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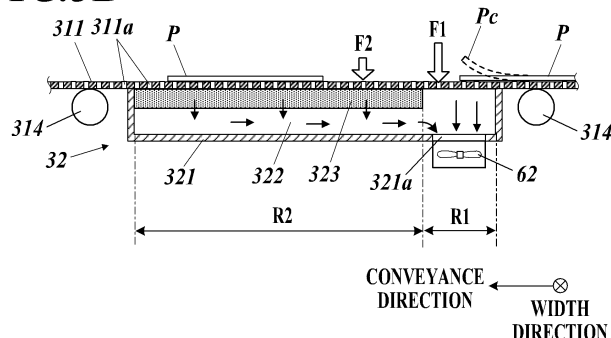
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(54) **SHEET MEMBER CONVEYANCE APPARATUS AND INK JET RECORDING APPARATUS**

(57) Provided are a sheet member conveyance apparatus and an ink jet recording apparatus with which it is possible to suction-attract a sheet member more reliably onto a mounting surface. The sheet member conveyance apparatus is provided with: a ventilation member provided on the side of a conveyance member opposite to a mounting surface thereof, along a movement path in a conveyance direction of the conveyance member; an air chamber which is provided on said opposite side along the movement path in a range including a region overlapping the ventilation member, and which enables ventilation with the mounting surface side of the conveyance member via ventilation holes in the conveyance member; and a suction part that sucks air via the

air chamber from the side of the conveyance member opposite to the mounting surface side thereof, to suction-attract a sheet member onto the mounting surface. The air chamber includes a first section and a second section which is provided on a downstream side in the conveyance direction of the first section, and in which ventilation is provided by means of a ventilation path passing through the ventilation holes and the ventilation member. The ventilation member is provided such that a pressure loss in the ventilation path from the mounting surface side of the conveyance member to the first section is smaller than a pressure loss in the ventilation path from the mounting surface side of the conveyance member to the second section.

FIG.3B



Description

TECHNOLOGICAL FIELD

[0001] The present invention relates to a sheet member conveyance apparatus and an ink jet recording apparatus.

BACKGROUND ART

[0002] There have been ink jet recording apparatuses for discharging ink to a sheet member, such as paper or a resin sheet, to form an image on the sheet member.

[0003] For an ink jet recording apparatus, a sheet member conveyance apparatus for conveying a sheet member by placing the sheet member on a mounting surface of a conveyance member that moves along a predetermined movement path (e.g., a conveyance belt that moves around a predetermined circuit path) is commonly used.

[0004] For such a sheet member conveyance apparatus, there is a technique of fixing a sheet member by adsorbing the sheet member on a mounting surface of a conveyance member by sucking air from the side opposite to the mounting surface through vents provided in the conveyance member. Furthermore, a technique of adsorbing a sheet member on a mounting surface of a conveyance member while ensuring flatness of the sheet member on the mounting surface as well as flatness of the mounting surface by supporting the side opposite to the mounting surface with a flat plate-shaped vent member (e.g., porous body) is known (e.g., Patent Document 1 and Patent Document 2). According to such a technique, it is possible to accurately perform various processes for sheet members, such as ink discharge, to form a high-quality image.

PRIOR ART DOCUMENT

PATENT DOCUMENT

[0005]

Patent Document 1: JP 2013-212922 A

Patent Document 2: JP 2015-047798 A

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0006] However, pressure loss occurs in the vent member while air is sucked through the vent member. Therefore, in order to reliably adsorb the sheet member on the mounting surface when an edge of the sheet member warps and floats on the mounting surface, suction force must be large enough to compensate pressure loss. There is a problem that the apparatus is very large or power consumption is increased.

[0007] An object of the present invention is to provide a sheet member conveyance apparatus and an ink jet recording apparatus capable of more reliably adsorbing a sheet member on a mounting surface.

MEANS FOR SOLVING PROBLEMS

[0008] To achieve the object, a sheet member conveyance apparatus according to claim 1 includes:

a conveyer which moves a conveyance member in a conveyance direction to convey a sheet member placed on a mounting surface of the conveyance member;

a ventilation member which is provided on a side opposite to the mounting surface of the conveyance member along a movement path in the conveyance direction of the conveyance member, and which ventilates in a direction perpendicular to the mounting surface;

an air chamber which is provided on the side opposite to the mounting surface of the conveyance member along the movement path in a range including a region overlapping with the ventilation member as seen in the direction perpendicular to the mounting surface, so that ventilation between the air chamber and a mounting surface side of the conveyance member is maintained through vents provided in the conveyance member; and

a suction unit which sucks air from the side opposite to the mounting surface of the conveyance member through the air chamber to adsorb the recording medium P on the mounting surface of the conveyance member,

wherein
the air chamber comprises:

a first section within a predetermined range in the conveyance direction; and

a second section which is provided downstream from the first section in the conveyance direction, and which is ventilated along a ventilation path through the vents and the ventilation member, and

the ventilation member is provided such that, when the suction unit sucks air from the air chamber, pressure loss in a ventilation path from the mounting surface side of the conveyance member to the first section is smaller than pressure loss in a ventilation path from the mounting surface side of the conveyance member to the second section.

[0009] The invention according to claim 2 is the sheet member conveyance apparatus according to claim 1, wherein

the ventilation member is provided in a range overlapping with the second section as seen in the direction perpen-

dicular to the mounting surface, and
the first section is ventilated along a ventilation path that
does not pass through the ventilation member.

[0010] The invention according to claim 3 is the sheet
member conveyance apparatus according to claim 1,
wherein

the ventilation member is provided in a range over-
lapping with the first section and the second section
as seen in the direction perpendicular to the mount-
ing surface, and
the first section is ventilated along a ventilation path
through the ventilation member.

[0011] The invention according to claim 4 is the sheet
member conveyance apparatus according to claim 3,
wherein

each of a portion of the ventilation member overlap-
ping with the first section and a portion of the venti-
lation member overlapping with the second section
as seen in the direction perpendicular to the mount-
ing surface has a flat plate shape, and
a thickness of the portion overlapping with the first
section in the direction perpendicular to the mounting
surface is smaller than a thickness of the portion
overlapping with the second section in the direction
perpendicular to the mounting surface.

[0012] The invention according to claim 5 is the sheet
member conveyance apparatus according to any one of
claims 1 to 4, wherein the ventilation member is consti-
tuted by a porous body.

[0013] The invention according to claim 6 is the sheet
member conveyance apparatus according to claim 3 or
4, wherein

the ventilation member is constituted by a porous
body having pores, and
an open ratio of the pores in a cross section parallel
to the mounting surface in the portion overlapping
with the first section as seen in the direction perpen-
dicular to the mounting surface is larger than an open
ratio of the pores in the cross section parallel to the
mounting surface in the portion overlapping with the
second section as seen in the direction perpendicu-
lar to the mounting surface.

[0014] The invention according to claim 7 is the sheet
member conveyance apparatus according to any one of
claims 1 to 4, wherein the ventilation member is consti-
tuted by a plate provided with through holes penetrating
in the direction perpendicular to the mounting surface.

[0015] The invention according to claim 8 is the sheet
member conveyance apparatus according to claim 3 or
4, wherein

the ventilation member is constituted by a plate pro-

vided with through holes penetrating in the direction
perpendicular to the mounting surface, and
an open ratio of the through holes in a cross section
parallel to the mounting surface in the portion over-
lapping with the first section as seen in the direction
perpendicular to the mounting surface is larger than
an open ratio of the through holes in the cross section
parallel to the mounting surface in the portion over-
lapping with the second section as seen in the direc-
tion perpendicular to the mounting surface.

[0016] The invention according to claim 9 is the sheet
member conveyance apparatus according to any one of
claims 1 to 8, wherein

the first section of the air chamber occupies a pre-
determined range from an edge of the air chamber
on an upstream side in the conveyance direction,
and
the second section is a section other than the first
section.

[0017] The invention according to claim 10 is the sheet
member conveyance apparatus according to claim 9,
wherein

the air chamber comprises:

a first sub chamber that constitutes the first sec-
tion; and
a second sub chamber that constitutes the sec-
ond section,

ventilation is not directly maintained between the first
sub chamber and the second sub chamber, and
the suction unit sucks air through the first sub cham-
ber and the second sub chamber respectively.

[0018] The invention according to claim 11 is the sheet
member conveyance apparatus according to claim 10,
wherein the suction unit comprises:

a first suction fan that sucks air through the first sub
chamber; and
a second suction fan that sucks air through the sec-
ond sub chamber.

[0019] The invention according to claim 12 is the sheet
member conveyance apparatus according to any one of
claims 1 to 11, wherein

the conveyance member is a circular conveyance
belt,
an external circumference of the conveyance belt
constitutes the mounting surface,
the conveyer moves the conveyance belt along a
predetermined circuit path, and
the ventilation member and the air chamber are pro-

vided on an internal circumference side of the conveyance belt.

[0020] The invention according to claim 13 is the sheet member conveyance apparatus according to any one of claims 1 to 9, wherein

the conveyance member comprises:

a first conveyance belt which is circular and which has an external circumference that constitutes the mounting surface; and
a second conveyance belt which is circular, which is provided downstream from the first conveyance belt, and which has an external circumference that constitutes the mounting surface,

the conveyer moves the first conveyance belt and the second conveyance belt respectively along predetermined circuit paths to convey the sheet member in the conveyance direction while passing the sheet member between the first conveyance belt and the second conveyance belt,

the ventilation member is provided on the internal circumference side of the second conveyance belt, and

the air chamber is partitioned into:

an upstream chamber which is provided on the internal circumference side of the first conveyance belt and which includes at least a part of the first section; and
a downstream chamber which is provided on the internal circumference side of the second conveyance belt and which includes the second section.

[0021] The invention according to claim 14 is the sheet member conveyance apparatus according to claim 13, wherein

the conveyer moves the first conveyance belt by rotating at least one of first conveyance rollers around which the first conveyance belt is stretched,
the conveyer moves the second conveyance belt by rotating at least one of second conveyance rollers around which the second conveyance belt is stretched, and
among the first conveyance rollers, a diameter of a first drive roller closest to a rear edge of a conveyance path of the sheet member on the first conveyance belt is smaller than a diameter of a second conveyance roller closest to a front edge of a conveyance path of the sheet member on the second conveyance belt among the second conveyance rollers.

[0022] The invention according to claim 15 is an ink jet recording apparatus, comprising:

an ink discharger that discharges ink from a nozzle to the sheet member; and
the sheet member conveyance apparatus according to any one of claims 1 to 14 that conveys the sheet member on which ink discharged from the nozzle of the ink discharger has landed.

[0023] The invention according to claim 16 is the ink jet recording apparatus according to claim 15, wherein

the ink discharger discharges ink that cures in response to provision of predetermined energy from the nozzle,
the ink jet recording apparatus comprises an energy applier which is provided on a side opposite to the second section of the air chamber across the conveyance member, and which gives the predetermined energy to ink that has landed on the sheet member adsorbed on the mounting surface.

[0024] The invention according to claim 17 is the ink jet recording apparatus according to claim 15 or 16, wherein

the conveyer comprises:

a first conveyer that is provided with the ventilation member so that the vents constitutes ventilation paths to the first section and to the second section; and
a second conveyer that conveys the sheet member in the conveyance direction upstream from the first conveyer in the conveyance direction,

the conveyer moves the sheet member in the conveyance direction while passing the sheet member between the first conveyer and the second conveyer, and
the ink discharger discharges ink from the nozzle to the sheet member being conveyed by the second conveyer.

ADVANTAGEOUS EFFECTS OF INVENTION

[0025] According to the present invention, there is an effect that it is possible to more reliably adsorb a sheet member on a mounting surface.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

Fig. 1 is a diagram illustrating a schematic configuration of an ink jet recording apparatus.

Fig. 2 is a block diagram illustrating a main functional configuration of the ink jet recording apparatus.

Fig. 3A is a plan view of a support suction unit as seen from an ultraviolet irradiator side.

Fig. 3B is a cross-sectional view in A-A line of Fig. 3A. Fig. 4 is a diagram illustrating suction characteristics of direct suction and suction through a vent member. Fig. 5A is a cross-sectional view showing a configuration of a support suction unit according to Modification 1.

Fig. 5B is a cross-sectional view showing a configuration of a support suction unit according to Modification 1.

Fig. 6A is a cross-sectional view showing a configuration of a support suction unit according to Modification 2.

Fig. 6B is a cross-sectional view showing a configuration of a support suction unit according to Modification 2.

Fig. 6C is a cross-sectional view showing a configuration of a support suction unit according to Modification 2.

Fig. 7 is a cross-sectional view showing a configuration of a support suction unit according to Modification 3.

Fig. 8 is a plan view showing a configuration of a support suction unit according to Modification 4.

Fig. 9 is a diagram illustrating a schematic configuration of an ink jet recording apparatus according to Modification 5.

Fig. 10 is a diagram illustrating a schematic configuration of an ink jet recording apparatus according to Modification 5.

EMBODIMENTS FOR CARRYING OUT THE INVENTION

[0027] Hereinafter, embodiments of the sheet member conveyance apparatus and the ink jet recording apparatus of the present invention will be described with reference to the drawings.

[0028] Fig. 1 is a diagram illustrating a schematic configuration of an ink jet recording apparatus 1 according to an embodiment of the present invention.

[0029] The ink jet recording apparatus 1 includes a recording medium supplier 10, an image recorder 20, a fixing unit 30, a recording medium ejector 40, and the like.

[0030] The recording medium supplier 10 includes a mounting tray 11, medium carrier rollers 12 and the like.

[0031] The mounting tray 11 is a plate-shaped member on which various kinds of recording medium P (sheet member), such as paper, cardboard, corrugated cardboard and a resin sheet, are piled up. The uppermost recording medium P on the mounting tray is sent to the image recorder 20 one by one. The mounting tray 11 is movable in the vertical direction. In accordance with, for example, the total weight of the placed recording media P, the uppermost recording medium P is kept at a position for sending the recording medium P to the image recorder 20.

