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MEDIUM DISCHARGE DEVICE AND ELECTRONIC APPARATUS

Abstract

A medium discharge unit includes a discharge roller pair configured to nip a medium between a first roller and a second roller and discharge the medium to a sheet ejection unit, a first pressing member including a medium pressing portion configured to move below a nipping position at which the discharge roller pair nips the medium and being configured to press the medium by the medium pressing portion, and a lifting member configured to lift up the medium pressing portion from a first position below the nipping position to a second position above the first position. The medium pressing portion is lifted by the lifting member while a downstream leading edge of the medium in a discharge direction passes through the nipping position, and moves from the first position to the second position. While an upstream trailing edge of the medium in the discharge direction passes through the nipping position, the medium pressing portion moves from the second position to the first position.

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Background/Summary

[0001] The present application is based on, and claims priority from JP Application Serial Number 2024-020071, filed Feb. 14, 2024, and 2024-090500, filed Jun. 4, 2024, the disclosures of which are hereby incorporated by reference herein in its entirety.

BACKGROUND

1. Technical Field

[0002] The present disclosure relates to a medium discharge device and an electronic apparatus.

2. Related Art

[0003] JP-A-2013-60241 describes a sheet discharge device that discharges a sheet from a pair of sheet ejection rollers to a sheet stack. The sheet discharge device includes first and second sheet pressing members, which can swing interlockingly with each other, downstream of the sheet ejection roller pair in a discharge direction. The first sheet pressing member includes a swinging end that presses a sheet to prevent a trailing edge of a discharged sheet from remaining at the sheet ejection roller pair. The second sheet pressing member has a swinging radius smaller than that of the first sheet pressing member, and includes a swinging end positioned upward of the swinging end of the first sheet pressing member. The sheet discharged from the sheet ejection roller pair contact with the swinging end of the second sheet pressing member, and then is guided to the sheet stack positioned below. Further, when the trailing edge of the sheet passes through the sheet ejection roller pair, the trailing edge of the sheet is pressed down toward the sheet stack by the first sheet pressing member. According to this configuration, the leading edge of the sheet does not contact the first sheet pressing member, and hence the first sheet pressing member can be prevented from excessively pressing down the leading edge of the sheet onto the sheet stack. As a result, hindrance to movement of a sheet due to frictional resistance can be suppressed.

[0004] However, in a configuration in which the leading edge of the sheet is pressed by the second sheet pressing member, when rigidity of the sheet is low or the like, the second sheet pressing member may significantly press down the edges in a sheet width direction intersecting with the discharge direction. In this case, sheets on the sheet stack may possibly be disorganized.

SUMMARY

[0005] A medium discharge device is a medium discharge device configured to discharge a medium to a placement unit on which the medium is placed, the medium discharge device including a roller pair including a first roller and a second roller positioned above the first roller and being configured to nip the medium between the first roller and the second roller and discharge the medium to the placement unit, a first pressing member including a first member and being configured to press the medium by the first member, the first member being configured to move below a nipping position at which the roller pair nips the medium, and a lifting member configured to lift up the first member from a first position below the nipping position to a second position above the first position, wherein [0006] the first member is lifted up by the lifting member while a downstream leading edge of the medium in a discharge direction passes through the nipping position, and moves from the first position to the second position, and while an upstream trailing edge of the medium in the discharge direction passes through the nipping position, the first member moves from the second position to the first position.

[0007] A medium discharge device is a medium discharge device configured to discharge a medium to a placement unit on which the medium is placed, the medium discharge device including a roller pair including a first roller and a second roller positioned above the first roller and being configured to nip the medium between the first roller and the second roller and discharge the medium to the placement unit, and a discharge assisting member configured to assist a discharge operation of the medium to be discharged from the roller pair, wherein the discharge assisting member includes a medium pressing portion configured to move between a first position below a nipping position at which the roller pair nips the medium and a second position above the first position and press down the medium in the process of moving from the second position to the first position, and a medium abutting portion against which the medium abuts upstream of the medium pressing portion in the discharge direction of the medium, when the medium abuts against the medium abutting portion while a downstream leading edge of the medium in the discharge direction passes through the nipping position, the medium pressing portion moves from the first position to the second position, and when the medium abutting portion is separated from the medium while an upstream trailing edge of the medium in the discharge direction passes through the nipping position, the medium pressing portion moves from the second position to the first position.
[0008] An electronic apparatus includes the medium discharge device described above.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0009] FIG. **1** is a perspective view illustrating a schematic configuration of an image reading apparatus.
[0010] FIG. **2** is a cross-sectional view illustrating an internal configuration of the image reading apparatus.
[0011] FIG. **3** is a side view illustrating a configuration of a medium discharge unit of a first embodiment.
[0012] FIG. **4** is a plan view illustrating a configuration of the medium discharge unit of the first embodiment.
[0013] FIG. **5** is a side view illustrating a state in which the medium discharge unit of the first embodiment discharges a medium.
[0014] FIG. **6** is a side view illustrating a state in which the medium discharge unit of the first embodiment discharges a medium.
[0015] FIG. **7** is a side view illustrating a state in which the medium discharge unit of the first embodiment discharges a medium.
[0016] FIG. **8** is a side view illustrating a medium discharge unit of a second embodiment.
[0017] FIG. **9** is a plan view illustrating the medium discharge unit of the second embodiment.
[0018] FIG. **10** is a side view illustrating a state in which the medium discharge unit of the second embodiment discharges a medium.
[0019] FIG. **11** is a side view illustrating a state in which the medium discharge unit of the second embodiment discharges a medium.
[0020] FIG. **12** is a side view illustrating a state in which the medium discharge unit of the second embodiment discharges a medium.
[0021] FIG. **13** is a side view illustrating a medium discharge unit of a third embodiment.
[0022] FIG. **14** is a side view illustrating a state in which the medium discharge unit of the third embodiment discharges a medium.
[0023] FIG. **15** is a side view illustrating a state in which the medium discharge unit of the third embodiment discharges a medium.
[0024] FIG. **16** is a side view illustrating a state in which the medium discharge unit of the third

