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MAINTENANCE UNIT AND LIQUID EJECTION DEVICE

Abstract

A maintenance unit includes a wiping section **55** configured to wipe the nozzle forming surface **25** of a liquid ejection section **22** in which nozzles for ejecting a first liquid are formed, and a mixed fluid spray section that sprays a mixed fluid of gas and a second liquid from a spray nozzle **93** to moisten the wiping section **55.**

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Background/Summary

[0001] The present application is based on, and claims priority from JP Application Serial Number 2024-024353, filed Feb. 21, 2024, the disclosure of which is hereby incorporated by reference herein in its entirety.

BACKGROUND

1. Technical Field

[0002] The present disclosure relates to a maintenance unit and a liquid ejection device.

2. Related Art

[0003] For example, there is an inkjet recording device, which is an example of a liquid ejection device, such as JP-A-2018-30347. The inkjet recording device is equipped with a head, which is an example of a liquid ejection section, a wiping mechanism, and a supply mechanism. The head prints by ejecting liquid, which is an example of first liquid, from nozzles arranged on a nozzle surface, which is an example of a nozzle forming surface. The wiping mechanism wipes the nozzle surface with a wiping sheet. The supply mechanism supplies washing liquid, which is an example of a second liquid, to the wiping sheet from a supply pipe in which a hole is opened.

[0004] The supply mechanism described in JP-A-2018-30347 supplies the washing liquid to the wiping sheet by rotating the supply pipe such that the hole faces downward. When dropping the washing liquid onto the wiping sheet from the hole, a large amount of washing liquid is required to make the entire wiping sheet a uniformly moistened state.

SUMMARY

[0005] In order to overcome the above problem, a maintenance unit includes a wiping section configured to wipe a nozzle forming surface of a liquid ejection section in which a nozzle that ejects a first liquid is formed and a mixed fluid spray section that sprays a mixed fluid of gas and a second liquid from a spray nozzle to moisten the wiping section.

[0006] In order to overcome the above problem, a liquid ejection device includes a liquid ejection section that has a nozzle forming surface in which a nozzle that ejects a first liquid is formed and a maintenance unit above.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. **1** is a schematic diagram of a first embodiment of a liquid ejection device.

[0008] FIG. **2** is a perspective view of a wiping device.

[0009] FIG. **3** is a schematic sectional view of a fluid liquid spray head and the wiping device.

[0010] FIG. **4** is a perspective view of the pressing section.

[0011] FIG. **5** is a schematic sectional view of the wiping device in which the wiping section is located at a wiping position.

[0012] FIG. **6** is a side view of a maintenance unit.

[0013] FIG. **7** is a schematic sectional view of the fluid liquid spray head and the wiping device.

[0014] FIG. **8** is a schematic sectional view of a second embodiment of the fluid liquid spray head and the wiping device.

DESCRIPTION OF EMBODIMENTS

First Embodiment

[0015] Hereinafter, a first embodiment of a maintenance unit and a liquid ejection device will be described with reference to the drawings. The liquid ejection device is, for example, an inkjet printer that prints images such as characters and photographs by ejecting ink, which is an example of first liquid, onto a medium such as a paper sheet or cloth.

[0016] In the drawing, assuming that the liquid ejection device **11** is placed on a horizontal surface, a direction of gravity is indicated by a Z-axis, and directions along the horizontal surface are indicated by an X-axis and a Y-axis. The X-axis, the Y-axis, and the Z-axis are orthogonal to each

other. In the following description, a direction parallel to the X-axis is also referred to as a scanning direction X1 and a wiping direction X2, a direction parallel to the Y-axis is also referred to as a width direction Y, and a direction parallel to the Z-axis is also referred to as the vertical direction Z. The wiping direction X2 is a direction opposite to the scanning direction X1.

Liquid Ejection Device

[0017] As shown in FIG. **1**, the liquid ejection device **11** may equipped with a control section **12**, a medium transport section **13**, a printing section **14**, and a maintenance section **15**.

[0018] The control section **12** integrally controls drive of each mechanism in the liquid ejection device **11**, and controls various operations performed in the liquid ejection device **11**. The control section **12** can be configured as a circuit that includes α: one or more processors that execute various processes in accordance with computer programs, β: one or more dedicated hardware circuits that execute at least some of the various processes, or γ: a combination thereof. The hardware circuit is, for example, an application-specific integrated circuit. The processor includes a CPU and a memory, such as a RAM and a ROM, and the memory stores program code or instructions configured to cause the CPU to execute processes. The memory, or computer readable media, includes any readable media that can be accessed by a general-purpose or dedicated computer.

Medium Transport Section

[0019] The medium transport section **13** is configured to transport a medium **17**. The medium transport section **13** may be equipped with a medium support section **18** and a transport roller **19**.

[0020] The medium support section **18** supports a medium **17**. The medium support section **18** supports, for example, the medium **17** from below. The medium support section **18** supports the medium **17** to be transported. The medium transport section **13** may be equipped with a plurality of transport rollers **19**. The transport rollers **19** transport a medium **17** by rotating.

[0021] The medium transport section **13**, for example, intermittently transports a medium **17**. Specifically, the medium transport section **13** stops transporting a medium **17** while the printing section **14** performs printing on the medium **17**. The medium transport section **13** transports the medium **17** after printing is performed on the medium **17**. The medium transport section **13** may transport not only an elongated medium **17** but also a cut sheet medium **17**.

Printing Section

[0022] The printing section **14** is configured to perform printing on a medium **17**. The printing section **14** performs printing on a region of the medium **17** that is supported by the medium support section **18**. The printing section **14** may be equipped with a first carriage **21**, a liquid ejection section **22**, and a pressurizing section **23**.

[0023] The first carriage **21** is configured to reciprocate in the scanning direction X1 and the wiping direction X2. The first carriage **21** reciprocates in the scanning direction X1 and the wiping direction X2, thereby passing through a position facing the medium **17**. The first carriage **21** passes, for example, above the medium support section **18**.

[0024] In the liquid ejection device **11** of the present embodiment, a direction in which the first carriage **21** moves and a direction in which the medium **17** moves on the medium support section **18** coincide with each other. In other words, the liquid ejection device **11** is a lateral printer. The liquid ejection device **11** may be a serial printer in which a medium **17** is transported in a direction different from the scanning direction X1.

[0025] The printing section **14** may be equipped with a plurality of liquid ejection sections **22**. The printing section **14** of the present embodiment is equipped with five liquid ejection sections **22**. The plurality of liquid ejection sections **22** may be provided side by side in the scanning direction X1. Each of the plurality of liquid ejection sections **22** has a similar configuration. Therefore, one liquid ejection section **22** will be described below.

[0026] The liquid ejection section **22** is configured to eject first liquid. The liquid ejection section **22** of the present embodiment ejects the first liquid in the vertical direction Z. The liquid ejection

section **22** has a nozzle forming surface **25**. Nozzles **26** are formed on the nozzle forming surface **25**. The nozzle forming surface **25** is a surface on which one or more nozzles **26** are opened. The liquid ejection section **22** ejects the first liquid from the nozzles **26**. The liquid ejection section **22** is mounted on the first carriage **21**. The liquid ejection section **22** ejects the first liquid onto the medium **17**, thereby printing an image on the medium **17**. The plurality of liquid ejection sections **22** may each eject the same types of first liquid or may each eject different types of first liquid. For example, four liquid ejection sections **22** may eject inks of different colors, and one liquid ejection section **22** may eject reaction liquid for aggregating the inks.