[0032] Medium carrier rollers 12 are rotatable rollers that sandwich the recording medium P from above and

below, and send the uppermost recording medium P mounted on the mounting tray 11. In this embodiment, the recording medium P is sent in a horizontal direction. A guide member for aligning the recording medium P to a predetermined position in a width direction perpendicular to the conveyance direction of the recording medium P (leftward in Fig. 1) is attached to the medium carrier rollers 12. The medium carrier rollers 12 send the recording medium P aligned in the width direction to the image recorder 20.

[0033] The image recorder 20 discharges ink onto the recording medium P passed from the recording medium supplier 10 to form an image. After ink lands on the recording medium P to form an image, the recording medium P is sent to the fixing unit 30. The image recorder 20 comprises a medium conveyer 21 (second conveyer), a support suction unit 22, one or more (in this embodiment, four) print heads 23 that discharge ink (ink discharger), a press roller 24, and the like. The medium conveyer 21 comprises a conveyance belt 211, a drive roller 212, a driven roller 213, guide rollers 214, and a tension roller 215.

[0034] The conveyance belt 211 of the medium conveyer 21 (conveyance member) is an endless (circular) strip member. A steel belt is used in this embodiment. The steel belt is made of, for example, stainless steel such as SUS304 and SUS631 or aluminum alloy having thickness of about 0.3 mm. The conveyance belt 211 is provided with vents which have the same opening shape and which penetrate between the external circumference and the internal circumference of the conveyance belt 211. Specifically, a large number (plurality) of circular vents having a diameter of about 0.5 mm are arranged at about 1.4 mm intervals so that the open ratio is about 20%. Air passes between the external circumference and the internal circumference.

[0035] The conveyance belt 211 bridges between the drive roller 212 and the driven roller 213 (hereinafter, these rollers together are also referred to as conveyance rollers 212, 213). The external circumference on which the recording medium P is mounted (hereinafter, also referred to as a mounting surface) is movable along a circuit path around the conveyance rollers 212, 213. Thus, as the drive roller 212 rotates in accordance with rotation driven by a conveyance motor 65 (Fig. 2), the conveyance belt 211 moves along the circuit path around the conveyance rollers 212, 213 in accordance with the speed and the rotation direction of the rotation of the drive roller 212. In this embodiment, the drive roller 212 rotates counterclockwise on the plane of Fig. 1 so that the conveyance belt 211 rotates counterclockwise. Thereby a portion of the conveyance belt 211 corresponding to the conveyance section from the driven roller 213 to the drive roller 212 moves in the conveyance direction. The recording medium P placed on the mounting surface of the conveyance belt 211 in the conveyance section is conveyed along the movement path in the conveyance direction of the conveyance belt 311 as the conveyance

belt 311 moves.

[0036] A flat surface (in this embodiment, a horizontal surface) of the support suction unit 22 (hereinafter referred to as a support surface) supports the internal circumference of the conveyance belt 211 (the surface that touches the conveyance rollers 212, 213) in a range within the conveyance section of the conveyance belt 211, the range including a portion where the mounting surface of the conveyance belt 211 faces an ink discharge surface of the print heads 23. The support surface of the support suction unit 22 consists of a plate-shaped vent member 223 constituted by a porous body having ventilation. The support suction unit 22 has a suction fan 62 (Fig. 2) (suction unit) that sucks air from the internal circumference side of the conveyance belt 211 through the vents of the conveyance belt 211 and the vent member 223. Thus the recording medium P, which is placed on the mounting surface of the conveyance belt 211, is adsorbed on the mounting surface.

[0037] Guide rollers 214 are provided respectively upstream and downstream from the support suction unit 22 in the conveyance direction. Two guide rollers 214 support the internal circumference of the conveyance belt 211 outside both edges of the support surface of the support suction unit 22. The guide rollers 214 respectively support the conveyance belt 211 at substantially the same height as the support surface of the support suction unit 22 to guide circumferential movement of the conveyance belt 211.

[0038] The press roller 24 is rotatably provided at a position opposed to the upstream guide roller 214 across the conveyance belt 211. Upstream in the conveyance direction from a position on the recording medium P where ink is discharged, the press roller 24 presses down the recording medium P on the conveyance belt 211 at an appropriate pressure and guide the recording medium P along the conveyance belt 211. Thereby the recording medium P, which has been sent from the recording medium supplier 10, is prevented from separating from the conveyance belt 211. Especially, an edge of the recording medium P is prevented from warping (curling) so that the recording medium P is more reliably adsorbed. The press roller 24 may be configured such that the distance from the conveyance surface of the conveyance belt 211 is variable in accordance with the thickness or the like of the recording medium P to be conveyed.

[0039] In order to give appropriate tension, on the side where the external circumference of the conveyance belt 211 is not opposed to the print heads 23, the tension roller 215 presses the conveyance belt 211 from the internal circumference side at a position between the two conveyance rollers 212, 213, that is, in the middle of movement of the conveyance belt 211 from the drive roller 212 to the driven roller 213. The vertical position of the tension roller 215 is adjustable at two different positions in the width direction, for example, at both edges. The tension roller 215 corrects meander caused by non-uniformity of tension on the conveyance belt 211 applied

by the support suction section 22 and the like. Thereby the conveyance belt 211 and the recording medium P are properly moved in the conveyance direction.

[0040] The print heads 23 are provided on the side opposite to the support suction unit 22 across the conveyance belt 211. On the side facing the conveyance belt 211, the print heads 23 have an ink discharge surface provided with nozzle openings. The print heads 23 discharge ink to the recording medium P which is transferred while being adsorbed on the mounting surface of the conveyance belt 211 by the support suction unit 22. Thus ink lands on the recording medium P. The print heads 23 have one or more recording heads 231 (Fig. 2) in which nozzle openings are provided in a predetermined arrangement to perform an operation relating to ink discharge from the nozzle openings. A range in the width direction in which an image is formed on the recording medium P is within a range in the width direction in which the nozzles of the print heads 23 are arranged. The positions of the print heads 23 are fixed while an image is recorded. Ink is discharged sequentially on different positions in the conveyance direction at predetermined intervals (intervals in the conveyance direction) as the recording medium P is conveyed. Thereby an image is formed in a single-pass manner. The four print heads 23 are respectively connected to ink tanks (not shown) of colors cyan (C), magenta (M), yellow (Y) and black (K) to respectively discharge ink of these CMYK colors. Alternatively, the image recorder 20 may include a print head 23 for discharging ink other than these four colors, such as orange, green, violet, red, blue, white, or the like, or transparent ink.

[0041] Ink that changes phase between gel and sol is used as ink discharged from the nozzles of the print heads 23. Gel is classified as solid while Sol is classified as liquid. In the present embodiment, ink that has been made gelatinous through heating is discharged from the nozzles of the print heads 23. After ink lands on the recording medium P, the ink is cooled down to be gelatinous rapidly, and solidifies on the recording medium P.

[0042] In the present embodiment, ink that cures under ultraviolet rays (curable material) is used. Ink that contains a photopolymerizable compound (monomer), a photopolymerization initiator and a colorant are used as this kind of ink. Among them, photopolymerizable compound polymerizes through polymerization reaction under ultraviolet rays. Ink cures through the polymerization. The photopolymerization initiator is a compound that initiates the above polymerization reaction. The colorant includes a pigment or dye of an ink color.

[0043] The image recorder 20 sends the recording medium P, on which ink has been discharged from the print head 23, to the fixing unit 30.

[0044] The fixing unit 30 is provided downstream from the image recorder 20 in the conveyance direction of the recording medium P, and fixes ink on the recording medium P passed from the image recorder 20. The fixing unit 30 includes a medium conveyer 31 (first conveyer),

a support suction unit 32, an ultraviolet irradiator 33 (energy provider), and the like. The medium conveyor 31 has a conveyance belt 311, a drive roller 312, a driven roller 313, a guide roller 314, and a tension roller 315.

[0045] The configuration of the medium conveyor 31 is the same as that of the medium conveyor 21 of the image recorder 20.

[0046] The configuration of the support suction unit 32 is different from the support suction unit 22 of the image recorder 20 in that the ventilation member 323 of the porous body, which constitutes the support surface, is provided in a region excluding a predetermined range in the edge of the support suction unit 32 on the upstream side in the conveyance direction. As described later, according to the support suction unit 32 having this configuration, the recording medium P is reliably adsorbed on the mounting surface of the conveyance belt 211 even if the recording medium P includes a warp or the like. Therefore, the fixing unit 30 is not provided with a press roller. The configuration of the support suction unit 32 will be described in detail later.

[0047] In an irradiation range in the width direction of the conveying belt 311, the ultraviolet irradiator 33 irradiates the recording medium P with ultraviolet rays, the recording medium P being conveyed while being adsorbed on the mounting surface of the conveying belt 311 by the support suction unit 32. Accordingly, ink on the recording medium P (ink that has landed on the recording medium P) cures to be fixed. Preferably, the recording medium P mounted on the conveyance belt 311 is irradiated with ultraviolet rays from the ultraviolet irradiator 33 without large unevenness (variation in intensity).

[0048] The fixing unit 30 sends the recording medium P, on which ink has been fixed, to the recording medium ejector 40.

[0049] The recording medium P passed from the fixing unit 30 is held on the recording medium ejector 40 until it is taken out by the user. The recording medium ejector 40 includes an ejection tray 41 and guide rollers 42. The guide rollers 42 sandwich the recording medium P, which has been sent from the fixing unit 30, from above and below, conveys the recording medium P, and put it on the ejection tray 41. In order to carry the recording medium P from the mounting surface of the conveyance belt 311, the ejection tray 41 may be set at a position lower than the mounting surface and be vertically movable in accordance with the amount of the mounted recording medium P.

[0050] As described above, the ink jet recording apparatus 1 has a configuration that, while the recording medium P is conveyed by the medium conveyers 21, 31, predetermined processing is performed on the recording medium P by functional configurations of the ink jet recording apparatus 1 including the medium conveying portions 21, 31, that is, the image recorder 20 and the fixing unit 30. This configuration shortens the ranges in which the recording medium P is placed on the conveyance

belts 211, 311 of the medium conveyers 21, 31 respectively. Therefore, it is possible to avoid decrease of accuracy in the conveyance position of the recording medium P due to expansion, contraction and uneven speed of the conveyance belts 211, 311. Accordingly, especially the image recorder 20 discharges ink to a desired position on the recording medium P. Further, it is possible to avoid problem that heat generated by the ultraviolet irradiation in the fixing unit 30 is transmitted to the recording medium P in the image recorder 20 so that the temperature of the recording medium P deviates from a proper range for discharging ink.

[0051] The configuration of the ink jet recording apparatus 1 is not limited to those described above. For example, a heater that heats the recording medium P to a predetermined temperature, a medium processor for performing a surface modification process, such as corona treatment, for the recording medium P, and the like may be provided between the recording medium supplier 10 and the image recorder 20.

[0052] Fig. 2 is a block diagram illustrating the main functional configuration of the ink jet recording apparatus 1.

[0053] The ink jet recording apparatus 1 includes a controller 50, support suction units 22, 32 having a suction controller 61 and a suction fan 62, a print head 23 having a head controller 63 and a recording head 231, a conveyance controller 64, a conveyance motor 65, an input-output interface 66, a bus 67, and the like. A hardware configuration of the controller 50 may also be used as the suction controller 61, the head controller 63, or the conveyance controller 64. Alternatively, a dedicated CPU, a memory, a logic circuit, or the like may be provided separately.

[0054] The controller 50 includes a CPU 51 (Central Processing Unit), a RAM 52 (Random Access Memory), a ROM 53 (Read Only Memory), and a memory 54.

[0055] The CPU 51 reads the program and setting data stored in the ROM 53 for various control, stores them in the RAM 52, and execute the program to perform various arithmetic processes. In addition, the CPU 51 oversees and controls the entire operation of the ink jet recording apparatus 1.

[0056] The RAM 52 provides the CPU 51 with a memory space for working and stores temporary data. The RAM 52 may include a non-volatile memory.

[0057] The ROM 53 stores various control programs and setting data executed by the CPU 51. A rewritable non-volatile memory such as an EEPROM (Electrically Erasable Programmable Read Only Memory) or a flash memory may be used instead of the ROM 53.

[0058] The memory 54 stores a print job (image recording instruction) input from the external device 2 through the input-output interface 66 and image data of an image to be recorded by the print job. As the memory 54, for example, a HDD (Hard Disk Drive) is used. A DRAM (Dynamic Random Access Memory) or the like may be used together.

[0059] Suction controller 61 rotates the suction fan 62 of the support suction unit 22, 32 at a rotational speed corresponding to the control signal from the controller 50.

[0060] The head controller 63 outputs various control signals and image data to a head driver in the recording head 231 at appropriate time in accordance with a control signal from the controller 50. Thereby ink is discharged from the nozzle opening of the recording head 231.

[0061] The conveyance controller 64, based on a control signal supplied from the controller 50, controls operation of the conveyance motors 65 respectively connected to the medium carrier roller 12 and the drive rollers 212, 312 to rotate these rollers. Thus the recording medium P is conveyed at an appropriate speed.

[0062] The input-output interface 66 mediates transmission and reception of data between the external device 2 and the controller 50. The input-output interface 66 may comprise, for example, one of various serial interfaces or various parallel interfaces, or a combination thereof.

[0063] The bus 67 is a path for transmitting and receiving signals between the controller 50 and other configurations.

[0064] The external device 2 is, for example, a personal computer, and supplies print jobs, image data, etc. to the controller 50 via the input-output interface 66.

[0065] Among the components of the ink jet recording apparatus 1 described above, the medium conveyers 21, 31, the support suction units 22, 32, the conveyance controller 64, and the conveyance motors 65 constitute the sheet member conveyance apparatus. The medium conveyers 21, 31 constitute a conveyer. The present invention may be applied such that the medium conveyer 31 alone constitutes the conveyer.

[0066] Next, detailed configurations and operations of the support suction unit 32 of the fixing unit 30 will be described.

[0067] Fig. 3A is a plan view of the support suction unit 32 as seen from the ultraviolet irradiator 33 side. In Fig. 3A, for facilitation of understanding, each configuration is shown through the conveyance belt 311, and vents provided in the conveyance belt 311 are omitted.

