

(19)



(11)

EP 3 100 859 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
22.07.2020 Bulletin 2020/30

(51) Int Cl.:
B41J 2/165^(2006.01)

(21) Application number: **15739840.5**

(86) International application number:
PCT/JP2015/052239

(22) Date of filing: **27.01.2015**

(87) International publication number:
WO 2015/111757 (30.07.2015 Gazette 2015/30)

(54) INKJET PRINTING DEVICE, INKJET PRINTING METHOD, PRINTING CONTROL DEVICE, PROGRAM, AND RECORDING MEDIUM

TINTENSTRAHLDRUCKVORRICHTUNG, TINTENSTRAHLDRUCKVERFAHREN, DRUCKSTEUERUNGSVORRICHTUNG, PROGRAMM UND AUFZEICHNUNGSMEDIUM

DISPOSITIF ET PROCÉDÉ D'IMPRESSION À JET D'ENCRE, DISPOSITIF DE COMMANDE D'IMPRESSION, PROGRAMME ET SUPPORT D'IMPRESSION

(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

- **AKUTA, Shunsuke**
Tomi-city
Nagano 3890512 (JP)
- **ICHIKAWA, Youichi**
Tomi-city
Nagano 3890512 (JP)

(30) Priority: **27.01.2014 JP 2014012736**

(43) Date of publication of application:
07.12.2016 Bulletin 2016/49

(74) Representative: **Horn Kleimann Waitzhofer**
Patentanwälte PartG mbB
Ganghoferstrasse 29a
80339 München (DE)

(73) Proprietor: **Mimaki Engineering Co., Ltd.**
Tomi-City, Nagano 389-0512 (JP)

(72) Inventors:
• **OCHI, Kazuhiro**
Tomi-city
Nagano 3890512 (JP)

(56) References cited:
EP-A1- 1 557 266 **WO-A1-2004/094150**
WO-A1-2008/069070 **JP-A- 2011 101 974**
JP-A- 2013 060 018 **US-A1- 2011 109 682**

EP 3 100 859 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

TECHNICAL FIELD

[0001] The present invention relates to an inkjet printing device, an inkjet printing method, a printing control device, a program, and a recording medium.

BACKGROUND ART

[0002] JP-A-2002-36644 discloses an inkjet recording apparatus for reducing the time required to record a plurality of images.

[0003] US 2011/109682 A1 discloses a printing apparatus, comprising a conveying mechanism configured to convey a sheet; a printing unit configured to apply an ink onto the sheet conveyed by the conveying mechanism to perform print operation; a drying unit configured to dry the sheet on which an ink has been applied by the printing unit; and a control unit configured to control the conveying mechanism, the printing unit, and the drying unit, wherein the control unit controls the conveying mechanism to vary a sheet conveyance amount per unit time while print operation of one job is in progress, and is configured to control the drying unit depending on variation in the sheet conveyance amount while the print operation of the one job is in progress.

[0004] WO 2008/069070A1 discloses a printer including a printing head which discharges ink onto a wrapping film; a drying heater which blows out a warm wind toward the wrapping film after printing so as to dry the ink attached to the wrapping film and can adjust the temperature of the warm wind; an encoder which detects the convey speed of the wrapping film when it passes the position where the warm wind from the drying heater is applied; and a control unit which controls the temperature of the warm wind from the drying heater in accordance with the convey speed detected by the encoder.

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0005] Some of inkjet printing devices of the related art like the inkjet recording apparatus disclosed in JP-A-2002-36644 have maintenance systems for regularly stopping and cleaning inkjet heads configured to eject ink.

[0006] In such an inkjet printing device, even when an inkjet head is in a stop state for maintenance of the inkjet head, drying of ink ejected on a recording medium progresses. Therefore, in the portion dried during the printing stop period, unevenness in drying ink occurs. Further, this unevenness in drying emerges as density unevenness on the printed material, resulting in a reduction in the quality of the printed material. Especially, in a case of using ink required to be dried at high temperature by a heater or the like, such as latex ink, there is a pos-

sibility that occurrence of density unevenness on printed materials will be remarkably appear.

[0007] The present invention was made in order to solve the above described problem, and an object of the present invention is to provide an inkjet printing device, an inkjet printing method, a printing control device, a program, and a recording medium capable of suppressing occurrence of unevenness in drying during cleaning on an inkjet head.

SOLUTION TO PROBLEM

[0008] In order to achieve the above described object, an inkjet printing device according is provided that has the features of claim 1

[0009] During cleaning on inkjet head, printing using the inkjet head is in a stop state, whereas drying of ink ejected on the recording medium progresses. For this reason, in the portion dried during the printing stop period, unevenness in drying ink may occur. Further, this unevenness in drying emerges as density unevenness on the printed material, resulting in a reduction in the quality of the printed material. Especially, in a case of using ink required to be dried at high temperature, such as latex ink, there is a possibility that occurrence of density unevenness on printed materials will be remarkably appear.

[0010] As the result of repetition of earnest examination for preventing occurrence of drying unevenness during cleaning on the inkjet head, the inventors of the present invention found that it is possible to prevent occurrence of drying unevenness by making the drying efficiency during cleaning on the inkjet head lower than the drying efficiency during printing of the inkjet head or making the drying efficiency during printing of the inkjet head higher than the drying efficiency during manufacturing of the inkjet head, and finally completed the present invention.

[0011] In other words, if the progress of drying of ink during cleaning on the inkjet head is slowed down, it becomes difficult for drying unevenness to occur between a portion dried during a printing period and a portion dried during a printing stop period. Also, even in a case where the progress of drying of ink during printing of the inkjet head is accelerated, similarly, it becomes difficult for drying unevenness to occur between a portion dried during a printing period and a portion dried during a printing stop period. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0012] Also, in the inkjet printing device according to the present invention, the drying means includes a fan configured to blow air toward the printing surface of the recording medium, and the control means makes the rotation speed of the fan during cleaning on the inkjet head lower than the rotation speed of the fan during ejection of ink from the inkjet head.

[0013] According to the above described configuration,

it is possible to make the ink drying efficiency during cleaning on the inkjet head lower than the ink drying efficiency during ejection of ink from the inkjet head, and it is possible to slow down the progress of drying of ink during cleaning on the inkjet head. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0014] Further, in the inkjet printing device according to present invention, the control means may stop the operation of the fan during cleaning on the inkjet head, and operate the fan during ejection of ink from the inkjet head.

[0015] According to the above described configuration, since the fan is operated during ejection of ink, and the fan is stopped during cleaning of ink, it is possible to make the ink drying efficiency during cleaning on the inkjet head lower than the ink drying efficiency during ejection of ink from the inkjet head. As a result, it is possible to slow down the progress of drying of ink during cleaning on the inkjet head, and it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0016] Also, in the inkjet printing device according to the present invention, the drying means includes a fan configured to blow air toward the printing surface of the recording medium, and the control means makes the rotation speed of the fan during ejection of ink from the inkjet head higher than the rotation speed of the fan during cleaning on the inkjet head.