embodiment discharges a medium.
[0025] FIG. **17** is a side view illustrating a state in which the medium discharge unit of the third embodiment discharges a medium.
[0026] FIG. **18** is a side view schematically illustrating a configuration of a medium discharge unit of a fourth embodiment.
[0027] FIG. **19** is a plan view illustrating a configuration of the medium discharge unit of the fourth embodiment.
[0028] FIG. **20** is a side view illustrating a state in which the medium discharge unit of the fourth embodiment discharges a medium.
[0029] FIG. **21** is a side view illustrating a state in which the medium discharge unit of the fourth embodiment discharges a medium.
[0030] FIG. **22** is a side view illustrating a state in which the medium discharge unit of the fourth embodiment discharges a medium.
[0031] FIG. **23** is a side view schematically illustrating a medium discharge unit of a fifth embodiment.
[0032] FIG. **24** is a plan view illustrating the medium discharge unit of the fifth embodiment.
[0033] FIG. **25** is a side view illustrating a state in which the medium discharge unit of the fifth embodiment discharges a medium.
[0034] FIG. **26** is a side view schematically illustrating a state in which the medium discharge unit of the fifth embodiment discharges a medium.
[0035] FIG. **27** is a side view schematically illustrating a state in which the medium discharge unit of the fifth embodiment discharges a medium.

DESCRIPTION OF EMBODIMENTS

1. First Embodiment

[0036] With reference to the drawings, a configuration of an image reading apparatus **1** according to a first embodiment is described below.
[0037] The image reading apparatus **1** is an electronic apparatus that reads an image formed on a medium M such as paper being transported and generates image data.
[0038] Each figure illustrates X-, Y-, and Z-axes that intersect with one another. In the embodiment, the X-, Y-, and Z-axes are perpendicular to one another. The X-axis is parallel to the installation surface of the image reading apparatus **1**, and corresponds to the width direction of the image reading apparatus **1**. The Y-axis is parallel to the installation surface of the image reading apparatus **1**, and corresponds to the depth direction of the image reading apparatus **1**. The Z-axis is vertical to the installation surface of the image reading apparatus **1**, and corresponds to the height direction of the image reading apparatus **1**.
[0039] Hereinafter, a +X direction parallel to the X-axis is a left direction when facing the front surface of the image reading apparatus **1**. A −X direction parallel to the X-axis is a direction opposite to the +X direction. A +Y direction parallel to the Y-axis is a direction from the back surface to the front surface of the image reading apparatus **1**. A −Y direction parallel to the Y-axis is a direction opposite to the +Y direction. A +Z direction parallel to the Z-axis is an upward direction from the installation surface of the image reading apparatus **1**. A −Z direction parallel to the Z-axis is a direction opposite to the +Z direction. In the embodiment, a ±Z direction is parallel to the vertical direction.
[0040] FIG. **1** is a perspective view illustrating a schematic configuration of the image reading apparatus **1**, and FIG. **2** is a cross-sectional view illustrating an internal structure of the image reading apparatus **1**.
[0041] As illustrated in FIG. **1**, the image reading apparatus **1** includes a lower unit **11** and an upper unit **12**. The upper unit **12** is arranged on the upper side of the lower unit **11**. The upper unit **12** includes a sheet supply unit **13** on which the medium M before being read is placed and a sheet ejection unit **14** on which the medium M after being read is placed. It is configured so that the

plurality of media M (see FIG. **2**) are stacked on the sheet supply unit **13** and the sheet ejection unit **14**. The upper unit **12** is openable and closeable with respect to the lower unit **11**. The sheet ejection unit **14** is an example of the placement unit.

[0042] As illustrated in FIG. **2**, in the upper unit **12** of the image reading apparatus **1**, a transport path **15** for the medium M, which is indicated by the broken line, is formed. The transport path **15** is a path that passes from the sheet supply unit **13** through the inside of the upper unit **12**, passes between the lower unit **11** and the upper unit **12**, and then arrives at the sheet ejection unit **14**. The transport path **15** is bent inside the upper unit **12**.

[0043] The image reading apparatus **1** includes a medium transport unit **21** inside the upper unit **12**. The medium transport unit **21** includes a feeding unit **22** and a plurality of transport roller pairs **23**. The feeding unit **22** separates the uppermost medium M from the plurality of media M stacked on the sheet supply unit **13**, and feeds the media one at a time into the transport path **15**. The transport roller pair **23** includes a driving roller **23***a* that rotates by driving of a driving device (for example, a motor), which is omitted in illustration, and a driven roller **23***b* that rotates in response to rotation of the driving roller **23***a*. The transport roller pair **23** transports the medium M while nipping the medium M between the driving roller **23***a* and the driven roller **23***b*. The medium transport unit **21** transports the medium M along the transport path **15** toward a discharge roller pair **31**, which is described later. The medium transport unit **21** is an example of the transport unit.

[0044] The image reading apparatus **1** includes a first sensor unit **24** and a second sensor unit **25** at a position adjacent to the transport path **15**. For example, the first sensor unit **24** and the second sensor unit **25** include sensors of a contact image sensor (CIS) type extending along the Y-axis. However, the sensors of the first sensor unit **24** and the second sensor unit **25** may be sensors of other types such as a charge coupled device (CCD) type.

[0045] The first sensor unit **24** is accommodated in the lower unit **11**. A document table **26** that can transmit light is arranged on the upper surface of the lower unit **11**, and the first sensor unit **24** faces, via the document table **26**, the first surface of the medium M being transported. The first sensor unit **24** reads an image formed on the first surface of the medium M being transported. Note that the first sensor unit **24** is movable in the +X direction, and can also read an image on the medium M placed on the document table **26** while opening the upper unit **12**, in addition to the medium M being transported in the transport path **15**.

[0046] The second sensor unit **25** is accommodated inside the upper unit **12**, and is arranged downstream of the first sensor unit **24** in the transport path **15**. The second sensor unit **25** faces a second surface opposite to the first surface of the medium M being transported, and reads an image formed on the second surface.

[0047] The image reading apparatus **1** includes a medium discharge unit **30** downstream of the medium transport unit **21**, the first sensor unit **24**, and the second sensor unit **25** in the transport path **15**. The medium discharge unit **30** discharges the medium M toward the sheet ejection unit **14** after the images thereon are read by the first sensor unit **24** and the second sensor unit **25**. The medium discharge unit **30** is an example of the medium discharge device.