[0068] Fig. 3B is a cross-sectional view in line A-A of Fig. 3A.

[0069] Support suction unit 32 includes a cuboid housing 321, a ventilation member 323, a suction fan 62, and the like. The cuboid housing 321 is opened on the side of the conveyance belt 311. The ventilation member 323 consists of a plate-shaped porous body that partially closes the open side of the housing 321. The suction fan 62 sucks air from the housing 321. The open side of the housing 321 is covered with the conveyance belt 311. Thereby, an air chamber 322 is formed inside the housing 321. The suction fan 62 sucks air from the air chamber 322 through a suction port 321a opened in a part of the lower portion of the housing 321.

[0070] The housing 321 is made of a metal plate such as stainless steel or aluminum alloy having a thickness

of some millimeters. The lengths of the housing 321 in the width direction and in the conveyance direction are appropriately determined in accordance with the size, shape, and the like of the recording medium P to be conveyed by the medium conveyer 31. According to the embodiment of Fig. 3, the suction port 321a is provided in the vicinity of the edge of the bottom surface of the housing 321 on the upstream side in the conveyance direction. However, the position of the suction port 321a is not limited thereto.

[0071] The ventilation member 323 is a plate-shaped porous body having a thickness of about 5 mm fixed to the housing 321 along the open side of the housing 321 (i.e., along the movement path of the conveyance belt 311). The ventilation member 323, as seen in a direction perpendicular to the mounting surface of the conveyance belt 311, is provided in a range overlapping a second section R2 which corresponds to a range of the air chamber 322 excluding a first section R1 in a predetermined range at the edge on the upstream side in the conveyance direction. Therefore, in the first section R1, the air chamber 322 is not provided with the ventilation member 323, and the upper side of the housing 321 is opened.

[0072] Since the ventilation member 323 is disposed in this way, in the first section R1, ventilation between the air chamber 322 and the mounting surface side of the conveyance belt 311 is maintained along a ventilation path that passes not through the ventilation member 323 but through the vents 311a of the conveyance belt 311. In the second section R2, ventilation between the air chamber 322 and the mounting surface side of the conveyance belt 311 is maintained along a ventilation path through the vents 311a of the conveyance belt 311 and through the ventilation member 323.

[0073] The length of the first section R1 in the air chamber 322 in the conveyance direction is not particularly limited as long as it is set to be longer than a length in which an edge Pc of the recording medium P could warp. This is for sufficiently achieving effect that the warped edge Pc of the recording medium P is adsorbed on the mounting surface, which will be described later.

[0074] Preferably, the length of the second section R2 in the air chamber 322 in the conveyance direction is set at, for example, approximately the length of the recording medium P in the conveyance direction (based on a standard length, the maximum length, or the like among various lengths of the recording medium P to be conveyed). More preferably, the length of the second section R2 in the conveyance direction is set to be longer than the maximum length of the recording medium P so that the entire recording medium P is adsorbed within the second section R2. Therefore, usually, the length of the second section R2 in the conveyance direction is set at a length longer than the length of the first section R1 in the conveyance direction, and is several times or more than ten times as long as the length of the first section R1 in the conveyance direction. The ultraviolet irradiator 33 is disposed on the side opposite to the second section R2 of

the air chamber 322 across the conveyance belt 311 (see Fig. 1).

[0075] The length of the first section R1 and the second section R2 in the width direction (i.e., the length of the housing 321 and the ventilation member 323 in the width direction) is set at a length equal to or longer than the maximum length in the width direction of the recording medium P to be conveyed.

[0076] The porous body constituting the ventilation member 323 is made by sintering, for example, resin particles such as polyethylene resin, fluororesin, and polypropylene resin. Netlike pores spreading three-dimensionally inside the porous body constitute ventilation paths. This achieves three-dimensional ventilation.

[0077] The frictional resistance between the conveyance belt 311 and the ventilation member 323 constituted by the porous body of the above material is low. Therefore, it is possible to avoid damage to the conveyance belt 311, and to reduce a load on the conveyance motor 65. While the conveyance belt 311 slides on the ventilation member 323, wear powder is hardly generated since the frictional resistance is low as described above.

[0078] The suction fan 62 sucks air from the air chamber 322 through the suction port 321a with a suction force controlled by the suction controller 61, and discharges air. Thus a negative pressure is created in the air chamber 322.

[0079] Thus, as shown by a solid arrow in the air chamber 322 in Fig. 3B, air flows vertically downward toward the suction port 321a through the vents 311a of the conveyance belt 311 in the first section R1. Thus air is discharged out of the housing 321. Hereinafter, suction of air in the first section R1 not through the ventilation member 323 but through the vents 311a is also referred to as "direct suction".

[0080] In the second section R2, air flows vertically downward through the vents 311a of the conveyance belt 311 and through the ventilation member 323. Then air flows toward the suction port 321a in the direction opposite to the conveyance direction in the vicinity of the bottom surface of the housing 321. Thus air is discharged out of the housing 321. Hereinafter, suction of air in the second section R2 through the vents 311a and the ventilation member 323 is also referred to as "suction through the ventilation member".

[0081] Fig. 4 is a diagram illustrating the suction characteristics of the direct suction and the suction through the ventilation member.

[0082] In Fig. 4 shows the relation between the direct suction and the suction through the ventilation member concerning drawing power and adsorption sustainability. The drawing power is a force for drawing the recording medium P, which is separated from (floating on) the mounting surface of the conveyance belt 311 by a predetermined distance in the vertical direction, to the mounting surface. The adsorption sustainability is a force for keeping an adsorption state by preventing the recording medium P, which is adsorbed on the mounting sur-

face, from separating from the mounting surface or from sliding on the mounting surface.

[0083] The "L" in Fig. 4 indicates that the drawing power or the adsorption sustainability is larger than the "S". As shown in Fig. 4, the drawing power in the direct suction is larger than that in the suction through the ventilation member. The adsorption sustainability in the suction through the ventilation member is larger than that in the direct suction. Reasons will be described below.

[0084] Suction of air by the suction fan 62 causes pressure loss in the vents 311a of the conveyance belt 311 and in the ventilation member 323. Pressure loss is caused by loss due to friction between air and walls of an air flow path, contracted flow due to decrease in an area of a flow path, separation of air flow due to increase in an area of a flow path, loss at an inlet and an outlet of a flow path, and the like.

[0085] In the support suction unit 32 of the embodiment, the open area and the open ratio of the vents 311a is large enough with respect to the velocity and viscosity of air. The length (depth) in the vertical direction is sufficiently small. Therefore, pressure loss at the vents 311a is very little. On the other hand, since the fine pores in the porous body of the ventilation member 323 constitute air flow paths, pressure loss due to various factors described above is larger than that in the vents 311a. Therefore, pressure loss along the ventilation path through the vents 311a and the ventilation member 323 in the suction through the ventilation member in the second section R2 is larger than pressure loss along the ventilation path through the vents 311a in the direct suction in the first section R1 by an amount corresponding to pressure loss in the ventilation member 323.

[0086] In the first section R1 where pressure loss is small, since air is sucked into the vent 311a from the mounting surface side of the conveyance belt 311 at a pressure corresponding approximately to the negative pressure in the air chamber 322, the flow rate F1 (Fig. 3B) of sucked air on the mounting surface is large. Therefore, the drawing power for the recording medium P separated from the mounting surface is large.

[0087] On the other hand, in the second section R2 where pressure loss is large, air is sucked into the vent 311a from the mounting surface side of the conveyance belt 311 by a negative pressure of an absolute value smaller than an absolute value of the negative pressure in the air chamber 322. Therefore, the flow F2 (Fig. 3B) of air on the mounting surface is smaller than the flow F1. Accordingly, the drawing power for the recording medium P separated from the mounting surface is smaller than that in the first section R1.

[0088] Because of this, as shown in Fig. 4, the drawing power of the direct suction in the first section R1 is larger than that of the suction through the ventilation member in the second section R2.

[0089] In the support suction unit 32, even after the recording medium P is adsorbed on the mounting surface, the region around the recording medium P as seen

from a direction perpendicular to the mounting surface (i.e., both sides of the recording medium P in the width direction as well as the upstream and downstream sides in the conveyance direction), air is sucked into the air chamber 322 from the mounting surface side of the conveyance belt 311.

[0090] During this suction, since pressure loss of the air passing through the vents 311a of the conveyance belt 311 is very little in the first section R1, difference in the atmospheric pressure between the air chamber 322 and the area beside the mounting surface of the conveyance belt 311 hardly occurs. This prevents the effect of the difference in the atmospheric pressure, that is, facilitation of adsorption and maintenance of recording medium P on the mounting surface. Thus the adsorption sustainability decreases.

[0091] On the other hand, since pressure loss of air passing through the vents 311a of the conveyance belt 311 and the ventilation member 323 is large in the second section R2, the difference in the atmospheric pressure between the air chamber 322 and the area beside the mounting surface of the conveyance belt 311 is large (the air pressure in the air chamber 322 is relatively small). In other words, the ventilation member 323 with large pressure loss seals the upper surface of the air chamber 322 with a certain degree of airtightness. Since the difference in the atmospheric pressure between the air chamber 322 and the mounting surface side of the conveyance belt 311 is large, the recording medium P is strongly pressed against the mounting surface by the difference. Thus the adsorption sustainability to adsorb and keep the recording medium P on the mounting surface increases.

[0092] Because of this, as shown in Fig. 4, the adsorption sustainability of the suction through the ventilation member in the second section R2 is larger than that of the direct suction in the first section R1.

[0093] In the support suction unit 32 of the embodiment, the first section R1, where the drawing power is large, is provided upstream in the conveyance direction. Therefore, even if the edge Pc on the front side of the recording medium P warps (floats on the mounting surface), it is possible to draw and adsorb the edge Pc on the mounting surface by the direct suction when the recording medium P is conveyed by the conveyance belt 311 to the first section R1.

[0094] When the recording medium P adsorbed on the mounting surface is conveyed in the conveyance direction to the second section R2, the recording medium P is adsorbed with a strong adsorption sustainability by the suction through the ventilation member. Therefore, the edge Pc of the recording medium P is prevented from floating on the mounting surface again or sliding on the mounting surface. Thus problems are avoided.

[0095] The controller 50 controls the rotation speed of the suction fan 62 such that the rotation speed is equal to or more than the minimum rotation speed that achieves a drawing power large enough to draw and adsorb the

warped edge Pc of the recording medium P. The minimum rotation speed varies in accordance with various parameters such as the type (thickness, hardness, ventilation, etc.) of the conveyed recording medium P, the size of an assumed warpage (height from the mounting surface), the width in the width direction of the recording medium P (i.e., the width of the portion of the first section R1 not covered by the recording medium P), and the like. Therefore, the rotational speed of the suction fan 62 is predetermined in accordance with, for example, each combination of these parameters. Alternatively, an edge Pc of one of recording media P to be used may be made to warp, and then conveyed. The rotation speed is set at a speed in which the edge Pc is actually adsorbed.

[0096] On the recording medium P mounted on the mounting surface of the conveyance belt 311 in the fixing unit 30, ink discharged in the image recorder 20 has not cured. Therefore, if the surface of the recording medium P with a warped edge Pc is pressed by a press roller, uncured ink on the recording medium P touches the press roller to distort an image, or the press roller is contaminated with ink. It is unfavorable. However, according to the configuration of the embodiment, the recording medium P is adsorbed on the mounting surface and is conveyed to a position facing the ultraviolet irradiator 33 without such problems.

[0097] In the support suction unit 22 in the image recorder 20, the ventilation member 223 is provided all over the surface of the housing, and the suction through the ventilation member is performed in the entire support suction unit 22. In a case in which the edge Pc of the recording medium P warps, the edge Pc is pressed against the mounting surface by the press roller 24 as described above, and is adsorbed on the mounting surface. This is because, since ink is not discharged to the recording medium P in the image recorder 20, the above problems do not happen when the press roller 24 directly presses the surface of the recording medium P.

[0098] Next, conveyance operation of the recording medium P and recording operation of images in the ink jet recording apparatus 1 according to the embodiment will be described.

[0099] In the ink jet recording apparatus 1, recording operation of an image begins when a print job is stored in the memory 54 of the controller 50.

[0100] When the recording operation begins, a control signal is output from the suction controller 61 to each suction fan 62 of the support suction units 22, 32. Rotation operation of each suction fan 62 at a predetermined rotational speed begins.

[0101] A control signal is output from the conveyance controller 64 to the conveyance motors 65 respectively connected to the medium carrier rollers 12 and the drive rollers 212, 312. Then supply operation of the recording medium P from the recording medium supplier 10 to the medium conveyer 21 of the image recorder 20 and conveyance operation of the recording medium P by the medium conveyers 21, 31 begins.

[0102] At an appropriate time in accordance with a position of the recording medium P conveyed by the medium conveyer 21, the head controller 63 supplies image data of an image to be recorded and a control signal to each recording head 231 of the print head 23. Thereby ink is discharged from the nozzle of the print head 23, and an image is recorded on the recording medium P. At the time of recording the image, the recording medium P is adsorbed and fixed on the mounting surface of the conveyance belt 211 with a strong adsorption sustainability by the suction through the ventilation member in the support suction unit 22. This prevents erroneous recording caused by floating or vibration of the recording medium P.

[0103] The recording medium P on which ink has been discharged is passed from the medium conveyer 21 of the image recorder 20 to the medium conveyer 31 of the fixing unit 30. In a case in which the front edge of the recording medium P warps, the recording medium P is effectively drawn and adsorbed on the mounting portion of the conveyance belt 311 by the direct suction in a portion of the support suction unit 32 overlapping with the first section R1 as described above. Then, the recording medium P is conveyed to a portion overlapping with the second section R2, and the recording medium P is adsorbed and fixed on the mounting surface of the conveyance belt 211 with a strong adsorption sustainability by the suction through the ventilation member. The ultraviolet irradiator 33 performs curing and fixation of ink on the recording medium P in this state. This prevents erroneous fixation caused by floating or vibration of the recording medium P.

