



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.10.2020 Bulletin 2020/44

(51) Int Cl.:
B41J 29/02 (2006.01)

(21) Application number: **20166142.8**

(22) Date of filing: **27.03.2020**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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(30) Priority: **25.04.2019 JP 2019083560**

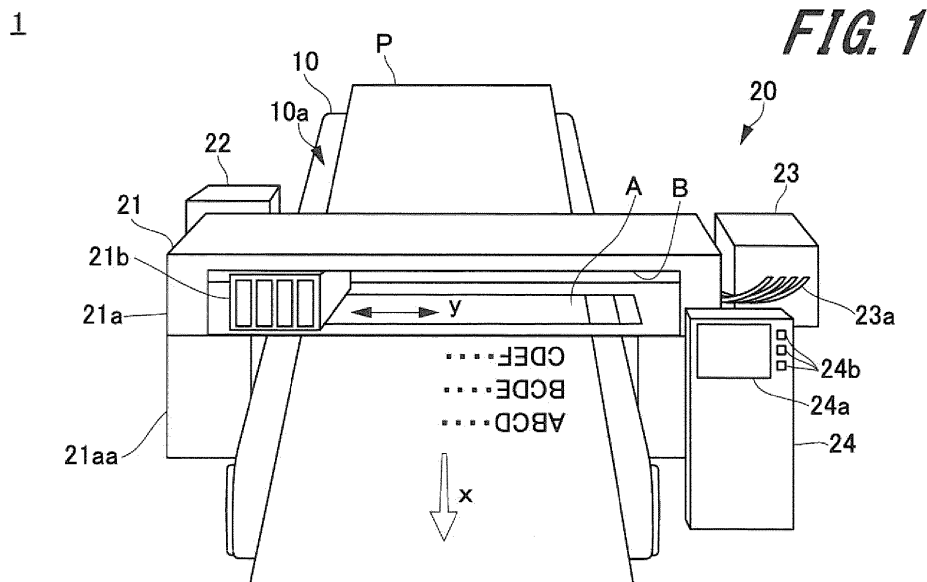
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(54) **INK SUPPLY DEVICE AND IMAGE FORMING APPARATUS**

(57) An ink supply device can improve the freedom in the installation condition with respect to a conveyor for conveying a recording medium in one direction for image formation. The device supplies ink to a sheet recording medium conveyed in one direction by the conveyor for image formation. It includes a supply device main body with several ink heads which is located across the conveyance width direction of the conveyor perpendicular to the conveying direction of the recording medium by the

conveyor. The supply device main body, when installed over the conveyor, has a surface oriented upstream and a surface oriented downstream in the conveying direction and can be inverted in the plane including the conveying direction and conveyance width direction so that the upstream-oriented surface and the downstream-oriented surface are changed and the supply device main body can be thus installed over the conveyor in two ways.



Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The entire disclosure of Japanese Patent Application No. 2019-83560, filed on Apr. 25, 2019, is incorporated herein by reference in its entirety.

BACKGROUND

Technological Field

[0002] The present invention relates to an ink supply device and an image forming apparatus.

Background

[0003] An image forming apparatus which forms an image on a recording medium by supply of ink includes a conveyor for conveying the recording medium and an ink supply device for supplying ink to the recording medium conveyed by the conveyor. As a technique related to such an image forming apparatus, JP-A-2001-287415 discloses the structure in which "one side of the conveyance section for conveying a recording medium for printing is in the shape of an opening and the recording medium can be conveyed in both forward and reverse directions. In this structure, printing can be made regardless of recording medium size and printing can be made regardless of whether the recording medium is conveyed in the forward direction or reverse direction.

Description of the Related Art

Patent Literature

[0004] Patent Literature 1: JP-A-2001-287415

Summary

[0005] In some cases, an ink supply device is newly added to the conveyor of an existing image forming apparatus. If that is the case, the new ink supply device must be installed according to the recording medium conveying direction for image formation in the existing image forming apparatus. However, it often happens that the space to install the new ink supply device is limited and it is difficult to install the new ink supply device or even if the new ink supply device can be installed, it is difficult to ensure a working environment in which the operator can work efficiently.

[0006] Therefore, the present invention has an object to provide an ink supply device which can improve the freedom in the installation condition with respect to a conveyor for an image forming apparatus which conveys a recording medium in one direction for image formation and provide an image forming apparatus which includes such an ink supply device.

[0007] To achieve at least one of the abovementioned objects, according to an aspect of the present invention, an ink supply device which supplies ink to a recording medium conveyed in one direction by a conveyor to form an image, reflecting one aspect of the present invention includes a supply device main body with a plurality of ink heads which is located across the conveyance width direction of the conveyor perpendicular to the conveying direction of the recording medium by the conveyor. The supply device main body, when installed over the conveyor, has a surface oriented upstream in the conveying direction and a surface oriented downstream in the conveying direction and can be inverted in the plane including the conveying direction and the conveyance width direction so that the surface oriented upstream in the conveying direction and the surface oriented downstream in the conveying direction can be changed and the supply device main body can be thus installed over the conveyor in two ways. According to another aspect of the present invention, there is provided an image forming apparatus which includes the above ink supply device.

