P being conveyed on the first conveyance belt **8**.

FIG. **3** is a side view of each of the recording heads **17***a* to **17***c* constituting each of the line heads **11**Y to **11**K in the recording portion **9**, FIG. **4** is a plan view of the each of the recording heads **17***a* to **17***c* as viewed from an ink ejection surface F**1** side thereof, FIG. **5** is a perspective view of a vicinity of the recording head **17***a* as viewed from diagonally below, and FIG. **6** is a perspective view of a vicinity of the recording head **17***a* as viewed from diagonally above. Since the recording heads **17***a* to **17***c* are identical in shape and configuration, FIG. **3** and FIG. **4** show a single recording head as each of the recording heads **17***a* to **17***c*. As shown in FIG. **3** and FIG. **4**, on an ink ejection surface (nozzle surface) F**1** of each of the recording heads **17***a* to **17***c*, there are provided a plurality of (herein, four blocks of) nozzle regions Ra to Rd in which the multitude of ink ejection ports **18** (see FIG. **2**) are arrayed. The ink ejection surface F**1** is made of, for example, SUS (stainless steel).

The recording heads **17***a* to **17***c* constituting each of the line heads **11**Y to **11**K are supplied with ink of four different colors (cyan, magenta, yellow, and black) stored in ink tanks (not shown) so as to correspond to respective colors of the line heads **11**Y to **11**K.

Based on a control signal from the control device **110** (see FIG. **8**), in accordance with image data received from an external computer, the recording heads **17***a* to **17***c* eject the ink through the ink ejection ports **18** toward the sheet P being conveyed while being absorbed to the conveyance surface of the first conveyance belt **8**. Thus, on the sheet P on the first conveyance belt **8**, there is formed a color image in which the four different colors, which are cyan, magenta, yellow, and black, of ink are superimposed on each other. Furthermore, a cleaning liquid supply part **60** that supplies a cleaning liquid is provided at one end of each of the recording heads **17***a* to **17***c* in a longitudinal direction thereof (the arrow B-B' direction) orthogonal to the sheet conveyance direction (the arrow A direction). The cleaning liquid supply part **60** has a multitude of cleaning liquid supply ports **60***a* formed therein.

As shown in FIG. **5** and FIG. **6**, a downstream end of a supply path **70** formed of a tube for passing the cleaning liquid therethrough is connected to the cleaning liquid supply part **60**. An upstream end of the supply path **70** is connected to a cleaning liquid supply mechanism (not shown). The cleaning liquid supply mechanism is composed of a tank (not shown) for containing the cleaning liquid and a pumping-up pump (not shown) that pumps up the cleaning liquid from the tank to the supply path **70**.

The supply path **70**, while being a single path at the upstream end thereof, repeatedly branches off toward a downstream side into **12** partial paths. The **12** paths are each connected to the cleaning liquid supply part **60** of each of the recording heads **17***a* to **17***c* constituting each of the line heads **11**Y to **11**K.

In the printer **100**, in order to clean the ink ejection surface F**1** of each of the recording heads **17***a* to **17***c*, at a start of printing after long-term non-operation and between printing operations, in preparation for a subsequent printing operation, there is executed a recovery operation of the recording heads **17***a* to **17***c* in which the ink is extruded (purged) through the ink ejection ports **18** of all the recording heads **17***a* to **17***c*, the cleaning liquid is supplied to a cleaning liquid supply surface F**2** through the cleaning liquid supply ports **60***a*, and together with the cleaning liquid, the ink ejected to the ink ejection surface F**1** is wiped off by a wiper (not shown). The ink and the cleaning liquid wiped off from the ink ejection surface F**1** are collected by after-mentioned ink receivers **31**Y to **31**K (see FIG. **7**).

FIG. **7** schematically shows a configuration in a vicinity of a conveyance path along which the sheet P is conveyed from the paper feed cassette **2** to the second conveyance unit **12** via the first conveyance unit **5**. Furthermore, FIG. **8** is a block diagram showing a hardware configuration of a main part of the printer **100**. In addition to the above-described configuration, the printer **100** further includes a registration sensor **21**, a first sheet sensor **22**, a second sheet sensor **23**, and belt sensors **24** and **25**.

The registration sensor **21** detects the sheet P being conveyed by the paper feed device **3** from the paper feed cassette **2** to the registration roller pair **13**. The registration sensor **21** is positioned on an upstream side relative to the registration roller pair **13** in a feeding direction of the sheet P. Based on a result of the detection by the registration

sensor **21**, the control device **110** (for example, a sheet feeding control portion **110***c*) controls a timing for starting rotation of the registration roller pair **13**. For example, based on a result of the detection by the registration sensor **21**, the control device **110** controls a timing for feeding, to the first conveyance belt **8**, the sheet P that has been subjected to skew (oblique feed) correction by the registration roller pair **13**.

The first sheet sensor **22** detects a position of the sheet P in the width direction thereof, which is being sent from the registration roller pair **13** to the first conveyance belt **8**. Based on a result of the detection by the first sheet sensor **22**, the control device **110** (for example, the main control portion **110***a*) can perform control in which the ink is ejected through, among the ink ejection ports **18** of the recording heads **17***a* to **17***c* of each of the line heads **11**Y to **11**K, a set of ink ejection ports **18** corresponding to a width of the sheet P so that an image is recorded on the sheet P.