[0048] The medium discharge unit **30** includes the discharge roller pair **31** configured by a first roller **31***a* and a second roller **31***b*. The first roller **31***a* rotates by driving of a driving device (for example, a motor), which is omitted in illustration. The second roller **31***b* is positioned above, in other words, on the +Z side of the first roller **31***a*, and rotates in response to rotation of the first roller **31***a*. The discharge roller pair **31** discharges the medium M to the sheet ejection unit **14** while nipping the medium M between the first roller **31***a* and the second roller **31***b*. The discharge roller pair **31** is an example of the roller pair.

[0049] The image reading apparatus **1** includes a control unit **50** inside the lower unit **11**. The control unit **50** includes a processor such as a central processing unit (CPU), and controls an operation of the image reading apparatus **1**. In other words, the control unit **50** controls operations of the medium transport unit **21**, the first sensor unit **24**, the second sensor unit **25**, and the medium

discharge unit **30**.

[0050] FIG. **3** is a side view illustrating a configuration of the medium discharge unit **30**, and FIG. **4** is a plan view illustrating a configuration of the medium discharge unit **30**. Hereinafter, a direction in which the medium discharge unit **30** discharges the medium M is also referred to as a discharge direction. In the embodiment, the discharge direction is substantially the −X direction. Further, the ±Y direction intersecting with the discharge direction is also referred to as a width direction of the medium M.

[0051] As illustrated in FIG. **3**, in addition to the discharge roller pair **31** described above, the medium discharge unit **30** includes a scraping member **32**, a first pressing member **33**, and a lifting member **34**. The scraping member **32** scrapes the medium M out of the discharge roller pair **31**. The first pressing member **33** presses the discharged medium M against the first roller **31***a*. The lifting member **34** changes the posture of the first pressing member **33** as the medium M moves. Those configurations are described later in detail.

[0052] As illustrated in FIG. **4**, the medium discharge unit **30** includes the plurality of discharge roller pairs **31** along the ±Y direction. In the embodiment, the medium discharge unit **30** includes the four discharge roller pairs **31** along the ±Y direction. In other words, the medium discharge unit **30** includes the four first rollers **31***a* and the four second rollers **31***b* along the ±Y direction.

[0053] The four first rollers **31***a* are fixed to a rotation shaft **35** extending along the ±Y direction. The four first rollers **31***a* rotate about the rotation shaft **35** by driving of a driving device, which is omitted in illustration. The four second rollers **31***b* are fixed to a rotation shaft **36** extending along the ±Y direction. The four second rollers **31***b* rotate about the rotation shaft **36** in response to rotation of the first roller **31***a*. For example, the rotation shafts **35** and **36** are supported rotatably by the casing body of the upper unit **12** or the like.

[0054] The medium discharge unit **30** includes the plurality of scraping members **32**. In the embodiment, the medium discharge unit **30** includes the two scraping members **32**. Each of the two scraping members **32** is arranged to be adjacent to the inner surface sides of the two first rollers **31***a*, which are positioned inside, among the four first rollers **31***a*. Specifically, one of the scraping members **32** is arranged to be adjacent to the −Y side of the second first roller **31***a* to the +Y side. The other scraping member **32** is arranged to be adjacent to the +Y side of the third first roller **31***a* to the +Y side.

[0055] For example, the scraping member **32** is a disk-like member formed of sponge or the like. In other words, the scraping member **32** has a surface on which fine irregularities are formed, and can be elastically deformed. The scraping member **32** rotates together with the first roller **31***a* about the rotation shaft **35** by driving of a driving device, which is omitted in illustration. In other words, the scraping member **32** rotates coaxially with the first roller **31***a*, and nips the medium M with the second roller **31***b*. The scraping member **32** utilizes the irregularities on the surface to scrape the medium M in the discharge direction.

[0056] The diameter of the scraping member **32** is larger than the diameter of the first roller **31***a*. However, the scraping member **32**, which is formed of sponge or the like, is deformed and compressed when contacting with the second roller **31***b* and the medium M. Note that the scraping member **32** is not limited to sponge, and is only required to be configured by an elastic member including a surface on which fine irregularities are formed. Further, the medium discharge unit **30** may be configured without the scraping member **32**.

[0057] The medium discharge unit **30** includes the plurality of first pressing members **33** arrayed along the ±Y direction being the axial direction of the first roller **31***a*. In the embodiment, the medium discharge unit **30** includes the three first pressing members **33** arrayed along the ±Y direction. The first pressing members **33** are arranged, with one placed between each of the four discharge roller pairs **31**. Each of the first pressing members **33** includes a rotation shaft **37** positioned on a commonly-shared imaginary linear line, and can rotate about the rotation shaft **37**. The rotation shaft **37** of the first pressing member **33** is arranged on the +X side, in other words,

upstream of the rotation shaft **35** of the first roller **31***a* and the rotation shaft **36** of the second roller **31***b* in the discharge direction. For example, the rotation shaft **37** is supported rotatably by the casing of the upper unit **12** or other structural bodies. The rotation shaft **37** is an example of the first rotation shaft.

[0058] The first pressing member **33** includes a medium pressing portion **33***a* extending from the rotation shaft **37** to the −X side and a lever portion **33***b* extending from the rotation shaft **37** to the +X side. The first pressing member **33** rotates. With this, the medium pressing portion **33***a* is movable below a nipping position Pn at which the discharge roller pair **31** nips the medium M. Further, the first pressing member **33** presses down the medium M being discharged, by the medium pressing portion **33***a* moving downward. When the first pressing member **33** rotates, the lever portion **33***b* contacts with the lifting member **34**. The medium pressing portion **33***a* is an example of the first member, and the lever portion **33***b* is an example of the second member.