Brief Description of the Drawings

[0008] The advantages and features provided by one or more embodiments of the invention will become more fully understood from the detailed description given hereinafter and the appended drawings which are given by way of illustration only, and thus are not intended as a definition of the limits of the present invention:

Fig. 1 is a schematic structural diagram (1) which shows an ink supply device and an image forming apparatus according to an embodiment of the invention;

Fig. 2 is a schematic structural diagram (2) which shows the ink supply device and the image forming apparatus according to the embodiment;

Fig. 3 is a structural diagram (1) of the head carriage of the ink supply device according to the embodiment;

Fig. 4 is a structural diagram (2) of the head carriage of the ink supply device according to the embodiment;

Fig. 5 is a diagram (1) which shows an example of installation of the ink supply device and image forming apparatus according to the embodiment; and

Fig. 6 is a diagram (2) which shows an example of installation of the ink supply device and image forming apparatus according to the embodiment.

Detailed Description of Embodiments

[0009] Hereinafter, one or more embodiments of the present invention will be described with reference to the drawings. However, the scope of the invention is not limited to the disclosed embodiments. In the drawings, the same elements are designated by the same reference

signs.

[0010] Fig. 1 is a schematic structural diagram (1) which shows an ink supply device and an image forming apparatus according to an embodiment of the invention. Fig. 2 is a schematic structural diagram (2) which shows the ink supply device and the image forming apparatus according to the embodiment. The image forming apparatus 1 shown in these figures is an apparatus for forming an image on the main surface of a recording medium P. The recording medium P is in the form of a sheet and may be a single sheet or continuous sheet. For the recording medium P, various materials including cloth materials such as fabrics, plain paper, cardboard, thin paper, Japanese paper, specialized paper, corrugated paper and resin film are used. The image forming apparatus 1 includes a conveyor 10 and an ink supply device 20 and is characterized in that the ink supply device 20 can be inverted or turned over with respect to the conveyor 10 as shown in Figs. 1 and 2. Next, the structure of the conveyor 10 of the image forming apparatus 1 and the structure of the ink supply device 20 will be described in detail.

<<Conveyor 10>>

[0011] The conveyor 10 is a device which conveys the recording medium P and adopts, for example, the belt conveyance method as shown in the figures. The belt conveyance type conveyor 10 has an endless belt wound around a plurality of rollers which are not shown in the figures. In the conveyor 10, the outer surface of the endless belt is a loading surface 10a on which the recording medium P in the form of a sheet is placed and the recording medium P fixed on the loading surface 10a by suction is conveyed by rotation of the endless belt with rotation of the rollers in the belt rotation direction. In the example shown in the figures, the upward-facing surface of the endless belt outer surface is the loading surface 10a for the recording medium P.

[0012] The direction x in which the conveyor 10 conveys the recording medium P is one conveying direction x at the time of image formation but it may be the opposite direction [-x] at the time of adjustment of the position of the recording medium P or maintenance of the image forming apparatus 1.

<<Ink Supply Device 20>>

[0013] The ink supply device 20 is a device which supplies ink to the recording medium P conveyed in the prescribed conveying direction x by the conveyor 10. The ink supply device 20 can supply ink across the conveyance width direction y of the loading surface 10a of the conveyor 10. The conveyance width direction y is in a plane parallel to the loading surface 10a and is perpendicular to the conveying direction x of the recording medium P by the conveyor 10.

[0014] The ink supply device 20 adopts, for example, an ink jet system and ejects ink to the recording medium

P conveyed in the prescribed conveying direction x by the conveyor 10 at a prescribed timing. It supplies ink to the recording medium P in a non-contact manner. The ink-jet system of the ink supply device 20 may use a scan method or single-path method. The ink supply device 20 which uses the scan method is described below as an example.

[0015] The ink supply device 20 includes a supply device main body 21, a control console 22, an ink supply unit 23, and an operation unit 24. These are structured as explained below.

<Supply Device Main Body 21>

[0016] The supply device main body 21 has a surface oriented upstream in the conveying direction x and a surface oriented downstream when it is installed over the conveyor 10 and can be inverted in the plane including the conveying direction x and conveyance width direction y so that the surface oriented upstream in the conveying direction x and the surface oriented downstream are changed and it can be thus installed over the conveyor 10 in two ways. The supply device main body 21 includes a casing 21a and a head carriage 21b housed in the casing 21a. These are structured as explained below.

[Casing 21a]

[0017] The casing 21a houses and holds the head carriage 21b and components to activate the head carriage 21b which will be described next. The casing 21a is located across the conveyance width direction y of the loading surface 10a of the conveyor 10, facing the loading surface 10a. In the example shown in the figures, the casing 21a is located above the upward-facing loading surface 10a. In this case, for example, the casing 21a is supported on the floor surface by support legs 21aa on both sides in the conveyance width direction y of the conveyor 10. The casing 21a need not always be supported on the floor surface as shown in the figures; instead, it may be supported by the conveyor 10 or supported by a portion of the building in which the conveyor 10 and the ink supply device 20 are installed, other than the floor surface.