The second sheet sensor **23** detects passing of the sheet P fed to the first conveyance belt **8** by the registration roller pair **13**. That is, the second sheet sensor **23** detects a position of the sheet P in the conveyance direction, which is being conveyed on the first conveyance belt **8**. The second sheet sensor **23** is positioned on an upstream side of the recording portion **9** and on a downstream side of the first sheet sensor **22** in the sheet conveyance direction. Based on a result of the detection by the second sheet sensor **23**, the control device **110** (for example, the main control portion **110***a*) can control a timing for ejecting the ink to the sheet P being conveyed to reach the position opposed to the line heads **11**Y to **11**K (the recording heads **17***a* to **17***c*) by the first conveyance belt **8**.

The belt sensors **24** and **25** are each a reference detection sensor that detects a reference specifying area Mref (see FIG. **9**) provided on the first conveyance belt **8**. The reference specifying area Mref is a reference area for identifying every full revolution of the first conveyance belt **8** and, as will be described later, is formed of a combination of two adjacent ones of opening groups **82**. As will be described later, since a positional relationship between the reference specifying area Mref and other first openings **80** (opening groups **82**) is previously known, when the belt sensors **24** and **25** detect the reference specifying area Mref on the first conveyance belt **8**, based on a position of the reference specifying area Mref thus detected, there can be detected respective positions of the openings **80** (the opening groups **82**) provided in the first conveyance belt **8** in the conveyance direction. Accordingly, it can be said that the belt sensors **24** and **25** each function as an opening position detecting portion that detects the respective positions of the first openings **80** of the first conveyance belt **8**.

A configuration may also be adopted in which, at an end of the first conveyance belt **8** in a belt width direction thereof, marks are formed beforehand at positions corresponding to the opening groups **82**, and the belt sensors **24** and **25** detect the above-described marks, thus detecting the respective positions of the opening groups **82** (the first openings **80**) corresponding to the above-described marks.

The belt sensor **24** is positioned on a downstream side of the recording portion **9** in the sheet conveyance direction (the travelling direction of the first conveyance belt **8**). In the sheet conveyance direction, the belt sensor **25** is positioned on an upstream side relative to the driven roller **6***b* over which the first conveyance belt **8** is stretched. While in this embodiment, the belt sensor **25** is positioned between the driven roller **6***b* and the tension roller **7***b*, the belt sensor **25** may be positioned between the tension roller **7***a* and the roller **7***b*. The driven roller **6***b* is positioned on an upstream side with respect to the recording portion **9** in the travelling direction of the first conveyance belt **8**. The belt sensor **24** also has a function equivalent to that of the second sheet sensor **23**. Based on a result of the detection by the belt sensor **24** or **25**, the control device **110** (for example, the sheet feeding control portion **110***c*) can control the registration roller pair **13** to feed the sheet P to the first conveyance belt **8** at a prescribed timing.

Furthermore, a position of the sheet P is detected by the plurality of sensors (the second sheet sensor **23**, the belt sensor **24**), and the reference specifying area Mref on the first conveyance belt **8** is detected by the plurality of sensors (the belt sensors **24** and **25**), and thus it also becomes possible to correct an error of the position thus detected or to detect an abnormality.

The first sheet sensor **22**, the second sheet sensor **23**, and the belt sensors **24** and **25**, which are described above, may be each formed of a transmissive or reflective optical sensor, a CIS (contact image sensor), or the like.

In addition, the printer **100** may have a configuration including a meandering detection sensor that detects meandering of the first conveyance belt **8**, in which based on a result of the detection thereby, the meandering of the first conveyance belt **8** is corrected.

Furthermore, the printer **100** further includes an operation panel **27**, a storage portion **28**, and a communication portion **29**.

The operation panel **27** is an operation portion for accepting inputs of various settings. For example, by operating the operation panel **27**, a user can input information on a size of the sheet P placed in the paper feed cassette **2**, namely, a size of the sheet P to be conveyed by the first conveyance belt **8**. Furthermore, by operating the operation panel **27**, a user can also input the number of the sheets P to be printed or provide an instruction to start a printing job. Furthermore, the operation panel **27** also has a function as a notification device that provides a notification about an operation status (image recording or after-mentioned flushing) of the printer **100**.

The storage portion **28** is a memory storing an operation program for the control device **110** and also storing various types of information and is configured by including a ROM (read-only memory), a RAM (random-access memory), a non-volatile memory, and so on. Information (for example, the information on the size of the sheet P or the number of sheets P) set via the operation panel **27** is stored in the storage portion **28**.

The communication portion **29** is a communication interface for transmitting and receiving information between itself and an external device (for example, a personal computer (PC)). For example, when a user operates a PC to transmit a printing command together with image data to the printer **100**, the image data and the printing command, which are described above, are inputted to the printer **100** via the communication portion **29**. In the printer **100**, based on the above-described image data, the main control portion **110***a* can control the recording heads **17***a* to **17***c* to eject the ink so that an image is recorded on the sheet P.