[0104] After ink is fixed, the recording medium P is ejected to the recording medium ejector 40 by conveyance operation of the medium conveyer 31.

MODIFICATION 1

[0105] Next, Modification 1 of the above embodiment will be described. This modification and the above embodiment are different in the configuration of the support suction unit 32.

[0106] Fig. 5A and Fig. 5B are cross-sectional views showing a configuration of the support suction unit 32 according to the modification.

[0107] According to the support suction unit 32 in Fig. 5A and Fig. 5B, the ventilation member 323 is provided in a range overlapping with the entire air chamber 322 as seen in a direction perpendicular to the mounting surface of the conveyance belt 311. Portions of the ventilation member 323 in Fig. 5A and Fig. 5B overlapping with the first section R1 and the second section R2 respectively have a flat plate shape. The material, shape and arrangement of the ventilation member 323 is determined such that pressure loss in the portion overlapping with the first section R1 is smaller than pressure loss in the portion overlapping with the second section R2.

[0108] Specifically, in the example in Fig. 5A, the ven-

tilation member 323 consists of a first portion 3231 and a second portion 3232. The first portion 3231 is provided in a range overlapping with the first section R1, and is constituted by a porous body with coarse pores. The second portion 3232 is provided in a range overlapping with the second section R2, and is constituted by a porous body with pores finer than those in the first portion 3231. According to the ventilation member 323 in Fig. 5A, the open ratio of the pores in a cross section parallel to the mounting surface of the first portion 3231 is larger than the open ratio of the pores in a cross section parallel to the mounting surface of the second portion 3232. In other words, the porosity of the porous body of the first portion 3231 is larger than the porosity of the porous body of the second portion 3232. According to the configuration in Fig. 5A, pressure loss in the portion overlapping with the first section R1 of the ventilation member 323 is smaller than pressure loss in the portion overlapping with the second section R2.

[0109] In the ventilation member 323 of the example in Fig. 5B, the thickness in the direction perpendicular to the mounting surface in the first portion 3233 overlapping with the first section R1 is smaller than the thickness in the direction perpendicular to the mounting surface in the second portion 3234 overlapping with the second section R2. The fineness of the porous body (i.e., the open ratio of the pores in a cross section parallel to the mounting surface) in each of the first portion 3233 and the second portion 3234 is the same as that of the porous body constituting the ventilation member 323 of the above embodiment. Also according to the configuration in Fig. 5B, pressure loss in the portion of the ventilation member 323 overlapping with the first section R1 is smaller than pressure loss in the portion overlapping with the second section R2.

[0110] According to the configurations in Fig. 5A and Fig. 5B, the suction through the ventilation member is performed in both the first section R1 and the second section R2. Pressure loss in the portion overlapping with the first section R1 is smaller than pressure loss in the portion overlapping with the second section R2. Therefore, like the above embodiment, the drawing power is larger in the first section R1 than in the second section R2 while the adsorption sustainability is larger in the second section R2 than in the first section R1. Thus, also according to the configuration of the modification, the front edge of the recording medium P is securely adsorbed in the first section R1 while the recording medium P is adsorbed with a high adsorption sustainability in the second section R2.

[0111] The first portion and the second portion of the ventilation member 323 may be different in both the fineness and the thickness of the pores.

MODIFICATION 2

[0112] Next, Modification 2 of the above embodiment will be described. This modification and the above em-

bodiment are different in the configuration of the support suction unit 32.

[0113] Fig. 6A to Fig. 6C are cross-sectional views showing a configuration of the support suction unit 32 according to the modification.

[0114] According to the support suction unit 32 in Fig. 6A to Fig. 6C, the ventilation member 323 is made of a flat metal plate provided with through holes 323a (323b) penetrating in the direction perpendicular to the mounting surface. The material of the ventilation member 323 is not limited to metal. A material which is strong enough to support the conveyance belt 311 and which has low friction against the conveyance belt 311, such as resin, may be used.

[0115] The material, shape and arrangement of the ventilation member 323 in Fig. 6A to Fig. 6C is also determined such that pressure loss in the portion overlapping with the first section R1 is smaller than pressure loss in the portion overlapping with the second section R2.

[0116] Specifically, in the example in Fig. 6A, the ventilation member 323 made of a metal plate is provided only in a region overlapping with the second section R2. According to the configuration of Fig. 6A, similarly to the above embodiment, the direct suction is performed in the first section R1 while the suction through the ventilation member is performed in the second section R2. Thus, also according to the configuration in Fig. 6A, the front edge of the recording medium P is securely adsorbed in the first section R1 while the recording medium P is adsorbed with a high adsorption sustainability in the second section R2.

[0117] In the example of Fig. 6B, the ventilation member 323 is provided in a range overlapping with the entire air chamber 322. According to this ventilation member 323, the open area of the through holes 323a in the first portion 3235 overlapping with the first section R1 is larger than the open area of the through holes 323b in the second portion 3236 overlapping with the second section R2. Thus, the open ratio of the through holes 323a in a cross section parallel to the mounting surface in the first portion 3231 is larger than the open ratio of the through holes 323b in a cross section parallel to the mounting surface in the second portion 3232. Also according to the ventilation member 323 of this configuration, pressure loss in the portion overlapping with the first section R1 is smaller than pressure loss in the portion overlapping with the second section R2.

[0118] Also in the example in Fig. 6C, the ventilation member 323 is provided in a range overlapping with the entire air chamber 322. The thickness of the ventilation member 323 in the direction perpendicular to the mounting surface in the first portion 3237 overlapping with the first section R1 is smaller than the thickness in the direction perpendicular to the mounting surface in the second portion 3238 overlapping with the second section R2. The through holes 323a in the first portion 3237 and the second portion 3238 have the same open area and the same open ratio. Also according to the ventilation mem-

ber 323 of this configuration, pressure loss in the portion overlapping with the first section R1 is smaller than pressure loss in the portion overlapping with the second section R2.

[0119] According to the configuration in Fig. 6B and Fig. 6C, the suction through the ventilation member is performed in both the first section R1 and the second section R2. Pressure loss in the portion overlapping with the first section R1 is smaller than pressure loss in the portion overlapping with the second section R2. Therefore, like the above embodiment, the drawing power is larger in the first section R1 than in the second section R2 while the adsorption sustainability is larger in the second section R2 than in the first section R1. Thus, also in the configuration of the modification, the front edge of the recording medium P is securely adsorbed in the first section R1 while the recording medium P is adsorbed with a high adsorption sustainability in the second section R2.

[0120] The first portion and the second portion of the ventilation member 323 may be different in the open area and the open ratio of the through holes as well as the thickness.

25 MODIFICATION 3

[0121] Next, Modification 3 of the above embodiment will be described. This modification and the above embodiment are different in the configuration of the support suction unit 32.

[0122] Fig. 7 is a cross-sectional view showing a configuration of the support suction unit 32 according to the modification.

[0123] According to the support suction unit 32 in Fig. 7, the air chamber 322 is partitioned into a first sub chamber 3221 constituting the first section R1 and a second sub chamber 3222 constituting the second section R2. The first sub chamber 3221 and the second sub chamber 3222 are partitioned by a partition 3211 which is welded to be fixed to the bottom and sides of the housing 321, so that ventilation is not directly performed between them. Each of the first sub chamber 3221 and the second sub chamber 3222 is provided with a suction port 321a, and inner air is sucked by an individual suction fan 62 (the first suction fan and the second suction fan). Rotation operation of each suction fan 62 is individually controlled by the suction controller 61.

[0124] According to the configuration of the modification, it is possible to separately adjust the drawing power in the first section R1 and the adsorption sustainability in the second section R2.

MODIFICATION 4

[0125] Next, Modification 4 of the above embodiment will be described. This modification and the above embodiment are different in the configuration of the support suction unit 32.

[0126] Fig. 8 is a plan view showing a configuration of the support suction unit 32 according to the modification.

[0127] The ventilation member 323 of the support suction unit 32 in Fig. 8 consists of a first portion 3231 and a second portion 3232. The second portion 3232 is provided in the vicinity of both edges in the width direction, and is constituted by a porous body with fine pores. The first portion 3231 is provided in a portion excluding the vicinity of both edges in the width direction, and is constituted by a porous body with pores coarser than those in the second portion 3232. According to this configuration, pressure loss in the vicinity of both edges in the width direction of the second section R2 is larger than pressure loss in the center in the width direction. As a result, while the recording medium P is adsorbed on the second section R2, the ventilation member 323 in the outer portion in the width direction of the recording medium P is sealed to a high extent. Therefore, the difference in the atmospheric pressure between the air chamber 322 and the conveyance surface side of the conveyance belt 311 increases more effectively. Thus power for adsorbing and keeping the recording medium P increases.

MODIFICATION 5

[0128] Next, Modification 5 of the above embodiment will be described. This modification and the above embodiment are different in that a relay 70 for the recording medium P is provided between the image recorder 20 and the fixing unit 30.

[0129] Fig. 9 is a diagram illustrating a schematic configuration of the ink jet recording apparatus 1 according to the modification.

[0130] The ink jet recording apparatus 1 according to the modification includes the relay 70 at a position which is downstream from the image recorder 20 in the conveyance direction and which is upstream from the fixing unit 30 in the conveyance direction. The relay 70 adsorbs the recording medium P passed from the image recorder 20 and conveys it to the fixing unit 30 in the conveyance direction.

[0131] The relay 70 includes a medium conveyer 71 and a support suction unit 72. The medium conveyer 71 includes a conveyance belt 711 (first conveyance belt), a drive roller 712, a driven roller 713, and a tension roller 715 (first conveyance roller). In this modification, the medium conveyer 71 of the relay 70 and the medium conveyer 31 of the fixing unit 30 constitute the first conveyer.

[0132] The configuration of the conveyance belt 711 is substantially the same as that of the conveyance belt 311 (second conveyance belt) of the fixing unit 30. The configurations of the drive roller 712, the driven roller 713, and the tension roller 715 are almost the same as those of the drive roller 312, the driven roller 313, and the tension roller 315 (second conveyance roller) of the fixing unit 30. However, the diameters of the drive roller 712 and the driven roller 713 are smaller than the diam-

eters of the drive roller 312 and the driven roller 313. Therefore, among the first conveyance rollers in the medium conveyer 71, the diameter of the drive roller 712 closest to the rear edge e1 of the conveyance path of the recording medium P on the conveyance belt 711 is smaller than the diameter of the driven roller 313 closest to the front edge e2 of the conveyance path of the recording medium P on the conveyance belt 311 among the second conveyance rollers in the medium conveyer 31. The conveyance path of the recording medium P on the conveyance belt 311, 711 refers to a path in which the recording medium P is conveyed while being placed on the mounting surface of the conveyance belt 311 and 711. The distance in the conveyance direction between the drive roller 712 and the driven roller 713 is smaller than the distance in the conveyance direction between the drive roller 312 and the driven roller 313. Thus the circumferential length of the conveyance belt 711 is shorter than the circumferential length of the conveyance belt 311.

[0133] The configuration of the support suction unit 72 is the same as that of the support suction unit 32 except that the length in the conveyance direction is shorter than that of the support suction unit 32 and that a member corresponding to the ventilation member 323 is not provided. Accordingly, the entire support suction unit 72 performs the direct suction to adsorb the recording medium P on the mounting surface of the conveyance belt 711. In the modification, the air chamber in the support suction unit 72 constitutes an upstream chamber while the air chamber in the support suction unit 32 constitutes a downstream chamber.

[0134] The relay 70 achieves the following effects. In a case in which the recording medium P is directly passed from the image recorder 20 to the fixing unit 30, the length of a section where the recording medium P is not adsorbed is long since the diameters of the drive roller 212 and the driven roller 313 are large. On the other hand, in a case in which the conveyance of the recording medium P is relayed by the relay 70, which includes the drive roller 712 and the driven roller 713 with smaller diameters, the length of the section where the recording medium P is not adsorbed is short. Even if an edge of the recording medium P warps, it is possible to reliably draw and adsorb the edge on the mounting surface of the conveyance belt 711 since the recording medium P is adsorbed by the direct suction in the relay 70.

[0135] In a case in which the distance between the support suction unit 72 of the relay 70 and the support suction unit 32 of the fixing unit 30 is sufficiently short, the ventilation member 323 may be provided all over the upper side of the housing 321 in the support suction unit 32 of the fixing unit 30 as shown in Fig. 10. According to this configuration, in a case in which an edge of the recording medium P warps, the edge is drawn and adsorbed to the mounting surface of the conveyance belt 711 by the direct suction in the relay 70. Then the recording medium P is passed to the fixing unit 30 while the warped edge is pressed. Thus the recording medium P

is reliably adsorbed also in the fixing unit 30.

[0136] As described above, the sheet member conveyance apparatus according to the embodiment includes:

the medium conveyer 31 which conveys the recording medium P by moving the conveyance belt 311 in a conveyance direction, the recording medium P being placed on a mounting surface of the conveyance belt 311;

the ventilation member 323 which is provided on a side opposite to the mounting surface of the conveyance belt 311 along a movement path in the conveyance direction of the conveyance belt 311, and which ventilates in a direction perpendicular to the mounting surface;

the air chamber 322 which is provided on the side opposite to the mounting surface of the conveyance belt 311 along the movement path in a range including a region overlapping with the ventilation member 323 as seen in the direction perpendicular to the mounting surface, so that ventilation between the air chamber 322 and the mounting surface side of the conveyance belt 311 is maintained through the vents 311a of the conveyance belt 311; and

the suction fan 62 which sucks air from the side opposite to the mounting surface of the conveyance belt 311 through the air chamber 322 to adsorb the recording medium P on the mounting surface of the conveyance belt 311.

[0137] The air chamber 322 comprises:

a first section R1 within a predetermined range in the conveyance direction; and

a second section R2 which is provided downstream from the first section R1 in the conveyance direction, and which is ventilated along the ventilation path through the vents 311a and the ventilation member 323.

[0138] The ventilation member 323 is provided such that, when the suction fan 62 sucks air from the air chamber 322, pressure loss in the ventilation path from the mounting surface side of the conveyance belt 311 to the first section R1 is smaller than pressure loss from the mounting surface side of the conveyance belt 311 to the second section R2.

