(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 398 783 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
07.11.2018 Bulletin 2018/45

(21) Application number: **16882151.0**

(22) Date of filing: **30.12.2016**

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

(86) International application number:
PCT/KR2016/015549

(87) International publication number:
WO 2017/116199 (06.07.2017 Gazette 2017/27)

(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:
MA MD

(30) Priority: **31.12.2015 KR 20150190787**

(71) Applicant: **Inktec Co., Ltd.**
Danwon-gu
Ansan-si, Gyeonggi-do 15426 (KR)

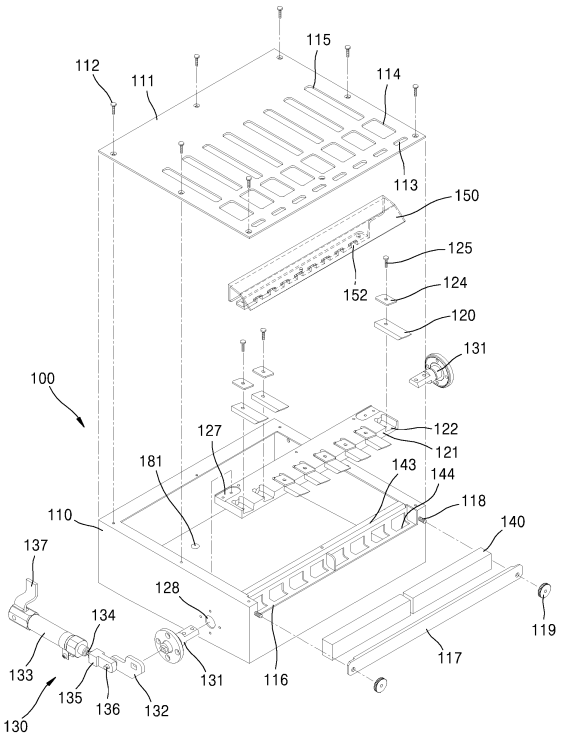
(72) Inventors:
- **NO, Hee Seok**
  Ansan-si
  Gyeonggi-do 15521 (KR)
- **YOU, Byoung Mu**
  Yongin-si
  Gyeonggi-do 16953 (KR)

(74) Representative: **Studio Torta S.p.A.**
Via Viotti, 9
10121 Torino (IT)

(54) DEVICE FOR CLEANING PRINTING HEAD OF INKJET PRINTER

(57) Provided is a printing head cleaning device for an inkjet printer. The printing head cleaning device may include: a waste ink tray; a wiping blade installed in the waste ink tray and configured to clean a printing head of the inkjet printer; a rotation means installed in the waste ink tray and configured to rotate the wiping blade such that the wiping blade is stood up or lain down; and a cleaning means installed in the waste ink tray and configured to clean the wiping blade by contacting the wiping blade when the wiping blade is rotated.

FIG. 2



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Description

TECHNICAL FIELD

[0001] The present disclosure relates to an inkjet printer, and more particularly, to an device for cleaning a printing head of an inkjet printer.

BACKGROUND ART

[0002] An inkjet printer is an apparatus for printing images of a predetermined color on the surface of a print medium by ejecting small droplets of print ink onto desired locations of the print medium.

[0003] In general, the inkjet printer includes a carrier moving back and forth in a predetermined direction, an ink cartridge mounted on the carrier and storing ink, and a printing head provided on the ink cartridge to eject ink. The printing head includes a plurality of nozzles for ejecting ink toward the surface of the print medium.

[0004] However, ink ejected from the plurality of nozzles or foreign materials such as dust gather on the surface of the printing head. In this case, the ink coagulates and blocks the nozzles or the foreign materials block the nozzles such that ink is not ejected or ejected in a wrong direction, resulting in poor print quality.

[0005] In order to prevent this problem, wiping blades move back and forth periodically during a printing operation or after a printing operation to clean the surface of the printing head, thereby removing ink or foreign materials around the nozzles.

[0006] However, ink is gathered on the wiping blades as they clean the printing head, and the ink gathered on the wiping blades coagulates to thereby damage the surface of the printing head or prevent a process of cleaning the surface of the printing head from being smoothly performed. Furthermore, foreign materials such as dust gather on the wiping blades, and the foreign materials damage or contaminate the print head.

[0007] In addition, typical wiping blades are always exposed to the outside even when no cleaning is performed, and accordingly, foreign materials such as dust easily gather on the wiping blades.

[0008] Particularly, in the case of an inkjet printer using UV curable ink, if wiping blades are always exposed to the outside, light or ultraviolet light causes ink gathered on the wiping blades to coagulate more quickly.

DESCRIPTION OF EMBODIMENTS

TECHNICAL PROBLEM

[0009] Provided is a printing head cleaning device for an inkjet printer, having a structure capable of cleanly wiping off ink or foreign materials that have gathered on a wiping blade to prevent a printing head of the inkjet printer from being damaged and to more effectively clean the printing head.

SOLUTION TO PROBLEM

[0010] According to an aspect of the present disclosure, a printing head cleaning device for an inkjet printer may include: a waste ink tray; a wiping blade installed in the waste ink tray and configured to clean a printing head of the inkjet printer; a rotation means installed in the waste ink tray and configured to rotate the wiping blade such that the wiping blade is stood up or lain down; and a cleaning means installed in the waste ink tray and configured to clean the wiping blade by contacting the wiping blade when the wiping blade is rotated.

[0011] The wiping blade may be inclined with respect to a movement direction of the waste ink tray or the printing head.

[0012] A cover plate for covering the waste ink tray may be installed in the waste ink tray, and a cleaning solution injection opening and a wiping blade protrusion opening may be formed in the cover plate in such a way as to penetrate the cover plate, wherein the cleaning solution injection opening is provided for injecting a cleaning solution into the cleaning means, and the wiping blade protrusion opening is provided to enable an upper end of the wiping blade to protrude above the cover plate.

[0013] A waste ink outlet for discharging waste ink stored in the waste ink tray to the outside may be provided in a bottom portion of the waste ink tray, and may be connected to a pump for discharging the waste ink through a waste ink discharge hose, wherein the waste ink discharged by the pump may be stored in a waste ink storage tank.

[0014] The printing head cleaning device may further include a reciprocating means configured to reciprocate the waste ink tray in a predetermined direction.

[0015] The reciprocating means may include two pulleys installed at a predetermined interval along a reciprocating moving direction of the waste ink tray, a driving motor configured to rotate any one of the two pulleys, a belt wound around the two pulleys and configured to circulate, and a belt coupling member fixed to the waste ink tray and coupled with the belt.

[0016] The printing head cleaning device may further include a guiding means configured to guide the waste ink tray to move back and forth, wherein the guiding means may include a guide bar and a slide member, the guide bar extending horizontally in parallel to the direction in which the waste ink tray moves back and forth, and the slide member being fixed to the waste ink tray and coupled to the guide bar in such a way as to be slidable on the guide bar.