Furthermore, the printer **100** of this embodiment includes the control device **110**. The control device **110** is configured by including, for example, a CPU (central processing unit) and a memory. Specifically, the control device **110** includes the main control portion **110***a*, a flushing control portion **110***b*, the sheet feeding control portion **110***c*, and a maintenance control portion **110***d*. Needless to say, the control

portions constituting the control device **110**, which are formed of a single CPU, may also be formed of separate CPUs.

The main control portion **110***a* controls operations of the various portions of the printer **100**. For example, driving of the rollers in the printer **100**, ejection of the ink from the recording heads **17***a* to **17***c* during image formation (other than during flushing), and so on are controlled by the main control portion **110***a*.

Based on detection of the respective positions of the first openings **80** by the belt sensor **24** or **25**, the flushing control portion **110***b* controls the recording heads **17***a* to **17***c* to execute flushing. Such flushing based on detection of the respective positions of the first openings **80** will be described later in detail.

The sheet feeding control portion **110***c* is a recording medium feeding control portion that controls the registration roller pair **13** as a recording medium feeding portion. For example, based on detection of the respective positions of the first openings **80** by the belt sensor **24** or **25**, the sheet feeding control portion **110***c* controls the registration roller pair **13**. The sheet feeding control portion **110***c* can also control the registration roller pair **13** independently of detection of the respective positions of the first openings **80** by the belt sensor **24** or **25** (regardless of the detection of the respective positions).

The maintenance control portion **110***d* controls the recording heads **17***a* to **17***c* to execute the above-described purging in which the ink is forcibly extruded through the ink ejection ports **18**. When the above-described recovery operation of the recording heads **17***a* to **17***c* is executed, the maintenance control portion **110***d* also controls driving of the maintenance unit **19** (for example, so that the maintenance unit **19** moves to below the recording portion **9** and retreats therefrom).

Furthermore, as shown in FIG. **7**, the printer **100** includes the ink receivers **31**Y, **31**M, **31**C, and **31**K provided on an inner circumferential surface side of the first conveyance belt **8**. When flushing is executed by the recording heads **17***a* to **17***c*, the ink receivers **31**Y to **31**K receive and collect the ink that has been ejected from the recording heads **17***a* to **17***c* and then passed through the first openings **80** of the first conveyance belt **8**. Accordingly, the ink receivers **31**Y to **31**K are each provided at a position opposed, via the first conveyance belt **8**, to each of the recording heads **17***a* to **17***c* of a corresponding one of the line heads **11**Y to **11**K. The ink collected by the ink receivers **31**Y to **31**K is sent, via an ink discharging flow path **33** (see FIG. **11**), to, for example, a waste ink tank (not shown) so as to be discarded.

The second conveyance unit **12** includes a second conveyance belt **12***a* and a dryer **12***b*. The second conveyance belt **12***a* is stretched over two rollers that are a driving roller **12***c* and a driven roller **12***d*. The sheet P that has been conveyed by the first conveyance unit **5** and to which the ink has been ejected by the recording portion **9** so that an image is recorded thereon is conveyed by the second conveyance belt **12***a*, while being dried by the dryer **12***b* during the conveyance, to the above-described decurler portion **14**.

2. Details of First Conveyance Belt

Next, a description is given of details of the first conveyance belt **8** of the first conveyance unit **5**. FIG. **9** is a plan view showing a configuration example of the first conveyance belt **8** used in the printer **100**. FIG. **10** is a partially enlarged view of a vicinity of second openings **85** of the first conveyance belt **8** shown in FIG. **9**.

This embodiment employs a negative pressure suction method in which the sheet P is conveyed while being absorbed to the first conveyance belt **8** by negative pressure suction. To this end, over an entire region of the first conveyance belt **8**, numerous suction holes **8***a* are formed for passing therethrough suction air for causing the sheet P to be absorbed to the first conveyance belt **8** by the negative pressure suction.

The first conveyance belt **8** has the plurality of first openings **80** for passing therethrough the ink ejected through the nozzles (the ink ejection ports **18**) of the recording heads **17***a* to **17***c* during flushing. The first openings **80** are holes formed to be elongated in the belt width direction (the arrow B-B' direction). While in this embodiment, when viewed in plan, the first openings **80** have a rectangular shape with rounded corner regions as shown in FIG. **9**, they may have a rectangular shape or any other shape (for example, an oval shape).

In this embodiment, the plurality of (herein, within one cycle S of the first conveyance belt **8**, seven) opening groups **82** each composed of a plurality of first openings **80** from among the first openings **80** is arranged at prescribed intervals in the sheet conveyance direction (the arrow A direction). The opening groups **82** are each composed of two opening rows **81***a* and **81***b*. In the conveyance direction, the opening groups **82** are formed not at equal intervals but irregularly at respective positions corresponding to a size of the sheet P to be conveyed. That is, in the sheet conveyance direction, intervals between adjacent ones of the opening groups **82** are not constant but vary. At this time, a maximum interval between each pair of adjacent ones of the opening groups **82** in the sheet conveyance direction is longer than a length, in the sheet conveyance direction, of the sheet P of a printable minimum size (for example, an A4 size in landscape orientation) placed on the first conveyance belt **8**.