[0017] According to the above described configuration, it is possible to make the drying efficiency during printing of the inkjet head higher than the drying efficiency during cleaning on the inkjet head, and it is possible to accelerate the progress of drying of ink during printing. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0018] Further, in the inkjet printing device according to the present invention, the printing means may have a plurality of inkjet heads, and the control means may stop cleaning when some of the plurality of inkjet heads have been cleaned by the cleaning means, and perform printing on the recording medium by ejecting ink from the inkjet heads, and then perform control such that the cleaning means restarts cleaning and cleans the other uncleaned inkjet heads of the plurality of inkjet heads.

[0019] According to the above described configuration, it is possible to shorten the period of one cleaning event on the inkjet head, that is, the printing stop period, and it becomes difficult for drying unevenness to occur between a portion dried during printing and a portion dried during the printing stop period. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed

material.

[0020] Also, in the inkjet printing device according to the present invention, the drying means includes a heater disposed at a position facing the inkjet head and configured to heat the recording medium from the surface side that is opposite to the printing surface, and the control means may make the heating temperature of the heater during cleaning on the inkjet head lower than the heating temperature of the heater during ejection of ink from the inkjet head.

[0021] According to the above described configuration, it is possible to make the ink drying efficiency during cleaning on the inkjet head lower than the ink drying efficiency during ejection of ink from the inkjet head, and it is possible to slow down the progress of drying of ink during cleaning on the inkjet head. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0022] Further, in the inkjet printing device according to the present invention, the drying means includes a heater disposed at a position facing the inkjet head and configured to heat the recording medium from the surface side that is opposite to the printing surface, and the control means may make the heating temperature of the heater during ejection of ink from the inkjet head higher than the heating temperature of the heater during cleaning on the inkjet head.

[0023] According to the above described configuration, it is possible to make the drying efficiency during printing of the inkjet head higher than the drying efficiency during cleaning on the inkjet head, and it is possible to accelerate the progress of drying of ink during printing. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0024] An inkjet printing method is provided that has the features of claim 6.

[0025] According to the above described configuration, the same effects as those of the inkjet printing device according to the present invention are obtained.

ADVANTAGEOUS EFFECTS OF INVENTION

[0026] According to the present invention, an effect that it is possible to suppress occurrence of density unevenness of a printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material is obtained.

BRIEF DESCRIPTION OF DRAWINGS

[0027]

[Fig. 1] Fig. 1 is a schematic diagram illustrating an inkjet printing device according to an embodiment of

the present invention.

[Fig. 2] Fig. 2 is a schematic diagram illustrating a portion of the inkjet printing device according to the embodiment of the present invention.

[Fig. 3] Fig. 3 is a schematic diagram illustrating another example of the portion of the inkjet printing device according to the embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS

[INKJET PRINTING DEVICE]

[0028] An inkjet printing device according to an embodiment of the present invention will be described below with reference to Figs. 1 and 2. Fig. 1 is a schematic diagram illustrating an inkjet printing device according to an embodiment of the present invention, and Fig. 2 is a schematic diagram illustrating a portion of the inkjet printing device according to the embodiment of the present invention. An inkjet printing device 1 includes a printing unit (a printing means) 10, a heater 20 and a fan 40 configured as drying means, a wiper 12 configured as a cleaning means, and a control unit (a control means) 30.

[0029] The printing unit 10 has an inkjet head 11 configured to perform printing on a recording medium 50 by ejecting ink. The printing unit 10 makes the inkjet head 11 scan the recording medium 50 which is conveyed in a direction shown by arrows in Fig. 1 by a conveying means 60 composed of a plurality of rollers, over the recording medium. In this way, the relative position between the recording medium 50 and the inkjet head 11 is moved. Further, the printing unit ejects ink from the inkjet head 11 moved to a predetermined position, onto the recording medium 50, thereby performing printing on the recording medium 50.

[0030] The inkjet head 11 injects ink drops from nozzles 13 arranged on the bottom of the inkjet head as shown in Fig. 2, onto the recording medium 50. The printing unit 10 needs only to have one inkjet head 11; however, it may be configured to have a plurality of independently controllable inkjet heads such as inkjet heads 11a and 11b shown in Fig. 2.

[0031] The heater 20 and the fan 40 accelerate drying of ink that has landed on the recording medium 50. In the present embodiment, the configuration having both of the heater 20 and the fan 40 as drying means is described as an example; however, the inkjet printing device may have only one of the heater and the fan. Driving of the heater 20 and the fan 40 is controlled by the control unit 30. Since drying of ink that has landed on the recording medium 50 is accelerated by the heater 20 and the fan 40, it is possible to appropriately fix the ink on the recording medium 50 while preventing bleeding of the ink on the recording medium 50.

[0032] The heater 20 is disposed at a position facing the inkjet head 11 with the recording medium 50 interposed therebetween, and heats the recording medium

50 from the surface side that is opposite to the printing surface. In this way, the heater accelerates drying of ink that has landed on the printing surface of the recording medium 50. The heater 20 needs only to be configured to heat the recording medium 50 by transmitting heat to the recording medium 50. As this heater 20, an electric heater or the like using ceramic or nichrome wire can be used.

[0033] Also, a pre-heater (not shown) for heating the recording medium 50 from the printing surface side or the surface side that is opposite to the printing surface may be provided on the upstream side from a position of the recording medium 50 facing the inkjet head 11. By heating the recording medium 50 before landing of ink by the pre-heater, it is possible to accelerate drying of ink immediately after landing of ink, and further prevent bleeding of ink. Also, an after-heater (not shown) for heating the recording medium 50 from the printing surface side or the surface side that is opposite to the printing surface may be provided on the downstream side from the position of the recording medium 50 facing the inkjet head 11. By heating the recording medium 50 after landing of ink by the after-heater, it is possible to accelerate drying of the ink on the recording medium 50, and more appropriately fix the ink on the recording medium 50.

[0034] The fan 40 sends air toward the printing surface of the recording medium 50. The fan 40 needs only to be set, for example, on the ceiling or the like of the inside of a housing containing the individual components of the inkjet printing device 1, and circulate air of the inside of the housing, thereby producing a current of air. Since this current of air is sent to the printing surface of the recording medium 50, drying of ink that has landed on the printing surface of the recording medium 50 is accelerated. Also, a plurality of fans 40 may be provided in the housing containing the individual components of the inkjet printing device 1.

[0035] The wiper 12 is for cleaning the inkjet head 11. If ink is struck in the nozzles 13 or dew is condensed on the inkjet head 11, it may become impossible to appropriately eject ink from the inkjet head 11 during printing (such as a failure in ejection of the nozzles). In order to prevent this, the inkjet head 11 is regularly maintained and cleaned. A method of cleaning the inkjet head 11 is not particularly limited, and it is possible to wipe the nozzle surface of the inkjet head 11, like the wiper 12 shown in Fig. 2.

[0036] It is also possible to move the inkjet head 11 into a maintenance station (not shown) provided at a position spaced from the recording medium 50, and clean the inkjet head inside the maintenance station. In this case, the cleaned inkjet head 11 is returned to the position facing the recording medium 50, and printing restarts.

[0037] The control unit 30 controls driving of the printing unit 10, the heater 20, the fan 40, and the wiper 12. Further, the control unit 30 stops ejection of ink from the inkjet head 11, and makes the wiper 12 clean the inkjet

head 11. At this time, the control unit 30 controls driving of the heater 20 and the fan 40, thereby dissimulating drying efficiency during printing of the inkjet head 11 and drying efficiency during cleaning on the inkjet head 11.