[0017] The rotation means may include a support member configured to support the wiping blade, a rotating shaft rotatably provided on both side walls of the waste ink tray and coupled to both ends of the support member, and a driving means configured to rotate the rotating shaft to a predetermined angle.

[0018] The support member may have the shape of a bar extending in a width direction of the waste ink tray,

an insertion groove into which a lower end of the wiping blade is inserted may be provided in the support member, and the lower end of the wiping blade may be fixed to the support member in the state in which the lower end of the wiping blade is inserted into the insertion groove.

[0019] The driving means may include a lever member having one end coupled to the rotating shaft, and a hydraulic cylinder or a pneumatic cylinder coupled to another end of the lever member and configured to push and pull the other end of the lever member.

[0020] A cover member may be installed in the support member, the cover member for covering the wiping blade from above the wiping blade when the wiping blade is rotated to be lain down.

[0021] A discharge hole for discharging ink and foreign materials flowing down along the wiping blade may be provided in the cover member in such a way as to penetrate the cover member.

[0022] When the wiping blade is rotated to be lain down, the cover member may cover the wiping blade protrusion opening formed in the cover plate.

[0023] The cleaning means may include a sponge and a fabric, wherein the sponge is capable of being elastically contacted by the wiping blade and contains a cleaning solution, and the fabric surrounds an outer surface of the sponge.

[0024] The cleaning means may be installed in the waste ink tray such that a portion of the cleaning means overlaps a rotation path of the wiping blade.

[0025] The cleaning means may be installed in an upper front portion of the waste ink tray, a support plate configured to support the cleaning means may be installed in the waste ink tray, and a through hole for exposing the cleaning means is provided in the support plate in such a way that the wiping blade is able to contact the cleaning means.

[0026] An opening for installing the cleaning means and replacing the cleaning means with a new cleaning means may be formed in an upper front portion of the waste ink tray, and a cover plate for covering the opening may be detachably installed in a front portion of the waste ink tray.

ADVANTAGEOUS EFFECTS OF DISCLOSURE

[0027] The printing head cleaning device for the inkjet printer according to the present disclosure may cleanly wipe off ink and foreign materials gathered on the wiping blade, thereby raising the efficiency of cleaning the printing head, while preventing the printing head from being damaged by coagulated ink or foreign materials.

[0028] Also, since the wiping blade is inclined with respect to the moving direction, ink that has gathered on the wiping blade may flow down quickly and smoothly when the printing head is cleaned, such that the wiping blade may be cleaned quickly and thoroughly.

[0029] Also, when the wiping blade is not used, the wiping blade may be rotated to be lain down on the inside of the waste ink tray, and the cover member may cover the upper side of the wiping blade. Therefore, it may be possible to prevent ink gathered on the wiping blade from coagulating due to outside light or ultraviolet light and to prevent foreign materials such as dust from being gathered on the wiping blade.

BRIEF DESCRIPTION OF DRAWINGS

[0030]

FIG.1 is a perspective view of a printing head cleaning device for an inkjet printer, according to the present disclosure;
FIG.2 is an exploded perspective view of the printing head cleaning device shown in FIG.1;
FIG.3 is a perspective view of a reciprocating means for reciprocating a waste ink tray of the printing head cleaning device shown in FIG.1;
FIG.4 is a top view of a wiping blade shown in FIG.1;
FIG.5 is a cross-sectional view of a cleaning means shown in FIG.2;
FIG.6 shows a wiping blade standing up by being rotated by a rotation means shown in FIG.1; and
FIG.7 shows a wiping blade lying down by being rotated by the rotation means shown in FIG.1.

MODE OF DISCLOSURE

[0031] Hereinafter, a printing head cleaning device for an inkjet printer according to the present disclosure will be described in detail with reference to the accompanying drawings. In the following drawings, like reference numerals indicate the same components.

[0032] FIG.1 is a perspective view of a printing head cleaning device for an inkjet printer according to the present disclosure, FIG.2 is an exploded perspective view of the printing head cleaning device shown in FIG. 1, FIG.3 is a perspective view of a reciprocating device for reciprocatingly moving a waste ink tray of the printing head cleaning device shown in FIG.1, FIG.4 is a top view of a wiping blade shown in FIG.1, and FIG.5 is a cross-sectional view of a cleaning device shown in FIG.2. In FIGS.1 and 3, a wiping blade is shown to stand, and in FIG.2, the wiping blade is shown to lie. Referring to FIGS. 1 to 5, a printing head cleaning device 100 for an inkjet printer according to the present disclosure may be used to clean a printing head 20 disposed on a bottom of an ink cartridge 10 of an inkjet printer. The printing head cleaning device 100 may cleanly wipe off ink and foreign materials gathered on a wiping blade 120, as well as removing ink and foreign materials such as dust gathered on the surface of the printing head 20 using the wiping blade 120.

[0033] The printing head cleaning device 100 may include a waste ink tray 110, the wiping blade 120 for cleaning the printing head 20, a rotation means 130 for rotating the wiping blade 120, and a cleaning means 140 for

cleaning the wiping blade 120.

[0034] More specifically, the waste ink tray 110 may be used to store ink and foreign materials (hereinafter, referred to as waste ink) removed from the printing head 20 by the wiping blade 120, and the waste ink tray 110 may be formed in the shape of a rectangular box. In the bottom of the waste ink tray 110, a waste ink outlet 181 may be formed to discharge waste ink stored in the waste ink tray 110 to the outside, which will be described later.

[0035] In the waste ink tray 110, a cover plate 111 for covering the waste ink tray 110 may be provided. The cover plate 111 may be mounted on the waste ink tray 110 using a plurality of screws 112.

[0036] After a printing operation is completed, ink remaining in the inside of the printing head 20 may be generally purged in order to prevent the ink from being coagulated. A purged ink inlet 115 may be formed in the cover plate 111 in such a way to penetrate the cover plate 111, in order to cause the ink purged from the printing head 20 to enter the inside of the waste ink tray 110. Also, in the cover plate 111, a cleaning solution injecting opening 113 and a wiping blade protruding opening 114 may be further formed in such a way to penetrate the cover plate 111, which will be described in detail later.

[0037] The waste ink tray 110 may be movable back and forth in a predetermined direction (a direction of an arrow A). A reciprocating means 160 for moving the waste ink tray 110 back and forth in the direction of the arrow A may be provided.

[0038] The reciprocating means 160 may include two pulleys 162 and 163 installed at a predetermined interval along a reciprocating moving direction of the waste ink tray 110, a driving motor 165 for rotating any one of the two pulleys 162 and 163, a belt 164 wound around the two pulleys 162 and 163 to circulate, and a belt coupling member 161 fixed at the waste ink tray 110 and coupled to the belt 164.