[0018] The casing 21a has an ink supply opening A in its surface facing the loading surface 10a of the conveyor 10. The ink supply opening A extends across the conveyance width direction y of the loading surface 10a of the conveyor 10 so that ink can be supplied from the head carriage 21b to the recording medium P placed on the loading surface 10a along the entire width of the recording medium P.

[0019] In addition, the casing 21a has a surface oriented upstream in the conveying direction x and a surface oriented downstream with the ink supply device 20 installed over the conveyor 10. The casing 21a also includes a maintenance opening B which is used for maintenance of the head carriage 21b and other components

housed in the casing 21a. Fig. 1 shows that the maintenance opening B is made in the lateral surface of the casing 21a which is oriented downstream in the conveying direction x, with the ink supply device 20 installed over the conveyor 10. However, the number of maintenance openings B is not limited to one, but sufficiently large maintenance openings B may be made in a plurality of portions of the casing 21a including the top surface, as necessary.

[0020] The maintenance opening B has a door so that the maintenance opening B can be freely opened or closed, although not shown in the figure. In addition, a track (not shown) may be provided in the casing 21a for the head carriage 21b to scan in the conveyance width direction y in the casing 21a.

[0021] Particularly, the casing 21a can be inverted in the plane including the conveying direction x and conveyance width direction y so that the surface oriented downstream in the conveying direction x and the surface oriented upstream are changed and thus it can be positioned in two ways, in a manner to face the loading surface 10a of the conveyor 10. Specifically, as shown in Fig. 1, the casing 21a can be positioned with respect to the conveyor 10 while the surface having the maintenance opening B is oriented downstream in the conveying direction x. On the other hand, as shown in Fig. 2, the casing 21a can be positioned with respect to the conveyor 10 while the surface having the maintenance opening B is oriented upstream in the conveying direction x.

[Head Carriage 21b]

[0022] Fig. 3 is a structural diagram (1) of the head carriage of the ink supply device according to the embodiment. Fig. 4 is a structural diagram (2) of the head carriage of the ink supply device according to the embodiment. These figures are schematic diagrams of the head carriage 21b as viewed from the bottom side of the head carriage 21b, namely from the loading surface 10a of the conveyor 10.

[0023] As these figures indicate, the head carriage 21b is housed in the casing 21a in a prescribed manner, holding a plurality of ink heads 101, and performs scanning in the conveyance width direction y while housed in the casing 21a. The head carriage 21b holds a plurality of head units 102 holding the ink heads 101, an ink supply drive 103, an ink supply controller 104, and a head controller 105.

-Head Unit 102-

[0024] Each head unit 102 corresponds to one ink color. The various color head units 102 are, for example, a head unit 102c for cyan ink, a head unit 102m for magenta ink, a head unit 102y for yellow ink, and a head unit 102k for black ink. These color head units 102 are arranged along the conveyance width direction y in an arbitrarily set order of colors. The order of arrangement

of the color head units 102 can be changed or their connection to the supply pipes of the ink supply unit 23, which will be described later, can be changed.

[0025] Each head unit 102 holds a plurality of ink heads 101. Each ink head 101 has a plurality of nozzle openings 101b in one nozzle surface 101a and ink is ejected from each nozzle opening 101b at a given timing. Each head unit 102 holds the plural ink heads 101 so that the nozzle surfaces 101a of the ink heads 101 are on the same plane. Also, each head unit 102 holds the plural ink heads 101 in a staggered pattern so that the nozzle openings 101b in the nozzle surfaces 101a of the ink heads 101 are arranged at substantially regular intervals along the conveying direction x. The arrangement of the ink heads 101 may be the same among the head units 102.

[0026] The head units 102 for various colors are held by the head carriage 21b in two ways, namely regardless of whether they are inverted or not in the plane including the conveying direction x and conveyance width direction y, or in the plane in which the opening direction of the nozzle openings 101b is kept constant. Consequently, the ink heads 101 held by each head unit 102 are held by the head carriage 21b in two ways, namely regardless of whether they are inverted or not in the plane including the conveying direction x and conveyance width direction y.

[0027] Therefore, even when the supply device main body 21 is inverted with respect to the conveyor 10 as mentioned above (see Figs. 1 and 2), by inverting the head units 102 held by the head carriage 21b, the positions of the ink heads 101 can be made the same before and after the inversion in the conveying direction x and conveyance width direction y. In this case, the order of the colors of the head units 102 can be kept constant in the conveying direction x and conveyance width direction y by further changing the order of arrangement of the head units 102 or changing the connection of the supply pipes of the ink supply unit 23 to the head units 102 for various colors.