[0059] The weight of the medium pressing portion **33***a* is more than the weight of the lever portion **33***b*. Thus, while the discharge roller pair **31** does not nip the medium M, the medium pressing portion **33***a* is displaced downward due to the own weight. Specifically, as illustrated in FIG. **3**, the medium pressing portion **33***a* is positioned below the nipping position Pn of the discharge roller pair **31**. While the discharge roller pair **31** does not nip the medium M, the position of the medium pressing portion **33***a* corresponds to the first position. Note that, in the present specification, the position of the medium pressing portion **33***a* is a position of a part of the medium pressing portion **33***a*, which actually contacts with the medium M.

[0060] The lifting member **34** presses down the lever portion **33***b* of the first pressing member **33** to change the posture of the first pressing member **33**. The lifting member **34** includes a rotation shaft **38** extending along the ±Y direction, and can rotate about the rotation shaft **38**. The rotation shaft **38** is arranged on the +X side, in other words, upstream of the rotation shaft **37** of the first pressing member **33** in the discharge direction. For example, the rotation shaft **38** is supported rotatably by the casing of the upper unit **12** or other structural bodies. The rotation shaft **38** is an example of the second rotation shaft.

[0061] The lifting member **34** includes one medium contacting portion **34***a* extending from the rotation shaft **38** to the −X side and three lever pressing portion **34***b* extending from the rotation shaft **38** to the +X side. Specifically, the medium contacting portion **34***a* extends in a direction containing a −X component and a −Z component so as to intersect with the transport path **15**, and contacts with the medium M being transported. Further, each of the three lever pressing portions **34***b* faces the lever portion **33***b* of the first pressing member **33**. Thus, when the lifting member **34** rotates in a counterclockwise direction in FIG. **3**, the lever pressing portion **34***b* contacts with the lever portion **33***b*, and presses down the lever portion **33***b*. The medium contacting portion **34***a* is an example of the third member, and the lever pressing portion **34***b* is an example of the fourth member.

[0062] When the lever portion **33***b* of the first pressing member **33** is pressed down, the medium pressing portion **33***a* is elevated. The position of the medium pressing portion **33***a* after elevation corresponds to the second position. The second position is a position above the first position. In this manner, the lifting member **34** lifts up the medium pressing portion **33***a* of the first pressing member **33** from the first position below the nipping position Pn of the discharge roller pair **31** to the second position above the first position. In the embodiment, the second position is a position substantially at the same height as the nipping position Pn of the discharge roller pair **31**.

[0063] Next, an operation of the medium discharge unit **30** is described.

[0064] When reading of an image formed on the medium M is executed, the medium transport unit **21** takes one medium M from the sheet supply unit **13** into the transport path **15**, based on control of the control unit **50**. The medium transport unit **21** transports the medium M, which is taken in, along the transport path **15** toward the medium discharge unit **30**. Further, the first sensor unit **24** and the second sensor unit **25** read the image formed on the medium M being transported, based on

control of the control unit **50**. Further, the first roller **31***a* rotates based on control of the control unit **50**. With this, the medium discharge unit **30** discharges, to the sheet ejection unit **14**, the medium M after reading the image thereon.

[0065] FIG. **5** to FIG. **7** are side views illustrating a state in which the medium discharge unit **30** of the embodiment discharges the medium M.

[0066] As illustrated in FIG. **5**, the medium M transported by the medium transport unit **21** contacts with the medium contacting portion **34***a* of the lifting member **34** upstream of the nipping position Pn of the discharge roller pair **31** in the transport direction, and the medium contacting portion **34***a* moves downstream. With this, the lifting member **34** rotates about the rotation shaft **38** in a first direction R1, that is, a counterclockwise direction in FIG. **5**. As a result, the lever pressing portion **34***b* of the lifting member **34** contacts with the lever portion **33***b* of the first pressing member **33**.

[0067] Further, when the medium M moves downstream, the lifting member **34** further rotates in the first direction R1. With this, the lever pressing portion **34***b* presses down the lever portion **33***b*. With this, the first pressing member **33** rotates about the rotation shaft **37** in the first direction R1. As the first pressing member **33** rotates in the first direction R1, the medium pressing portion **33***a* is lifted upward.

[0068] Elevation of the medium pressing portion **33***a* due to rotation of the first pressing member **33** continues until the distal end of the medium contacting portion **34***a* abuts against the upper surface of the medium M. Further, as illustrated in FIG. **6**, when the leading edge of the medium M, in other words, the downstream edge thereof in the discharge direction passes through the nipping position Pn of the discharge roller pair **31**, the distal end of the medium contacting portion **34***a* abuts against the upper surface of the medium M. Hereinafter, the postures of the lifting member **34** and the first pressing member **33** are substantially constant. In this state, the medium pressing portion **33***a* extends along the discharge direction, and an abutting surface **33***c* facing the medium M contacts with the upper surface of the medium M. As described above, the position of the medium pressing portion **33***a* lifted by the lifting member **34** corresponds to the second position. In other words, when the downstream leading edge of the medium M in the discharge direction passes through the nipping position Pn, the first pressing member **33** rotates in the first direction R1. With this, the medium pressing portion **33***a* moves from the first position to the second position. In other words, the medium pressing portion **33***a* is lifted by the lifting member **34**, and thus moves from the first position to the second position.

[0069] Herein, it is assumed that the medium pressing portion **33***a* is not elevated. When the edges of the medium M in the width direction, in other words, the edges of the medium M in the ±Y direction are present in the vicinity of the position of the medium pressing portion **33***a*, the medium pressing portion **33***a* may significantly press down the edges of the medium M in the width direction. In particular, when rigidity of the medium M is low, the medium M easily hangs down. In this case, the leading edge of the discharged medium M in the width direction collide with the trailing edge of the medium M on the sheet ejection unit **14**. With this, the medium M on the sheet ejection unit **14** may be disorganized. In view of this, in the embodiment, when the leading edge of the medium M passes through the nipping position Pn, the medium pressing portion **33***a* is elevated. With this, the edges of the medium M in the width direction can be prevented from being pressed down.