[0038] In other words, the control unit 30 performs at least one of control for making the ink drying efficiency during cleaning on the inkjet head 11 lower than the ink drying efficiency during ejection of ink from the inkjet head 11, and control for making the ink drying efficiency during ejection of ink from the inkjet head 11 higher than the ink drying efficiency during cleaning on the inkjet head 11.

[0039] During cleaning on the inkjet head 11, printing using the inkjet head 11 is in a stop state, whereas drying of ink ejected on the recording medium 50 progresses. For this reason, in the portion dried during the printing stop period, unevenness in drying ink may occur. Further, this unevenness in drying emerges as density unevenness on the printed material, resulting in a reduction in the quality of the printed material. Especially, in a case of using ink required to be dried at high temperature, such as latex ink, there is a possibility that occurrence of density unevenness on printed materials will be remarkably appear.

[0040] As the result of repetition of earnest examination for preventing occurrence of drying unevenness during cleaning on the inkjet head 11, the inventors of the present invention found that it is possible to prevent occurrence of drying unevenness by making the drying efficiency during cleaning on the inkjet head 11 lower than the drying efficiency during printing of the inkjet head 11 or making the drying efficiency during printing of the inkjet head 11 higher than the drying efficiency during manufacturing of the inkjet head 11, and finally completed the present invention.

[0041] In other words, if the progress of drying of ink during cleaning on the inkjet head 11 is slowed down, it becomes difficult for drying unevenness to occur between a portion dried during a printing period and a portion dried during a printing stop period. Also, even in a case where the progress of drying of ink during printing of the inkjet head 11 is accelerated, similarly, it becomes difficult for drying unevenness to occur between a portion dried during a printing period and a portion dried during a printing stop period.

[0042] As a method of making the ink drying efficiency during cleaning on the inkjet head 11 lower than the ink drying efficiency during ejection of ink from the inkjet head 11, the control unit 30 may make the rotation speed of the fan 40 during cleaning on the inkjet head 11 lower than the rotation speed of the fan 40 during ejection of ink from the inkjet head 11. By reducing the rotation speed of the fan 40 during cleaning on the inkjet head 11, it is possible to slow down the progress of drying of ink.

[0043] Also, as another method of making the ink drying efficiency during cleaning on the inkjet head 11 lower than the ink drying efficiency during ejection of ink from the inkjet head 11, the control unit 30 may make the heating temperature of the heater 20 during cleaning on the

inkjet head 11 lower than the heating temperature of the heater 20 during ejection of ink from the inkjet head 11. By reducing the heating temperature of the heater 20 during cleaning on the inkjet head 11, it is possible to slow down the progress of drying of ink.

[0044] As a method of making the drying efficiency during printing of the inkjet head 11 higher than the drying efficiency during cleaning on the inkjet head 11, the control unit 30 may make the rotation speed of the fan 40 during ejection of ink from the inkjet head 11 higher than the rotation speed of the fan 40 during cleaning on the inkjet head 11. By increasing the rotation speed of the fan 40 during printing of the inkjet head 11, it is possible to accelerate the progress of drying of ink during printing.

[0045] Also, as another method of making the drying efficiency during printing of the inkjet head 11 higher than the drying efficiency during cleaning on the inkjet head 11, the control unit 30 may make the heating temperature of the heater 20 during ejection of ink from the inkjet head 11 higher than the heating temperature of the heater 20 during cleaning on the inkjet head 11. By increasing the heating temperature of the heater 20 during printing of the inkjet head 11, it is possible to accelerate the progress of drying of ink during printing.

[0046] The control unit 30 transmits a drive signal for driving the wiper 12, to a wiper driving unit (not shown), at a predetermined timing or in response to an input from a user. The control unit 30 determines whether the inkjet head 11 is being cleaned by, for example, determining whether the wiper 12 has been driven. Alternatively, a control means different from the control unit 30 may control the wiper, and the control unit 30 may recognize whether the wiper is being driven, whereby the control unit 30 may determine whether cleaning is being performed. Then, if determining that the inkjet head 11 is being cleaned, the control unit 30 transmits a signal for changing the drying efficiency depending on at least one of the heater 20 and the fan 40, to the heater driving unit (not shown) and a fan driving unit (not shown). The signal for changing the drying efficiency may be a signal for changing the temperature of the heater 20 or the rotation speed of the fan 40 to a predetermined value, or may be a signal for changing the temperature of the heater 20 and the rotation speed of the fan 40 on the basis of a dry state obtained by performing dry-state detection. Also, it is possible to make the user input a desired drying efficiency, and compute at least one of the temperature of the heater 20 and the rotation speed of the fan 40 according to the desired drying efficiency, and drive the heater 20 and the fan 40 such that the computed temperature and the computed rotation speed are achieved. Also, the control unit 30 may determine whether ink has been ejected from the inkjet head 11, thereby determining whether ink is being ejected from the inkjet head 11. In this case, if determining that ink is being ejected from the inkjet head 11, the control unit 30 transmits a signal for making the drying efficiency depending on at least one of the heater 20 and the fan 40 higher than that during

cleaning, to the heater driving unit and the fan driving unit.

[0047] The control unit 30 may make a voltage value to be applied to the fan 40 during cleaning on the inkjet head 11 lower than a voltage value to be applied to the fan 40 during ejection of ink from the inkjet head 11, thereby decreasing the rotation speed of the fan 40 during cleaning on the inkjet head 11. The control unit 30 may perform control for applying a voltage of 24 V during ejection of ink from the inkjet head 11, for example, by performing control such a voltage to be applied to the fan 40 during cleaning on the inkjet head 11 becomes 0 V (control for stopping the fan).

[0048] Also, the control unit 30 may stop the operation of the fan 40 during cleaning on the inkjet head 11, and operate the fan 40 only during ejection of ink from the inkjet head 11. Also, in a case where the inkjet printing device 1 has a plurality of fans, it is possible to make the number of fans which are operated during cleaning on the inkjet head 11 smaller than the number of fans which are operated during ejection of ink from the inkjet head 11.

[0049] The control unit 30 may make the heating temperature of the heater 20 during cleaning on the inkjet head 11 lower than the heating temperature of the heater 30 during ejection of ink from the inkjet head 11, for example, by performing control for stopping heating of the heater 20 during cleaning on the inkjet head 11 and performing control for making the heating temperature of the heater 20 during ejection of ink from the inkjet head 11 equal to or higher than 60°C. Also, the control unit 30 may stop the operation of the heater 20 during cleaning on the inkjet head 11 and operate the heater 20 only during ejection of ink from the inkjet head 11.

[0050] Also, control of the control unit 30 for making the ink drying efficiency during cleaning on the inkjet head 11 lower than the ink drying efficiency during ejection of ink from the inkjet head 11, or control of the control unit for making the drying efficiency during printing of the inkjet head 11 higher than the drying efficiency during cleaning on the inkjet head 11 may be performed by any one of control on the operation of the heater 20 and control of the operation of the fan 40, or may be performed by both of control on the operation of the heater and control of the operation of the fan.

[0051] Cleaning on the inkjet head 11 may be appropriately performed depending on the state of the inkjet head 11, or may be regularly performed at intervals of a predetermined period. In order to shorten the printing stop period, it is preferable to perform control such that the period of one cleaning event becomes short as much as possible, and it is more preferable that the cleaning period should be equal to or less than 8 seconds.