[0027] The liquid ejection section **22** is, for example, a line head that can simultaneously eject the first liquid onto the medium **17** over the width direction Y. The liquid ejection section **22** is movable in the scanning direction X1. The liquid ejection section **22** is movable in the wiping direction X2. The liquid ejection section **22** reciprocates in the scanning direction X1 and the wiping direction X2 together with the first carriage **21**. The liquid ejection section **22** can eject the first liquid over the entire region of the medium **17** supported by the medium support section **18**.

[0028] The pressurizing section **23** is connected to the liquid ejection section **22**. The pressurizing section **23**, for example, pressurizes inside the plurality of liquid ejection sections **22**. The printing section **14** may be equipped with a plurality of pressurizing sections **23**. For example, the printing section **14** may be equipped with the pressurizing sections **23** for each liquid ejection section **22**.

[0029] The pressurizing section **23** is, for example, a pump. The pressurizing section **23** pressurizes inside the liquid ejection sections **22** to discharge the first liquid from the liquid ejection sections **22**. In other words, the pressurizing section **23** pressurizes the inside the liquid ejection sections **22**, thereby causing the first liquid to be pressurized and discharged from the nozzles **26**. Pressurizing and then discharging the first liquid is also referred to as pressurized cleaning. The pressurized cleaning is a maintenance in which bubbles and foreign matter are forced out from the nozzles **26** along with the first liquid inside the liquid ejection section **22** by forcing the first liquid from the nozzles **26**.

Maintenance Section

[0030] The maintenance section **15** is configured to maintain the liquid ejection section **22**. The maintenance section **15** may be equipped with a moisture retention section **28**, a cleaning section **29**, a maintenance unit **30**, and a liquid receiving section **31**. The moisture retention section **28**, the cleaning section **29**, the maintenance unit **30**, the liquid receiving section **31**, and the medium support section **18** may be provided side by side in this order in the scanning direction X1.

[0031] The moisture retention section **28** may be equipped with one or more moisture retention caps **33**. The moisture retention section **28** may be equipped with the same number of moisture retention caps **33** as the liquid ejection sections **22**. The moisture retention cap **33** forms a space that communicates with the nozzles **26** by contacting the liquid ejection section **22**. The moisture retention cap **33** caps the liquid ejection section **22**, which is located at a home position indicated by a two-dot chain line in FIG. **1**. The moisture retention cap **33** caps the liquid ejection section **22**, thereby moistening the nozzles **26**.

[0032] The cleaning section **29** performs suction cleaning of the liquid ejection sections **22** by sucking the first liquid from the liquid ejection sections **22**. The cleaning section **29** may be equipped with one or more suction caps **35**. The cleaning section **29** may individually clean the plurality of liquid ejection sections **22**. The cleaning section **29** may collectively clean the plurality of liquid ejection sections **22**.

[0033] The suction cap **35**, by contacting with the liquid ejection section **22**, forms a space that communicates with the nozzles **26**. The suction cap **35** caps the liquid ejection section **22**. The cleaning section **29** performs suction cleaning by creating a negative pressure by sucking air inside of the suction cap **35**. By performing the suction cleaning on the liquid ejection section **22** that is not filled with the first liquid, the first liquid is filled in the liquid ejection section **22**. By performing suction cleaning on the liquid ejection section **22** that is filled with the first liquid, air

bubbles, foreign matter, and the like are discharged from the inside the liquid ejection section **22**. The suction cap **35** receives the first liquid that is discharged by the suction cleaning.

[0034] The liquid receiving section **31** is configured to receive the first liquid discharged from the nozzles **26**. The liquid receiving section **31** may receive the first liquid discharged from the liquid ejection section **22** by the pressure applied by the pressurizing section **23**. In other words, the liquid receiving section **31** may receive the first liquid that is discharged by the pressurized cleaning. The liquid receiving section **31** may receive the first liquid ejected as a dummy ejection. The dummy ejection is an operation of ejecting the first liquid from the nozzles **26** in order to suppress clogging of the nozzles **26**. The dummy ejection is also referred to as flushing. For example, a thickened first liquid is discharged from the nozzles **26** by the dummy ejection. The liquid receiving section **31** receives the first liquid discharged from the liquid ejection section **22** facing the liquid receiving section **31**.

Maintenance Unit

[0035] As shown in FIG. **1**, the maintenance unit **30** may be equipped with a wiping device **37** and a mixed fluid spray section **38**.

[0036] As shown in FIG. **2**, the wiping device **37** may be equipped with a feed section **40**, a winding section **41**, a absorbent member **42**, a guide roller **43**, and a first movement mechanism **44**. The wiping device **37** may be equipped with a plurality of guide rollers **43**.

[0037] The feed section **40** may be equipped with a braking section **47** and a feed shaft **48**. The braking section **47** restricts rotation of the feed shaft **48**. The braking section **47** applies a load to the rotating feed shaft **48**. The feed shaft **48** supports an unused absorbent member **42** wound in a roll shape. The feed shaft **48** rotates to feed the unused absorbent member **42**.

[0038] The winding section **41** can wind up the absorbent member **42**. The winding section **41** may be equipped with a first drive source **50** and a winding shaft **51**. The first drive source **50** is, for example, a motor. The first drive source **50** rotates the winding shaft **51**. The winding shaft **51** winds up and supports the used absorbent member **42** in a roll shape.

[0039] As shown in FIG. **3**, the absorbent member **42** is band-shaped. The absorbent member **42** is wound around a plurality of guide rollers **43**. The plurality of guide rollers **43** extend, for example, in the width direction Y. The absorbent member **42** fed from the feed section **40** is transported to the winding section **41** via a plurality of guide rollers **43**. The absorbent member **42** is fed in the transport direction Dc from the feed section **40** toward the winding section **41**. The transport direction Dc is a direction along the path along which the absorbent member **42** is transported.

[0040] The absorbent member **42** can absorb liquid. The absorbent member **42** is, for example, cloth. The length of the absorbent member **42** in the width direction Y may be longer than the length of the nozzle forming surface **25** in the width direction Y.

[0041] The absorbent member **42** has a contact surface **53** and a back surface **54**. The contact surface **53** is a surface that contacts the nozzle forming surface **25**. The back surface **54** is a surface opposite to the contact surface **53**. The absorbent member **42** has a wiping section **55**. In other words, the wiping section **55** is formed of the absorbent member **42**. The absorbent member **42** may have a flat section **56**. The flat section **56** may be located downstream of the wiping section **55** in the transport direction Dc. The flat section **56** may be arranged between the wiping section **55** and the liquid receiving section **31** in the scanning direction X1. The wiping section **55** may be arranged between the cleaning section **29** and the flat section **56** in the scanning direction X1. In the scanning direction X1, the liquid receiving section **31** may be arranged on the downstream side of the wiping section **55**.