[0070] After that, the medium M is further discharged, and the trailing edge of the medium M, in other words, the upstream edge thereof in the discharge direction is separated from the medium contacting portion **34***a*. In this state, as illustrated in FIG. **7**, the medium contacting portion **34***a* is lowered due to the own weight. In other words, the lifting member **34** rotates about the rotation shaft **38** in a second direction R2 opposite to the first direction R1. With this, the lever pressing portion **34***b* of the lifting member **34** is separated from the lever portion **33***b* of the first pressing member **33**. Further, when the lever pressing portion **34***b* is separated from the lever portion **33***b*, the medium pressing portion **33***a* is lowered due to the own weight. With this, the first pressing

member **33** rotates about the rotation shaft **37** in the second direction R2. As a result, the first pressing member **33** presses down the medium M by the own weight of the medium pressing portion **33***a*, and presses the medium M against the first roller **31***a*. In this state, the medium M is warped downward between the first rollers **31***a*. Thus, the position of the medium pressing portion **33***a* is below the nipping position Pn of the discharge roller pair **31**. Further, the medium pressing portion **33***a* continues pressing the medium M until the medium M is separated. Note that, in FIG. **7**, the part of the medium M that is nipped, the part thereof that contacts with the circumferential surface of the first roller **31***a*, and the like are omitted in illustration. After that, when the medium M is separated from the medium pressing portion **33***a*, the position of the medium pressing portion **33***a* returns to the first position before the medium M is charged. In this manner, when the upstream trailing edge of the medium M in the discharge direction passes through the nipping position Pn, the first pressing member **33** rotates about the rotation shaft **37** in the second direction R2. With this, the medium pressing portion **33***a* moves from the second position to the first position.

[0071] Note that, as illustrated in FIG. **3** and FIG. **6**, when the medium pressing portion **33***a* is positioned at the first position (see FIG. **3**), a region in which the medium pressing portion **33***a* and the first roller **31***a* overlap with each other as viewed in the ±Y direction being the axial direction of the first roller **31***a* is larger than that in a case in which the medium pressing portion **33***a* is positioned at the second position (see FIG. **6**). Further, when the medium pressing portion **33***a* is positioned at the first position (see FIG. **3**), an angle θ of the medium pressing portion **33***a* with respect to the horizontal plane is larger than that in a case in which the medium pressing portion **33***a* is positioned at the second position (see FIG. **6**). Herein, the angle θ of the medium pressing portion **33***a* with respect to the horizontal plane indicates an angle formed between the abutting surface **33***c* of the medium pressing portion **33***a*, which contacts with the medium M, and the horizontal plane.

[0072] As described above, according to the medium discharge unit **30** and the image reading apparatus **1** of the embodiment, the following effects can be obtained.

[0073] according to the embodiment, when the leading edge of the medium M passes through the nipping position Pn, the medium pressing portion **33***a* of the first pressing member **33** is lifted up by the lifting member **34**. With this, the edges of the medium M in the width direction can be prevented from being pressed down. In other words, the entry angle of the downstream edge of the medium M, in other words, the angle of the medium M with respect to the horizontal plane is reduced. As a result, collision between the leading edge of the discharged medium M and the trailing edge of the medium M on the sheet ejection unit **14** is avoided, and hence disorganization of the medium M on the sheet ejection unit **14** is suppressed. In contrast, when the trailing edge of the medium M passes through the nipping position Pn, the medium pressing portion **33***a* moves downward. With this, the medium M is pressed against the first roller **31***a* by the first pressing member **33**. With this, a force of transporting the medium M downstream is increased. As a result, the medium M moves as the first roller **31***a* rotates. Thus, the trailing edge of the medium M can be prevented from remaining at the discharge roller pair **31**.

[0074] Further, according to the embodiment, the medium M transported by the medium transport unit **21** contacts with the medium contacting portion **34***a*, and the lifting member **34** rotates in the first direction R1. With this, the medium pressing portion **33***a* is elevated from the first position to the second position. In other words, the medium pressing portion **33***a* can be elevated with a simple configuration.

[0075] Further, according to the embodiment, the discharged medium M is separated from the lifting member **34**. With this, the medium pressing portion **33***a* is lowered from the second position to the first position. In other words, the medium pressing portion **33***a* can be lowered with a simple configuration.

[0076] Further, according to the embodiment, when the medium pressing portion **33***a* is positioned at the first position, a region in which the medium pressing portion **33***a* and the first roller **31***a*

overlap with each other is larger than that in a case in which the medium pressing portion **33***a* is positioned at the second position. In other words, when the medium pressing portion **33***a* is positioned at the first position, the medium M is pressed against the first roller **31***a*. Thus, the trailing edge of the medium M can be prevented from remaining at the discharge roller pair **31**. In contrast, when the medium pressing portion **33***a* is positioned at the second position, a region in which the medium pressing portion **33***a* and the first roller **31***a* overlap with each other is smaller than that in a case in which the medium pressing portion **33***a* is positioned at the first position. Thus, at the leading edge of the medium M, the edges thereof in the width direction can be prevented from being pressed down.

[0077] Further, according to the embodiment, when the medium pressing portion **33***a* is positioned at the first position, the angle of the medium pressing portion **33***a* with respect to the horizontal plane is larger than that in a case in which the medium pressing portion **33***a* is positioned at the second position. In other words, when the medium pressing portion **33***a* is positioned at the first position, the medium M is pressed against the first roller **31***a*. Thus, the trailing edge of the medium M can be prevented from remaining at the discharge roller pair **31**. In contrast, when the medium pressing portion **33***a* is positioned at the second position, the angle of the medium pressing portion **33***a* with respect to the horizontal plane is smaller than that in a case in which the medium pressing portion **33***a* is positioned at the first position. Thus, at the leading edge of the medium M, the edges thereof in the width direction can be prevented from being pressed down.

[0078] Further, according to the embodiment, the plurality of first pressing members **33** are arrayed along the axial direction of the first roller **31***a*. Thus, the medium M having various sizes can effectively be pressed by the first pressing member **33**.

[0079] Further, according to the embodiment, t the discharge roller pair **31**, the medium M is scraped by the scraping member **32**. Thus, the trailing edge of the medium M can further be prevented from remaining at the discharge roller pair **31**.

2. Second Embodiment

[0080] Next, the image reading apparatus **1** according to a second embodiment is described.

[0081] The image reading apparatus **1** of the embodiment includes a medium discharge unit **30**A different from the medium discharge unit **30** of the first embodiment. The configurations other than the medium discharge unit **30**A are similar to those in the first embodiment, and hence description thereof is omitted.