[0052] Also, in a case where the printing unit 10 has a plurality of inkjet heads 11, such as inkjet heads 11a and 11b, as shown in Fig. 2, the control unit 30 may stop cleaning, for example, when the inkjet head 11a has been cleaned by the wiper 12, and perform printing on the recording medium 50 by ejecting ink from at least one of

the inkjet heads 11a and 11b, and move the wiper 12 toward the inkjet head 11b, and clean the inkjet head 11b.

[0053] In other words, the control unit 30 stops cleaning when some of the plurality of inkjet heads 11 have been cleaned by the wiper 12, and performs printing on the recording medium 50 by ejecting ink from the inkjet heads 11, and then restarts cleaning by the wiper 12, thereby cleaning the other uncleaned inkjet heads 11 of the plurality of inkjet heads 11. As a result, it is possible to reduce the period of one cleaning event, that is, the printing stop period, and it becomes difficult for drying unevenness to occur between a portion dried during printing and a portion dried during the printing stop period.

[0054] Information on a timing to stop cleaning, a cleaning range representing where the wiper 12 should clean until the corresponding timing, and a timing to restart cleaning may be input in advance, for example, by the user, and the control unit 30 may make the user input a desired printing speed and the degree of suppression of drying unevenness, and compute the timings and the cleaning range described above, from the information input by the user. According to the information input by the user and/or the information computed by the control unit 30, the control unit 30 drives the wiper 12, the inkjet head 11, and the like.

[0055] As described above, in the inkjet printing device 1, since the control unit 30 performs at least one of control for making the ink drying efficiency during cleaning on the inkjet head 11 lower than the ink drying efficiency during ejection of ink from the inkjet head 11, and control for making the ink drying efficiency during ejection of ink from the inkjet head 11 higher than the ink drying efficiency during cleaning on the inkjet head 11, it becomes difficult for drying unevenness to occur between a portion dried during a printing period and a portion dried during a printing stop period, and it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0056] Also, although the case where the inkjet heads 11a and 11b are arranged side by side in the transverse direction as shown in Fig. 2 has been described, the present invention is not limited thereto. For example, as shown in Fig. 3, the inkjet heads 11a and 11b may be staggered. Fig. 3 is a schematic view illustrating the modification of the inkjet heads 11. Even by inkjet heads staggered as shown in Fig. 3, it is possible to suppress density unevenness, and provide high-quality printed materials.

[INKJET PRINTING METHOD]

[0057] An inkjet printing method according to an embodiment of the present invention includes a printing process of printing by ejecting ink from an inkjet head onto a recording medium, a drying process of drying ink that has landed on the recording medium, and a cleaning process of stopping ejection of ink from the inkjet head and cleaning the inkjet head, and performs at least one

of control for making the ink drying efficiency of the cleaning process lower than the ink drying efficiency of the printing process, and control for making the ink drying efficiency of the printing process higher than the ink drying efficiency of the cleaning process.

[0058] In other words, the embodiment of the inkjet printing method according to the present invention is a printing method which is performed by the inkjet printing device of the present invention described above. Therefore, the embodiment of the inkjet printing method according to the present invention conforms the above description of the inkjet printing device of the present invention.

[PRINTING CONTROL DEVICE]

[0059] A printing control device according to an embodiment of the present invention is a printing control device configured to control a printing device having an inkjet head for performing printing by ejecting ink onto a recording medium, and performs at least one of control for making the ink drying efficiency during cleaning on the inkjet head lower than the ink drying efficiency during ejection of ink from the inkjet head, and control for making the ink drying efficiency during ejection of ink from the inkjet head higher than the ink drying efficiency during cleaning on the inkjet head.

[0060] In other words, the embodiment of the printing control device according to the present invention is the control unit of the inkjet printing device of the present invention described above. Therefore, the embodiment of the printing control device according to the present invention conforms the above description of the inkjet printing device of the present invention.

[IMPLANTATION EXAMPLE USING SOFTWARE]

[0061] Control of the control unit 30 may be implemented by a logic circuit (hardware) formed on an integrated circuit (an IC chip) and so on, or may be implemented by software which is executed by a CPU (Central Processing Unit).

[0062] In the latter case, the control unit 30 includes a CPU configured to execute commands of a program which is software for implementing its individual functions, a ROM (Read Only Memory) or a storage unit (referred to as the "recording medium") in which the above described program and a variety of data have been recorded so as to be readable in a computer (or a CPU), a RAM (Random Access Memory) for developing the program, and so on. Therefore, if the computer (or the CPU) reads the program from the recording medium and executes the program, the object of the present invention is achieved. As the above described recording medium, a "non-transitory tangible medium", such as a tape, a disk, a card, a semiconductor memory, or a programmable logic circuit, can be used. Also, the program may be supplied to the computer via an arbitrary transmission me-

dium (such as a communication network or a broadcast wave) capable of transmitting the program. Also, the present invention can be implemented in the form of a data signal embedded as an embodiment of the program based on electronic transmission in a carrier wave.

[SUPPLEMENTARY INFORMATION]

[0063] The inkjet printing device 1 includes the printing unit 10 having the inkjet head 11 for performing printing by ejecting ink onto the recording medium 50, the drying means for drying ink that has landed on the recording medium 50, the wiper 12 for cleaning the inkjet head 11, and the control unit 30 for performing at least one of control for making the ink drying efficiency during cleaning on the inkjet head 11 lower than the ink drying efficiency during ejection of ink from the inkjet head 11, and control for making the ink drying efficiency during ejection of ink from the inkjet head 11 higher than the ink drying efficiency during cleaning on the inkjet head 11.

[0064] During cleaning on the inkjet head 11, printing using the inkjet head 11 is in a stop state, whereas drying of ink ejected on the recording medium 50 progresses. For this reason, in the portion dried during the printing stop period, unevenness in drying ink may occur. Further, this unevenness in drying emerges as density unevenness on the printed material, resulting in a reduction in the quality of the printed material. Especially, in a case of using ink required to be dried at high temperature, such as latex ink, there is a possibility that occurrence of density unevenness on printed materials will be remarkably appear.

[0065] As the result of repetition of earnest examination for preventing occurrence of drying unevenness during cleaning on the inkjet head 11, the inventors of the present invention found that it is possible to prevent occurrence of drying unevenness by making the drying efficiency during cleaning on the inkjet head 11 lower than the drying efficiency during printing of the inkjet head 11 or making the drying efficiency during printing of the inkjet head 11 higher than the drying efficiency during manufacturing of the inkjet head 11, and finally completed the present invention.

[0066] In other words, if the progress of drying of ink during cleaning on the inkjet head 11 is slowed down, it becomes difficult for drying unevenness to occur between a portion dried during a printing period and a portion dried during a printing stop period. Also, even in a case where the progress of drying of ink during printing of the inkjet head 11 is accelerated, similarly, it becomes difficult for drying unevenness to occur between a portion dried during a printing period and a portion dried during a printing stop period. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0067] Also, in the inkjet printing device 1, the drying means includes the fan 40 for sending air toward the

printing surface of the recording medium 50, and the control unit 30 makes the rotation speed of the fan 40 during cleaning on the inkjet head 11 lower than the rotation speed of the fan 40 during ejection of ink from the inkjet head 11.