[0139] According to this configuration, in the first section R1, where pressure loss in the ventilation path is smaller than that in the second section R2, an edge of the recording medium P, which has been separated from (floating on) the mounting surface of the conveyance belt 311, is sucked to the mounting surface more strongly than in the second section R2. Thus, even if a front edge of the recording medium P warps and floats, the front edge is reliably adsorbed on the mounting surface when the front edge comes to the first section R1. In the second section R2, where pressure loss in the ventilation path

is larger, the difference in the atmospheric pressure between the air chamber 322 and the area beside the mounting surface of the conveyance belt 311 is larger than that in the first section R1. Therefore, the recording medium P is strongly pressed against the mounting surface by the difference in the atmospheric pressure, and the recording medium P is adsorbed on the mounting surface with a higher adsorption sustainability. Thus, according to the above configuration, an edge of the recording medium P is reliably drawn and adsorbed to the mounting surface in the first section R1 while, in the second section R2 which is downstream from the first section R1 in the conveyance direction, the recording medium P is adsorbed and kept on the mounting surface with a high adsorption sustainability.

[0140] The ventilation member 323 is provided in a range overlapping with the second section R2 as seen in the direction perpendicular to the mounting surface. The first section R1 in the air chamber 322 is ventilated along a ventilation path that does not pass through the ventilation member 323. Therefore, pressure loss by the ventilation member 323 does not occur in the first section R1. Pressure loss in the first section R1 is suppressed, and power to draw the recording medium P to the mounting surface is increased.

[0141] The ventilation member 323 of Modifications 1 and 2 (Fig. 6B and Fig. 6C) is provided in a range overlapping with the first section R1 and the second section R2 as seen in the direction perpendicular to the mounting surface. The first section R1 in the air chamber 322 is ventilated along a ventilation path through the ventilation member 323. Therefore, the ventilation member 323 supports the conveyance belt 311 over the entire air chamber 322. Accordingly, the mounting surface of the conveyance belt 311 and the recording medium P on the mounting surface are kept flat in a wider range.

[0142] In Modification 1 (Fig. 5B) and Modification 2 (Fig. 6C), each of portions of the ventilation member 323 overlapping with the first section R1 and the second section R2 has a flat plate shape. The thickness of the portion overlapping with the first section R1 in the direction perpendicular to the mounting surface is smaller than the thickness of the portion overlapping with the second section R2 in the direction perpendicular to the mounting surface. Therefore, it is easy to make pressure loss in the ventilation path in the first section R1 smaller than pressure loss in the ventilation path in the second section R2. Thus the drawing power for the recording medium P in the first section R1 and the adsorption sustainability in the second section R2 are increased.

[0143] Since the ventilation member 323 is constituted by the porous body, it is possible to realize the ventilation member 323 having ventilation while supporting the conveyance belt 311 with a simple configuration. Since the entire surface of the ventilation member 323 has ventilation, constant ventilation between the air chamber 322 and the mounting surface side of the conveyance belt 311 is performed regardless of positions of the vents

311a corresponding to conveyance of the conveyance belt 311.

[0144] According to the porous body of the ventilation member 323 of Modification 1 (Fig. 5A), the open ratio of pores in a cross section parallel to the mounting surface in the portion overlapping with the first section R1 is larger than the open ratio of pores in the cross section parallel to the mounting surface in the portion overlapping with the second section R2. Therefore, it is possible to make pressure loss in the ventilation path in the first section R1 smaller than pressure loss in the ventilation path in the second section R2. Thus the drawing power for the recording medium P in the first section R1 and the adsorption sustainability in the second section R2 are increased.

[0145] The ventilation member 323 of Modification 2 is constituted by a plate provided with through holes 323a (323b) penetrating in the direction perpendicular to the mounting surface. Thus, it is possible to realize the ventilation member 323 having ventilation while supporting the conveyance belt 311 with a simple configuration.

[0146] According to the ventilation member 323 of Modification 2 (Fig. 6B), the open ratio of through holes 323a in the cross section parallel to the mounting surface in the portion overlapping with the first section R1 is larger than the open ratio of through holes 323b in the cross section parallel to the mounting surface in the portion overlapping with the second section R2. Therefore, it is possible to make pressure loss in the ventilation path in the first section R1 smaller than pressure loss in the ventilation path in the second section R2. Thus the drawing power for the recording medium P in the first section R1 and the adsorption sustainability in the second section R2 are increased.

[0147] The air chamber 322 consists of the first section R1 within the predetermined range from the edge of the air chamber 322 on the upstream side in the conveyance direction, and the second section R2 which is the region other than the first section R1. Therefore, the adsorption state of the recording medium P drawn to the mounting surface in the first section R1 near the edge of the air chamber 322 on the upstream side in the conveyance direction is reliably kept in the second section R2 which extends to the downstream edge of the air chamber 322.

[0148] The air chamber 322 of Modification 3 includes a first sub chamber 3221 that constitutes the first section R1 and a second sub chamber 3222 that constitutes the second section R2. Ventilation is not directly performed between the first sub chamber 3221 and the second sub chamber 3222. The suction fan 62 sucks air through the first sub chamber 3221 and the second sub chamber 3222 respectively. Therefore, the negative pressure in the second section R2 is easily increased, and thus the absorption sustainability in the second section R2 is increased.

[0149] The suction fan 62 of Modification 3 includes the first suction fan that sucks air through the first sub chamber 3221, and the second suction fan that sucks air

through the second sub chamber 3222. Therefore, it is possible to separately adjust the drawing power in the first section R1 and the adsorption sustainability in the second section R2.

[0150] The conveyance belt 311 is a circular conveyance belt, and the external circumference of the circular conveyance belt constitutes the mounting surface. The medium conveyer 31 moves the conveyance belt 311 along a predetermined circuit path. The ventilation member 323 and the air chamber 322 are provided on the internal circumference side of the conveyance belt 311. Therefore, the recording medium P is more reliably adsorbed on the external circumference of the conveyance belt 311 in the medium conveyer 31 that has a simple and compact configuration for rotating the conveyance belt 311.

[0151] The sheet member conveyance apparatus of Modification 5 includes:

- a conveyance belt 711 which is circular and has an external circumference that constitutes a mounting surface; and
- a conveyance belt 311 provided downstream from the conveyance belt 711.

[0152] The medium conveyers 71, 31 move the conveyance belt 711 and the conveyance belt 311 along respective predetermined circuit paths to convey the recording medium P in the conveyance direction while passing the recording medium P between the conveyance belt 711 and the conveyance belt 311. The ventilation member 323 is provided on the internal circumference side of the conveyance belt 311.

[0153] The air chamber 322 is partitioned into:

- the upstream chamber which is provided on the internal circumference side of the conveyance belt 711 and which includes at least a part of the first section R1; and
- the downstream chamber which is provided on the internal circumference side of the conveyance belt 311 and which includes the second section R2.

[0154] According to this configuration, in a case in which an edge of the recording medium P warps, the edge is drawn and adsorbed to the mounting surface of the conveyance belt 711 on the upstream side. The recording medium P is passed to the conveyance belt 311 on the downstream side while the edge is pressed to suppress warping. Therefore, the recording medium P is reliably adsorbed also on the conveyance belt 311.

[0155] The medium conveyer 71 rotates at least one of the first conveyance rollers, around which the conveyance belt 711 is stretched, to move the conveyance belt 711. The medium conveyer 31 rotates at least one of the second conveyance rollers, around which the conveyance belt 311 is stretched, to move the conveyance belt 311. Among the first conveyance rollers, the diameter of

the drive roller 712 closest to the rear edge e1 of the conveyance path of the recording medium P on the conveyance belt 711 is smaller than the diameter of the driven roller 313 closest to the front edge e2 of the conveyance path of the recording medium P on the conveyance belt 311 among the second conveyance rollers. Therefore, a section where the recording medium P is not adsorbed is shortened. The recording medium P is more reliably adsorbed on the mounting surface of the conveyance belt 311 on the downstream side.

[0156] The ink jet recording apparatus 1 in the above embodiment and modifications includes:

the print head 23 that discharges ink from the nozzle to the recording medium P; and
the above sheet member conveyance apparatus that conveys the recording medium P on which ink discharged from the nozzle of the print head 23 has landed.

[0157] According to this configuration, air is sucked from the air chamber 322 in the first section R1 to draw and adsorb the recording medium P to the mounting surface. After the print head 23 discharges ink, the recording medium P is adsorbed on the mounting surface and is conveyed without contaminating the surface of the recording medium P.

[0158] The print head 23 discharges ink, which cures in response to the application of ultraviolet rays, from the nozzle. The ink jet recording apparatus 1 includes the ultraviolet irradiator 33 which is provided on the side opposite to the second section R2 of the air chamber 322 across the conveyance belt 311 and which irradiates ink, which has landed on the recording medium P adsorbed on the mounting surface, with ultraviolet rays.

[0159] According to this configuration, before ink cures and be fixed, the ink is applied to the surface of the recording medium P placed on the mounting surface of the conveyance belt 311. The recording medium P is drawn and adsorbed to the mounting surface by suction of air from the air chamber 322 in the first section R1. This prevents a problem that ink on the recording medium P touches other member to disturb an image.

[0160] The conveyor of the sheet member conveyance apparatus includes:

a medium conveyor 31 that is provided with the ventilation member 323 so that the vents 311a constitute a ventilation path to the first section R1 and to the second section R2; and
a medium conveyor 21 that conveys the recording medium P in the conveyance direction on the upstream side of the medium conveyor 31.

[0161] The medium conveyor 21 and the medium conveyor 31 move the recording medium P in the conveyance direction while passing the recording medium P between the medium conveyor 21 and the medium conveyor

31. The print head 23 discharges ink from the nozzle to the recording medium P being conveyed by the medium conveyor 21.

[0162] Thus, the recording medium P, on which ink has been discharged by the print head 23, is passed between the medium conveyor 21 and the medium conveyor 31, and the medium conveyor 31 conveys the recording medium P without contaminating the surface of the recording medium P.

[0163] The present invention is not limited to the above embodiment and modifications, and various changes can be made.

[0164] For example, according to the above embodiment and modifications, pressure loss in the ventilation path changes at two stages in the first section R1 and the second section R2. However, the invention is not limited thereto. For example, the material, shape and arrangement of the ventilation member 323 may be determined such that pressure loss gradually increases toward the downstream side in the conveyance direction. Specifically, a section where pressure loss is at an intermediate value between pressure losses in the first section R1 and the second section R2 may be provided between the first section R1 and the second section R2.

[0165] In the above embodiment and modifications, an example in which the air chamber 322 consists of the single first section R1 and the single second section R2 is given. However, the invention may have any configuration as long as at least one first section R1 and at least one second section R2 downstream from the first section R1 in the conveyance direction are provided. For example, the air chamber 322 may have one first section R1 and two second sections R2 disposed on both sides of the first section R1 in the conveyance direction.

[0166] In the above embodiment and modifications, a porous body and a metal plate are used for the ventilation member 323. However, any material may be used as long as pressure loss occurs in the ventilation path in the ventilation member 323 when air is sucked through the ventilation member 323.

[0167] In the above embodiment and modifications, a strip-shaped conveyance belt is given as an example of the conveyance member. However, the invention is not limited thereto.

[0168] For example, the present invention may be applied to a conveyor that conveys a recording medium P by rotation of a cylindrical conveyance drum as the conveyance member. According to this conveyor, the support suction unit (the air chamber and the ventilation member) fixed to the rotation shaft is provided along a curved surface (internal circumference) inside the external circumference of the conveyance drum. The rotating drum is provided with vents. The support suction unit sucks air to adsorb the recording medium P on the drum surface.

[0169] A mounting member may reciprocate in the conveyance direction in a movement range including a region above the support suction unit.

[0170] In the above embodiment and modifications, ultraviolet curable ink is given as an example of ink discharged from the nozzle of the print head 23. However, the invention is not limited thereto. Various materials that polymerize and cure when certain energy is given may be used as ink. For example, a thermosetting material that polymerizes when heated, an electron beam curable material that polymerizes when irradiated with an electron beam, and the like may be used.

[0171] In the above embodiment and modifications, the ink jet recording apparatus 1 of a single pass system is given as an example. However, the present invention may be applied to an ink jet recording apparatus that records an image while scanning with a print head or a recording head.

[0172] Although some embodiments of the present invention have been described, the scope of the present invention is not limited to the embodiments described above, but includes the scope of the invention described in the claims and its equivalent range.

INDUSTRIAL APPLICABILITY

[0173] The present invention can be utilized in a sheet member conveyance apparatus and an ink jet recording apparatus.