[0082] FIG. **8** is a side view illustrating the medium discharge unit **30**A of the embodiment, and FIG. **9** is a plan view illustrating the medium discharge unit **30**A.

[0083] As illustrated in FIG. **8** and FIG. **9**, the medium discharge unit **30**A of the embodiment includes two second pressing members **40** in addition to the configuration of the medium discharge unit **30** of the first embodiment. The second pressing member **40** is a plate-like member having a substantially rectangular shape in plan view, and is formed to have a wave-like form as viewed from a side. The end portion of the second pressing member **40** on the +X side is rotatably attached to the rotation shaft **36** of the second roller **31***b*. Further, a pressing end portion **40***a* being an end portion of the second pressing member **40** on the −X side is a free end, and is positioned on the sheet ejection unit **14**. When the medium M is placed on the sheet ejection unit **14**, the second pressing member **40** presses the medium M by the own weight toward the sheet ejection unit **14**. In this manner, on the sheet ejection unit **14** present in the discharge direction with respect to the medium pressing portion **33***a* of the first pressing member **33**, the second pressing member **40** presses the medium M, which is discharged from the discharge roller pair **31**, toward the sheet ejection unit **14**.

[0084] FIG. **10** to FIG. **12** are side views illustrating a state in which the medium discharge unit **30**A of the embodiment discharges the medium M.

[0085] As illustrated in FIG. **10**, similarly to the first embodiment, when the medium M transported by the medium transport unit **21** arrives at the medium discharge unit **30**A, the lifting member **34**

lifts up the medium pressing portion **33***a* of the first pressing member **33**. Further, the leading edge of the medium M that passes through the nipping position Pn of the discharge roller pair **31** abuts against the second pressing member **40**, and the second pressing member **40** rotates so as to elevate the pressing end portion **40***a*. In contrast, while being pressed down by the own weight of the second pressing member **40**, the medium M is transported toward the sheet ejection unit **14**.

[0086] As illustrated in FIG. **11**, when the medium M is further discharged, the medium M passing through the nipping position Pn of the discharge roller pair **31** is warped downward. With this, the pressing end portion **40***a* of the second pressing member **40** is lowered. Further, the medium M passing through the pressing end portion **40***a* of the second pressing member **40** moves along the upper surface of the sheet ejection unit **14** or the upper surface of the medium M placed on the sheet ejection unit **14**.

[0087] As illustrated in FIG. **12**, similarly to the first embodiment, when the medium M is further discharged, and the trailing edge of the medium M is separated from the medium contacting portion **34***a*, the medium contacting portion **34***a* is lowered due to the own weight. With this, the medium pressing portion **33***a* also moves downward. As a result, the first pressing member **33** presses down the medium M by the own weight of the medium pressing portion **33***a*, and presses the medium M against the first roller **31***a*. After that, while being pressed by the second pressing member **40**, the trailing edge of the medium M arrives at the sheet ejection unit **14**. Note that, in FIG. **12**, the part of the medium M that is nipped, the part thereof that contacts with the circumferential surface of the first roller **31***a*, and the like are also omitted in illustration.

[0088] As described above, according to the medium discharge unit **30**A and the image reading apparatus **1** of the embodiment, the following effects can be obtained.

[0089] According to the embodiment, the medium M discharged from the discharge roller pair **31** is pressed toward the sheet ejection unit **14** by the second pressing member **40**. Thus, the medium M can be prevented from being excessively transported downstream in the sheet ejection unit **14**, and alignment of the medium M can be improved.

3. Third Embodiment

[0090] Next, the image reading apparatus **1** according to a third embodiment is described.

[0091] The image reading apparatus **1** of the embodiment includes a medium discharge unit **30**B different from the medium discharge units **30** and **30**A of the first and second embodiments. The configurations other than the medium discharge unit **30**B are similar to those in the first and second embodiments, and hence description thereof is omitted.

[0092] FIG. **13** is a side view illustrating the medium discharge unit **30**B of the embodiment.

[0093] As illustrated in FIG. **13**, the medium discharge unit **30**B of the embodiment is different from the medium discharge units **30** and **30**A of the first and second embodiments in that the lifting member **34** is not provided. Further, the medium discharge unit **30**B includes a first pressing member **41** having a shape different from the first pressing member **33** of the first and second embodiments.

[0094] Specifically, similarly to the first pressing member **33**, the first pressing member **41** includes a medium pressing portion **41***a* extending from a rotation shaft **42** to the −X side. In contrast, the first pressing member **41** is different from the first pressing member **33** in that the lever portion **33***b* extending to the +X side is not provided. The first pressing member **41** rotates. With this, the medium pressing portion **41***a* is movable below the nipping position Pn at which the discharge roller pair **31** nips the medium M. Further, the first pressing member **41** can press down the medium M being discharged, by the medium pressing portion **41***a* moving downward. The medium pressing portion **41***a* is an example of the first member.

[0095] While the discharge roller pair **31** does not nip the medium M, the medium pressing portion **41***a* of the first pressing member **41** is displaced downward due to the own weight. Specifically, as illustrated in FIG. **13**, the medium pressing portion **41***a* positioned below the nipping position Pn of the discharge roller pair **31**. In this state, the medium pressing portion **41***a* extends in a direction