[0039] The belt coupling member 161 may be fixed on an outer surface of the waste ink tray 110, and the two pulleys 162 and 163 and the driving motor 165 may be installed on a frame (not shown) of the inkjet printer.

[0040] When the belt 164 circulates in a predetermined direction by the driving motor 165, the belt coupling member 161 coupled to the belt 164 may move back and forth in the direction of the arrow A, and the waste ink tray 110 at which the belt coupling member 161 is fixed may also move back and forth in the direction of the arrow A.

[0041] Accordingly, the wiping blade 120 (which will be described later) installed in the waste ink tray 110 may also move back and forth in the same direction, that is, in the direction of the arrow A to remove ink and foreign materials gathered on the printing head 20, thereby cleaning the printing head 20. The operation will be described in more detail, later.

[0042] A guide means 170 may be further provided to guide the waste ink tray 110 to move back and forth.

[0043] The guide means 170 may include a guide bar 171 extending horizontally in parallel to the direction in which the waste ink tray 110 moves back and forth, and a slide member 173 fixed at the waste ink tray 110 and coupled to the guide bar 171 in such a way to slide on the guide bar 171. Both ends of the guide bar 171 may be fixed at the frame (not shown) of the inkjet printer using a bracket 172, and two slide members 173 may be disposed at a predetermined interval in the direction in which the waste ink tray 110 moves back and forth.

[0044] When the waste ink tray 110 moves back and forth by the reciprocating means 160, the slide member 173 may slide along the guide bar 171, and accordingly, the waste ink tray 110 may also move back and forth along the guide bar 171 together with the slide member 173 stably without wobbling.

[0045] Meanwhile, the above-described configurations of the reciprocating means 160 and the guide means 170 are preferred examples, and the reciprocating means 160 and the guide means 170 may have other configurations.

[0046] Also, in the current embodiment, the waste ink tray 110 and the wiping blade 120 may move back and forth in the direction of the arrow A, however, it may also be possible that the ink cartridge 10 and the printing head 20 move back and forth in the direction of the arrow A. When the ink cartridge 10 and the printing head 20 move back and forth, the reciprocating means 160 and the guide means 170 may be not provided in the printing head cleaning device 100 according to the present disclosure.

[0047] In the waste ink tray 110, the wiping blade 120, the rotation means 130, and the cleaning means 140 may be installed.

[0048] The wiping blade 120 may contact the surface of the printing head 20 to remove ink and foreign materials such as dust gathered on the surface of the printing head 20, thereby cleaning the printing head 20. The wiping blade 120 may be made of a synthetic resin having elasticity. The wiping blade 120 may be rotatably installed in the waste ink tray 110.

[0049] As shown in FIG.4, the wiping blade 120 may be inclined with respect to the direction (that is, the direction of the arrow A) in which the waste ink tray 110 or the printing head 20 moves back and forth. An angle α of inclination of the wiping blade 120 may be about 60 degrees.

[0050] When the wiping blade 120 is inclined with respect to the direction of the arrow A, ink gathered on the wiping blade 120 may flow down more quickly and smoothly so that the wiping blade 120 may be cleaned quickly and thoroughly.

[0051] The rotation means 130 may function to rotate the wiping blade 120, and be installed in the waste ink tray 110.

[0052] The rotation means 130 may include a support member 121 for supporting the wiping blade 120, rotating shafts 131 rotatably disposed on both side walls of the waste ink tray 110 and coupled to both ends of the support member 121, and a driving means for rotating the rotating

shaft 131 to a predetermined angle.

[0053] The support member 121 may be in the shape of a bar extending in a width direction of the waste ink tray 110, and in the support member 121, an insertion groove 122 may be formed into which a lower end of the wiping blade 120 is inserted. The wiping blade 120 may be firmly fixed at the support member 121 using a clip 124 and a coupling screw 125 in the state in which the lower end of the wiping blade 120 is inserted in the insertion groove 122.

[0054] Meanwhile, in the ink cartridge of the inkjet printer, a plurality of printing heads may be provided, and a plurality of wiping blades 120 may also be provided to correspond to the number of the printing heads. In this case, a plurality of insertion grooves 122 may be formed at regular intervals in the support member 121 in the width direction of the waste ink tray 110, that is, in a longitudinal direction of the support member 121, and the plurality of wiping blades 120 may be respectively inserted in the plurality of insertion grooves 122.

[0055] The rotating shaft 131 may be rotatably inserted in a rotating shaft inserting hole 128 formed in both side walls of the waste ink tray 110 in such a way as to penetrate the side walls of the waste ink tray 110. At both ends of the support member 121, a coupling groove 127 to which one end of the rotating shaft 131 is coupled may be formed. The rotating shaft 131 may be firmly coupled to both ends of the support member 121 using a screw (not shown) in the state in which one end of the rotating shaft 131 is inserted in and coupled to the coupling groove 127.

[0056] The driving means may include a lever member 132 whose one end is coupled to the rotating shaft 131, and a hydraulic cylinder 133 or a pneumatic cylinder coupled to the other end of the lever member 132 to push and pull the other end of the lever member 132. The hydraulic cylinder 133 may be coupled to a bracket 137 fixed on the side wall of the waste ink tray 110, and thus be supported on the bracket 137. A link member 135 may be coupled to one end of a plunger 134 of the hydraulic cylinder 133, and the link member 135 may be coupled to the other end of the lever member 132 through a link pin 136.

[0057] Meanwhile, the above-described configuration of the driving means is a preferred example, and the driving means may have other configurations. For example, the driving means may be a driving motor coupled to the rotating shaft 131 to rotate the rotating shaft 131.

[0058] When the hydraulic cylinder 133 operates, the plunger 134 may push or pull the other end of the lever member 132. As shown in FIG.1, when the plunger 134 of the hydraulic cylinder 133 pushes the other end of the lever member 132, the lever member 132 may rotate in a counterclockwise direction, and accordingly, the rotating shaft 131 may also rotate in the counterclockwise direction so that the wiping blade 120 coupled to the support member 121 may stand vertically. In contrast, as shown in FIG.2, when the plunger 134 of the hydraulic cylinder 133 pulls the other end of the lever member 132, the lever member 132 may rotate in a clockwise direction, and accordingly, the rotating shaft 131 may also rotate in the clockwise direction so that the wiping blade 120 coupled to the support member 121 may lie nearly horizontally. As described above, the wiping blade 120 may be rotated by the rotation means 130 to be stood up vertically or to be lain down. When the wiping blade 120 is rotated to be stood up, the upper end of the wiping blade 120 may protrude above the cover plate 111. In order for the upper end of the wiping blade 120 to protrude above the cover plate 111, a wiping blade protruding opening 114 may be formed in the cover plate 111 in such a way to penetrate the cover plate 111. When a plurality of wiping blades 120 are provided, a plurality of wiping blade protruding openings 114 may be formed at predetermined intervals in a width direction of the cover plate 111.