[0042] As shown in FIG. **3**, when the absorbent member **42** is located at a separation position Ps, the wiping section **55** and the flat section **56** are located below the nozzle forming surface **25**. The separation position Ps is a location where the absorbent member **42** is separated from the nozzle forming surface **25**. The wiping section **55** and the flat section **56**, when located at the separation position Ps, do not interfere with the liquid ejection section **22** that reciprocates in the scanning

direction X1.
[0043] The first movement mechanism **44** may be equipped with a raising and lowering section **58**, a holder **59**, an accommodation frame **60**, and a pressing section **61**. The holder **59** detachably holds the accommodation frame **60**. The accommodation frame **60** rotatably supports the feed shaft **48** and the winding shaft **51**. The user can replace the absorbent member **42** by removing the accommodation frame **60** from the holder **59** and removing the feed shaft **48** and the winding shaft **51** from the accommodation frame **60**.
[0044] The raising and lowering section **58** is, for example, an air cylinder. The raising and lowering section **58** reciprocates the holder **59** in the vertical direction Z. The raising and lowering section **58** moves the holder **59** and the accommodation frame **60** supported by the holder **59**. In other words, the first movement mechanism **44** causes the entire absorbent member **42** to reciprocate in the vertical direction Z.
[0045] The pressing section **61** is configured to press the wiping section **55** against the nozzle forming surface **25**. The absorbent member **42** is wound around the pressing section **61**. The pressing section **61** is equipped with a holding member **63**, a cover member **64**, an attachment member **65**, a roller **66**, and an elastic member **67**. The pressing section **61** may be equipped with a plurality of each of the attachment members **65**, the rollers **66**, and the elastic members **67**. The holding member **63** and the cover member **64** form a space that accommodates the attachment members **65**, the rollers **66**, and the elastic members **67**.
[0046] As shown in FIGS. **3** and **4**, the cover member **64** has the same number of through holes **69** as the number of rollers **66**. Part of rollers **66** protrude from the corresponding through holes **69**. As shown in FIG. **3**, the rollers **66** are mounted on the attachment members **65**. The rollers **66** contact the back surface **54** of the absorbent member **42**. The attachment member **65** rotatably holds the rollers **66**. The rollers **66** may be driven to rotate by the transported absorbent member **42**. The elastic members **67** push the attachment members **65**. The elastic members **67** push up the absorbent member **42** through the attachment members **65** and the rollers **66**. The elastic members **67** are, for example, springs.
[0047] The roller **66** has a cylindrical portion **71** and a shaft portion **72**. The cylindrical portion **71** is a portion around which the absorbent member **42** is wound. The shaft portion **72** is a portion to be inserted into the cylindrical portion **71**. The shaft portion **72** is mounted to the attachment member **65**. The shaft portion **72** extends, for example, in the width direction Y. In the roller **66**, the cylindrical portion **71** that comes into contact with wiping section **55** may be elastic. The cylindrical portion **71** may be formed of, for example, a member such as sponge or rubber. In this case, the absorbent member **42** is more easily brought into close contact with the nozzle forming surface **25**.
[0048] A plurality of shaft portions **72** are attached to different attachment members **65**. Therefore, the plurality of shaft portions **72** can each be tilted at different angles. Therefore, when wiping the nozzle forming surface **25**, the plurality of cylindrical portions **71** can be tilted to conform to the nozzle forming surface **25**. This makes it easier for the absorbent member **42** to come into close contact with the nozzle forming surface **25**.
[0049] As shown in FIG. **5**, the first movement mechanism **44** can move the absorbent member **42** to a wiping position Pw. The first movement mechanism **44** can move the wiping section **55** to the separation position Ps shown in FIG. **3** and the wiping position Pw shown in FIG. **5**. When the absorbent member **42** is located at the wiping position Pw, the wiping section **55** is located above the nozzle forming surface **25**. The wiping position Pw is a location at which the wiping section **55** can come into contact with the nozzle forming surface **25**. When the absorbent member **42** is located at the wiping position Pw, the flat section **56** is located below the nozzle forming surface **25**. The wiping position Pw is a location at which the flat section **56** is separated from the nozzle forming surface **25**. The wiping section **55**, when located at the wiping position Pw, interferes with the liquid ejection section **22** that reciprocates in the scanning direction X1.

[0050] The wiping device **37** can wipe the nozzle forming surface **25**. The wiping section **55** can wipe the nozzle forming surface **25** by moving relative to the liquid ejection section **22**. For example, wiping of the nozzle forming surface **25** may be performed by moving the liquid ejection section **22** in the wiping direction X2 with respect to the wiping section **55** which is stopped at the wiping position Pw. The wiping section **55** removes the first liquid or the like, that adheres to the nozzle forming surface **25**. It is also referred as wiping when the wiping device **37** wipes the nozzle forming surface **25**.

Mixed Fluid Spray Section

[0051] As shown in FIG. **6**, the mixed fluid spray section **38** may be arranged upstream of the wiping device **37** in the scanning direction X1. In the scanning direction X1, the mixed fluid spray section **38** is arranged between the cleaning section **29** and the wiping section **55**. The mixed fluid spray section **38** and the wiping section **55** may be provided side by side in the scanning direction X1.

[0052] The mixed fluid spray section **38** may be equipped with a guide frame **74**, a guide rail **75**, a second carriage **76**, a fluid spray head **77**, a second movement mechanism **78**, and a third movement mechanism **79**. The mixed fluid spray section **38** may be equipped with a sub-tank **81**, an upstream supply path **82**, a downstream supply path **83**, an introduction section **84**, and a gas supply path **85**.

[0053] The guide frame **74** supports the guide rail **75** and the second movement mechanism **78**. The guide rail **75** extends in the width direction Y. The guide rail **75** guides the second carriage **76** in the width direction Y.

[0054] The second carriage **76** is supported by the guide rail **75**. The second carriage **76** is provided so as to be capable of reciprocating in the width direction Y along the guide rail **75**. The second movement mechanism **78** may be equipped with a second drive source **87**, a power transmission section **88**, a drive pulley **89**, a driven pulley **90**, and a timing belt **91**.

[0055] The second drive source **87** is, for example, a motor. The power transmission section **88** has, for example, a plurality of gears. The power transmission section **88** transmits the driving force of the second drive source **87** to the drive pulley **89**. In other words, the second drive source **87** rotates the drive pulley **89**.

[0056] The drive pulley **89** is rotatably supported by the guide frame **74**. The driven pulley **90** is rotatably supported by the guide frame **74**. The axis of the drive pulley **89** and the axis of the driven pulley **90** are parallel to each other.

[0057] The timing belt **91** is an annular belt. The timing belt **91** is looped around the drive pulley **89** and the driven pulley **90**. A part of the timing belt **91** is fixed to the second carriage **76**.

[0058] The second movement mechanism **78** transmits the drive force of the second drive source **87** to the second carriage **76** through the timing belt **91**. The second movement mechanism **78** reciprocates the second carriage **76** in the width direction Y.

[0059] The fluid spray head **77** has a spray nozzle **93**. The spray nozzle **93** can spray a mixed fluid of gas and a second liquid. The gas in the present embodiment is compressed air. The fluid spray head **77** is mounted on the second carriage **76**. The fluid spray head **77** reciprocates in the width direction Y along with the movement of the second carriage **76**. In other words, the spray nozzle **93** is movable in the width direction Y. The movement range of the spray nozzle **93** in the width direction Y may be larger than the width of the nozzle forming surface **25**. The movement range of the spray nozzle **93** in the width direction Y may be larger than the width of the absorbent member **42**. The fluid spray head **77** moistens the absorbent member **42** over the width direction Y by spraying the mixed fluid while moving in the width direction Y.