[0068] According to the above described configuration, it is possible to make the ink drying efficiency during cleaning on the inkjet head 11 lower than the ink drying efficiency during ejection of ink from the inkjet head 11, and it is possible to slow down the progress of drying of ink during cleaning on the inkjet head 11. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0069] Further, in the inkjet printing device 1, the control unit 30 stops the operation of the fan 40 during cleaning on the inkjet head 11, and operates the fan 40 during ejection of ink from the inkjet head 11.

[0070] According to the above described configuration, since the fan 40 is operated during ejection of ink, and the fan 40 is stopped during cleaning of ink, it is possible to make the ink drying efficiency during cleaning on the inkjet head 11 lower than the ink drying efficiency during ejection of ink from the inkjet head 11. As a result, it is possible to slow down the progress of drying of ink during cleaning on the inkjet head 11, and it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0071] Also, in the inkjet printing device 1, the drying means includes the fan 40 for sending air toward the printing surface of the recording medium 50, and the control unit 30 makes the rotation speed of the fan 40 during ejection of ink from the inkjet head 11 higher than the rotation speed of the fan 40 during cleaning on the inkjet head 11.

[0072] According to the above described configuration, it is possible to make the drying efficiency during printing of the inkjet head 11 higher than the drying efficiency during cleaning on the inkjet head 11, and it is possible to accelerate the progress of drying of ink during printing. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0073] Also, in the inkjet printing device 1, the printing unit 10 includes the plurality of inkjet heads 11, and the control unit 30 performs control for stopping cleaning when some of the plurality of inkjet heads 11 have been cleaned by the wiper 12, and performing printing on the recording medium 50 by ejecting ink from the inkjet heads 11, and then restarting cleaning by the wiper 12, thereby cleaning the other uncleaned inkjet heads 11 of the plurality of inkjet heads 11.

[0074] According to the above described configuration, it is possible to shorten the period of one cleaning event on the inkjet heads 11, that is, the printing stop period,

and it becomes difficult for drying unevenness to occur between a portion dried during printing and a portion dried during the printing stop period. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0075] Also, in the inkjet printing device 1, the drying means includes the heater 20 disposed at a position facing the inkjet head 11 and configured to heat the recording medium 50 from the surface side that is opposite to the printing surface, and the control unit 30 makes the heating temperature of the heater 20 during cleaning on the inkjet head 11 lower than the heating temperature of the heater 20 during ejection of ink from the inkjet head 11.

[0076] According to the above described configuration, it is possible to make the ink drying efficiency during cleaning on the inkjet head 11 lower than the ink drying efficiency during ejection of ink from the inkjet head 11, and it is possible to slow down the progress of drying of ink during cleaning on the inkjet head 11. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0077] Also, in the inkjet printing device 1, the drying means includes the heater 20 disposed at a position facing the inkjet head 11 and configured to heat the recording medium 50 from the surface side that is opposite to the printing surface, and the control unit 30 makes the heating temperature of the heater 20 during ejection of ink from the inkjet head 11 higher than the heating temperature of the heater 20 during cleaning on the inkjet head 11.

[0078] According to the above described configuration, it is possible to make the drying efficiency during printing of the inkjet head 11 higher than the drying efficiency during cleaning on the inkjet head 11, and it is possible to accelerate the progress of drying of ink during printing. As a result, it is possible to suppress occurrence of density unevenness of the printed material attributable to drying unevenness, thereby preventing a reduction in the quality of the printed material.

[0079] The inkjet printing method includes the printing process of performing printing by ejecting ink from the inkjet head 11 onto the recording medium 50, the drying process of drying ink that has landed on the recording medium 50, and the cleaning process of stopping ejection of ink from the inkjet head 11 and cleaning the inkjet head 11, and performs at least one of control for making the ink drying efficiency in the cleaning process lower than the ink drying efficiency in the printing process, and control for making the ink drying efficiency in the printing process higher than the ink drying efficiency in the cleaning process.

[0080] According to the above described configuration, the same effects as those of the inkjet printing device 1

are achieved.

[0081] The printing control device is a printing control device configured to control the inkjet printing device 1 having the inkjet head 11 for performing printing by ejecting ink onto the recording medium 50, and performs at least one of control for making the ink drying efficiency during cleaning on the inkjet head 11 lower than the ink drying efficiency during ejection of ink from the inkjet head 11, and control for making the ink drying efficiency during ejection of ink from the inkjet head 11 higher than the ink drying efficiency during cleaning on the inkjet head 11.

[0082] According to the above described configuration, the same effects as those of the inkjet printing device 1 are achieved.

[0083] The printing control device may be implemented by a computer. In this case, a printing-control-device control program for implementing the printing control device in a computer by making the computer operate as means for performing the control which the printing control device performs, and a computer-readable recording medium retaining that program are also included in the scope of the present invention.

[0084] The present invention is not limited to the above described embodiments, and can be variously modified within the scope defined by claims, and embodiments which can be obtained by appropriately combining the individual technical means disclosed in the different embodiments are also included in the technical scope of the present invention.

EXAMPLE

[0085] The inventors conducted experiments using an inkjet printer (JV400-160LX made by MIMAKI ENGINEERING CO., LTD.) similar to the inkjet printing device 1, with respect to occurrence of drying unevenness of printed materials depending on regular cleaning on inkjet heads using a wipe.

[0086] The inventors performed printing on media under the condition of a printing speed of 11 m²/h, 900×900 ND, 12 pB (6p×2layer), and 65/55/70+10. As an example, the inventors conducted wiping on two inkjet heads alternately at regular intervals of 5 minutes. As a comparative example, the inventors conducted wiping on two inkjet heads once at regular intervals of 10 minutes. Also, in the example, the period of each of regular wiping events was set to 7 seconds, and in the comparative example, the period of each of regular wiping events was set to 15 seconds. Further, in the example, a voltage to be applied to a ceiling fan was set to 24 V, and the ceiling fan was stopped during wiping. In the comparative example, a voltage to be applied to the ceiling fan during printing and during wiping was set to 20 V.

[0087] As a result, strip patterns attributable to wiping and corresponding to printing parts dried during wiping were seen thinly on the printed materials of the example, but were seen thickly and clearly on the printed materials of the comparative example. Also, the color difference

ΔE (between stripe patterns and the normal state) in the printed materials of the example was 0.9; however, the color difference ΔE in the printed materials of the comparative example was 3.5.

INDUSTRIAL APPLICABILITY

[0088] The present invention can be used in printing using an inkjet printing device.