[0059] Also, a cover member 150 for covering the wiping blade 120 from above the wiping blade 120 when the wiping blade 120 is rotated to be lain down may be installed in the support member 121. The cover member 150 may be coupled to the support member 121 using a screw (not shown) to thus be fixed at the support member 121. A plurality of discharge holes 152 for discharging ink and foreign materials flowing down along the wiping blade 120 to prevent the ink and foreign materials from being collected between the support member 121 and the cover member 150 may be formed in the cover member 150 in such a way to penetrate the cover member 150.

[0060] When the wiping blade 120 is rotated to be lain down, the cover member 150 may cover the wiping blade protruding opening 114 formed in the cover plate 111 to thereby prevent outside light or ultraviolet light from reaching the wiping blade 120 through the wiping blade protruding opening 114 and to prevent foreign materials such as dust from reaching the wiping blade 120. In contrast, when the wiping blade 120 is rotated to be stood up, the cover member 150 may rotate together with the support member 121 to open the wiping blade protruding opening 114 formed in the cover plate 111.

[0061] The cleaning means 140 may contact the wiping blade 120 when the wiping blade 120 is rotated to remove ink and foreign material that has gathered on the wiping blade 120, thereby cleaning the wiping blade 120.

[0062] More specifically, the cleaning means 140 may be installed in the waste ink tray 110 such that a portion of the cleaning means 140 overlaps a rotation path of the wiping blade 120. Accordingly, when the wiping blade 120 rotates, the upper end of the wiping blade 120 may contact the cleaning means 140 to be cleaned. The operation will be described in more detail, later.

[0063] The cleaning means 140 may include a sponge 141, and a fabric 142 surrounding the outer surface of the sponge 141. Since the sponge 141 is porous, the sponge 141 may contain a large amount of a cleaning solution, and since the sponge 141 has elasticity, the wiping blade 120 may contact the sponge 141 closely without being damaged. Also, the fabric 142 surrounding

the outer surface of the sponge 141 may have high durability compared to the sponge 141 to prevent the sponge 141 from being damaged by a direct contact to the wiping blade 120, thereby elongating the life of the cleaning means 140. Also, when the fabric 142 is stained or damaged, the fabric 142 may be easily replaced with new one, resulting in a reduction of maintenance cost.

[0064] Also, a plurality of cleaning solution injecting openings 113 for injecting a cleaning solution into the cleaning means 140 may be formed in the cover plate 111 in such a way to penetrate the cover plate 111. Since the cleaning solution injecting openings 113 are formed in the cover plate 111, it may be possible to easily inject a cleaning solution into the cleaning means 140 without separating the cleaning means 140 from the waste ink tray 110.

[0065] The cleaning means 140 may be installed in an upper front portion of the waste ink tray 110. In order to install the cleaning means 140 in the front, upper portion of the waste ink tray 110, a support plate 143 for supporting the cleaning means 140 may be installed in the waste ink tray 110. Also, in the support plate 143, a through hole 144 for exposing the cleaning means 140 may be formed such that the wiping blade 120 may contact the cleaning means 140.

[0066] In the upper front portion of the waste ink tray 110, an opening 116 for installing the cleaning means 140 and replacing it with a new one may be formed. Also, a cover plate 117 for covering the opening 116 may be detachably installed in the front portion of the waste ink tray 110 using a bolt 118 and a nut 119.

[0067] FIG.6 shows the wiping blade standing by being rotated by the rotation means shown in FIG.1, and FIG. 7 shows the wiping blade lying by being rotated by the rotation means shown in FIG.1.

[0068] Referring first to FIG.6, when the wiping blade 120 is rotated by the rotation means 130 to be stood up vertically, an operation of cleaning the printing head 20 disposed on the ink cartridge 10 may be performed. The upper end of the wiping blade 120 may protrude above the cover plate 111 through the wiping blade protruding opening 114 formed in the cover plate 111, and the cover member 150 installed in the support member 121 may rotate to open the wiping blade protruding opening 114.

[0069] In order to prevent ink gathered on the printing head 20 from being coagulated before the operation of cleaning the printing head 20 using the wiping blade 120, an operation of purging ink remaining in the inside of the printing head 20 may be first performed. At this time, the purged ink inlet 115 formed in the cover plate 111 may be located immediately below the printing head 20, and in this state, ink purged from the printing head 20 may enter the inside of the waste ink tray 110 through the purged ink inlet 115 to be stored in the inside of the waste ink tray 110.

[0070] After the purging operation is completed, the waste ink tray 110 and the wiping blade 120 may move rearward in the direction of the arrow A by the reciprocating means 160, and at this time, the upper end of the wiping blade 120 may contact the surface of the printing head 20 to remove ink and foreign material gathered on the surface of the printing head 20. The ink and foreign materials removed from the printing head 20 may flow down along the surface of the wiping blade 120 to be stored in the inside of the waste ink tray 110. Particularly, the ink and foreign materials flowing down between the support member 121 and the cover member 150 from the wiping blade 120 may pass through the discharge holes 152 penetrating the cover member 150 to be stored in the inside of the waste ink tray 110.

[0071] The waste ink stored in the inside of the waste ink tray 110 may be discharged to the outside through the waste ink outlet 181 formed in the bottom of the waste ink tray 110. The waste ink outlet 181 may be connected to a pump 183 for discharging waste ink through a waste ink discharge hose 182, and waste ink discharged by the pump 183 may be stored in a waste ink storage tank 184.

[0072] Meanwhile, as described above, the ink cartridge 10 and the printing head 20, instead of the waste ink tray 110, may move back and forth in the direction of the arrow A, and at this time, the wiping blade 120 may clean the surface of the printing head 20.

[0073] After the operation of cleaning the printing head 20 is completed, the wiping blade 120 may be rotated by the rotation means 130 to be lain down nearly horizontally, as shown in FIG.7. At this time, the upper end of the rotating wiping blade 120 may contact the cleaning means 140 through the through hole 144 formed in the support plate 143 supporting the cleaning means 140 so that ink and foreign materials gathered on the wiping blade 120 may be removed. At this time, the wiping blade 120 may fully enter the inside of the waste ink tray 110, and the cover member 150 may cover the upper end of the wiping blade 120 to close the wiping blade protruding opening 114 formed in the cover plate 111. Accordingly, the cover member 150 may prevent outside light or ultraviolet light from reaching the wiping blade 120 through the wiping blade protruding opening 114, while preventing foreign materials such as dust from reaching the wiping blade 120 through the wiping blade protruding opening 114. When the lying wiping blade 120 is rotated by the rotation means 130 to be stood up again, the upper end of the wiping blade 120 may contact the cleaning means 140 so that ink and foreign materials gathered on the wiping blade 120 may be removed.