[0028] Therefore, whether the supply device main body 21 is inverted or not in the plane including the conveying direction x and conveyance width direction y, image formation can be made in the same manner on the recording medium P conveyed in the conveying direction x by the conveyor 10. This means that the supply device main body 21 can be installed over the conveyor 10 in two ways, namely whether it is inverted or not in the plane including the conveying direction x and conveyance width direction y.

[0029] Another structure in which the supply device main body 21 can be installed over the conveyor 10 in two ways, namely regardless of whether it is inverted or not in the plane including the conveying direction x and conveyance width direction y, may be a structure in which the ink heads 101 in the head units 102 can be inverted. In this case, the head units 102 held by the head carriage 21b need not be invertible in the head carriage 21b.

-Ink Supply Drive 103-

[0030] The ink supply drive 103 is a drive to supply the color ink supplied from the ink supply unit 23 (see Figs. 1 and 2) which will be described later, to the ink heads 101 of each head unit 102. The ink supply drive 103 includes a pump and an electromagnetic valve.

-Ink Supply Controller 104-

[0031] The ink supply controller 104 controls the ink supply drive 103. The ink supply controller 104 is constituted by a computer such as a microcomputer. The computer includes a CPU (Central Processing Unit) and storages such as a ROM (Read Only Memory) and a RAM (Random Access Memory). Ink supply to each ink head 101 is controlled by the CPU which executes the program stored in the ROM and RAM.

-Head Controller 105-

[0032] The head controller 105 controls the operation of the ink heads 101 according to signals from the operation unit 24 and the control console 22, which will be described later, so that various color inks are ejected from the nozzle openings 101b at given timings. The head controller 105 is constituted by a computer, like the ink supply controller 104. The operation of each ink head 101 is controlled by the CPU which executes the program stored in the ROM and RAM.

[0033] The ink supply drive 103, ink supply controller 104, and head controller 105 are located, for example, at one end of the head carriage 21b in the conveying direction x. Consequently, even when the casing 21a is inverted with respect to the conveyor 10 as mentioned above (see Figs. 1 and 2), the positions of the head units 102 with respect to the casing 21a in the conveyance width direction y can be kept constant.

<Control Console 22>

[0034] Referring back to Figs. 1 and 2, the control console 22 houses electric components for controlling the ink supply device 20 electrically, such as electric controllers and electric devices. The control console 22 may include a meter or a switch though not shown in the figures.

[0035] The control console 22 is kept electrically connected to the supply device main body 21 and may be fixed on the supply device main body 21 or installed separately from the supply device main body 21. For example, as shown in Fig. 1, the control console 22 can be located on the opposite side of the maintenance opening B across the casing 21a and on the left as one faces the maintenance opening B. Also, as shown in Fig. 2, the control console 22 can be located on the opposite side of the maintenance opening B across the casing 21a and on the right as one faces the maintenance opening B.

Although not shown, the ink supply unit 23 can be located on the same side of the casing 21a as the maintenance opening B and on the left or right as one faces the maintenance opening B. The location of the maintenance opening B is not limited to the positions shown in the figures.

<Ink Supply Unit 23>

[0036] The ink supply unit 23 supplies various color inks to the ink heads 101 in the head units 102 held by the head carriage 21b through the ink supply drive 103. The ink supply unit 23 includes a plurality of reservoir tanks for accumulating various color inks (not shown) and a plurality of supply pipes 23a for supplying inks from the reservoir tanks to the ink heads 101 in the head units 102. Each supply pipe 23a is provided with a pump which is connected to the ink supply drive 103.

[0037] Particularly, the ink supply unit 23 is independent from the supply device main body 21 and provided with sufficiently long supply pipes 23a and sufficiently powerful pumps and can be located in a desired position with respect to the supply device main body 21. For example, as shown in Fig. 1, the ink supply unit 23 can be located on the opposite side of the maintenance opening B across the casing 21a and on the right as one faces the maintenance opening B. Also, as shown in Fig. 2, the ink supply unit 23 can be located on the opposite side of the maintenance opening B across the casing 21a and on the left as one faces the maintenance opening B. Although not shown in the figures, the ink supply unit 23 can be located on the same side of the casing 21a as the maintenance opening B and on the left or right as one faces the maintenance opening B. The location of the maintenance opening B is not limited to the positions shown in the figures.

<Operation Unit 24>

[0038] The operation unit 24 has a user interface to enter the settings for the image formation job to be performed using the image forming apparatus 1, which includes, for example, a display panel 24a and operation buttons 24b. For the operation buttons 24b, a touch panel integrated with the display panel 24a may be used. The settings for the image formation job which are entered through the operation unit 24 are, for example, settings to specify the size of the recording medium P for image formation, the image to be formed on the recording medium P, and the image layout.

[0039] In addition to the user interface such as the display panel 24a and operation buttons 24b, the operation unit 24 may include a storage to store image data and a computer to generate image data. The operation unit 24, which is operated as mentioned above, may be the operation part of a personal computer connected to the image forming apparatus 1 or another external device.