Each of the opening rows **81***a* and **81***b* has a plurality of (herein, five) first openings **80** disposed at equal intervals in the belt width direction (the arrow B-B' direction). When viewed from the conveyance direction for conveying the sheet P (the arrow A direction), each of the first openings **80** of the opening row **81***a* as one of the opening rows **81***a* and **81***b* is disposed so as to overlap a part (a longitudinal end), in the belt width direction, of a corresponding one of the first openings **80** of the opening row **81***b* as the other of the opening rows **81***a* and **81***b* (so as to have an overlapping part D). That is, on the first conveyance belt **8**, the plurality of first openings **80** is disposed in a staggered manner. The number of the first openings **80** of the opening row **81***a* may be different from the number of the first openings **80** of the opening row **81***b*.

Here, when a head width of the line heads **11**Y to **11**K (the recording heads **17***a* to **17***c*) is indicated as W**1** (mm), a width W**2** (mm) of the opening groups **82** in the belt width direction is larger than W**1**. As a result, when the recording heads **17***a* to **17***c* execute flushing, the ink ejected through the ink ejection ports **18** of the recording heads **17***a* to **17***c* passes through either the first openings **80** of the opening row **81***a* or the first openings **80** of the opening row **81***b*. Accordingly, the flushing is executed over the entire head width by the recording heads **17***a* to **17***c*, and thus it becomes possible to reduce clogging due to drying of the ink in all the ink ejection ports **18**.

In this embodiment, in accordance with a size of the sheet P used, the control device **110** (for example, the flushing control portion **110***b*) determines a pattern (a combination) of, from among the opening groups **82**, a plurality of opening groups **82** in the sheet conveyance direction, which

is used for flushing in the one cycle S of the first conveyance belt **8**. To be more specific, the reference specifying area Mref on the first conveyance belt **8** is read by the belt sensor **24** or **25**, and based on positional information on the reference specifying area Mref and size information on the sheet P, a timing for conveying the sheet P from the registration roller pair **13** to the first conveyance belt **8** is caused to vary. Thus, control is performed so that, at a constant cycle, the opening groups **82** are positioned in inter-sheet spaces between the sheets P being continuously conveyed.

Based on information stored in the storage portion **28** (for example, the size information on the sheet P inputted via the operation panel **27**), the control device **110** can recognize the size of the sheet P used. A timing for performing the flushing is based on the "inter-sheet spaces" without being limited thereto. For example, the flushing can also be performed before an image is formed on a foremost one of the sheets P or after an image has been formed on a rearmost one of the sheets P.

Furthermore, the first conveyance belt **8** has the second openings **85** provided therein. In one location within the one cycle S of the first conveyance belt **8**, three second openings **85** in total are each formed at a position corresponding to the cleaning liquid supply part **60** of each of the three recording heads **17***a* to **17***c* constituting each of the line heads **11**Y to **11**K.

3. Configuration of Ink Receiver of First Embodiment

Next, a description is given of the ink receivers **31**Y to **31**K in the printer **100** of the present invention. FIG. **11** is a schematic view showing an ink discharging path including ink receivers **31**Y to **31**K in a printer **100** according to a first embodiment of the present invention. FIG. **12** is a sectional side view showing a configuration of the ink receivers **31**Y to **31**K used in the printer **100** of the first embodiment. Since the ink receivers **31**Y to **31**K are similar in configuration, the description is given by using a single ink receiver shown in FIG. **12** as each of the ink receivers **31**Y to **31**K. Furthermore, in FIG. **12** and after-mentioned FIG. **13** to FIG. **16**, depiction of a first conveyance belt **8** is omitted.

The ink receivers **31**Y to **31**K are disposed immediately below line heads **11**Y to **11**K via the first conveyance belt **8**, respectively. That is, the line heads **11**Y to **11**K are disposed along an intersecting direction (an arrow B-B' direction), and the ink receivers **31**Y to **31**K are also disposed along the intersecting direction (the arrow B-B' direction). Furthermore, a plurality of (herein, five) sucking parts **32** for holding a sheet P while absorbing it on the first conveyance belt **8** by negative pressure suction is disposed along an advancing direction of the first conveyance belt **8** so that each of the ink receivers **31**Y to **31**K is interposed between adjacent ones of the sucking parts **32**.

A pipe-shaped ink discharging flow path **33** is connected to bottom surfaces of the ink receivers **31**Y to **31**K. The ink discharging flow path **33** branches off into partial paths connected to the ink receivers **31**Y to **31**K, which merge into a single path on a downstream side of the ink receiver **31**K in an ink discharging direction. The ink discharging flow path **33** includes a pump **35** provided on a downstream side of the ink receiver **31**K.