[0074] As described above, the printing head cleaning device 100 for the inkjet printer according to the present disclosure may cleanly wipe off ink and foreign materials gathered on the wiping blade 120, as well as cleaning the surface of the printing head 20 using the wiping blade 120. Accordingly, the printing head cleaning device 100 may raise the efficiency of cleaning the printing head 20, while preventing the printing head 20 from being damaged by coagulated ink or foreign materials.

[0075] While the present disclosure has been described with reference to exemplary embodiments shown

in the drawings, it will be understood by one of ordinary skill in the art that various modifications and equivalent embodiments may be made from the embodiments. Thus, the scope of the present disclosure should be defined by the appended claims.

Claims

1. A printing head cleaning device for an inkjet printer, comprising:

   a waste ink tray;
   a wiping blade installed in the waste ink tray and configured to clean a printing head of the inkjet printer;
   a rotation means installed in the waste ink tray and configured to rotate the wiping blade such that the wiping blade is stood up or lain down; and
   a cleaning means installed in the waste ink tray and configured to clean the wiping blade by contacting the wiping blade when the wiping blade is rotated.

2. The printing head cleaning device of claim 1, wherein the wiping blade is inclined with respect to a movement direction of the waste ink tray or the printing head.

3. The printing head cleaning device of claim 1, wherein a cover plate for covering the waste ink tray is installed in the waste ink tray, and
   wherein a cleaning solution injection opening and a wiping blade protrusion opening are provided in the cover plate in such a way as to penetrate the cover plate, wherein the cleaning solution injection opening is provided for injection of a cleaning solution into the cleaning means, and the wiping blade protrusion opening is provided to enable an upper end of the wiping blade to protrude above the cover plate.

4. The printing head cleaning device of any one of claims 1 to 3, wherein a waste ink outlet for discharging waste ink stored in the waste ink tray to the outside is provided in a bottom portion of the waste ink tray, and is connected to a pump for discharging the waste ink through a waste ink discharge hose, wherein the waste ink discharged by the pump is stored in a waste ink storage tank.

5. The printing head cleaning device of claim 1, further comprising a reciprocating means configured to reciprocate the waste ink tray in a predetermined direction.

6. The printing head cleaning device of claim 5, wherein the reciprocating means comprises two pulleys installed at a predetermined interval along a reciprocating moving direction of the waste ink tray, a driving motor configured to rotate any one of the two pulleys, a belt wound around the two pulleys and configured to circulate, and a belt coupling member fixed to the waste ink tray and coupled with the belt.

7. The printing head cleaning device of claim 5 or 6, further comprising a guiding means configured to guide the waste ink tray to move back and forth,
   wherein the guiding means comprises a guide bar and a slide member, the guide bar extending horizontally in parallel to the direction in which the waste ink tray moves back and forth, and the slide member being fixed to the waste ink tray and coupled to the guide bar in such a way as to be slidable on the guide bar.

8. The printing head cleaning device of any one of claims 1 to 3, wherein the rotation means comprises a support member configured to support the wiping blade, a rotating shaft rotatably provided on both side walls of the waste ink tray and coupled to both ends of the support member, and a driving means configured to rotate the rotating shaft to a predetermined angle.

9. The printing head cleaning device of claim 8, wherein the support member has the shape of a bar extending in a width direction of the waste ink tray, an insertion groove into which a lower end of the wiping blade is inserted is provided in the support member, and the lower end of the wiping blade is fixed to the support member in a state in which the lower end of the wiping blade is inserted into the insertion groove.

10. The printing head cleaning device of claim 8, wherein the driving means comprises a lever member having one end coupled to the rotating shaft, and a hydraulic cylinder or a pneumatic cylinder coupled to another end of the lever member and configured to push and pull the other end of the lever member.

11. The printing head cleaning device of claim 8, wherein a cover member is installed in the support member, the cover member for covering the wiping blade from above the wiping blade when the wiping blade is rotated to be lain down.

12. The printing head cleaning device of claim 11, wherein a discharge hole for discharging ink and foreign materials flowing down along the wiping blade is provided in the cover member in such a way as to penetrate the cover member.

13. The printing head cleaning device of claim 11, wherein when the wiping blade is rotated to be lain down, the cover member covers the wiping blade

protrusion opening formed in the cover plate.

14. The printing head cleaning device of any one of claims 1 to 3, wherein the cleaning means comprises a sponge and a fabric, wherein the sponge is capable of being elastically contacted by the wiping blade and contains a cleaning solution, and the fabric surrounds an outer surface of the sponge.

15. The printing head cleaning device of claim 14, wherein the cleaning means is installed in the waste ink tray such that a portion of the cleaning means overlaps a rotation path of the wiping blade.

16. The printing head cleaning device of claim 15, wherein the cleaning means is installed in an upper front portion of the waste ink tray, a support plate configured to support the cleaning means is installed in the waste ink tray, and a through hole for exposing the cleaning means is formed in the support plate in such a way that the wiping blade is able to contact the cleaning means.

17. The printing head cleaning device of claim 15, wherein an opening for installing the cleaning means and replacing the cleaning means with a new cleaning means is formed in an upper front portion of the waste ink tray, and a cover plate for covering the opening is detachably installed in a front portion of the waste ink tray.

FIG. 1

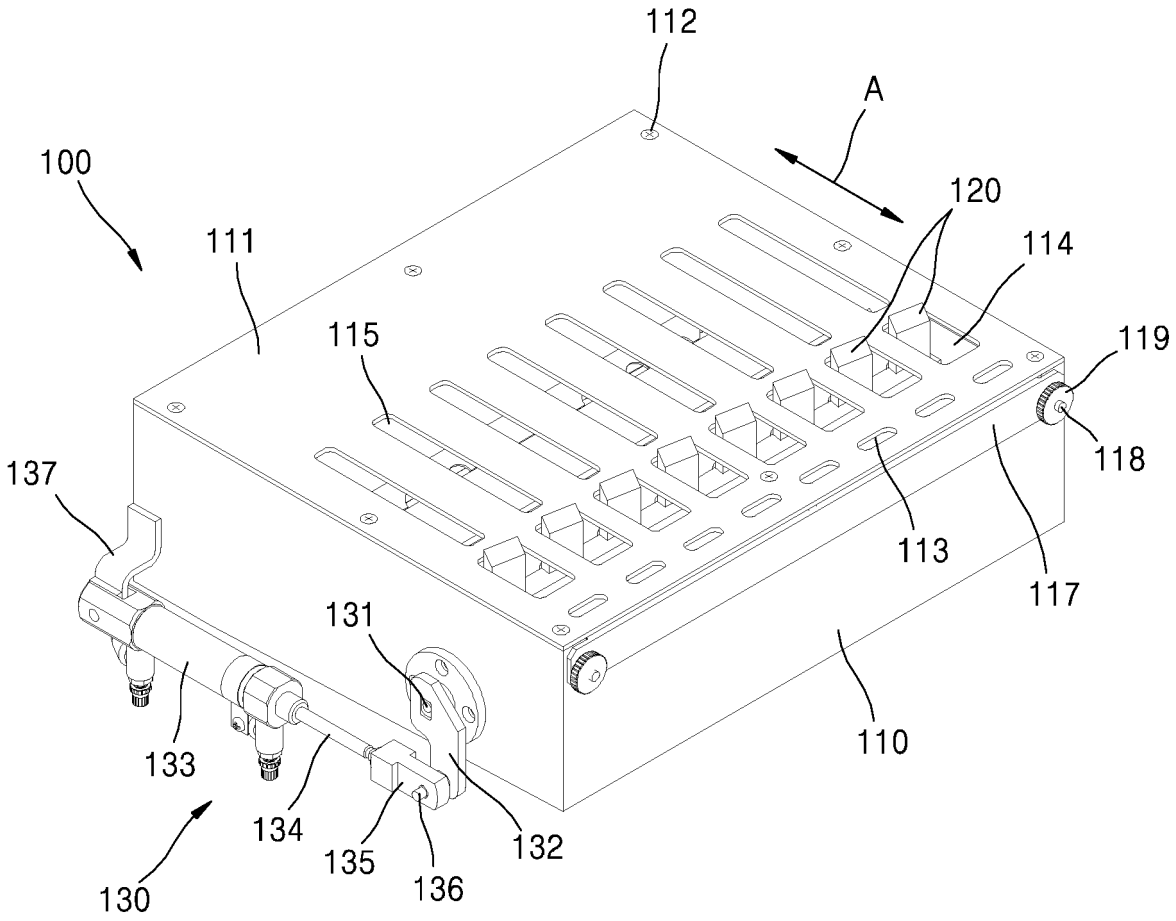
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FIG. 2