[0060] The third movement mechanism **79** moves the fluid spray head **77**. The third movement mechanism **79** may pivot the fluid spray head **77** around an axis (not shown) extending in the width direction Y. The third movement mechanism **79** moves the spray nozzle **93**. The spray nozzle **93** of the present embodiment is movable between a first position P**1** shown in FIG. **3** and a second

position P**2** shown in FIG. **7**.
[0061] As shown in FIG. **3**, the first position P**1** is a location for moistening the wiping section **55**. Specifically, the spray nozzle **93** located at the first position P**1** sprays the mixed fluid toward the absorbent member **42** between the winding section **41** and the wiping section **55**. The spray nozzle **93** located at the first position P**1** sprays the mixed fluid toward the part upstream side of the wiping section **55** in the transport direction Dc. The fluid spray head **77** may spray the mixed fluid in the scanning direction X1 or may spray the mixed fluid in a direction oblique to the scanning direction X1. The mixed fluid spray section **38** may spray the mixed fluid in a direction having a component facing the scanning direction X1.
[0062] The absorbent member **42** is moistened by the mixed fluid in the part upstream side of the wiping section **55** in the transport direction Dc. The moistened part of the absorbent member **42** moves in the transport direction Dc as the absorbent member **42** is wound by the winding section **41**. In other words, the part where the mixed fluid is sprayed moves to a location where it comes into contact with the pressing section **61** and forms the wiping section **55**.
[0063] As shown in FIG. **7**, the second position P**2** is a location at which the mixed fluid is sprayed onto the nozzle forming surface **25**. The spray nozzle **93**, when located at the second position P**2**, can face the nozzle forming surface **25**. For example, the spray nozzle **93**, when located at the second position P**2**, may spray the mixed fluid toward the nozzle forming surface **25** located immediately above.
[0064] As shown in FIG. **6**, a main tank **95** may be provided in the liquid ejection device **11**, or may be provided separately from the liquid ejection device **11**. The main tank **95** stores the second liquid. The upstream supply path **82** connects the main tank **95** and the sub-tank **81**. The upstream supply path **82** supplies the second liquid from the main tank **95** to the sub-tank **81**. The sub-tank **81** can store the second liquid supplied from the main tank **95**.
[0065] The downstream supply path **83** connects the sub-tank **81** and the fluid spray head **77**. The downstream supply path **83** supplies the second liquid from the sub-tank **81** to the fluid spray head **77**. The downstream supply path **83** is, for example, a tube. The downstream supply path **83** is deformable in accordance with the movement of the fluid spray head **77**.
[0066] The introduction section **84** is connectable to a lead out section **97**. The lead out section **97** may be provided in the liquid ejection device **11** or may be provided separately from the liquid ejection device **11**. The lead out section **97** can lead out compressed air as the gas.
[0067] The gas supply path **85** connects the fluid spray head **77** and the introduction section **84**. The gas supply path **85** supplies the compressed air introduced from the introduction section **84** to the fluid spray head **77**. The gas supply path **85** is, for example, a tube. The gas supply path **85** can be deformed in accordance with the movement of the fluid spray head **77**.
Pressurized Cleaning
[0068] The control section **12** performs pressurized cleaning, for example, when a predetermined time has elapsed from the start of printing or when a predetermined time has elapsed from the previous maintenance. The control section **12** may perform pressurized cleaning of the plurality of liquid ejection sections **22** collectively or one by one. The following describes maintenance when performing the pressurized cleaning of a single liquid ejection section **22**.
[0069] As shown in FIG. **7**, when maintenance is performed, the control section **12** first moves the liquid ejection section **22** so that the nozzle forming surface **25** faces the fluid spray head **77**. At this time, the absorbent member **42** is located at the separation position Ps.
[0070] The control section **12** drives the third movement mechanism **79** to move the spray nozzle **93** in the second position P**2**. The control section **12** may simultaneously perform the movement of the liquid ejection section **22** and the movement of the fluid spray head **77**.
[0071] The control section **12** drives the second movement mechanism **78** to move the fluid spray head **77** in the width direction Y. The control section **12** may reciprocate the fluid spray head **77**. The control section **12** causes the mixed fluid to be sprayed from the spray nozzle **93** toward the

nozzle forming surface **25**. The mixed fluid is sprayed onto the nozzle forming surface **25**. The second liquid is applied to the nozzle forming surface **25**. The mixed fluid is sprayed onto the liquid in the nozzles **26**. The mixed fluid is sprayed onto the liquid that has thickened within the nozzles **26**. The mixed fluid destroys the thickened state of the liquid in the nozzles **26**.

[0072] Next, the control section **12** moves the liquid ejection section **22** so that the nozzle forming surface **25** faces the liquid receiving section **31**. The control section **12** causes the pressurizing section **23** to discharge the liquid from the liquid ejection section **22**. In other words, the control section **12** performs the pressurized cleaning. Since the thickened state of the liquid in the nozzles **26** is destroyed by the mixed fluid, the liquid is easily discharged during the pressurized cleaning. The liquid discharged from the liquid ejection section **22** is received by the liquid receiving section **31**. Next, the control section **12** moves the liquid ejection section **22** so that the nozzle forming surface **25** faces the wiping section **55**.

[0073] In the state where the wiping section **55** faces the nozzle forming surface **25**, the control section **12** drives the first movement mechanism **44** to move the wiping section **55** to the wiping position Pw. The control section **12** causes the first movement mechanism **44** to move the wiping section **55** to a location where the wiping section **55** can come into contact with the nozzle forming surface **25**. The control section **12** causes the wiping section **55** to come into contact with the nozzle forming surface **25** by the first movement mechanism **44**.

[0074] After moving the wiping section **55** to the wiping position Pw, the control section **12** returns the wiping section **55** to the separation position Ps. In other words, the control section **12** causes the wiping section **55** to temporarily come into contact with the nozzle forming surface **25**, and then causes the first movement mechanism **44** to separate the wiping section **55** from the nozzle forming surface **25**. By contacting the nozzle forming surface **25**, the wiping section **55** absorbs the first liquid attached to the nozzle forming surface **25** during the pressurized cleaning.

[0075] As shown in FIG. **3**, the control section **12** moves the liquid ejection section **22** in the scanning direction X1. The control section **12** moves the liquid ejection section **22** to a location not facing the wiping section **55**. The control section **12** drives the third movement mechanism **79** to move the spray nozzle **93** at the first position P**1**. The control section **12** drives the second movement mechanism **78** to move the fluid spray head **77** in the width direction Y. The control section **12** may reciprocate the fluid spray head **77**. The control section **12** causes the mixed fluid to be sprayed from the spray nozzle **93**, which is moving in the width direction Y, toward the absorbent member **42**. The control section **12** moistens the absorbent member **42** with the second liquid.

[0076] The control section **12** drives the winding section **41** in a state in which the absorbent member **42** is separated from the nozzle forming surface **25**. The control section **12** drives the winding section **41** to wind the absorbent member **42**. By winding the absorbent member **42**, the part that is located in the wiping section **55** and that absorbed the first liquid is moved from the wiping section **55**, and the part which is moistened with the second liquid is located in the wiping section **55**.

[0077] As shown in FIG. **5**, the control section **12** drives the first movement mechanism **44** to move the wiping section **55** to the wiping position Pw. The control section **12** causes the first movement mechanism **44** to move the wiping section **55** to a location where the wiping section **55** can come into contact with the nozzle forming surface **25**.

[0078] The control section **12** moves the liquid ejection section **22** in the wiping direction X2. The control section **12** causes the liquid ejection section **22** to move and pass through the wiping section **55**. The control section **12** causes the wiping section **55** to wipe the nozzle forming surface **25**. After wiping the nozzle forming surface **25**, the control section **12** moves the wiping section **55** to the separation position Ps.