As shown in FIG. **12**, the ink receivers **31**Y to **31**K are each disposed so as to correspond to each of recording heads **17***a* to **17***c* constituting a corresponding one of the line heads **11**Y to **11**K. A bottom surface **31***a* of each of the ink receivers **31**Y to **31**K is inclined in the intersecting direction (the arrow B-B' direction). Specifically, in a sheet width direction, the bottom surface **31***a* has a downward gradient from one end thereof (a right side in FIG. **12**) toward the other end thereof (a left side in FIG. **12**), and a cleaning liquid supply part **60** of each of the recording heads **17***a* to **17***c* is opposed to the one end of the bottom surface **31***a*. The ink discharging flow path **33** is connected to the other end of the bottom surface **31***a*.

Next, a description is given of control to discharge ink from the ink receivers **31**Y to **31**K in the printer **100** of this embodiment. Upon a communication portion **29** receiving a printing instruction, based on image data, a main control portion **110***a* controls the recording heads **17***a* to **17***c* to perform image recording on the sheet P. and a flushing control portion **110***b* executes flushing in inter-sheet spaces between the sheets P. Ink droplets ejected as a result of the flushing pass through first openings **80** of the first conveyance belt **8** to be ejected onto the ink receivers **31**Y to **31**K.

FIG. **12** illustrates a state where the ink droplets are ejected into each of the ink receivers **31**Y to **31**K, so that there is an accumulation of ink **90** on the bottom surface **31***a* of the each of the ink receivers **31**Y to **31**K. The ink **90** moves along an inclination of the bottom surface **31***a* and then flows into the ink discharging flow path **33**.

Here, when the ink **90** becomes dried to have decreased flowability, the ink **90** becomes unlikely to move along the inclination of the bottom surface **31***a* and thus is deposited in the each of the ink receivers **31**Y to **31**K. As a result, the ink **90** thus deposited adheres to the first conveyance belt **8**, causing the sheet P to be contaminated, or the ink **90** having the decreased flowability flows into the ink discharging flow path **33** and causes clogging thereof, resulting in contamination inside the printer **100** or a breakdown of the printer **100**.

To solve this issue, in this embodiment, at every lapse of a given period of time, a cleaning liquid is ejected through cleaning liquid supply ports **60***a* of each of the recording heads **17***a* to **17***c* to the ink receivers **31**Y to **31**K via second openings **85** of the first conveyance belt **8**.

FIG. **13** is a view showing a state where, from the state shown in FIG. **12**, the cleaning liquid is ejected into the each of the ink receivers **31**Y to **31**K. As shown in FIG. **13**, when a cleaning liquid **91** is ejected from the cleaning liquid supply part **60** at every given period of time, the cleaning liquid **91** thus ejected moves along the inclination of the bottom surface **31***a* of the each of the ink receivers **31**Y to **31**K, washes away, while dissolving, the ink **90** that has been previously accumulated, and then flows into the ink discharging flow path **33**.

After that, the pump **35** is driven to deliver, to a waste ink tank, the ink **90** and the cleaning liquid **91** that have flowed into the ink discharging flow path **33**.

The cleaning liquid **91** is ejected, preferably, at a timing before execution of the above-described recovery operation of the recording heads **17***a* to **17***c* for the following reason. That is, when the cleaning liquid **91** is ejected, a cleaning liquid pool is generated on a cleaning liquid supply surface F**2** of each of the recording heads **17***a* to **17***c*. When image recording is performed in this state where the liquid pool has been generated, the first conveyance belt **8** or the sheet P might contact the liquid pool, causing adherence of the cleaning liquid to the first conveyance belt **8** or the sheet P.

After the cleaning liquid **91** has been ejected into the ink receivers **31**Y to **31**K, the recovery operation of the recording heads **17***a* to **17***c* is executed, and thus the cleaning liquid pool generated on the cleaning liquid supply surface F**2** can

be wiped off. Since the recovery operation of the recording heads **17***a* to **17***c* is executed every time a cumulative number of printed sheets reaches a prescribed number, an operation of ejecting the cleaning liquid **91** into the ink receivers **31**Y to **31**K can also be executed at every given period of time.

The first conveyance belt **8** shown in FIG. **9** has the three second openings **85** formed therein in one location within the one belt cycle S so as to be opposed to the cleaning liquid supply parts **60** of the recording heads **17***a* to **17***c*. With this configuration, for example, in a case of ejecting the cleaning liquid **91** into the ink receivers **31**K opposed to the line head **11**K for black, the cleaning liquid **91** is ejected from the recording heads **17***a* to **17***c* of the line head **11**K in a state where the first conveyance belt **8** is stopped from rotating so that the second openings **85** are positioned immediately below the line head **11**K. After that, the second openings **85** are sequentially moved to immediately below each of the line heads **11**C to **11**Y, and the cleaning liquid **91** is ejected from the recording heads **17***a* to **17***c* of the each of the line heads **11**C to **11**Y into corresponding ones of the ink receivers **31**C to **31**Y.

In a case where the first conveyance belt **8** has three second openings **85** formed therein in each of four locations opposed to the line heads **11**Y to **11**K, the cleaning liquid **91** can be ejected simultaneously from the recording heads **17***a* to **17***c* of each of the line heads **11**Y to **11**K in a state where the first conveyance belt **8** is stopped from rotating so that the three second openings **85** are positioned immediately below the each of the line heads **11**Y to **11**K.