LIST OF REFERENCE NUMERALS

[0089]

- 1 inkjet printing device
- 10 printing unit (printing means)
- 11 inkjet head
- 12 wiper (cleaning means)
- 13 nozzle
- 20 heater (drying means)
- 30 control unit (control means)
- 40 fan (drying means)
- 50 recording medium
- 60 conveying means

Claims

1. An inkjet printing device (1) comprising:

a printing means having an inkjet head (11) configured to perform printing by ejecting ink onto a recording medium (50);
a drying means (20, 40) configured to dry ink that has landed on the recording medium (50), the drying means (20, 40) including a fan (40) configured to blow air toward the printing surface of the recording medium (50),

characterized in that:

the drying means further includes a heater (20) disposed at a position facing the inkjet head (11) and configured to heat the recording medium (50) from the surface side that is opposite to the printing surface; and the inkjet printing device (1) further includes:

a cleaning means (12) configured to clean the inkjet head (11); and
a control means (30) configured to control the inkjet head (11), the fan (20) and the heater (20),
wherein the control means (30) is configured to make the ink drying efficiency during cleaning of the inkjet head (11) lower than the ink drying efficiency during ejection of ink from the inkjet head

(11) by making the rotation speed of the fan (40) during cleaning of the inkjet head (11) lower than the rotation speed of the fan (40) during ejection of ink from the inkjet head (11) and making the rotation speed of the fan (40) during ejection of ink from the inkjet head (11) higher than the rotation speed of the fan (40) during cleaning of the inkjet head (11).

2. The inkjet printing device (1) according to claim 1, wherein:
the control means (30) stops the operation of the fan (40) during cleaning of the inkjet head (11), and operates the fan (40) during ejection of ink from the inkjet head (11).

3. The inkjet printing device according to claim 1, wherein:

the printing means has a plurality of inkjet heads (11), and
the control mean stops cleaning when some of the plurality of inkjet heads (11) have been cleaned by the cleaning means (12), and performs printing on the recording medium (50) by ejecting ink from the inkjet heads (11), and then controls the cleaning means (12) such that the cleaning means (12) restarts cleaning and cleans the other uncleaned inkjet heads (11) of the plurality of inkjet heads (11).

4. The inkjet printing device according to any one of claims 1 to 3, wherein:
the control means (30) makes the heating temperature of the heater (20) during cleaning of the inkjet head (11) lower than the heating temperature of the heater (20) during ejection of ink from the inkjet head (11).

5. The inkjet printing device according to any one of claims 1 to 4, wherein:
the control means (30) makes the heating temperature of the heater (20) during ejection of ink from the inkjet head (11) higher than the heating temperature of the heater (20) during cleaning of the inkjet head (11).

6. An inkjet printing method comprising:

a printing process of performing printing by ejecting ink from an inkjet head (11) onto a recording medium (50);
a drying process of drying ink that has landed on the recording medium (50) with a drying means (20, 40) including a fan (40) configured to blow air toward the printing surface of the recording medium (50), and a heater (20) dis-

posed at a position facing the inkjet head (11) and configured to heat the recording medium (50) from the surface side that is opposite to the printing surface;

a cleaning process of stopping ejection of ink from the inkjet head (11) and cleaning the inkjet head (11), and

making the rotation speed of the fan (40) during cleaning of the inkjet head (11) lower than the rotation speed of the fan (40) during ejection of ink from the inkjet head (11),

wherein the ink drying efficiency in the cleaning process is made lower than the ink drying efficiency in the printing process, and the ink drying efficiency in the printing process is made higher than the ink drying efficiency in the cleaning process is performed.

7. A program for making a computer function as the printing control device according to claim 5 such that the computer functions as means configured to perform the control.

8. A computer-readable recording medium retaining the program according to claim 7.

Patentansprüche

1. Tintenstrahldruck-Vorrichtung (1), aufweisend:

ein Druck-Mittel mit einem Tintenstrahlkopf (11), welcher dazu eingerichtet ist, ein Drucken durch Ausgeben von Tinte auf ein Aufnahme-Medium (50) auszuführen;

ein Trocknungs-Mittel (20, 40), welches dazu eingerichtet ist, eine auf dem Aufnahme-Medium (50) aufgetroffene Tinte zu trocknen, wobei die Trocknungs-Mittel (20, 40) ein Gebläse (40) aufweisen, welches dazu eingerichtet ist, Luft in Richtung der Druckoberfläche des Aufnahme-Mediums (50) zu blasen,

dadurch gekennzeichnet, dass:

die Trocknungs-Mittel ferner eine Heizung (20) aufweisen, welche an einer dem Tintenstrahlkopf (11) gegenüberliegenden Position angeordnet ist und eingerichtet ist, das Aufnahme-Medium (50) von der Oberflächenseite her, welche der Druckoberfläche gegenüberliegt, zu erwärmen; und
die Tintenstrahldruck-Vorrichtung (1) ferner aufweist:

ein Reinigungs-Mittel (12), welches dazu eingerichtet ist, den Tintenstrahlkopf (11) zu reinigen; und
ein Steuer-Mittel (30), welches dazu

- eingerrichtet ist, den Tintenstrahlkopf (11), das Gebläse (20) und die Heizung (20) zu steuern, wobei das Steuer-Mittel (30) dazu ein-
gerichtet ist, zu bewirken, dass die Tintentrocknungseffizienz während eines Reinigens des Tintenstrahlkopfs (11) niedriger ist als die Tintentrocknungseffizienz während eines Abgebens von Tinte aus dem Tintenstrahlkopf (11), und zwar durch Reduzieren der Drehgeschwindigkeit des Gebläses (40) während des Reinigens des Tintenstrahlkopfs (11) im Vergleich zur Drehgeschwindigkeit des Gebläses (40) während des Abgebens von Tinte aus dem Tintenstrahlkopf (11), und durch Erhöhen der Drehgeschwindigkeit des Gebläses (40) während des Abgebens von Tinte aus dem Tintenstrahlkopf (11) im Vergleich zur Drehgeschwindigkeit des Gebläses (40) während des Reinigens des Tintenstrahlkopfs (11).
2. Tintenstrahl Druck-Vorrichtung (1) gemäß Anspruch 1, wobei:
das Steuer-Mittel (30) den Betrieb des Gebläses (40) während des Reinigens des Tintenstrahlkopfs (11) stoppt, und das Gebläse (40) während des Ausgebens von Tinte aus dem Tintenstrahlkopf (11) betreibt.
3. Tintenstrahl Druck-Vorrichtung gemäß Anspruch 1, wobei:
das Druck-Mittel mehrere Tintenstrahlköpfe (11) aufweist, und
das Steuer-Mittel das Reinigen stoppt, wenn einige der mehreren Tintenstrahlköpfe (11) durch das Reinigungs-Mittel (12) gereinigt wurden, und ein Drucken auf das Aufnahme-Medium (50) durch Ausgeben von Tinte aus den Tintenstrahlköpfen (11) ausführt, und dann das Reinigungs-Mittel (12) derart steuert, dass das Reinigungs-Mittel (12) ein Reinigen erneut startet und die anderen nicht-gereinigten Tintenstrahlköpfe (11) der mehreren Tintenstrahlköpfe (11) reinigt.
4. Tintenstrahl Druck-Vorrichtung gemäß einem der Ansprüche 1 bis 3, wobei:
das Steuer-Mittel (30) die Heiztemperatur der Heizung (20) während des Reinigens des Tintenstrahlkopfs (11) verringert im Vergleich zur Heiztemperatur der Heizung (20) während des Ausgebens von Tinte aus dem Tintenstrahlkopf (11).
5. Tintenstrahl Druck-Vorrichtung gemäß einem der Ansprüche 1 bis 4, wobei:
das Steuer-Mittel (30) die Heiztemperatur der Heizung (20) während des Ausgebens von Tinte aus dem Tintenstrahlkopf (11) erhöht im Vergleich zur Heiztemperatur der Heizung (20) während des Reinigens des Tintenstrahlkopfs (11).
6. Verfahren zum Tintenstrahl Drucken, aufweisend:
einen Druck-Prozess zum Ausführen eines Druckens durch Ausgeben von Tinte aus einem Tintenstrahlkopf (11) auf ein Aufnahme-Medium (50);
einen Trocknungs-Prozess eines Trocknens von auf dem Aufnahme-Medium (50) aufgetroffener Tinte mit einem Trocknungs-Mittel (20, 40), das ein Gebläse (40) aufweist, welches dazu eingerichtet ist, Luft in Richtung der Druckoberfläche des Aufnahme-Mediums (50) zu blasen, und einer Heizung (20), die an einer dem Tintenstrahlkopf (11) gegenüberliegenden Position angeordnet ist und eingerichtet ist, das Aufnahme-Medium (50) von der Oberflächenseite her, welche der Druckoberfläche gegenüberliegt, zu erwärmen;
einen Reinigungs-Prozess eines Stoppens der Ausgabe von Tinte aus dem Tintenstrahlkopf (11) und eines Reinigens des Tintenstrahlkopfs (11), und
ein Verringern der Drehgeschwindigkeit des Gebläses (40) während des Reinigens des Tintenstrahlkopfs (11) im Vergleich zur Drehgeschwindigkeit des Gebläses (40) während der Ausgabe von Tinte aus dem Tintenstrahlkopf (11),
wobei die Tintentrocknungseffizienz bei dem Reinigungs-Prozess im Vergleich zur Tintentrocknungseffizienz bei dem Druck-Prozess verringert wird, und die Tintentrocknungseffizienz bei dem Druck-Prozess im Vergleich zur Tintentrocknungseffizienz bei dem Reinigungs-Prozess erhöht wird.
7. Programm zum Veranlassen eines Computers, als die Druck-Steuvorrichtung gemäß Anspruch 5 zu fungieren, sodass der Computer als Mittel fungiert, das dazu eingerichtet ist, die Steuerung auszuführen.
8. Computerlesbares Aufnahme-Medium, welches das Programm gemäß Anspruch 7 speichert.