[0079] The control section **12** moves the liquid ejection section **22** such that the nozzle forming surface **25** faces the liquid receiving section **31**. The control section **12** causes liquid to be ejected

from the liquid ejection section **22** toward the liquid receiving section **31**. In other words, the control section **12** causes the wiping section **55** to wipe the nozzle forming surface **25**, and then ejects liquid as a dummy ejection from the liquid ejection section **22** toward the liquid receiving section **31**. By this, the maintenance of a single liquid ejection section **22** is completed. The control section **12** performs maintenance on the plurality of liquid ejection sections **22** in order.

Suction Cleaning

[0080] The control section **12** may perform suction cleaning instead of the above maintenance, that is the pressurized cleaning. When the clogging of nozzles **26** is not recovered by the pressurized cleaning, the control section **12** may perform the suction cleaning, for example. The control section **12** may perform suction cleaning of the plurality of liquid ejection sections **22** collectively or one by one. The following describes maintenance when performing the suction cleaning of a single liquid ejection section **22**.

[0081] As shown in FIG. **7**, the control section **12** causes the mixed fluid to be sprayed toward the nozzle forming surface **25** in the same manner as in the case of the pressurized cleaning. The mixed fluid is sprayed onto the liquid in the nozzles **26**. The mixed fluid is sprayed onto the liquid that has thickened within the nozzles **26**. The mixed fluid destroys the thickened state of the liquid in the nozzles **26**.

[0082] The control section **12** moves the liquid ejection section **22** so that the nozzle forming surface **25** faces the cleaning section **29**. The control section **12** performs suction cleaning of the liquid ejection section **22** by the cleaning section **29**. In other words, the control section **12** causes the suction cap **35** to cap the liquid ejection section **22**. The control section **12** causes inside the suction cap **35** to become a negative pressure, and causes the liquid to be discharged from the nozzles **26**. Since the thickened state of the liquid in the nozzles **26** is destroyed by the mixed fluid, the liquid is easily discharged during the suction cleaning. By this, the liquid is discharged from the nozzles **26**. When the suction cleaning is finished, the control section **12** releases the capping.

[0083] Next, in the same way as for the pressurized cleaning, the control section **12** sequentially performs bringing the wiping section **55** into temporary contact with the nozzle forming surface **25**, wiping the nozzle forming surface **25** with the moistened wiping section **55**, and causing the liquid ejection section **22** to perform a dummy ejection.

[0084] Specifically, the control section **12** moves the liquid ejection section **22** such that the nozzle forming surface **25** faces the wiping section **55**. In the state where the wiping section **55** faces the nozzle forming surface **25**, the control section **12** drives the first movement mechanism **44** to move the wiping section **55** to the wiping position Pw. The control section **12** causes the wiping section **55** to come into contact with the nozzle forming surface **25** by the first movement mechanism **44**.

[0085] After moving the wiping section **55** to the wiping position Pw, the control section **12** returns the wiping section **55** to the separation position Ps. In other words, the control section **12** causes the wiping section **55** to temporarily come into contact with the nozzle forming surface **25**, and then causes the first movement mechanism **44** to separate the wiping section **55** from the nozzle forming surface **25**. By contacting the nozzle forming surface **25**, the wiping section **55** absorbs the first liquid attached to the nozzle forming surface **25** during the suction cleaning.

[0086] As shown in FIG. **3**, the control section **12** moves the liquid ejection section **22** in the scanning direction X1. The control section **12** moves the liquid ejection section **22** to a location not facing the wiping section **55**. The control section **12** drives the third movement mechanism **79** to move the spray nozzle **93** at the first position P**1**. The control section **12** drives the second movement mechanism **78** to move the fluid spray head **77** in the width direction Y. The control section **12** may reciprocate the fluid spray head **77**. The control section **12** causes the mixed fluid to be sprayed from the spray nozzle **93**, which is moving in the width direction Y, toward the absorbent member **42**. The control section **12** moistens the absorbent member **42** with the second liquid.

[0087] The control section **12** drives the winding section **41** in a state in which the absorbent

member **42** is separated from the nozzle forming surface **25**. The control section **12** drives the winding section **41** to wind the absorbent member **42**. By winding the absorbent member **42**, the part that is located in the wiping section **55** and that absorbed the first liquid is moved from the wiping section **55**, and the part which is moistened with the second liquid is located in the wiping section **55**.

[0088] The control section **12** drives the first movement mechanism **44** to move the wiping section **55** to the wiping position Pw. The control section **12** causes the first movement mechanism **44** to move the wiping section **55** to a location where the wiping section **55** can come into contact with the nozzle forming surface **25**.

[0089] The control section **12** moves the liquid ejection section **22** in the wiping direction X2. The control section **12** causes the liquid ejection section **22** to move and pass through the wiping section **55**. The control section **12** causes the wiping section **55** to wipe the nozzle forming surface **25**. After wiping the nozzle forming surface **25**, the control section **12** moves the wiping section **55** to the separation position Ps.

[0090] The control section **12** moves the liquid ejection section **22** such that the nozzle forming surface **25** faces the liquid receiving section **31**. The control section **12** causes the liquid ejection section **22** to eject liquid toward the liquid receiving section **31**. In other words, the control section **12** causes the wiping section **55** to wipe the nozzle forming surface **25**, and then ejects liquid as a dummy ejection from the liquid ejection section **22** toward the liquid receiving section **31**. By this, the maintenance of a single liquid ejection section **22** is completed. The control section **12** performs maintenance on the plurality of liquid ejection sections **22** in order.

Operation of First Embodiment

[0091] The operation of the present embodiment will be described. The mixed fluid spray section **38** moistens the wiping section **55** before the wiping section **55** wipes the nozzle forming surface **25**. The mixed fluid spray section **38** moistens the absorbent member **42** over the width direction Y. The wiping device **37** wipes the nozzle forming surface **25** with the moistened wiping section **55**.

[0092] When the pressurized cleaning and the suction cleaning are performed, a part of the discharged first liquid adheres to the nozzle forming surface **25**. The control section **12** can reduce liquid adhered to the nozzle forming surface **25** before wiping by causing the wiping section **55** to temporarily contact the nozzle forming surface **25** before wiping the nozzle forming surface **25**. By this, speed of relative movement of the wiping section **55** and the liquid ejection section **22** during wiping can be increased. Since the amount of liquid mixed into the nozzles **26** can be reduced, the amount of liquid that is ejected as a dummy ejection can be reduced.

Effects of First Embodiment

[0093] Effects of this embodiment will be described.

[0094] (1-1) The mixed fluid spray section **38** sprays the mixed fluid made by mixing the second liquid and the gas. By mixing the gas with the second liquid, droplet size of the second liquid to be sprayed can be reduced, and the second liquid can be sprayed over a wide range. Therefore, it can make the wiping section **55** a uniformly moistened state with a small amount of the second liquid.

[0095] (1-2) The spray nozzle **93** is movable in the width direction Y. The mixed fluid spray section **38**, by spraying the mixed fluid from the spray nozzle **93** while moving in the width direction Y, can make easier the absorbent member **42** a uniformly moistened state even if the absorbent member **42** is elongated in the width direction Y.

[0096] (1-3) The spray nozzle **93** is movable to the first position P**1** and to the second position P**2**. When the mixed fluid is sprayed from the spray nozzle **93** located at the first position P**1**, the wiping section **55** can be moistened. When the mixed fluid is sprayed from the spray nozzle **93** located at the second position P**2**, the mixed fluid can be sprayed onto the nozzle forming surface **25**. This makes it easier recover the nozzles **26** even if the first liquid in the nozzles **26** is thickened and clogged. Therefore, it is possible to perform the moistening of the wiping section **55** and the maintenance of the liquid ejection section **22** using the mixed fluid spray section **38**.