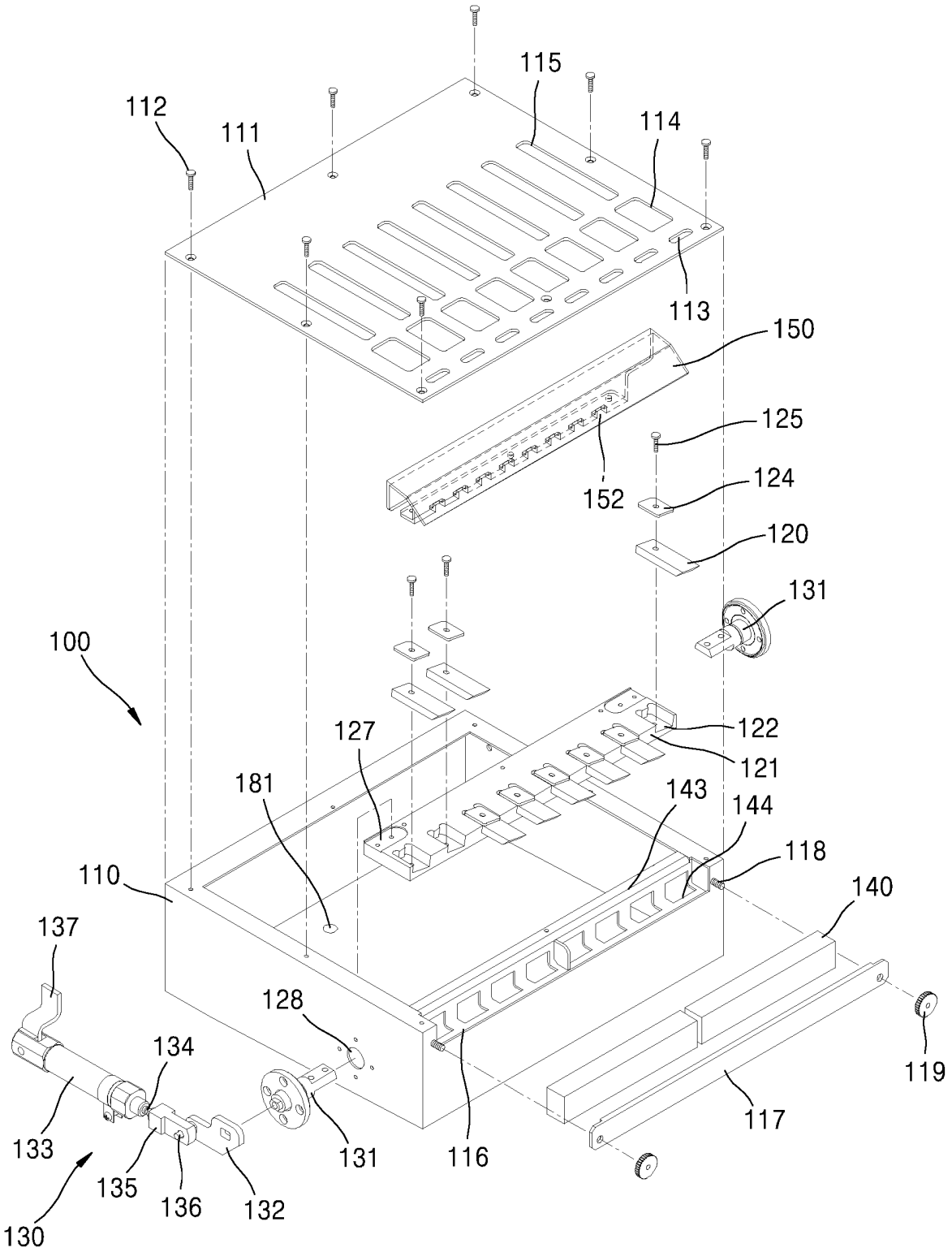
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FIG. 3