Revendications

1. Dispositif d'impression à jet d'encre (1) comprenant :
un moyen d'impression ayant une tête à jet d'encre (11) configurée pour effectuer une impres-

sion en éjectant de l'encre sur un support d'enregistrement (50) ;
un moyen de séchage (20, 40) configuré pour sécher de l'encre qui a atterri sur le support d'enregistrement (50), le moyen de séchage (20, 40) incluant un ventilateur (40) configuré pour souffler de l'air vers la surface d'impression du support d'enregistrement (50),

caractérisé en ce que :

le moyen de séchage inclut en outre un dispositif de chauffage (20) disposé au niveau d'une position faisant face à la tête à jet d'encre (11) et configuré pour chauffer le support d'enregistrement (50) depuis le côté de surface qui est opposé à la surface d'impression ; et
le dispositif d'impression à jet d'encre (1) inclut en outre :

un moyen de nettoyage (12) configuré pour nettoyer la tête à jet d'encre (11) ;
et

un moyen de commande (30) configuré pour commander la tête à jet d'encre (11), le ventilateur (20) et le dispositif de chauffage (20),

dans lequel le moyen de commande (30) est configuré pour rendre l'efficacité de séchage d'encre pendant le nettoyage de la tête à jet d'encre (11) inférieure à l'efficacité de séchage d'encre pendant l'éjection d'encre de la tête à jet d'encre (11) en rendant la vitesse de rotation du ventilateur (40) pendant le nettoyage de la tête à jet d'encre (11) inférieure à la vitesse de rotation du ventilateur (40) pendant l'éjection d'encre de la tête à jet d'encre (11) et en rendant la vitesse de rotation du ventilateur (40) pendant l'éjection d'encre de la tête à jet d'encre (11) supérieure à la vitesse de rotation du ventilateur (40) pendant le nettoyage de la tête à jet d'encre (11).

2. Dispositif d'impression à jet d'encre (1) selon la revendication 1, dans lequel :
le moyen de commande (30) arrête le fonctionnement du ventilateur (40) pendant le nettoyage de la tête à jet d'encre (11), et fait fonctionner le ventilateur (40) pendant l'éjection d'encre de la tête à jet d'encre (11).
3. Dispositif d'impression à jet d'encre selon la revendication 1, dans lequel :

le moyen d'impression comporte une pluralité

de têtes à jet d'encre (11), et
le moyen de commande arrête le nettoyage lorsque certaines têtes à jet d'encre de la pluralité de têtes à jet d'encre (11) ont été nettoyées par le moyen de nettoyage (12), et effectue l'impression sur le support d'enregistrement (50) en éjectant de l'encre des têtes à jet d'encre (11), puis commande le moyen de nettoyage (12) de telle sorte que le moyen de nettoyage (12) redémarre le nettoyage et nettoie les autres têtes à jet d'encre non nettoyées (11) de la pluralité de têtes à jet d'encre (11).

4. Dispositif d'impression à jet d'encre selon l'une quelconque des revendications 1 à 3, dans lequel :
le moyen de commande (30) rend la température de chauffage du dispositif de chauffage (20) pendant le nettoyage de la tête à jet d'encre (11) inférieure à la température de chauffage du dispositif de chauffage (20) pendant l'éjection d'encre de la tête à jet d'encre (11).
5. Dispositif d'impression à jet d'encre selon l'une quelconque des revendications 1 à 4, dans lequel :
le moyen de commande (30) rend la température de chauffage du dispositif de chauffage (20) pendant l'éjection d'encre de la tête à jet d'encre (11) supérieure à la température de chauffage du dispositif de chauffage (20) pendant le nettoyage de la tête à jet d'encre (11).
6. Procédé d'impression à jet d'encre comprenant :
un processus d'impression consistant à effectuer une impression en éjectant de l'encre d'une tête à jet d'encre (11) sur un support d'enregistrement (50) ;
un processus de séchage d'encre consistant à sécher de l'encre qui a atterri sur le support d'enregistrement (50) avec un moyen de séchage (20, 40) incluant un ventilateur (40) configuré pour souffler de l'air vers la surface d'impression du support d'enregistrement (50), et un dispositif de chauffage (20) disposé au niveau d'une position faisant face à la tête à jet d'encre (11) et configuré pour chauffer le support d'enregistrement (50) depuis le côté de surface qui est opposé à la surface d'impression ;
un processus de nettoyage consistant à arrêter l'éjection d'encre de la tête à jet d'encre (11) et à nettoyer la tête à jet d'encre (11), et
le fait de rendre la vitesse de rotation du ventilateur (40) pendant le nettoyage de la tête à jet d'encre (11) inférieure à la vitesse de rotation du ventilateur (40) pendant l'éjection d'encre de la tête à jet d'encre (11),
dans lequel l'efficacité de séchage d'encre dans le processus de nettoyage est rendue inférieure

à l'efficacité de séchage d'encre dans le processus d'impression, et l'efficacité de séchage d'encre dans le processus d'impression est rendue supérieure à l'efficacité de séchage d'encre dans le processus de nettoyage est effectué. 5

7. Programme permettant de faire fonctionner un ordinateur comme dispositif de commande d'impression selon la revendication 5, de telle sorte que l'ordinateur fonctionne comme moyen configuré pour effectuer la commande. 10