[0097] (1-4) The sub-tank **81** can store the second liquid supplied from the main tank **95**. By storing the second liquid in the sub-tank **81**, the second liquid can be easily supplied in accordance with spraying of the mixed fluid by the mixed fluid spray section **38**.
[0098] (1-5) The mixed fluid spray section **38** can spray a mixed fluid of compressed air and the second liquid. Therefore, for example, compared to a case where a mixed fluid of uncompressed air and the second liquid is sprayed, it can make the wiping section **55** a uniformly moistened state with a smaller amount of the second liquid.
[0099] (1-6) The mixed fluid spray section **38** can introduce compressed air via the introduction section **84**. By using the air compressed outside, the liquid ejection device **11** can be downsized.
[0100] (1-7) The mixed fluid spray section **38** sprays the mixed fluid in a direction that has a component facing in the scanning direction X1 in which the liquid ejection section **22** moves. Therefore, the mixed fluid spray section **38** can spray the mixed fluid from a region different from the region in which the liquid ejection section **22** moves. Therefore, the mixed fluid spray section **38** can be arranged at a location where it does not interfere with the movement of the liquid ejection section **22**.
[0101] (1-8) The mixed fluid spray section **38** is arranged between the cleaning section **29** and the wiping section **55** in the scanning direction X1. Therefore, the liquid ejection section **22** on which the suction cleaning was performed using the cleaning section **29** can be quickly wiped with the moistened wiping section **55**.
[0102] (1-9) In the scanning direction X1, the liquid receiving section **31** is arranged downstream side of the wiping section **55**. Therefore, after the first liquid is discharged to the liquid receiving section **31**, the nozzle forming surface **25** can be quickly wiped by the wiping section **55**.
[0103] (1-10) The cleaning section **29**, the wiping section **55**, and the liquid receiving section **31** are arranged side by side in the scanning direction X1. Therefore, by moving the liquid ejection section **22**, which has been subjected to suction cleaning by the cleaning section **29**, in the scanning direction X1, wiping of the nozzle forming surface **25** and a dummy ejection can be performed. Therefore, it is possible to shorten the time required for the wiping and the dummy ejection compared to a case where the wiping and the dummy ejection are performed while the liquid ejection section **22** is reciprocated in the scanning direction X1.
[0104] (1-11) The liquid receiving section **31** receives the first liquid discharged from the liquid ejection section **22** by the pressurizing section **23**. Therefore, the first liquid that is ejected as a dummy ejection from the head and the first liquid that is pressurized and discharged from the liquid ejection section **22** can be received in a single liquid receiving section **31**.

Second Embodiment

[0105] Next, a second embodiment of the maintenance unit and the liquid ejection device will be described with reference to the drawings. Note that the second embodiment differs from the first embodiment in that the mixed fluid spray section does not include the third moving mechanism. Since it is substantially the same as the first embodiment in other respects, by attaching the same reference numerals for the same configurations, redundant description will be omitted.
[0106] The maintenance unit **30** of the second embodiment is arranged between the cleaning section **29** and the liquid receiving section **31**, similarly to the first embodiment. In other words, the wiping section **55** is arranged between the cleaning section **29** and the liquid receiving section **31** in the scanning direction X1. The liquid receiving section **31** can receive the first liquid that is ejected as a dummy ejection from the liquid ejection section **22** and the first liquid that is discharged from the liquid ejection section **22** by pressurization of the pressurizing section **23**.
[0107] As shown in FIG. **8**, the fluid spray head **77** has a first spray nozzle **93***f* and a second spray nozzle **93***s*. The first spray nozzle **93***f* can face the absorbent member **42**. The first spray nozzle **93***f* sprays the mixed fluid in a direction having a component facing in the scanning direction X1. The fluid spray head **77** moistens the absorbent member **42** in the width direction Y by spraying the mixed fluid from the first spray nozzle **93***f* while moving in the width direction Y.

[0108] The second spray nozzle **93***s* can face the nozzle forming surface **25**. The second spray nozzle **93***s* can spray the mixed fluid onto the nozzle forming surface **25**. The second spray nozzle **93***s* may spray the mixed fluid upward in the vertical direction Z. The fluid spray head **77** may spray the mixed fluid onto the nozzle forming surface **25** by spraying the mixed fluid from the second spray nozzle **93***s* while moving in the width direction Y.
[0109] The mixed fluid spray section **38** may have a switching section **99**. The switching section **99** can switch between the spraying of the mixed fluid from the first spray nozzle **93***f* and the spraying of the mixed fluid from the second spray nozzle **93***s*.
Operation of Second Embodiment
[0110] The operation of the present embodiment will be described. The timing at which the mixed fluid spray section **38** sprays the mixed fluid to the absorbent member **42** and the nozzle forming surface **25** is the same as that of the first embodiment.
[0111] When spraying the mixed fluid to the absorbent member **42**, the fluid spray head **77** sprays the mixed fluid from the first spray nozzle **93***f* to the absorbent member **42** while moving in the width direction Y. When spraying the mixed fluid to the nozzle forming surface **25**, the fluid spray head **77** sprays the mixed fluid from the second spray nozzle **93***s* to the nozzle forming surface **25** while moving in the width direction Y.
Effects of Second Embodiment
[0112] Effects of this embodiment will be described.
[0113] (2-1) The mixed fluid spray section **38** has the second spray nozzle **93***s* in addition to the first spray nozzle **93***f*. When the mixed fluid is sprayed from the second spray nozzle **93***s*, the mixed fluid can be sprayed onto the nozzle forming surface **25**. Therefore, the mixed fluid spray section **38** can perform both the moistening of the wiping section **55** and the maintenance of the liquid ejection section **22**.
[0114] (2-2) The switching section **99** switches between the spraying of the mixed fluid from the first spray nozzle **93***f* and the spraying of the mixed fluid from the second spray nozzle **93***s*. Therefore, the mixed fluid spray section **38** can select the spraying destination of the mixed fluid.
Modifications
[0115] The present embodiment can be implemented with the following modifications. The present embodiment and the following modifications can be implemented in combination with each other as long as there is no technical contradiction. [0116] The wiping device **37** may cause the wiping section **55** to wipe the nozzle forming surface **25** as it is after at least one of the pressurized cleaning and the suction cleaning. [0117] The liquid ejection device **11** may be capable of performing one of the pressurized cleaning and the suction cleaning. The liquid ejection device **11** may be equipped with one of the pressurizing section **23** and the cleaning section **29**. [0118] The absorbent member **42** may receive liquid that is ejected as a dummy ejection from the liquid ejection section **22**. The absorbent member **42** may receive liquid discharged by the pressurized cleaning. For example, the flat section **56** may receive liquid discharged from the liquid ejection section **22**. In this case, the liquid ejection device **11** may be configured not to be equipped with the liquid receiving section **31**. [0119] The wiping device **37** may be equipped with a transport section that transports the band-shaped absorbent member **42**. The transport section may collect the used absorbent member **42** so as to be folded. [0120] The second liquid may be, for example, a reaction liquid, water, a solvent, a moisture retention liquid, a washing liquid, or the like. [0121] The wiping section **55** may wipe the nozzle forming surface **25** by contacting the liquid ejection section **22**, which moves in the scanning direction X1. For example, the control section **12** may moisten the wiping section **55** and move the wiping section **55** to the wiping position Pw during the suction cleaning. The control section **12** may cause the wiping section **55** to wipe the nozzle forming surface **25** by causing the liquid ejection section **22** that has been performed the suction cleaning to move in the scanning direction X1 and to pass through the wiping section **55**. The liquid ejection section **22** may perform a dummy ejection at a timing when the liquid ejection section **22** passes