[0040] Particularly, the operation unit 24 is independent

ent from the supply device main body 21 and connected to the supply device main body 21 by wire or wirelessly and can be located in a desired position with respect to the supply device main body 21. For example, as shown in Fig. 1, the operation unit 24 can be located on the same side of the casing 21a as the maintenance opening B and on the right as one faces the maintenance opening B. Also, as shown in Fig. 2, the operation unit 24 can be located on the same side of the casing 21a as the maintenance opening B and on the left as one faces the maintenance opening B. Although not shown in the figures, the operation unit 24 can be located on the opposite side of the maintenance opening B across the casing 21a and on the left or right as one faces the maintenance opening B. The location of the maintenance opening B is not limited to the positions shown in the figures.

<<Advantageous effects of the embodiment>>

[0041] The ink supply device 20 according to the embodiment which has been described so far can be inverted in the conveying direction x of the conveyor 10 and thus installed in two ways, thereby improving the freedom in the installation condition with respect to the conveyor 10. Consequently, for example, the orientation of the maintenance opening B of the ink supply device 20 with respect to the conveyor 10 can be changed and the location of the operation unit 24 can be freely determined so that maintainability of the ink supply device 20 can be ensured. Furthermore, as explained below, if the ink supply device 20 is newly added to the conveyor 10 of an existing image forming apparatus, it can be installed so that a high working efficiency is ensured.

[0042] Fig. 5 is a diagram (1) which shows an example of installation of the ink supply device and image forming apparatus according to the embodiment. Fig. 6 is a diagram (2) which shows an example of installation of the ink supply device and image forming apparatus according to the embodiment. These figures show examples of installation of the ink supply device 20 which is newly added to the existing image forming apparatus 1a installed in the confined installation space 1003 between a wall 1001 and a working aisle 1002.

[0043] The existing image forming apparatus 1a includes the conveyor 10 according to the embodiment and an image forming unit 30 which forms an image on the recording medium P conveyed by the conveyor 10. The image forming unit 30 may be an ink supply device or a printer which performs screen printing and may be comprised of one unit or two or more units.

[0044] When the ink supply device 20 according to the embodiment is additionally installed for the existing image forming apparatus 1a, as shown in Fig. 5 the ink supply device 20 may be installed so that the maintenance opening B faces the existing image forming unit 30. In this case, the operation unit 24 can be located near the aisle 1002 and on the same side as the maintenance opening B so that the operator Op can work efficiently

between the operation unit 24 and the maintenance opening B of the ink supply device 20 and the existing image forming unit 30 with a shorter traffic line. Furthermore, the ink supply unit 23 can be located near the aisle 1002 and on the opposite side of the operation unit 24 across the supply device main body 21 so that operation and maintenance work by the operator Op is not hindered and the reservoir tank of the ink supply unit 23 can be replaced easily. In addition, the control console 22, which is not operated usually, can be located near the wall 1001 opposite to the aisle 1002.

[0045] If distance d between the image forming unit 30 and the ink supply device 20 cannot be enough due to the limitation of the installation space 1003, as shown in Fig. 6, the maintenance opening B can be located in a manner to face in the direction opposite to the image forming unit 30. In this case, the operation unit 24 can be located near the aisle 1002 and on the same side as the maintenance opening B so that the operator Op can work efficiently between the operation unit 24 and the maintenance opening B of the ink supply device 20 with a shorter traffic line. Furthermore, the ink supply unit 23 can be located near the aisle 1002 and on the opposite side of the operation unit 24 across the supply device main body 21 so that operation and maintenance work by the operator Op is not hindered and the reservoir tank of the ink supply unit 23 can be replaced easily. In addition, the control console 22, which is not operated usually, can be located near the wall 1001 and opposite the aisle 1002. The location of the maintenance opening B shown in the figures is an example and not limited to the positions shown in the figures.

<<Variations>>

[0046] In the ink supply device 20, the ink heads 101 can be inverted in the head carriage 21b as described above referring to Figs. 3 and 4. However, the ink supply device 20 according to the present invention may have another structure which ensures that the supply device main body 21 can be installed over the conveyor 10 in two ways, namely regardless of whether it is inverted or not in the plane including the conveying direction x and conveyance width direction y of the recording medium P. An example of such a structure may be a structure which includes a data processor for performing processing to invert the image being formed, while the arrangement of the ink heads 101 in the head carriage 21b is fixed.

[0047] The data processor may be housed in the control console 22. In this case, the control console 22 should include a computer such as a microcomputer. The data processor may be the computer of the control console 22 in which a special program is installed. When the CPU of the computer executes the program stored in the ROM and RAM, the process to invert the image data received from the operation unit 24 or an external device is performed.

[0048] The data processor need not always be housed in the control console 22 but may be housed in the operation unit 24 or in the head controller 105 of the head carriage 21b. If the data processor is housed in the operation unit 24, the operation unit 24 should include a computer such as a microcomputer. The data processor may be the computer of the operation unit 24 in which a special program to invert the image data is installed. If the data processor is housed in the head controller 105, the data processor may be the head controller 105 in which a special program to invert the image data is installed.