8. Support d'enregistrement lisible par ordinateur contenant le programme selon la revendication 7. 15

20

25

30

35

40

45

50

55

FIG. 1

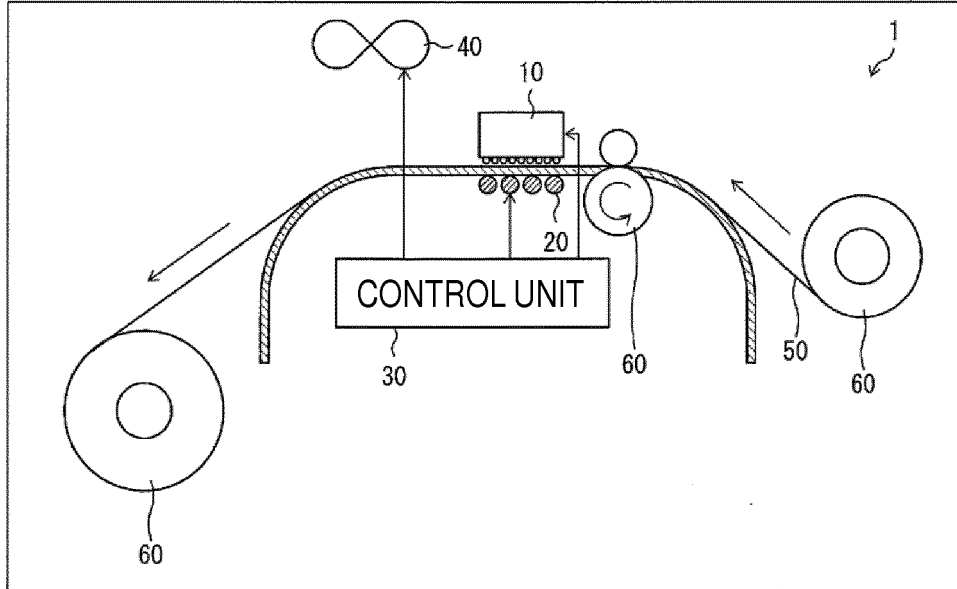


FIG. 2

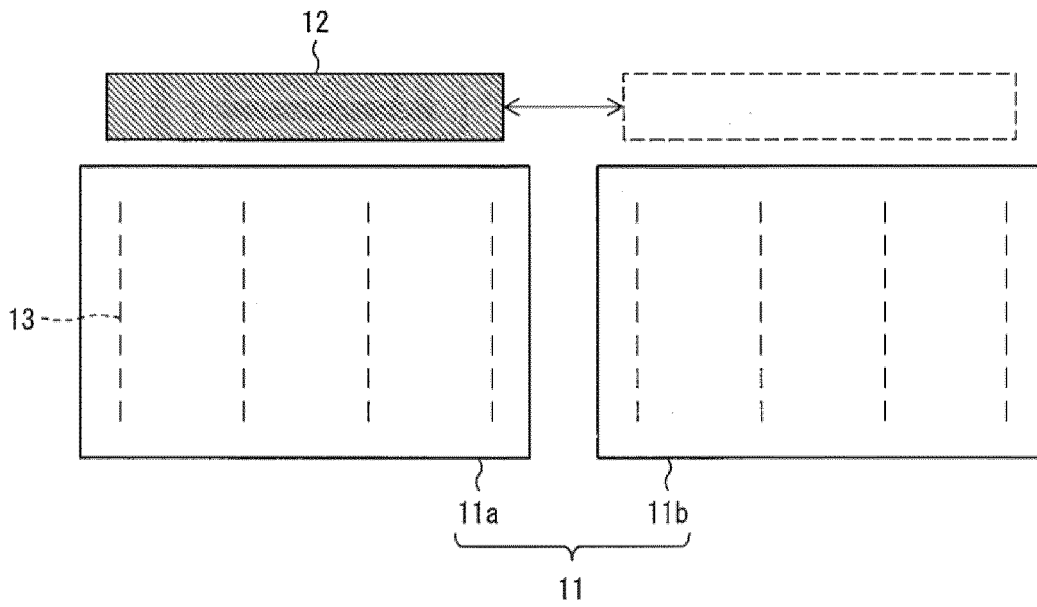
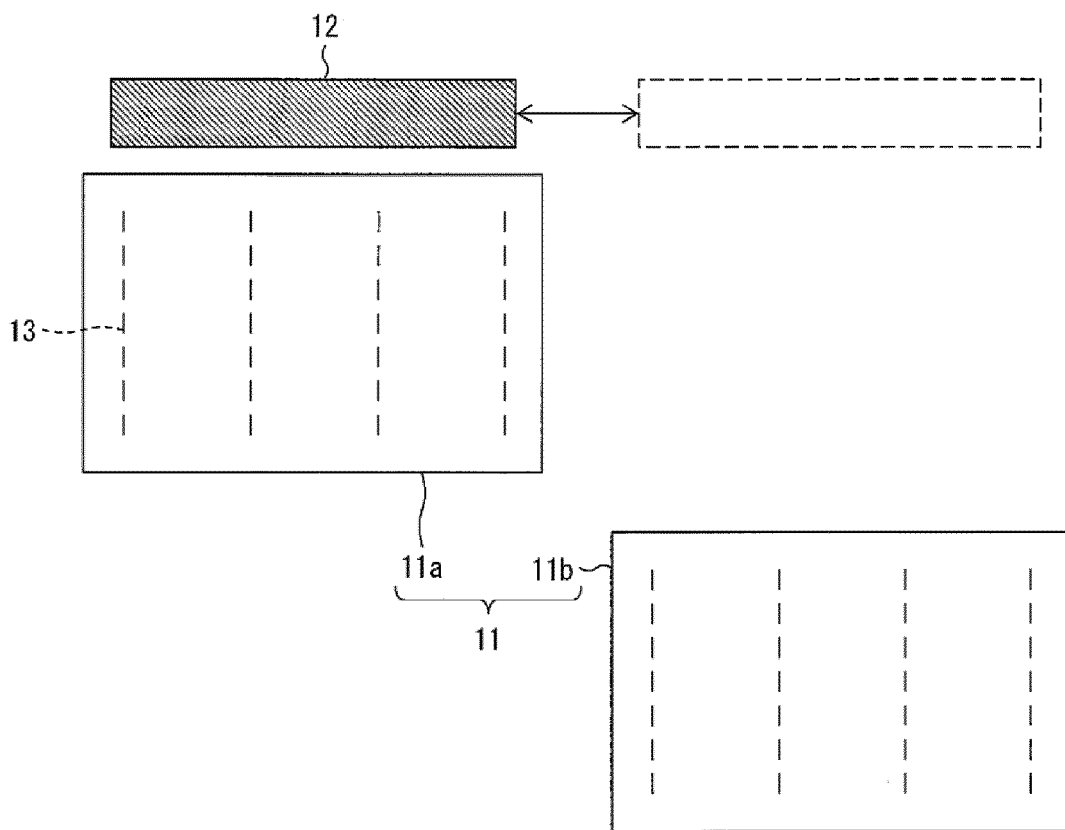


FIG. 3



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2002036644 A [0002] [0005]
- US 2011109682 A1 [0003]
- WO 2008069070 A1 [0004]