REFERENCE SIGNS LIST

[0174]

1	ink jet recording apparatus	
2	external device	
10	recording medium supplier	
20	image recorder	
21, 31, 71	medium conveyer	
22, 32, 72	support suction unit	
23	print head	
24	press roller	
30	fixing unit	
33	ultraviolet irradiator	
40	recording medium ejector	
50	controller	
51	CPU	
52	RAM	
53	ROM	
54	memory	
61	suction controller	
62	suction fan	
63	head controller	
64	conveyance controller	
65	conveyance motor	
66	input-output interface	
67	bus	
70	relay	
211, 311, 711	conveyance belt	
212, 312, 712	drive roller	
213, 313, 713	driven roller	

214, 314	guide roller
215, 315, 317	tension roller
223, 323	ventilation member
311a	vent
5 321	housing
321a	suction port
3211	partition
322	air chamber
323a, 323b	through hole
10 3221	first sub chamber
3222	second sub chamber
P	recording medium
R1	first section
R2	second section

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Claims

1. A sheet member conveyance apparatus, comprising:

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a conveyer which moves a conveyance member in a conveyance direction to convey a sheet member placed on a mounting surface of the conveyance member;

a ventilation member which is provided on a side opposite to the mounting surface of the conveyance member along a movement path in the conveyance direction of the conveyance member, and which ventilates in a direction perpendicular to the mounting surface;

an air chamber which is provided on the side opposite to the mounting surface of the conveyance member along the movement path in a range including a region overlapping with the ventilation member as seen in the direction perpendicular to the mounting surface, so that ventilation between the air chamber and a mounting surface side of the conveyance member is maintained through vents provided in the conveyance member; and

a suction unit which sucks air from the side opposite to the mounting surface of the conveyance member through the air chamber to adsorb the recording medium P on the mounting surface of the conveyance member,

wherein

the air chamber comprises:

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a first section within a predetermined range in the conveyance direction; and

a second section which is provided downstream from the first section in the conveyance direction, and which is ventilated along a ventilation path through the vents and the ventilation member, and

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the ventilation member is provided such that,

- when the suction unit sucks air from the air chamber, pressure loss in a ventilation path from the mounting surface side of the conveyance member to the first section is smaller than pressure loss in a ventilation path from the mounting surface side of the conveyance member to the second section.
2. The sheet member conveyance apparatus according to claim 1, wherein
the ventilation member is provided in a range overlapping with the second section as seen in the direction perpendicular to the mounting surface, and the first section is ventilated along a ventilation path that does not pass through the ventilation member.
 3. The sheet member conveyance apparatus according to claim 1, wherein
the ventilation member is provided in a range overlapping with the first section and the second section as seen in the direction perpendicular to the mounting surface, and
the first section is ventilated along a ventilation path through the ventilation member.
 4. The sheet member conveyance apparatus according to claim 3, wherein
each of a portion of the ventilation member overlapping with the first section and a portion of the ventilation member overlapping with the second section as seen in the direction perpendicular to the mounting surface has a flat plate shape, and
a thickness of the portion overlapping with the first section in the direction perpendicular to the mounting surface is smaller than a thickness of the portion overlapping with the second section in the direction perpendicular to the mounting surface.
 5. The sheet member conveyance apparatus according to any one of claims 1 to 4, wherein the ventilation member is constituted by a porous body.
 6. The sheet member conveyance apparatus according to claim 3 or 4, wherein
the ventilation member is constituted by a porous body having pores, and
an open ratio of the pores in a cross section parallel to the mounting surface in the portion overlapping with the first section as seen in the direction perpendicular to the mounting surface is larger than an open ratio of the pores in the cross section parallel to the mounting surface in the portion overlapping with the second section as seen in the direction perpendicular to the mounting surface.
 7. The sheet member conveyance apparatus according to any one of claims 1 to 4, wherein the ventilation member is constituted by a plate provided with
through holes penetrating in the direction perpendicular to the mounting surface.
 8. The sheet member conveyance apparatus according to claim 3 or 4, wherein
the ventilation member is constituted by a plate provided with through holes penetrating in the direction perpendicular to the mounting surface, and
an open ratio of the through holes in a cross section parallel to the mounting surface in the portion overlapping with the first section as seen in the direction perpendicular to the mounting surface is larger than an open ratio of the through holes in the cross section parallel to the mounting surface in the portion overlapping with the second section as seen in the direction perpendicular to the mounting surface.
 9. The sheet member conveyance apparatus according to any one of claims 1 to 8, wherein
the first section of the air chamber occupies a predetermined range from an edge of the air chamber on an upstream side in the conveyance direction, and
the second section is a section other than the first section.
 10. The sheet member conveyance apparatus according to claim 9, wherein
the air chamber comprises:
a first sub chamber that constitutes the first section; and
a second sub chamber that constitutes the second section,
ventilation is not directly maintained between the first sub chamber and the second sub chamber, and
the suction unit sucks air through the first sub chamber and the second sub chamber respectively.
 11. The sheet member conveyance apparatus according to claim 10, wherein the suction unit comprises:
a first suction fan that sucks air through the first sub chamber; and
a second suction fan that sucks air through the second sub chamber.
 12. The sheet member conveyance apparatus according to any one of claims 1 to 11, wherein
the conveyance member is a circular conveyance belt,
an external circumference of the conveyance belt constitutes the mounting surface,
the conveyer moves the conveyance belt along a predetermined circuit path, and
the ventilation member and the air chamber are provided on an internal circumference side of the con-

veyance belt.

- 13.** The sheet member conveyance apparatus according to any one of claims 1 to 9, wherein the conveyance member comprises:

a first conveyance belt which is circular and which has an external circumference that constitutes the mounting surface; and
a second conveyance belt which is circular, which is provided downstream from the first conveyance belt, and which has an external circumference that constitutes the mounting surface,

the conveyer moves the first conveyance belt and the second conveyance belt respectively along predetermined circuit paths to convey the sheet member in the conveyance direction while passing the sheet member between the first conveyance belt and the second conveyance belt,
the ventilation member is provided on the internal circumference side of the second conveyance belt, and
the air chamber is partitioned into:

an upstream chamber which is provided on the internal circumference side of the first conveyance belt and which includes at least a part of the first section; and
a downstream chamber which is provided on the internal circumference side of the second conveyance belt and which includes the second section.

- 14.** The sheet member conveyance apparatus according to claim 13, wherein
the conveyer moves the first conveyance belt by rotating at least one of first conveyance rollers around which the first conveyance belt is stretched,
the conveyer moves the second conveyance belt by rotating at least one of second conveyance rollers around which the second conveyance belt is stretched, and
among the first conveyance rollers, a diameter of a first drive roller closest to a rear edge of a conveyance path of the sheet member on the first conveyance belt is smaller than a diameter of a second conveyance roller closest to a front edge of a conveyance path of the sheet member on the second conveyance belt among the second conveyance rollers.

- 15.** An ink jet recording apparatus, comprising:

an ink discharger that discharges ink from a nozzle to the sheet member; and
the sheet member conveyance apparatus according to any one of claims 1 to 14 that conveys the sheet member on which ink discharged from

the nozzle of the ink discharger has landed.

- 16.** The ink jet recording apparatus according to claim 15, wherein

the ink discharger discharges ink that cures in response to provision of predetermined energy from the nozzle,
the ink jet recording apparatus comprises an energy applier which is provided on a side opposite to the second section of the air chamber across the conveyance member, and which gives the predetermined energy to ink that has landed on the sheet member adsorbed on the mounting surface.

- 17.** The ink jet recording apparatus according to claim 15 or 16, wherein
the conveyer comprises:

a first conveyer that is provided with the ventilation member so that the vents constitutes ventilation paths to the first section and to the second section; and
a second conveyer that conveys the sheet member in the conveyance direction upstream from the first conveyer in the conveyance direction,

the conveyer moves the sheet member in the conveyance direction while passing the sheet member between the first conveyer and the second conveyer, and
the ink discharger discharges ink from the nozzle to the sheet member being conveyed by the second conveyer.