[0049] The variations as mentioned above can also bring about the same advantageous effects as the above embodiment.

[0050] Although embodiments of the present invention have been described and illustrated in detail, the disclosed embodiments are made for purposes of illustration and example only and not limitation. The scope of the present invention should be interpreted by terms of the appended claims.

Reference Signs List

[0051]

1... image forming apparatus,
 10... conveyor,
 10a... loading surface,
 20... ink supply device,
 21... supply device main body,
 21a... casing,
 21aa... support leg,
 21b... head carriage,
 22... control console,
 23... ink supply unit,
 23a... supply pipe,
 24... operation unit,
 24a... display panel,
 24b... operation button,
 101... ink head,
 101a... nozzle surface,
 101b... nozzle opening,
 102... head unit,
 102k... head unit,
 102c... head unit,
 102m... head unit,
 102y... head unit,
 103... ink supply drive,
 104... ink supply controller,
 105... head controller

Claims

1. An ink supply device 20 for supplying ink to a recording medium P conveyed in one direction by a conveyor 10 to form an image, comprising:

a supply device main body 21 with a plurality of ink heads 101 which is located across a conveyance width direction y of the conveyor 10 perpendicular to a conveying direction x of the recording medium P by the conveyor 10, wherein the supply device main body 21, when installed over the conveyor 10, has a surface oriented upstream in the conveying direction x and a surface oriented downstream in the conveying direction x and can be inverted in a plane including the conveying direction x and the conveyance width direction y so that the surface oriented upstream in the conveying direction x and the surface oriented downstream in the conveying direction x are changed and the supply device main body 21 can be thus installed over the conveyor 10 in two ways.

2. The ink supply device 20 according to claim 1, wherein

the supply device main body 21 has a casing 21a to house the ink heads 101 with nozzle openings 101b of the ink heads 101 oriented in one direction, and
 the ink heads 101 are housed in the casing 21a in two ways with an opening direction of the nozzle openings 101b kept constant, regardless of whether the ink heads 101 are inverted or not.

3. The ink supply device 20 according to claim 2, wherein

the supply device main body 21 has a head carriage 21b for the ink heads 101 to scan in the conveyance width direction y with the ink heads 101 held in the casing 21a, and
 the ink heads 101 are arranged along the conveyance width direction y and held by the head carriage 21b.

4. The ink supply device 20 according to claim 3, wherein an order of arrangement of the ink heads 101 in the head carriage 21b can be changed.

5. The ink supply device 20 according to claim 1, further comprising:

a data processor which processes image data on an image to be formed by supplying ink from nozzle openings 101b of the ink heads 101 to the recording medium P, wherein
 the data processor performs a process to invert the image data.

6. The ink supply device 20 according to any one of claims 1 to 5, further comprising
 a functional part located independently from the sup-

ply device main body 21.

7. The ink supply device 20 according to claim 6, wherein the functional part is at least one of an ink supply unit 23 for supplying ink to the supply device main body 21, an operation unit 24 for operating the supply device main body 21, and a control console 22 for controlling the supply device main body 21 electrically. 5 10
8. An image forming apparatus 1, comprising:
- a conveyor 10 for conveying a recording medium P; and 15
- the ink supply device 20 according to any one of claims 1 to 7, wherein 20
- the conveyor 10 conveys the recording medium P in one direction when an image is formed by the ink supply device 20.
9. The image forming apparatus 1 according to claim 8, wherein the conveyor 10 adopts a belt conveyance method.
10. The image forming apparatus according to claim 8 or 9, comprising, in addition to the ink supply device 20, 25
- an image forming unit for forming an image on the recording medium P conveyed in one direction by the conveyor 10. 30