through the flat section **56**. [0122] Either the mixed fluid spray section **38** or the liquid ejection device **11** may be equipped with a compressor that is capable of compressing air. The gas supply path **85** may connect the compressor and the fluid spray head **77**. [0123] The mixed fluid spray section **38** may not spray the mixed fluid to the nozzle forming surface **25**. In this case, the mixed fluid spray section **38** of the first embodiment may be configured not to be equipped with the third movement mechanism **79**. The fluid spray head **77** of the second embodiment may be configured not to have the second spray nozzle **93***s*. [0124] The mixed fluid spray section **38** may be capable of spraying the mixed fluid simultaneously from both the first spray nozzle **93***f* and the second spray nozzle **93***s*. The mixed fluid spray section **38** may simultaneously spray the mixed fluid to the absorbent member **42** and to the nozzle forming surface **25**. [0125] The spray nozzle **93** may be capable of facing the wiping section **55**. The mixed fluid spray section **38** may directly spray the mixed fluid to the wiping section **55**. [0126] The mixed fluid spray section **38** may spray the mixed fluid in the vertical direction Z. [0127] The pressure of the gas supplied to the fluid spray head **77** may be atmospheric pressure. The gas supplied to the fluid spray head **77** is not limited to air, and may be nitrogen or the like. [0128] The mixed fluid spray section **38** may be configured not to be equipped with the second movement mechanism **78**. In this case, the length of the spray nozzle **93** in the width direction Y is desirably equal to or longer than the length of the absorbent member **42** in the width direction Y, and is desirably equal to or longer than the length of the nozzle forming surface **25** in the width direction Y. The fluid spray head **77** may be fixed. [0129] The maintenance unit **30** may be provided separately from the liquid ejection device **11**. [0130] The liquid ejection device **11** may be a liquid ejection device that sprays or ejects liquid other than ink. The state of the liquid which is ejected from the liquid ejection device in the form of a minute amount of liquid droplets includes granular shape, teardrop shape, and a shape with thread-like tail. Here, the liquid may be a material that can be ejected from the liquid ejection device. For example, the liquid may be in a state where a substance is in liquid phase, and includes fluid bodies such as liquid body having high or low viscosity, sols, gel waters, other inorganic solvents, organic solvents, solutions, liquid resins, liquid metals, and molten metal. The liquid includes not only liquid as one state of substance but also liquid in which particles of functional materials made of solid materials such as pigments or metal particles are dissolved, dispersed, or mixed in a solvent. Typical examples of the liquid include ink and liquid crystal as described in the above embodiment. Here, the ink includes various liquid compositions such as general water-based ink, oil-based ink, gel ink, and hot-melt ink. As a specific example of the liquid ejection device, there are devices that eject liquid containing materials such as electrode materials or color materials in a dispersed or dissolved form, which are used for manufacturing a liquid crystal display, an electroluminescence display, a surface emitting display, a color filter, and the like. The liquid ejection device may be a device for ejecting biological organic matter used for the manufacture of biochips, a device for ejecting liquid to be a sample used as a precision pipette, a textile printing device, a micro dispenser, or the like. The liquid ejection device may be a device that discharges lubricating oil in a pinpoint manner to precision machinery such as watches or cameras, or a device that discharges transparent resin liquid such as ultraviolet curable resin onto a substrate in order to form micro hemispherical lenses, optical lenses, or the like, which are used in optical communication elements or the like. The liquid ejection device may be a device that ejects etching solution such as acid or alkali to etch substrates or the like.

Definition

[0131] The expression “at least one” as used in this specification means “one or more” of the desired options. As an example, the expression “at least one” as used in this specification means “only one option” or “both of the two options” if the number of options is two. As another example, the expression “at least one” as used in this specification means “only one option”, “any combination of two options”, or “any combination of three or more options” if the number of options is three or more.

Notes

[0132] Hereinafter, technical ideas grasped from the above-described embodiments and modifications, and operations and effects thereof will be described.

[0133] (A) The maintenance unit includes a wiping section configured to wipe a nozzle forming surface of a liquid ejection section in which a nozzle that ejects a first liquid is formed and a mixed fluid spray section that sprays a mixed fluid of gas and a second liquid from a spray nozzle to moisten the wiping section.

[0134] According to this configuration, the mixed fluid spray section sprays the mixed fluid made by mixing the second liquid and the gas. By mixing the gas with the second liquid, droplet size of the second liquid to be sprayed can be reduced, and the second liquid can be sprayed over a wide range. Therefore, it can make the wiping section a uniformly moistened state with a small amount of the second liquid.

[0135] (B) The maintenance unit according to (A) described above may be configured such that the wiping section is configured with a band-shaped absorbent member configured to absorb liquid, a length of the absorbent member in a width direction is longer than a length of the nozzle forming surface in the width direction, and the spray nozzle is movable in the width direction.

[0136] According to this configuration, the spray nozzle is movable in the width direction. By spraying the mixed fluid from the spray nozzle that moves in the width direction, the mixed fluid spray section can make easier the absorbent member a uniformly moistened state even if the absorbent member is elongated in the width direction.

[0137] (C) The maintenance unit according to (A) or (B) described above may be configured such that the spray nozzle is movable between a first position for moistening the wiping section and a second position for spraying the mixed fluid at the nozzle forming surface.

[0138] According to this configuration, the spray nozzle is movable between the first position and the second position. When the mixed fluid is sprayed from the spray nozzle located at the first position, the wiping section can be moistened. When the mixed fluid is sprayed from the spray nozzle located at the second position, the mixed fluid can be sprayed onto the nozzle forming surface. Therefore, even when the first liquid in the nozzle is thickened and clogged, it can be easily recovered. Therefore, the mixed fluid spray section can perform the moistening of the wiping section and the maintenance of the liquid ejection section.

[0139] (D) The maintenance unit according to (A) or (B) described above may be configured such that assuming that the spray nozzle is a first spray nozzle, the mixed fluid spray section has a second spray nozzle configured to spray the mixed fluid onto the nozzle forming surface.

[0140] According to this configuration, the mixed fluid spray section has a second spray nozzle in addition to the first spray nozzle. When the mixed fluid is sprayed from the second spray nozzle, the mixed fluid can be sprayed onto the nozzle forming surface. Therefore, the mixed fluid spray section can perform both the moistening of the wiping section and the maintenance of the liquid ejection section.

[0141] (E) The maintenance unit according to (D) described above may be configured to such that the mixed fluid spray section has a switching section that enables switching between spraying of the mixed fluid from the first spray nozzle and spraying of the mixed fluid from the second spray nozzle.

[0142] According to this configuration, the switching section switches between the spraying of the mixed fluid from the first spray nozzle and the spraying of the mixed fluid from the second spray nozzle. Therefore, the mixed fluid spray section can select the spraying destination of the mixed fluid.