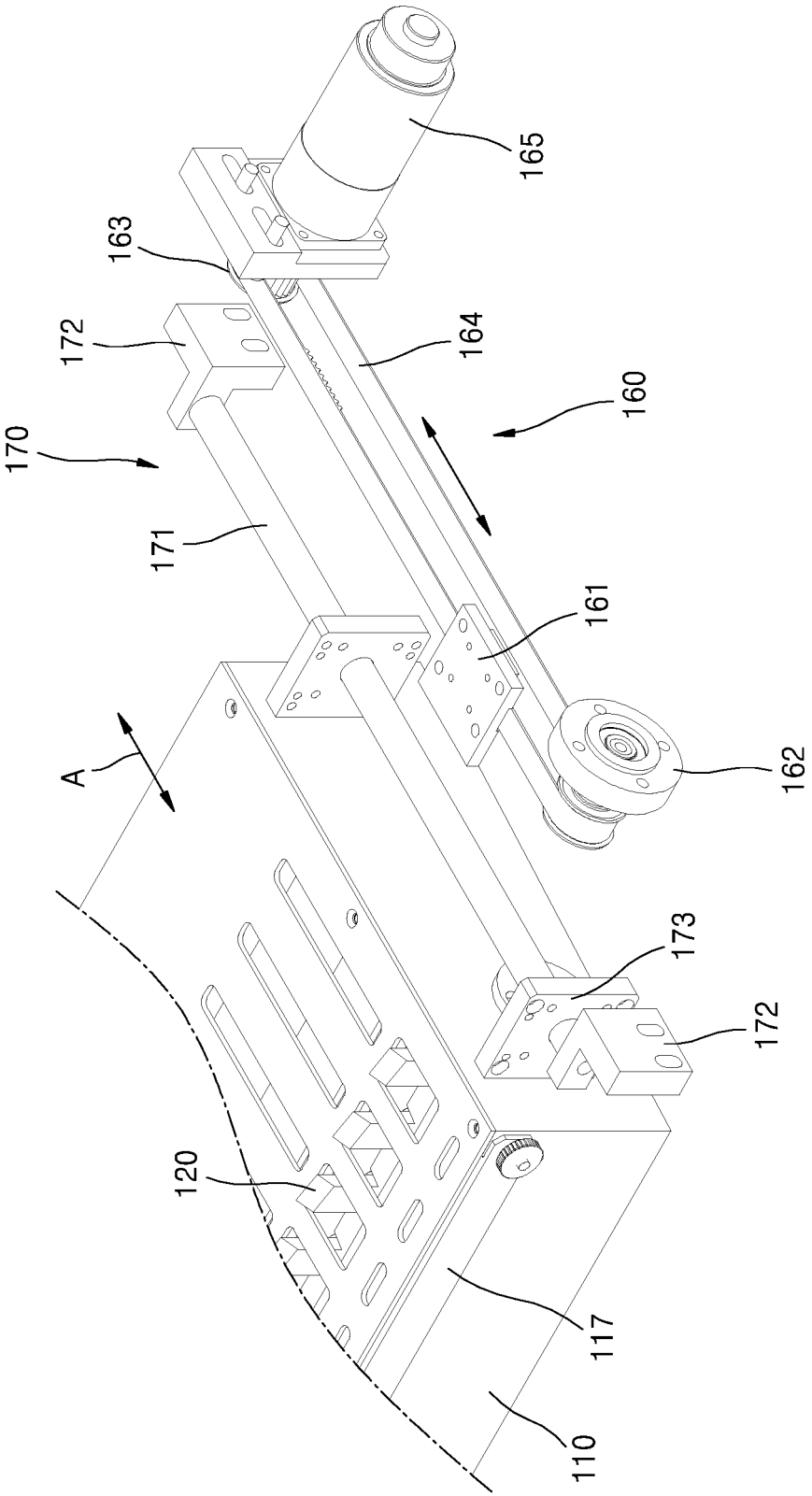

FIG. 4

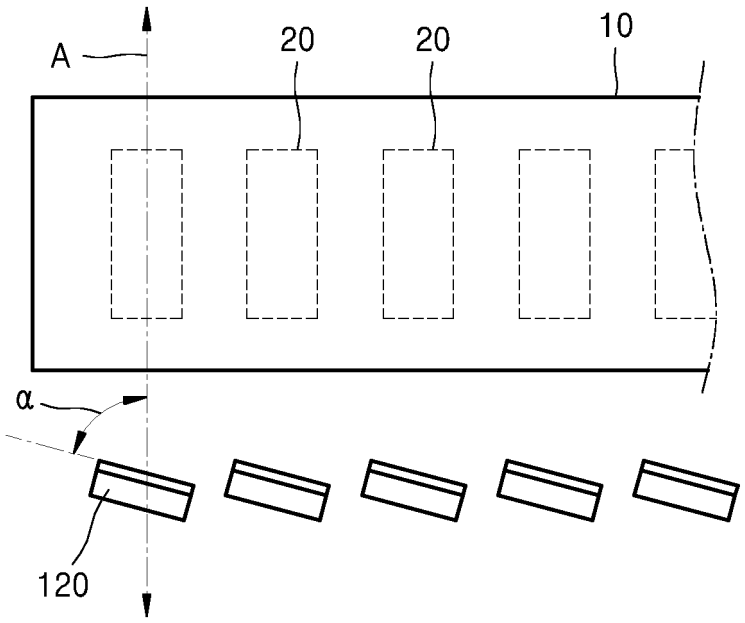

FIG. 5

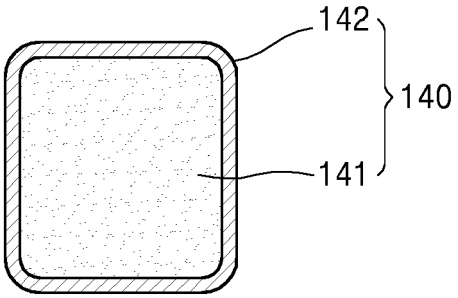

FIG. 6

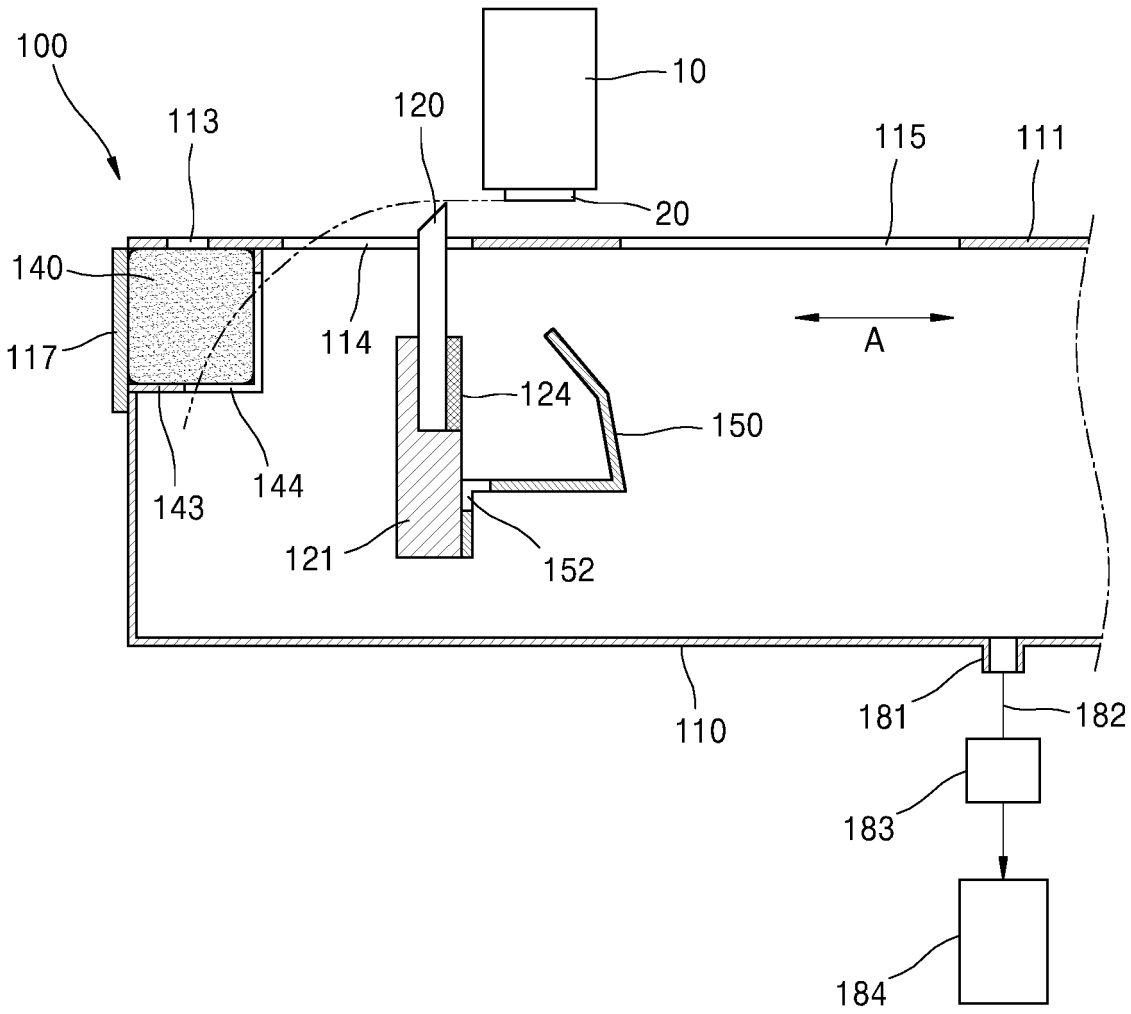
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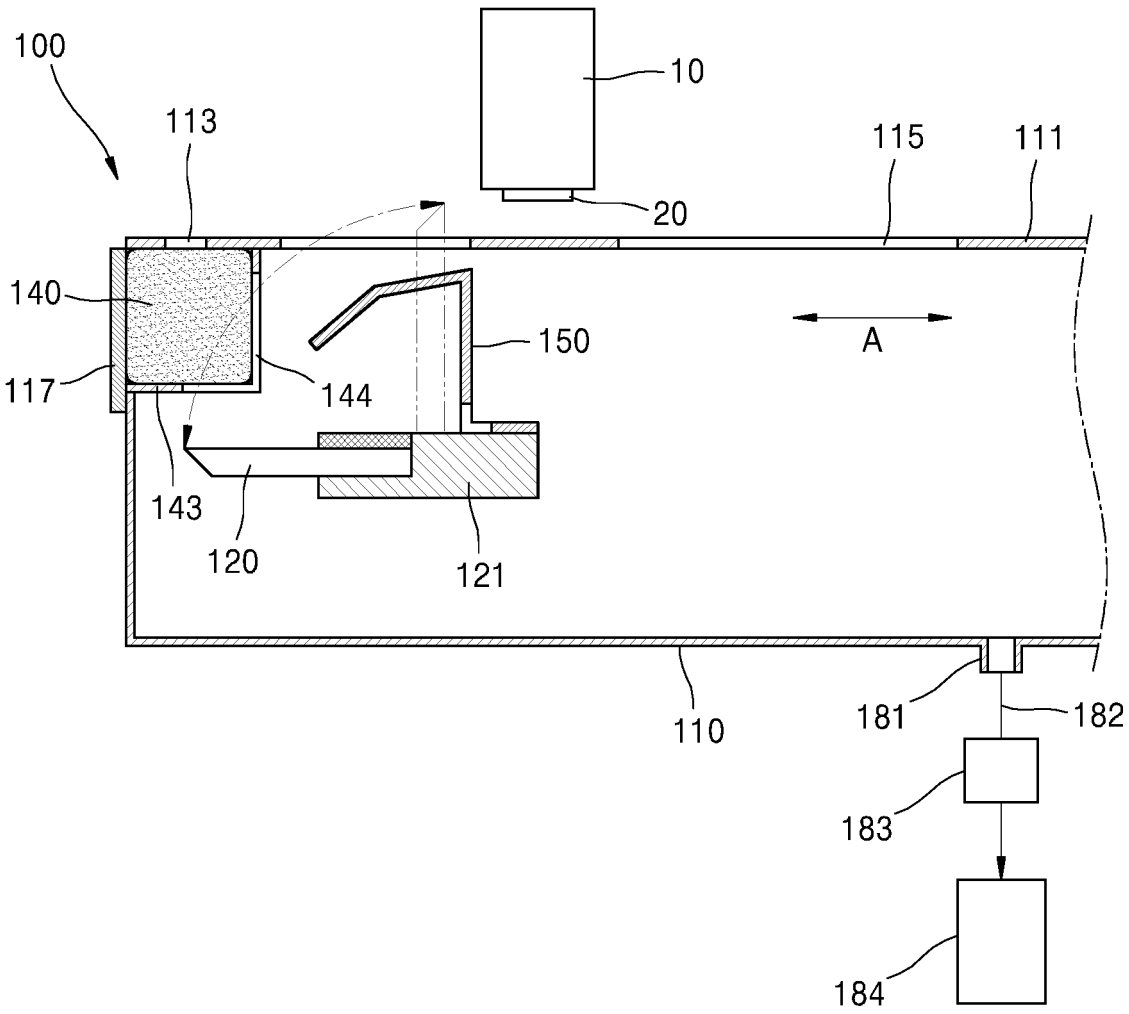
FIG. 7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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2016/015549

A. CLASSIFICATION OF SUBJECT MATTER

B41J 2/165(2006.01)i, B41J 2/17(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B41J 2/165; B05D 1/26; B41J 2/18; B41J 2/17

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS (KIPO internal) & Keywords: ink, discharge, waste ink, waste water, cleaning, washing, cleaning, cleaning, wiper, blade, discharge, cover, cover

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2004-243663 A (SII PRINTEK INC.) 02 September 2004 See paragraphs [0027], [0028], [0031] and figures 1-3	1,14,15
Y		2-11
A		12,13,16,17
Y	US 2003-0007031 A1 (SUGIYAMA, Wataru) 09 January 2003 See paragraph [0194] and figures 35b, 35d.	2
Y	JP 2008-290313 A (SEIKO EPSON CORP.) 04 December 2008 See abstract, paragraph [0032] and figures 5, 8.	3
Y	JP 2012-206366 A (SEIKO EPSON CORP.) 25 October 2012 See paragraphs [0027], [0036], [0037] and figure 2.	4
Y	JP 2014-205330 A (ROLAND DG CORP.) 30 October 2014 See paragraphs [0055]-[0064] and figure 2.	5-11
Y	JP 09-220813 A (COPYER CO., LTD.) 26 August 1997 See paragraphs [0013], [0020] and figures 1, 3, 6.	10,11

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

* Special categories of cited documents:
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
06 APRIL 2017 (06.04.2017)	**06 APRIL 2017 (06.04.2017)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2016/015549

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