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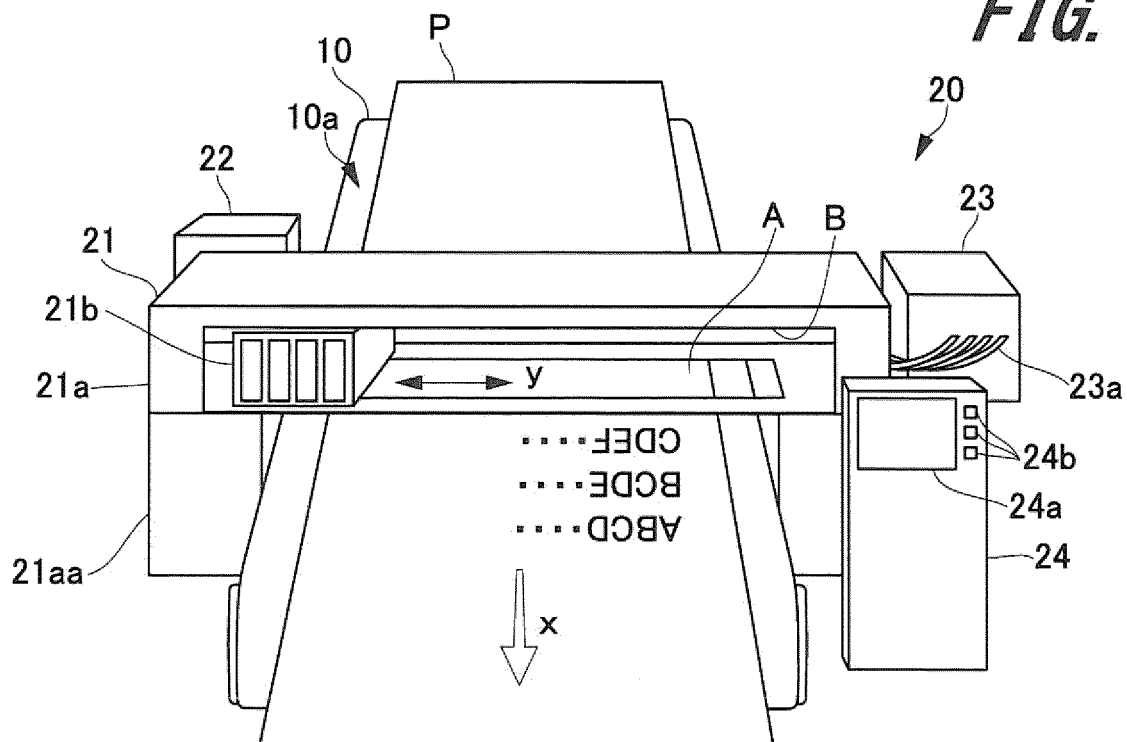
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FIG. 1