containing a −X component and a −Z component, and intersects with the transport path **15**.
[0096] Further, similarly to the second embodiment, the medium discharge unit **30**B includes the second pressing member **40**. On the sheet ejection unit **14** that is present in the discharge direction with respect to the medium pressing portion **41***a* of the first pressing member **41**, the second pressing member **40** presses the medium M, which is discharged from the discharge roller pair **31**, toward the sheet ejection unit **14**.
[0097] FIG. **14** to FIG. **17** are side views illustrating a state in which the medium discharge unit **30**B of the embodiment discharges the medium M.
[0098] As illustrated in FIG. **14**, when the medium M transported by the medium transport unit **21** arrives at the medium discharge unit **30**B, the leading edge of the medium M contacts with the medium pressing portion **41***a*. Further, as illustrated in FIG. **15**, the medium M moves further downstream, and is nipped by the discharge roller pair **31**. In this process, the medium pressing portion **41***a* is elevated, and the first pressing member **41** rotates in the first direction R1.
[0099] When the medium M is nipped by the discharge roller pair **31**, the posture of the first pressing member **41** is substantially constant. In this state, the medium pressing portion **41***a* extends along the discharge direction, and an abutting surface **41***c* facing the medium M contacts with the upper surface of the medium M. In this state, the first pressing member **41** presses down the medium M by the own weight, and thus presses the medium M against the first roller **31***a*.
[0100] As illustrated in FIG. **16**, the leading edge of the medium M that passes through the nipping position Pn of the discharge roller pair **31** abuts against the second pressing member **40**, and the second pressing member **40** rotates so as to elevate the pressing end portion **40***a*. In contrast, while being pressed down by the own weight of the second pressing member **40**, the medium M is transported toward the sheet ejection unit **14**.
[0101] Further, as illustrated in FIG. **17**, when the medium M is further discharged, and the trailing edge of the medium M arrives at the vicinity of the nipping position Pn of the discharge roller pair **31**, the medium M is warped downward due to the weight of the medium pressing portion **41***a*. With this, the medium pressing portion **41***a* moves downward. In other words, the first pressing member **41** rotates in the second direction R2. As a result, the first pressing member **41** presses down the medium M by the own weight of the medium pressing portion **41***a*, and thus presses the medium M against the first roller **31***a*. Further, the medium pressing portion **41** continues pressing the medium M until the medium M is separated. After that, the medium M is separated from the medium pressing portion **41***a*, the position of the medium pressing portion **41***a* returns to the position before the medium M is discharged. Further, while being pressed by the second pressing member **40**, the trailing edge of the medium M arrives at the sheet ejection unit **14**. Note that, in FIG. **17**, the part of the medium M that is nipped, the part thereof that contacts with the circumferential surface of the first roller **31***a*, and the like are also omitted in illustration.
[0102] As described above, according to the medium discharge unit **30**B and the image reading apparatus **1** of the embodiment, the following effects can be obtained.
[0103] According to the embodiment, when the discharge roller pair **31** nips the medium M, the medium pressing portion **41***a* extends along the discharge direction. Thus, the first pressing member **41** can press a wide range of the medium M. Thus, the trailing edge of the medium M can be prevented from remaining at the discharge roller pair **31**. Further, the discharged medium M is pressed toward the sheet ejection unit **14** by the second pressing member **40**. Thus, the medium M can be prevented from being excessively transported downstream in the sheet ejection unit **14**. With this, alignment of the medium M can be improved.

4. Fourth Embodiment

[0104] Next, the image reading apparatus **1** according to a fourth embodiment is described.
[0105] The image reading apparatus **1** of the embodiment includes a medium discharge unit **60** different from the medium discharge units **30**, **30**A, and **30**B of the first to third embodiments. The configurations other than the medium discharge unit **60** are similar to those in the first to third

embodiments, and hence description thereof is omitted.
[0106] FIG. **18** is a side view schematically illustrating a configuration of the medium discharge unit **60**, and FIG. **19** is a plan view illustrating a configuration of the medium discharge unit **60**.
[0107] As illustrated in FIG. **18**, the medium discharge unit **60** nips the medium M, which is transported in an oblique direction containing a −X component and a +Z component along the transport path **15**, between the discharge roller pair **31**, and discharges the medium M to the sheet ejection unit **14**.
[0108] The medium discharge unit **60** includes the scraping member **32** and a discharge assisting member **61** in addition to the discharge roller pair **31**. The scraping member **32** scrapes the medium M out of the discharge roller pair **31**. The discharge assisting member **61** assists in an operation of discharging the medium M discharged from the discharge roller pair **31**. Specifically, the discharge assisting member **61** presses the discharged medium M against the first roller **31***a*. The configurations of the scraping member **32** and the discharge assisting member **61** are described later in detail.
[0109] As illustrated in FIG. **19**, the medium discharge unit **60** includes the plurality of discharge roller pairs **31**, and each of the plurality of discharge roller pairs **31** includes the first roller **31***a* and the second roller **31***b*. The plurality of discharge roller pairs **31** are arrayed along the ±Y direction being the axial direction of the first roller **31***a*. In the embodiment, the medium discharge unit **60** includes the four discharge roller pairs **31**. In other words, the medium discharge unit **60** includes the four first rollers **31***a* and the four second rollers **31***b* along the ±Y direction.
[0110] The four first rollers **31***a* are fixed to the rotation shaft **35** extending along the ±Y direction. The four first rollers **31***a* rotate about the rotation shaft **35** by driving of a driving device, which is omitted in illustration. The four second rollers **31***b* are fixed to the rotation shaft **36** extending along the ±Y direction. The four second rollers **31***b* rotate about the rotation shaft **36** in response to rotation of the first roller **31***a*. The rotation shaft **36** of the second roller **31***b* is arranged on the +X side, in other words, upstream of the rotation shaft **35** of the first roller **31***a* in the discharge direction. For example, the rotation shafts **35** and **36** are supported rotatably by the casing body of the upper unit **12** or the like.
[0111] The medium discharge unit **60** includes the plurality of scraping members **32**. The plurality of scraping members **32** are arrayed along the ±Y direction. In the embodiment, the medium discharge unit **60** includes the four scraping members **32** corresponding to the discharge roller pairs **31**. The scraping member **32** is arranged to be adjacent to the first roller **31***a* of the corresponding discharge roller pair **31**. Specifically, among the four scraping members **32**, the two scraping members **32** that are positioned on the Y side with respect to the center are arranged so as to be adjacent to the −Y sides of the first rollers **31***a*. Further, among the four scraping members **32**, the two scraping members **32** that are positioned on the +Y side with respect to the center are arranged so as to be adjacent to the +Y sides of the first rollers **31***a*.
[0112] The medium discharge unit **60** includes the plurality of discharge assisting members **61**. The plurality of discharge assisting members **61** are arrayed along the ±Y direction being the axial direction of the first roller **31***a*. In the embodiment, the medium discharge unit **60** includes the three discharge assisting members **61**. The discharge assisting members **61** are arranged, with one placed between each of the four discharge roller pairs **31**. Each of the discharge assisting members **61** includes a rotation shaft **62** positioned on a commonly-shared imaginary linear line, and can rotate about the rotation shaft **62**. The rotation shaft **62** of the discharge assisting member **61** is arranged on the +X side, in other words, upstream of the rotation shaft **35** of the first roller **31***a* and the rotation shaft **36** of the second roller **31***b* in the discharge direction. For example, the rotation shaft **62** is supported rotatably by the casing of the upper unit **12** or other structural bodies. The rotation shaft **62** is an example of the third rotation shaft.
[0113] As illustrated in FIG. **18**, the discharge assisting member **61** includes a medium pressing portion **61***a* extending from the rotation shaft **62** to the −X side. The discharge assisting member **61**