[0143] (F) The maintenance unit according to (A) to (E) described above may be configured such that further including a sub-tank configured to store the second liquid supplied from a main tank that stores the second liquid. According to this configuration, the sub-tank can store the second liquid supplied from the main tank. By storing the second liquid in the sub-tank, the sub-tank can

supply easier the second liquid in accordance with the spraying of the mixed fluid by the mixed fluid spray section.

[0144] (G) The maintenance unit according to (A) to (F) described above may be configured such that the gas is compressed air. According to this configuration, the mixed fluid spray section can spray the mixed fluid of the compressed air and the second liquid. Therefore, for example, compared to a case where a mixed fluid of uncompressed air and the second liquid is sprayed, it can make the wiping section a uniformly moistened state with a smaller amount of the second liquid.

[0145] (H) A liquid ejection device includes a liquid ejection section that has a nozzle forming surface in which a nozzle that ejects a first liquid is formed and a maintenance unit according to (A) to (G) described above. According to this configuration, the liquid ejection device can achieve the same effects as those of the maintenance unit.

[0146] (I) The liquid ejection device according to (H) described above may be configured such that the mixed fluid spray section has an introduction section that is connectable to a lead out section configured to lead out compressed air as the gas. According to this configuration, the mixed fluid spray section can introduce the compressed air through the introduction section. By using the air compressed outside, the liquid ejection device can be downsized.

[0147] (J) The liquid ejection device according to (I) described above may be configured such that the liquid ejection section is movable in a scanning direction, the mixed fluid spray section and the wiping section are provided side by side in the scanning direction, and the mixed fluid spray section sprays the mixed fluid in a direction that includes a component facing the scanning direction.

[0148] According to this configuration, the mixed fluid spray section sprays the mixed fluid in a direction having a component facing the scanning direction in which the liquid ejection section moves. Therefore, the mixed fluid spray section can spray the mixed fluid from a region different from the region in which the liquid ejection section moves. Therefore, the mixed fluid spray section can be arranged at a location where it does not interfere with the movement of the liquid ejection section.

[0149] (K) The liquid ejection device according to (H) to (J) described above may be configured such that further including a cleaning section configured to perform suction cleaning of the liquid ejection section by sucking the first liquid from the liquid ejection section, wherein in the scanning direction, the mixed fluid spray section is arranged between the cleaning section and the wiping section.

[0150] According to this configuration, the mixed fluid spray section is arranged between the cleaning section and the wiping section in the scanning direction. Therefore, the liquid ejection section on which the suction cleaning was performed using the cleaning section can be quickly wiped with the moistened wiping section.

[0151] (L) The liquid ejection device according to (H) to (K) described above may be configured such that further including a pressurizing section that pressurizes inside the liquid ejection section to discharge the first liquid from the liquid ejection section and a liquid receiving section that receives the first liquid discharged from the liquid ejection section by the pressure applied by the pressurizing section, wherein in the scanning direction, the liquid receiving section is arranged downstream of the wiping section.

[0152] According to this configuration, in the scanning direction, the liquid receiving section is arranged the downstream side of the wiping section. Therefore, after the first liquid is discharged to the liquid receiving section, the nozzle forming surface can be quickly wiped by the wiping section.

[0153] (M) The liquid ejection device according to (H) to (L) described above may be configured such that further including a liquid receiving section that receives the first liquid ejected as a dummy ejection from the liquid ejection section, wherein in the scanning direction, the wiping section is arranged between the cleaning section and the liquid receiving section.

[0154] According to this configuration, the cleaning section, the wiping section, and the liquid receiving section are arranged side by side in the scanning direction. Therefore, by moving the liquid ejection section, which has been subjected to suction cleaning by the cleaning section, in the scanning direction, wiping of the nozzle forming surface and a dummy ejection can be perform. Therefore, compared to a case where the wiping and the dummy ejection are performed while reciprocating the liquid ejection section in the scanning direction, the time required for the wiping and the dummy ejection can be reduced.
[0155] (N) The liquid ejection device according to (H) to (M) described above may be configured such that further including a pressurizing section that pressurizes inside the liquid ejection section to discharge the first liquid from the liquid ejection section, wherein the liquid receiving section is configured to receive the first liquid discharged from the liquid ejection section by the pressure applied by the pressurizing section.
[0156] According to this configuration, the liquid receiving section receives the first liquid discharged from the liquid ejection section by the pressurizing section. Therefore, the first liquid that is ejected as a dummy ejection from the head and the first liquid that is pressurized and discharged from the liquid ejection section can be received in a single liquid receiving section.

Claims

1. A maintenance unit comprising: a wiping section configured to wipe a nozzle forming surface of a liquid ejection section in which a nozzle that ejects a first liquid is formed and a mixed fluid spray section that sprays a mixed fluid of gas and a second liquid from a spray nozzle to moisten the wiping section.
2. The maintenance unit according to claim 1, wherein the wiping section is configured with a band-shaped absorbent member configured to absorb liquid, a length of the absorbent member in a width direction is longer than a length of the nozzle forming surface in the width direction, and the spray nozzle is movable in the width direction.
3. The maintenance unit according to claim 1, wherein the spray nozzle is movable between a first position for moistening the wiping section and a second position for spraying the mixed fluid at the nozzle forming surface.
4. The maintenance unit according to claim 1, wherein assuming that the spray nozzle is a first spray nozzle, the mixed fluid spray section has a second spray nozzle configured to spray the mixed fluid onto the nozzle forming surface.
5. The maintenance unit according to claim 4, wherein the mixed fluid spray section has a switching section that enables switching between spraying of the mixed fluid from the first spray nozzle and spraying of the mixed fluid from the second spray nozzle.
6. The maintenance unit according to claim 1, further comprising: a sub-tank configured to store the second liquid supplied from a main tank that stores the second liquid.
7. The maintenance unit according to claim 1, wherein the gas is compressed air.
8. A liquid ejection device comprising: a liquid ejection section that has a nozzle forming surface in which a nozzle that ejects a first liquid is formed and the maintenance unit according to claim 1.
9. The liquid ejection device according to claim 8, wherein the mixed fluid spray section has an introduction section that is connectable to a lead out section configured to lead out compressed air as the gas.
10. The liquid ejection device according to claim 8, wherein the liquid ejection section is movable in a scanning direction, the mixed fluid spray section and the wiping section are provided side by side in the scanning direction, and the mixed fluid spray section sprays the mixed fluid in a direction that includes a component facing the scanning direction.
11. The liquid ejection device according to claim 10, further comprising: a cleaning section configured to perform suction cleaning of the liquid ejection section by sucking the first liquid

from the liquid ejection section, wherein in the scanning direction, the mixed fluid spray section is arranged between the cleaning section and the wiping section.

12. The liquid ejection device according to claim 11, further comprising: a pressurizing section that pressurizes inside the liquid ejection section to discharge the first liquid from the liquid ejection section and a liquid receiving section that receives the first liquid discharged from the liquid ejection section by the pressure applied by the pressurizing section, wherein in the scanning direction, the liquid receiving section is arranged downstream of the wiping section.

13. The liquid ejection device according to claim 11, further comprising: a liquid receiving section that receives the first liquid ejected as a dummy ejection from the liquid ejection section, wherein in the scanning direction, the wiping section is arranged between the cleaning section and the liquid receiving section.

14. The liquid ejection device according to claim 13, further comprising: a pressurizing section that pressurizes inside the liquid ejection section to discharge the first liquid from the liquid ejection section, wherein the liquid receiving section is configured to receive the first liquid discharged from the liquid ejection section by the pressure applied by the pressurizing section.