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FIG. 2

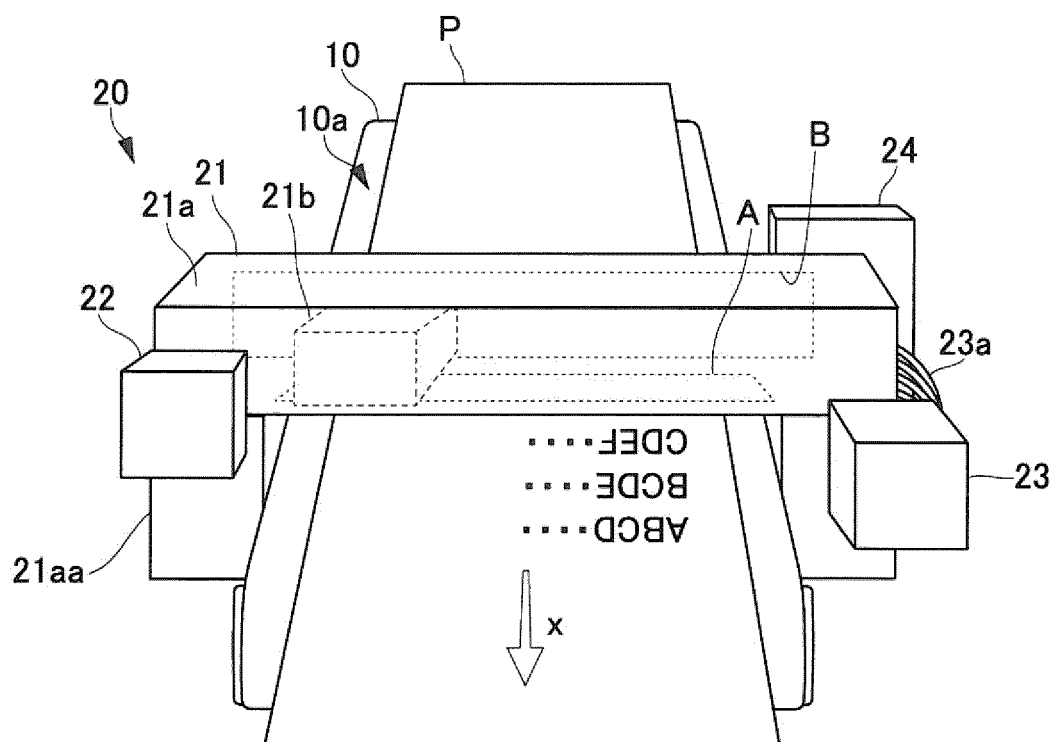


FIG. 3

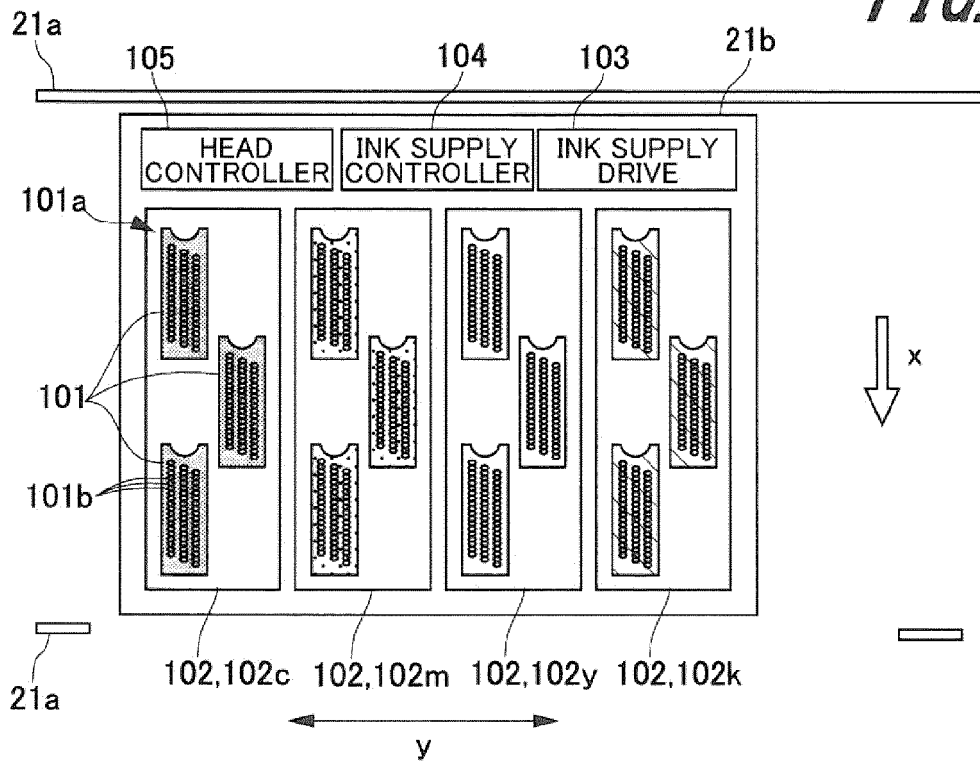
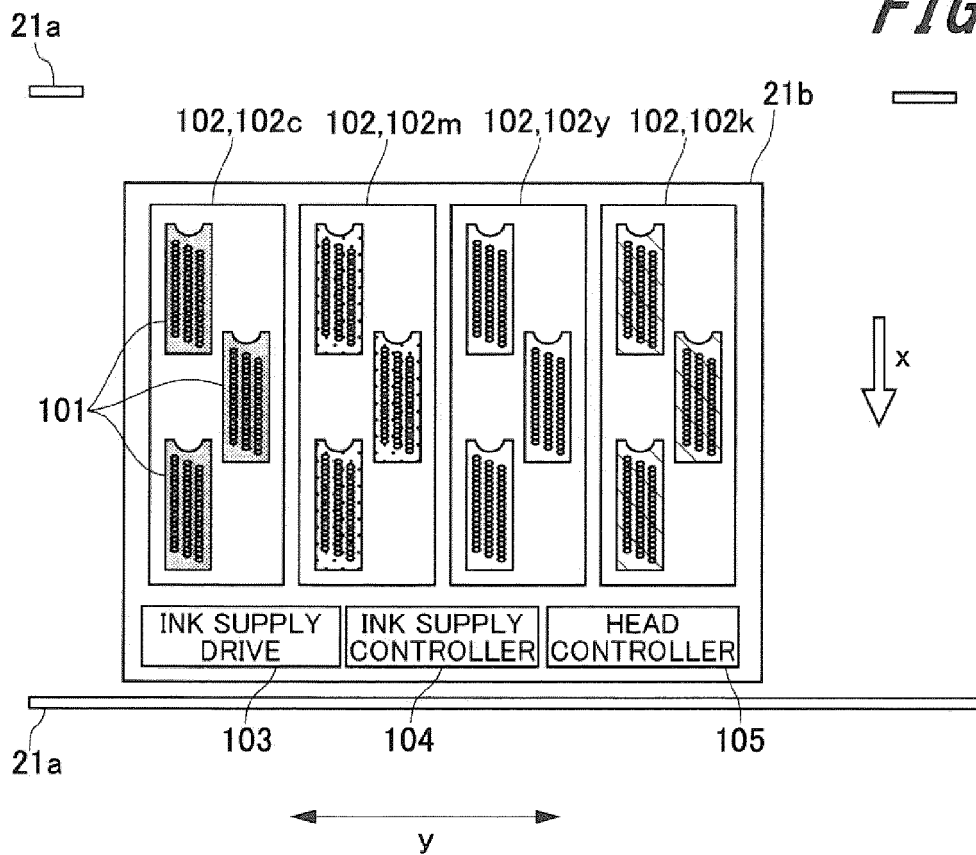


FIG. 4





EUROPEAN SEARCH REPORT

Application Number
EP 20 16 6142

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2004/263568 A1 (UEDA KIYOSHI [JP] ET AL) 30 December 2004 (2004-12-30) * paragraphs [0030] - [0032], [0059], [0062]; figure 5 *	1-10	INV. B41J29/02
X	US 2004/155923 A1 (IKEDA YASUHIKO [JP] ET AL) 12 August 2004 (2004-08-12) * paragraphs [0041] - [0043]; figures 1, 4 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B41J
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 August 2020	Examiner Adam, Emmanuel
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