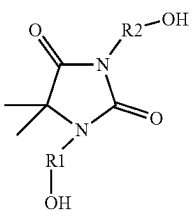
According to this embodiment, from the recording heads **17***a* to **17***c* opposed to corresponding ones of the ink receivers **31**Y to **31**K via the first conveyance belt **8**, the cleaning liquid **91** is supplied to the corresponding ones of the ink receivers **31**Y to **31**K so that the ink **90** remaining on the bottom surface **31***a* of each of the corresponding ones of the ink receivers **31**Y to **31**K is washed away, and thus it is possible to efficiently collect ink that has become dried on the corresponding ones of the ink receivers **31**Y to **31**K and thus has decreased flowability. Accordingly, it is possible to suppress contamination of the sheet P and the first conveyance belt **8** due to deposition of ink on the ink receivers **31**Y to **31**K and clogging of the ink discharging flow path **33** with solidified ink.

Furthermore, the cleaning liquid supply part **60** for cleaning an ink ejection surface F**1** is provided at one end of each of the recording heads **17***a* to **17***c*, and the ink receivers **31**Y to **31**K are supplied with the cleaning liquid **91** from the cleaning liquid supply part **60**. This eliminates the need to separately provide a cleaning liquid supply system for the ink receivers **31**Y to **31**K, thus making it possible to suppress a size increase and a cost increase of the printer **100**.

The cleaning liquid **91** used in the present invention contains water, an organic solvent, a deliquescence agent, a surfactant, a basic compound, and a polyhydric alcohol. The water has a function as a solvent that, together with the organic solvent, dissolves the deliquescence agent. Examples of the water contained in the cleaning liquid **91** include purified water and ion-exchanged water. Examples of the organic solvent include 2-pyrrolidone.

The deliquescence agent has a function of imparting a deliquescent property to a mixture of a cleaning liquid and ink adhering to a nozzle surface of a recording head so as to prevent drying thereof. The cleaning liquid of the present invention contains, as the deliquescence agent, a compound expressed by Chemical Formula (1) below.

[Chemical Formula 1]



(1)

(In the formula, each of R1 and R2 denotes a methyl group or an ethyl group.)

The surfactant is contained to enhance lubricity between the recording heads **17***a* to **17***c* and a wiper during a recovery process for recovering the recording heads **17***a* to **17***c*. As the surfactant contained in the cleaning liquid **91**, preferably, an ampholytic surfactant having a betaine structure is used.

The basic compound has a function of maintaining a pH of the cleaning liquid **91** alkaline so as to enhance dissolvability of an alkali-soluble binder resin contained in aqueous ink. Examples of the basic compound contained in the cleaning liquid **91** include sodium hydroxide or potassium hydroxide, which has strong alkalinity and can be used in a minute amount to adjust the pH.

The polyhydric alcohol is a compound having two or more hydroxyl groups and has a function of enhancing moisture retention of the cleaning liquid **91** so as to suppress drying of the nozzle surface. Examples of the polyhydric alcohol contained in the cleaning liquid **91** include diols, glycols, and glycerin. Table 1 shows a formulation example of the cleaning liquid **91**.

TABLE 1

NAME OF COMPONENT		BLENDING AMOUNT [mass %]
Deliquescence Agent	Compound of Formula (1)	2.0
Ampholytic Surfactant	Cocamidopropyl betaine	1.0
Polyhydric Alcohol	1,3-Propanediol	30
Organic Solvent	Triethylene glycol monobutyl ether	10
	2-Pyrrolidone	10
Basic Compound	1N Sodium hydroxide aqueous solution	0.1
Ion-Exchanged Water		Rest
TOTAL		100

4. Configuration of Ink Receiver of Second Embodiment

FIG. **14** is a sectional side view showing a configuration of ink receivers **31**Y to **31**K used in a printer **100** of a second embodiment. Since the ink receivers **31**Y to **31**K are similar in configuration, a description thereof is given by using a single ink receiver shown in the figure as each of the ink receivers **31**Y to **31**K.

In this embodiment, a bottom surface **31***a* of each of the ink receivers **31**Y to **31**K is divided into a first region R**1** opposed to an ink ejection surface F**1** of each of recording heads **17***a* to **17***c* and a second region R**2** opposed to a cleaning liquid supply part **60** (a cleaning liquid supply surface F**2**) of the each of the recording heads **17***a* to **17***c*. The second region R**2** is made of a material having higher water repellency than that of the first region R**1**. Other parts

in an ink discharging path are similar in configuration to those in the first embodiment.

According to this embodiment, the second region R2 of each of the ink receivers **31**Y to **31**K opposed to the cleaning liquid supply part **60** is a region where a cleaning liquid **91** supplied through cleaning liquid supply ports **60***a* flows. Since the second region R2 is increased in water repellency, adherence of the cleaning liquid **91** thereto is decreased, and thus the cleaning liquid **91** ejected onto each of the ink receivers **31**Y to **31**K can efficiently flow to the first region R1, with an amount of a residual part thereof remaining in the second region R2 reduced.