FIG.1

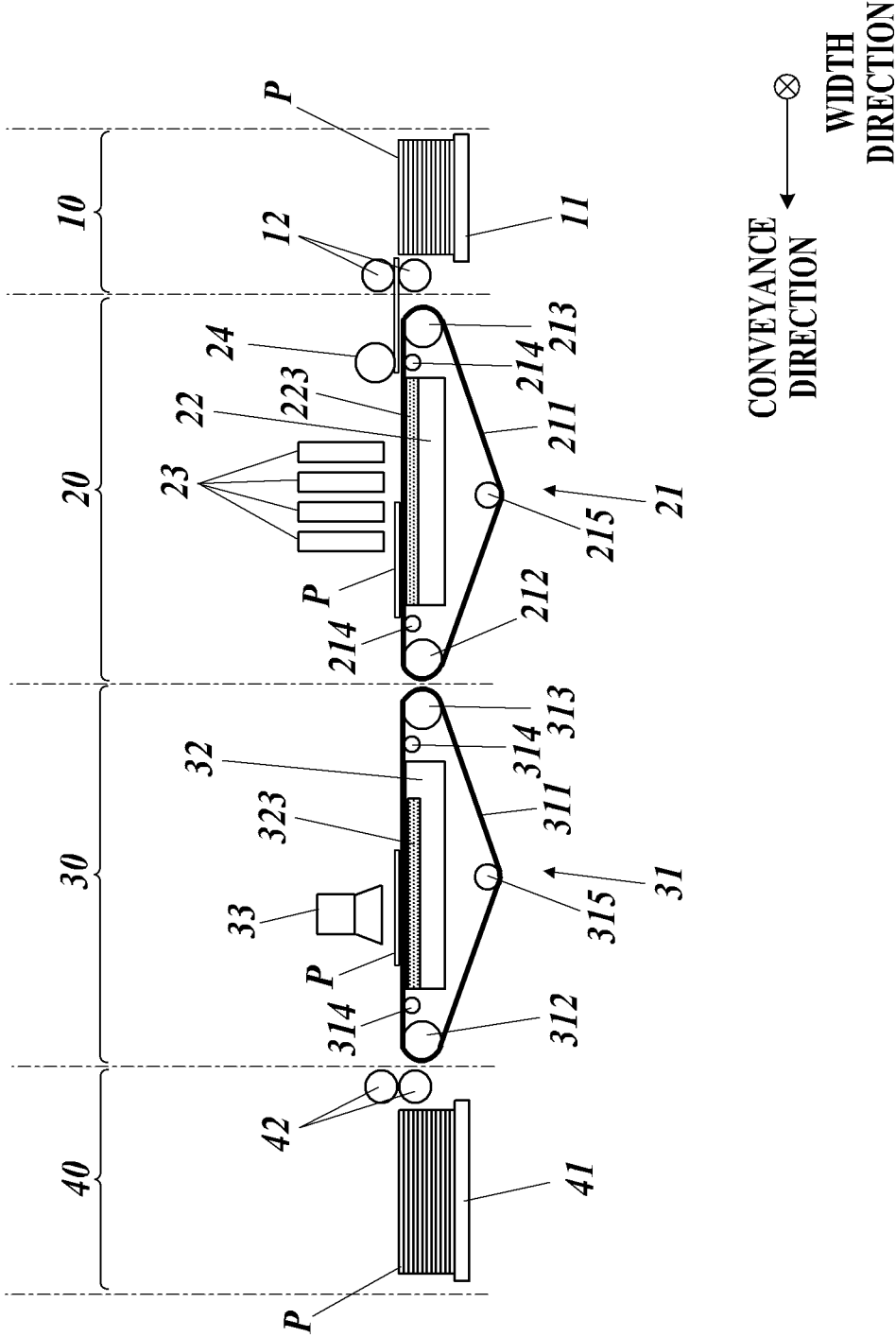


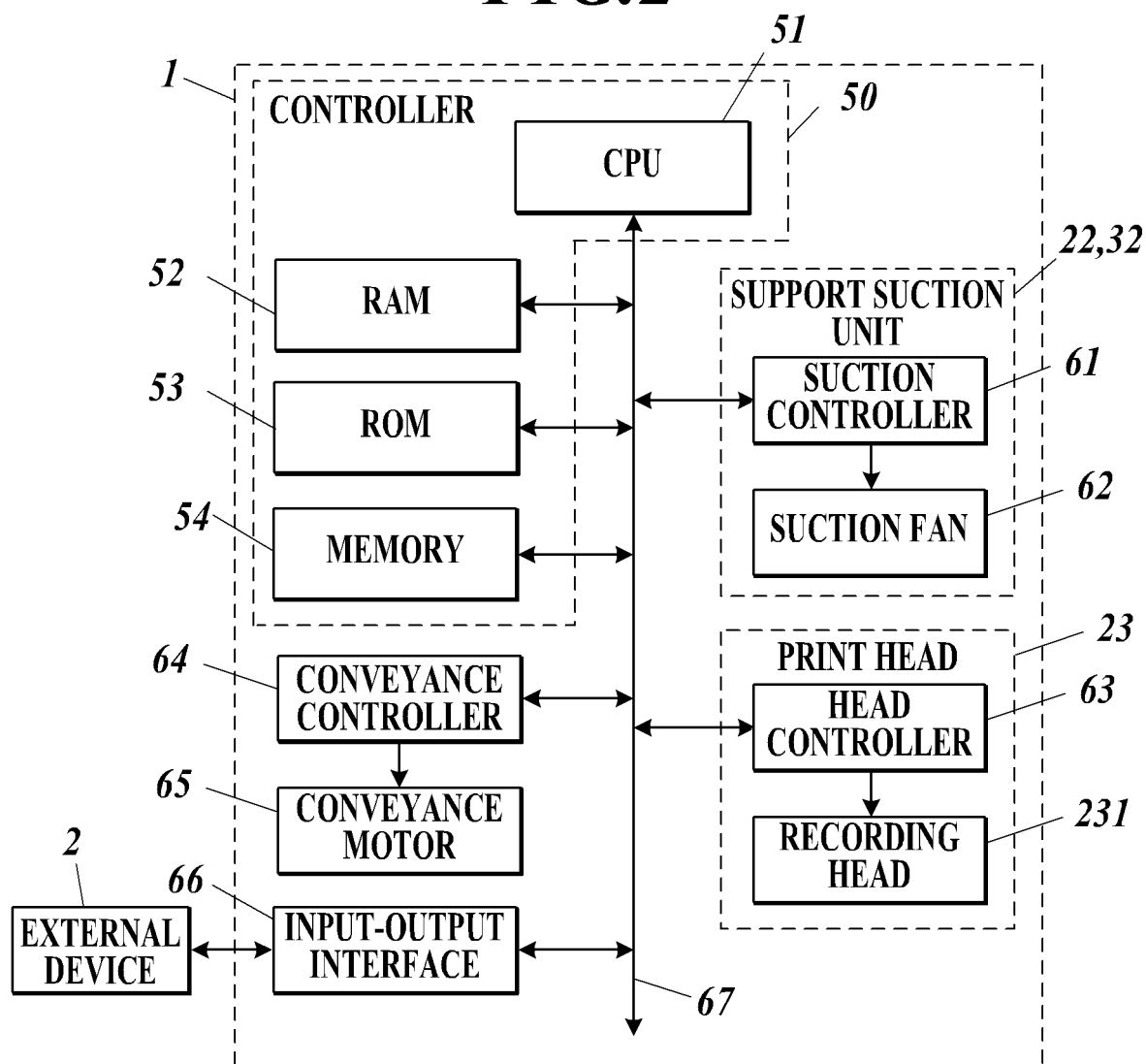
FIG.2

FIG.3A

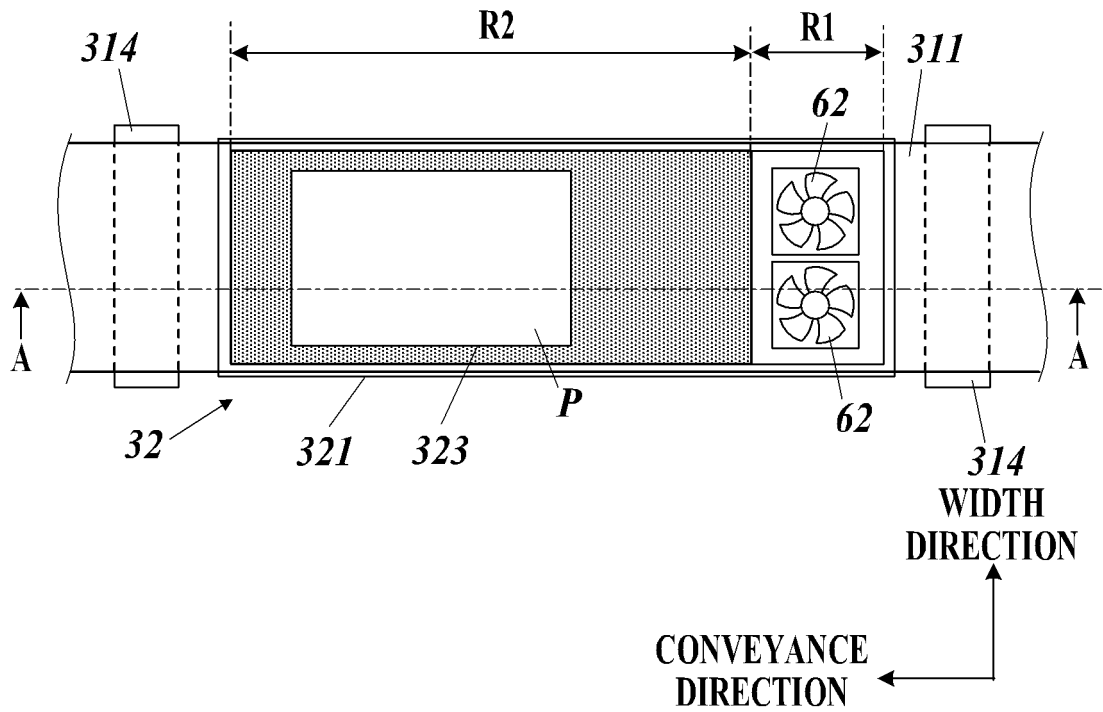


FIG.3B

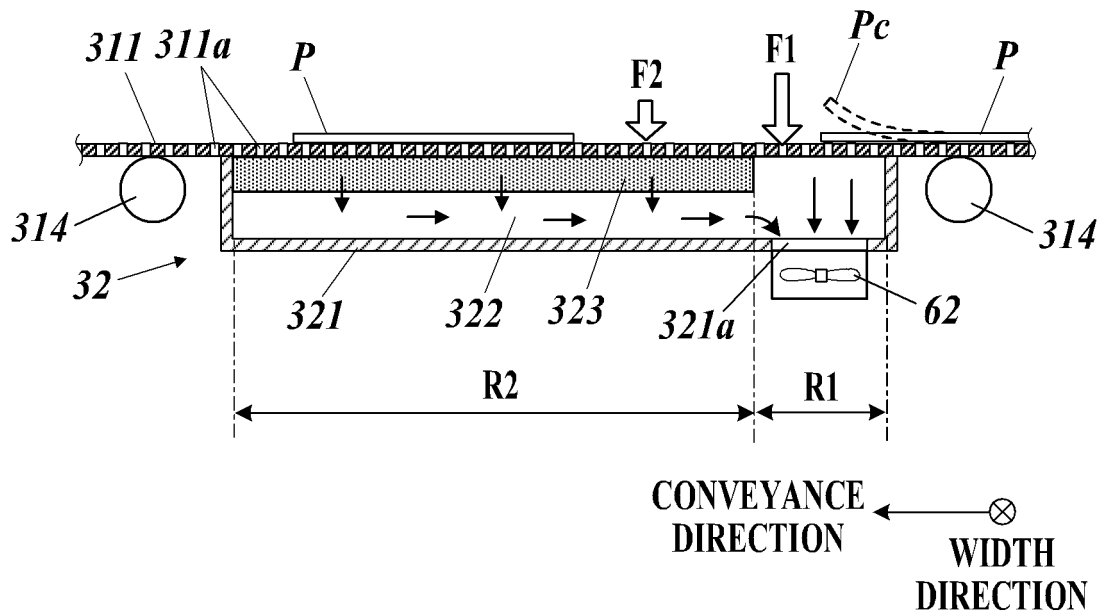


FIG.4

	DIRECT SUCTION IN FIRST SECTION R1	SUCTION THROUGH VENTILATION MEMBER IN SECOND SECTION R2
DRAWING POWER	L	S
ADSORPTION SUSTAINABILITY	S	L

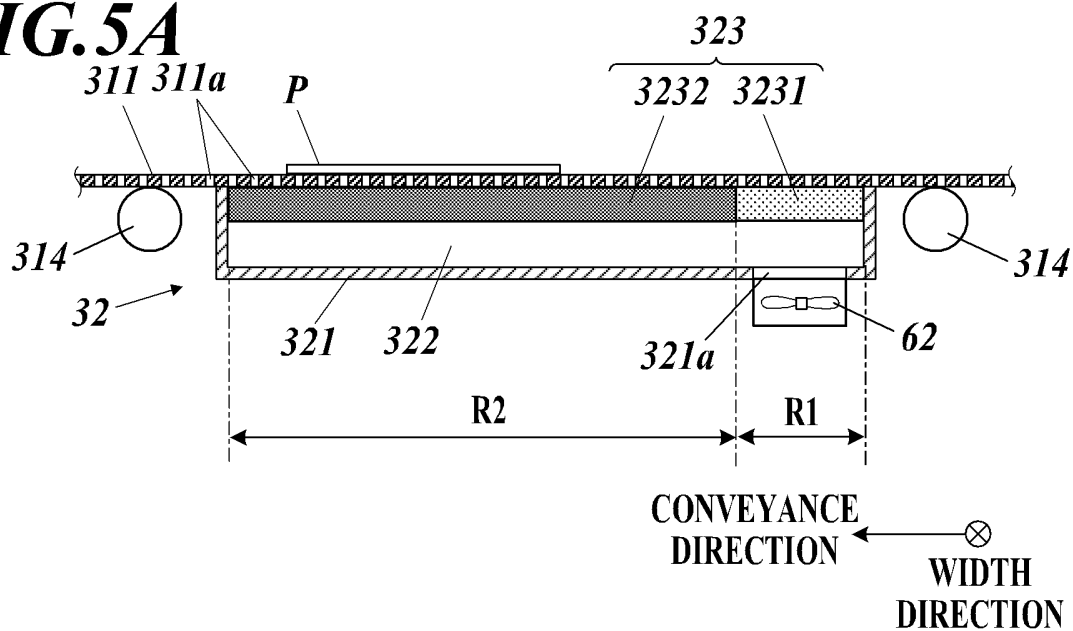
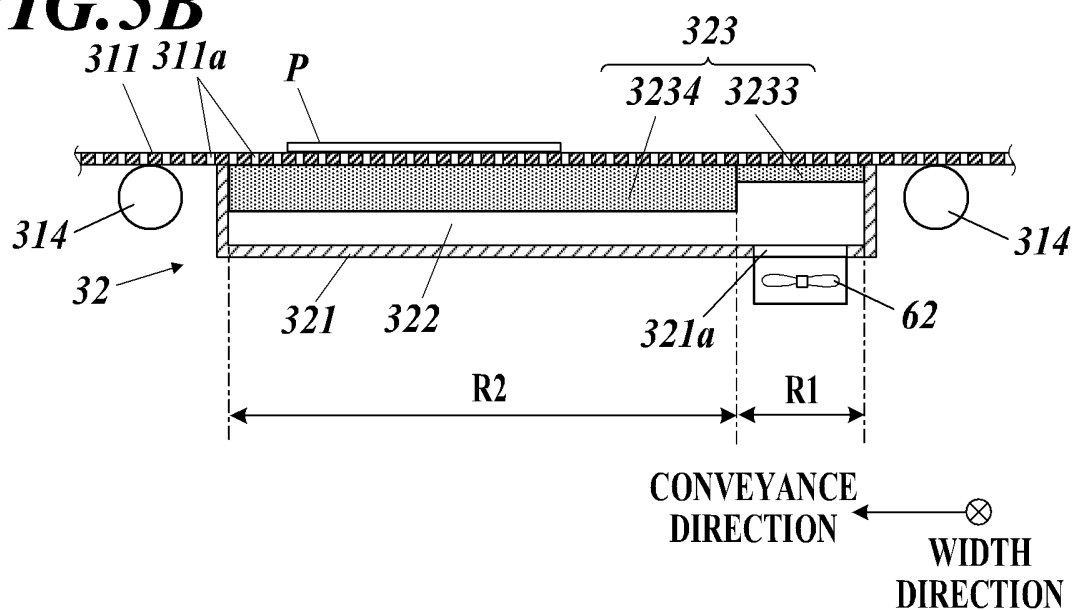
FIG.5A**FIG.5B**

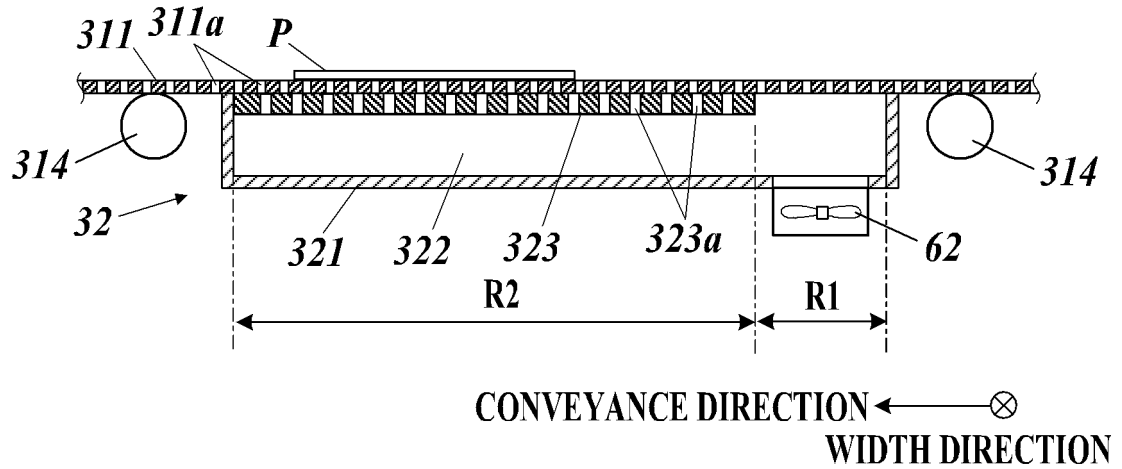
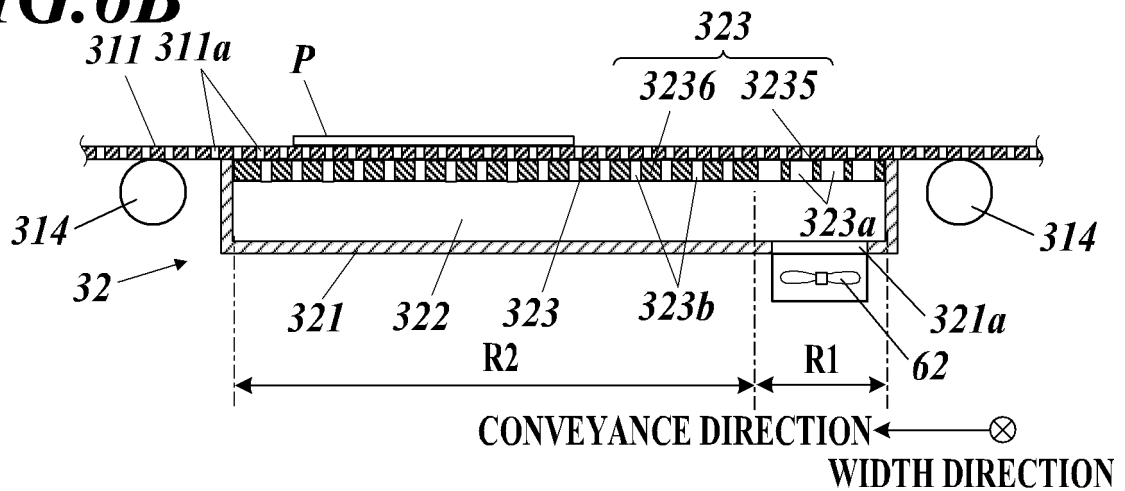
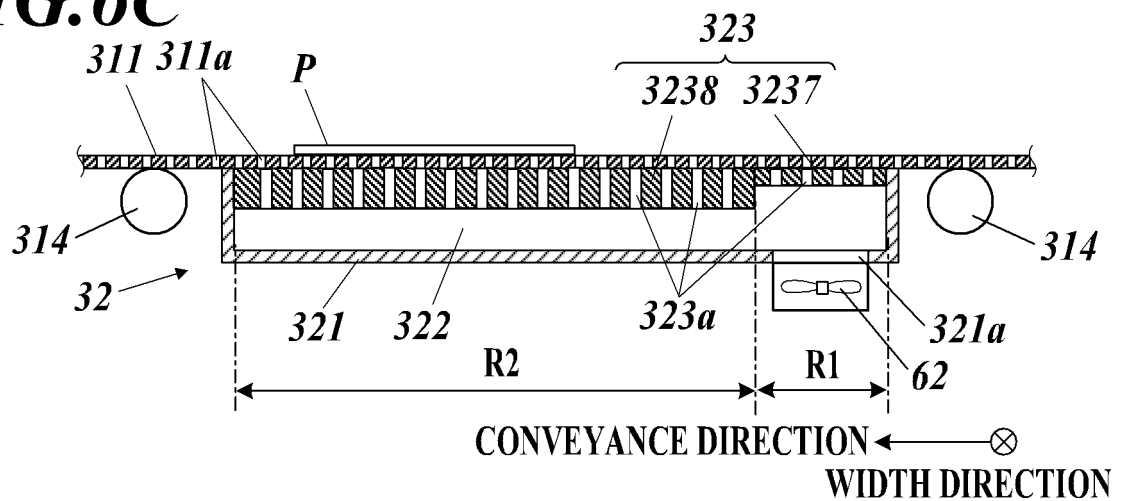
FIG. 6A**FIG. 6B****FIG. 6C**