While there is no particular limitation on the material of the second region R2 as long as the material is a resin having high water repellency, a polytetrafluoroethylene resin (PTFE) is preferably used as the material. As an index of the water repellency of the second region R2, preferably, the second region R2 has a contact angle of not less than 110° with respect to water.

The first region R1 opposed to the ink ejection surface F1, on the other hand, is a region reached by ink droplets ejected as a result of flushing. Since the first region R1 is decreased in water repellency, wettability thereof with respect to ink **90** and the cleaning liquid **91** is increased to facilitate spreading, over the entire first region R1, of the cleaning liquid **91** flowing in from the second region R2. It is, therefore, possible to efficiently wash away the ink **90** adhering to the first region R1, thus improving dischargeability of the ink **90** and the cleaning liquid **91** from the ink receivers **31**Y to **31**K.

While there is no particular limitation on a material of the first region R1 as long as the material is a resin having lower water repellency than that of the second region R2, a polystyrene resin (PS) is preferably used as the material. As an index of the water repellency of the first region R1, preferably, the first region R1 has a contact angle of not more than 85° with respect to water.

5. Configuration of Ink Receiver of Third Embodiment

FIG. **15** is a sectional side view showing a configuration of ink receivers **31**Y to **31**K used in a printer **100** of a third embodiment. Since the ink receivers **31**Y to **31**K are similar in configuration, a description thereof is given by using a single ink receiver shown in the figure as each of the ink receivers **31**Y to **31**K.

In this embodiment, a spherical floating member **40** is provided in each of the ink receivers **31**Y to **31**K. Furthermore, a bottom surface of each of the ink receivers **31**Y to **31**K includes a connection part **31***b* formed therein, to which an ink discharging flow path **33** is connected. Other parts of each of the ink receivers **31**Y to **31**K are similar in configuration to those in the first embodiment.

The floating member **40** is made of a material having a smaller specific gravity than those of ink **90** and a cleaning liquid **91** retained in the ink receivers **31**Y to **31**K. The connection part **31***b* has an inversely tapered shape whose diameter is decreased from an upstream side toward a downstream side (in a top-to-bottom direction in FIG. **15**) in a discharging direction of the ink **90** and the cleaning liquid **91**. A boundary part (a large-diameter part) between the connection part **31***b* and the bottom surface of each of the ink receivers **31**Y to **31**K has an inner diameter larger than a diameter of the floating member **40**, and a boundary part between the connection part **31***b* and the ink discharging flow path **33** has an inner diameter smaller than the diameter of the floating member **40**.

FIG. **15** is a view illustrating a state where there are no ink **90** and no cleaning liquid **91** in each of the ink receivers **31**Y to **31**K. In a case where there are no ink **90** and no cleaning liquid **91** in each of the ink receivers **31**Y to **31**K, the floating member **40** contacts the connection part **31***b* of the each of the ink receivers **31**Y to **31**K so as to close the ink discharging flow path **33**.

FIG. **16** illustrates a state where, from the state shown in FIG. **15**, the ink **90** and the cleaning liquid **91** have been ejected in respective given amounts into each of the ink receivers **31**Y to **31**K, in which the floating member **40** is floating in the ink **90** and the cleaning liquid **91**. In this state, each of the ink receivers **31**Y to **31**K communicates with the ink discharging flow path **33**, and thus it is possible, by driving a pump **35**, to discharge the ink **90** and the cleaning liquid **91** in the each of the ink receivers **31**Y to **31**K.

FIG. **17** is a schematic view showing an ink discharging path including the ink receivers **31**Y to **31**K in the printer **100** of the third embodiment. With the floating member **40** provided in each of the ink receivers **31**Y to **31**K, for example, when any one (the ink receiver **31**K in FIG. **17**) of the ink receivers **31**Y to **31**K becomes empty, the floating member **40** in the emptied one of the ink receivers **31**Y to **31**K closes the ink discharging flow path **33**.

With this configuration, when the pump **35** is driven, air is no longer sucked through a partial path of the ink discharging flow path **33** connected to the emptied one of the ink receivers **31**Y to **31**K, and thus it is possible to smoothly discharge the ink **90** and the cleaning liquid **91** from the others of the ink receivers **31**Y to **31**K (the ink receivers **31**Y to **31**C in FIG. **17**) via the ink discharging flow path **33**.

6. Others

The present invention is not limited to the foregoing embodiments and can be variously modified without departing from the spirit of the present invention. For example, while the foregoing embodiments describe the configuration in which the cleaning liquid is supplied from the cleaning liquid supply part **60** provided in each of the recording heads **17***a* to **17***c* to a corresponding one of the ink receivers **31**Y to **31**K via the second openings **85** of the first conveyance belt **8**, a configuration may also be adopted in which, without the use of the cleaning liquid supply part **60** of each of the recording heads **17***a* to **17***c*, a supply path connecting the ink receivers **31**Y to **31**K to a tank containing the cleaning liquid is provided so that the cleaning liquid is directly supplied from the tank to the ink receivers **31**Y to **31**K. Furthermore, a liquid supplied to the ink receivers **31**Y to **31**K is not limited to the cleaning liquid as long as the liquid is capable of dissolving ink, and a liquid other than the cleaning liquid may be supplied thereto.