FIG. 7

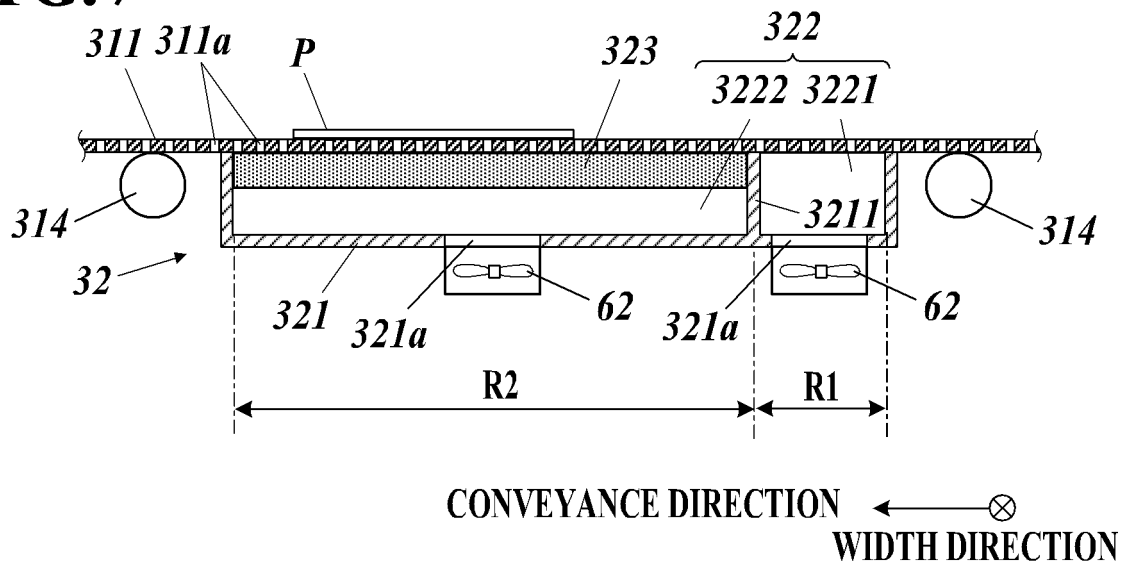


FIG. 8

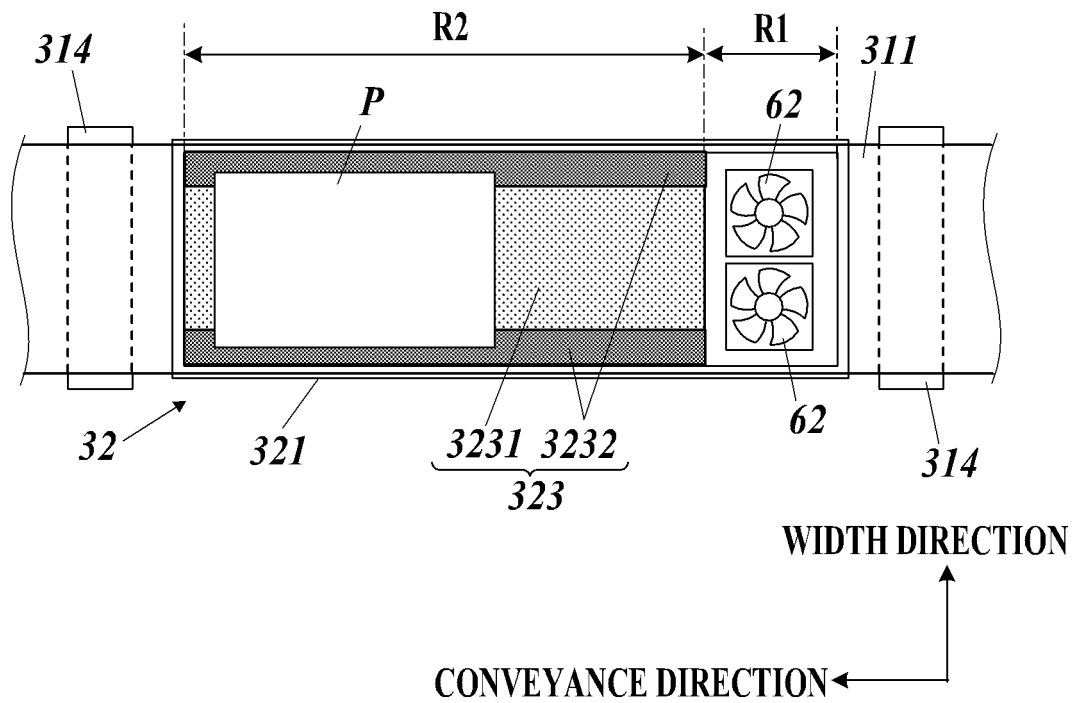


FIG. 9

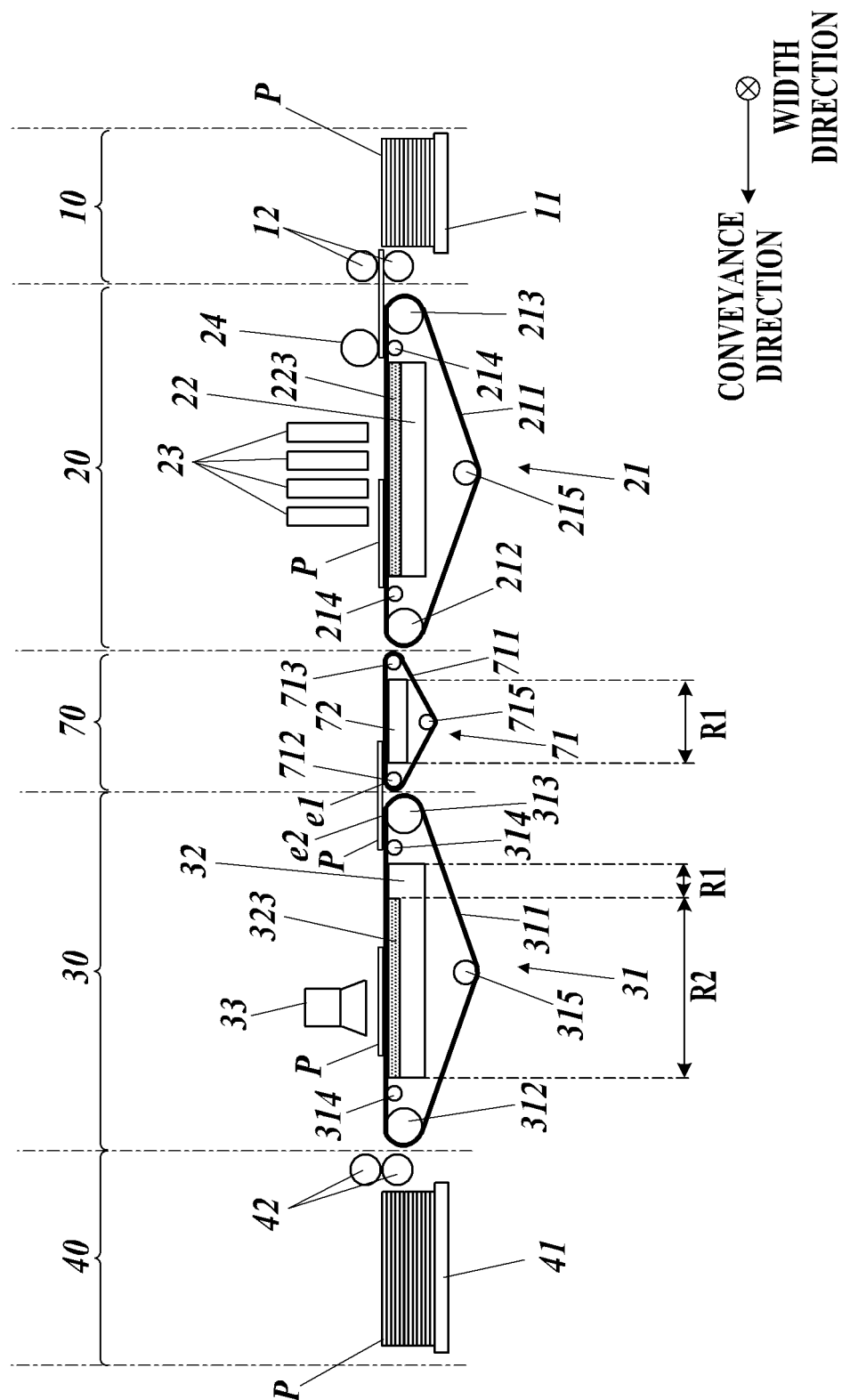
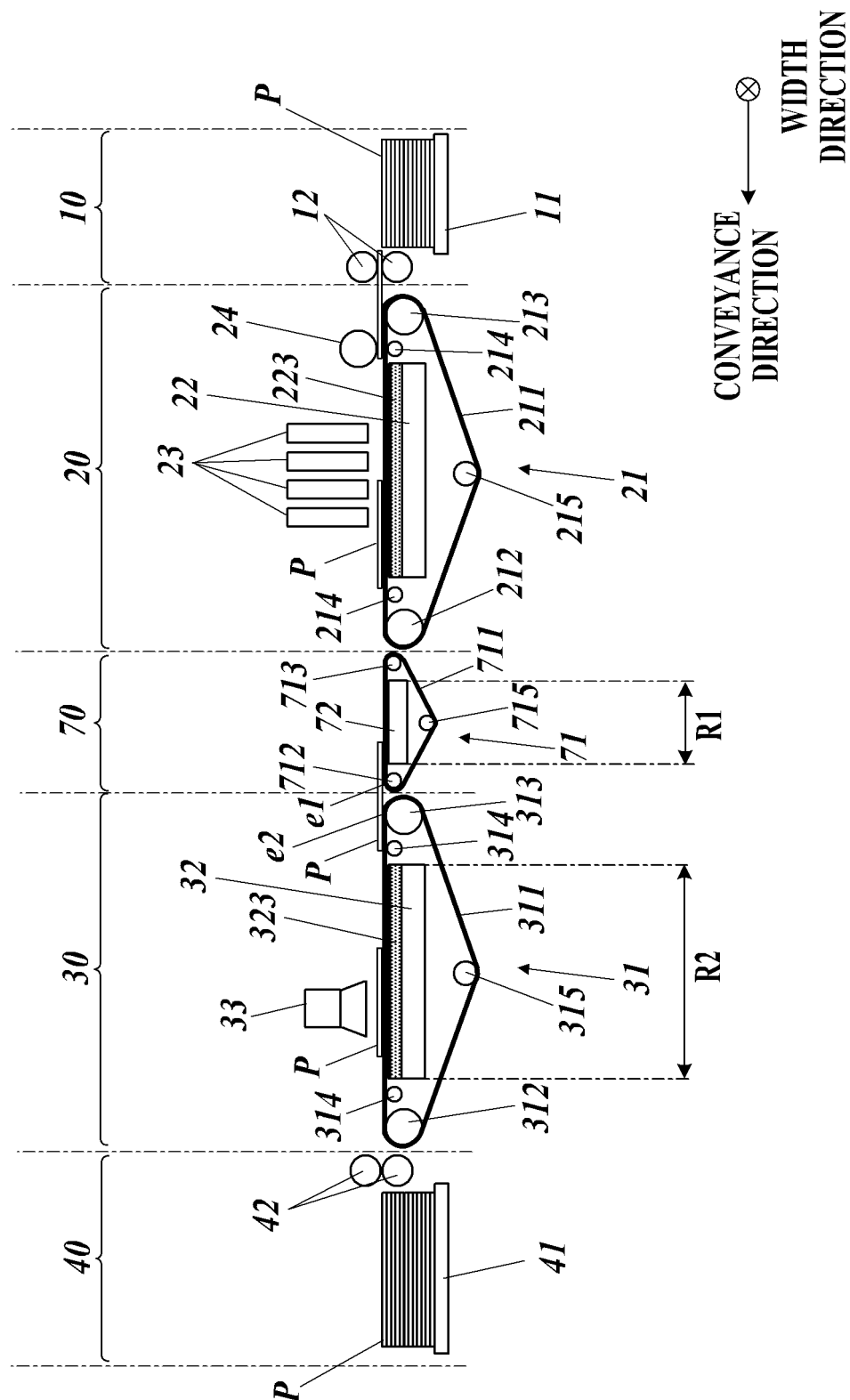


FIG. 10



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2017/035764

A. CLASSIFICATION OF SUBJECT MATTER

B41J2/01 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B41J2/01

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2017

Kokai Jitsuyo Shinan Koho 1971-2017 Toroku Jitsuyo Shinan Koho 1994-2017

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2007-31007 A (Olympus Corp.), 08 February 2007 (08.02.2007), paragraphs [0025] to [0038]; fig. 1, 4 (Family: none)	1, 3, 7-9, 12, 15, 17
Y		5-6, 16
A		2, 4, 10-11, 13-14
Y	JP 2016-150794 A (Canon Inc.), 22 August 2016 (22.08.2016), paragraph [0025] (Family: none)	5-6
Y	JP 2007-83510 A (Fujifilm Corp.), 05 April 2007 (05.04.2007), fig. 3 (Family: none)	16

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search
01 November 2017 (01.11.17)Date of mailing of the international search report
14 November 2017 (14.11.17)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2017/035764

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2001/0046404 A1 (WOTTON et al.), 29 November 2001 (29.11.2001), entire text; all drawings & DE 10117228 A1	1-17

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2013212922 A [0005]
- JP 2015047798 A [0005]