Furthermore, while the foregoing embodiments describe the case where the sheet P is conveyed while being absorbed to the first conveyance belt **8** by negative pressure suction using the sucking parts **32**, a configuration may also be adopted in which the first conveyance belt **8** is charged so that the sheet P is conveyed while being absorbed to the first conveyance belt **8** by electrostatic absorption (an electrostatic absorption method).

Furthermore, while the foregoing embodiments describe the configuration using the first conveyance belt **8** having the opening groups **82** each composed of the plurality of first openings **80** are disposed irregularly at respective positions

corresponding to a sheet size in the sheet conveyance direction (the arrow A direction), there can also be used the first conveyance belt **8** having the opening groups **82** arranged at constant intervals over an entire surface thereof.

Furthermore, while the foregoing embodiments describe the example using, as an inkjet recording apparatus, a color printer that uses ink of four different colors to record a color image, the ink discharging paths of the embodiments of the present invention can be used also in a case of using a monochrome printer that uses black ink to record a monochrome image.

INDUSTRIAL APPLICABILITY

The present invention is usable in an inkjet recording apparatus such as an inkjet printer.

The invention claimed is:

1. An inkjet recording apparatus, comprising:

a recording head including a plurality of nozzles for ejecting ink;

a conveyance belt that has a plurality of first openings and conveys a recording medium;

a control portion that controls driving of the recording head and the conveyance belt so as to execute flushing in which, at a timing different from a timing contributing to image recording, the ink is ejected through the nozzles of the recording head to pass through any of the plurality of first openings;

an ink receiver that is disposed to be opposed to the recording head via the conveyance belt and receives the ink that has passed through the first openings during execution of the flushing;

an ink discharging flow path connected to the ink receiver; and

a liquid supply mechanism that supplies a liquid capable of dissolving the ink into the ink receiver; wherein

the recording head includes a cleaning liquid supply part that ejects a cleaning liquid to be supplied to and used for cleaning a nozzle surface of the recording head in which the nozzles are open,

the conveyance belt has a second opening for the cleaning liquid ejected from the cleaning liquid supply part to pass through, and

the liquid supply mechanism corresponds to the cleaning liquid supply part that supplies, as the liquid, the cleaning liquid into the ink receiver via the second opening.

2. The inkjet recording apparatus according to claim **1**, wherein the recording head comprises a plurality of recording heads, the plurality of recording heads ejecting the ink of different colors and being disposed at different positions in a conveyance direction for conveying the recording medium, the second opening is formed in one location on the conveyance belt in the conveyance direction, and with respect to each of the plurality of recording heads, the control portion sequentially performs an operation in which the cleaning liquid is ejected from the cleaning liquid supply part in a state where the conveyance belt is stopped from rotating so that the second opening is at a position opposed to the cleaning liquid supply part of the each of the plurality of recording heads.

3. The inkjet recording apparatus according to claim **1**, wherein the recording head comprises a plurality of recording heads, the plurality of recording heads ejecting the ink of different colors and being disposed at different positions in a conveyance direction for conveying the recording medium, the second opening comprises a plurality of second openings, the plurality of second openings being formed in plural locations on the conveyance belt in the conveyance direction so as to correspond to the plurality of recording heads, and the control portion performs control in which the cleaning liquid is ejected simultaneously from the cleaning liquid supply part of each of the plurality of recording heads in a state where the conveyance belt is stopped from rotating so that the plurality of second openings is each at a position opposed to the cleaning liquid supply part of each of the plurality of recording heads.

4. The inkjet recording apparatus according to claim **1**, wherein the cleaning liquid supply part is provided at one end of the recording head in an intersecting direction intersecting a conveyance direction for conveying the recording medium, and a bottom surface of the ink receiver has a downward gradient from one end thereof opposed to the cleaning liquid supply part toward another end thereof in the intersecting direction, and the ink discharging flow path is connected to the other end of the bottom surface.

5. The inkjet recording apparatus according to claim **4**, wherein

the bottom surface of the ink receiver includes a first region opposed to the nozzle surface and a second region opposed to the cleaning liquid supply part, and

the second region has higher water repellency than that of the first region.

6. The inkjet recording apparatus according to claim **1**, wherein the control portion is capable of executing a recovery operation of the recording head in which, after the ink has been forcibly discharged through all the nozzles of the recording head to the nozzle surface, the ink is wiped off together with the cleaning liquid supplied through supply ports for supplying the cleaning liquid, and before executing the recovery operation, the control portion supplies the cleaning liquid into the ink receiver via the second opening.

7. The inkjet recording apparatus according to claim **1**, further comprising:

a pump that discharges the ink and the liquid in the ink receiver via the ink discharging flow path; and

a floating member that is provided in the ink receiver and has a smaller specific gravity than those of the ink and the liquid,

wherein when the ink and the liquid are present in the ink receiver, the floating member opens a connection part of the ink receiver between itself and the ink discharging flow path, and when the ink and the liquid in the ink receiver have been completely discharged, the floating member closes the connection part.

* * * * *