rotates. With this, the medium pressing portion **61***a* is movable below the nipping position Pn of the discharge roller pair **31**. Further, the discharge assisting member **61** can press down the medium M being discharged, by the medium pressing portion **61***a* moving downward.

[0114] While the discharge roller pair **31** does not nip the medium M, the medium pressing portion **61***a* is displaced downward due to the own weight. Specifically, as illustrated in FIG. **18**, the medium pressing portion **61***a* is positioned below the nipping position Pn of the discharge roller pair **31**. While the discharge roller pair **31** does not nip the medium M, the position of the medium pressing portion **61***a* corresponds to the first position. Note that, in the present specification, the position of the medium pressing portion **61***a* is a position of a part of the medium pressing portion **61***a*, which actually contacts with the medium M.

[0115] The discharge assisting member **61** includes a medium abutting portion **61***b* at a base end side of the medium pressing portion **61***a*, in other words, a side thereof close to the rotation shaft **62**. In other words, the medium abutting portion **61***b* is positioned upstream of the medium pressing portion **61***a* in the transport direction. The medium abutting portion **61***b* protrudes in a direction containing a +X component and a −Z component with respect to the medium pressing portion **61***a*. In other words, the medium abutting portion **61***b* protrudes upstream of the medium pressing portion **61***a* in the transport direction. In the embodiment, the medium pressing portion **61***a* and the medium abutting portion **61***b* are configured to be integrated with each other.

[0116] The downstream leading edge of the medium M transported by the medium transport unit **21** abuts against the medium abutting portion **61***b* in the medium discharge unit **60** (see FIG. **20**). In other words, the medium M abuts against the medium abutting portion **61***b* upstream of the medium pressing portion **61***a* in the transport direction. After that, when the medium M is further transported, the discharge assisting member **61** is pressed by the medium M to rotate. With this, the medium pressing portion **61***a* is elevated (see FIG. **21**). The position of the medium pressing portion **61***a* after elevation corresponds to the second position. The second position is a position above the first position. In other words, when the discharge assisting member **61** rotates, the medium pressing portion **61***a* is movable to the second position above the first position. In the embodiment, the second position is a position above the nipping position Pn of the discharge roller pair **31**.

[0117] Next, an operation of the medium discharge unit **60** is described.

[0118] FIG. **20** to FIG. **22** are side views schematically illustrating a state in which the medium discharge unit **60** of the embodiment discharges the medium M.

[0119] As illustrated in FIG. **20**, the medium M transported by the medium transport unit **21** abuts against the medium abutting portion **61***b* of the discharge assisting member **61** upstream of the nipping position Pn of the discharge roller pair **31** in the transport direction, and then the medium abutting portion **61***b* moves downstream. With this, the discharge assisting member **61** rotates about the rotation shaft **62** in the first direction R1, that is, a counterclockwise direction in FIG. **20**.

[0120] As illustrated in FIG. **21**, as the discharge assisting member **61** rotates in the first direction R1, the medium pressing portion **61***a* moves upward. Further, the medium abutting portion **61***b* contacts with the upper surface of the medium M upstream of the nipping position Pn of the discharge roller pair **31** in the discharge direction. Further, while the medium M is transported, the discharge assisting member **61** is in a substantially constant posture where the medium pressing portion **61***a* moves upward. As described above, the position of the medium pressing portion **61***a* after elevation due to the medium M being transported corresponds to the second position. In other words, when the downstream leading edge of the medium M in the discharge direction passes through the nipping position Pn, the medium M abuts against the medium abutting portion **61***b*. With this, the medium pressing portion **61***a* moves from the first position to the second position. In this manner, when the medium M transported by the medium transport unit **21** abuts against the medium abutting portion **61***b*, the discharge assisting member **61** rotates about the rotation shaft **62** in the first direction R1. Further, the medium pressing portion **61***a* moves from the first position to

the second position as the discharge assisting member **61** rotates in the first direction R1. Note that, in the embodiment, the medium pressing portion **61***a* does not contact with the medium M at the second position.

[0121] After that, the medium M passes through the nipping position Pn, and the trailing edge of the medium M, in other words, the upstream edge thereof in the discharge direction is separated away from the medium abutting portion **61***b*. In this state, as illustrated in FIG. **22**, the medium pressing portion **61***a* is lowered due to the own weight. With this, the discharge assisting member **61** rotates about the rotation shaft **62** in the second direction R2 opposite to the first direction R1. As a result, the medium pressing portion **61***a* presses the medium M downstream of the nipping position Pn in the discharge direction. Specifically, the medium pressing portion **61***a* presses down the medium M by the own weight, and presses the medium M against the first roller **31***a*. In this state, the medium M is warped downward between the two first rollers **31***a*. Thus, the position of the medium pressing portion **61***a* is below the nipping position Pn of the discharge roller pair **31**. Further, the medium pressing portion **61***a* continues pressing the medium M until the medium M is separated. Note that, in FIG. **22**, the part of the medium M that contacts with the circumferential surface of the first roller **31***a* and the like are omitted in illustration.

[0122] After that, the medium M is separated from the medium pressing portion **61***a*, the position of the medium pressing portion **61***a* returns to the first position before the medium M is charged. In this manner, when the upstream trailing edge of the medium M in the discharge direction passes through the nipping position Pn, the medium M is separated from the medium abutting portion **61***b*. With this, the medium pressing portion **61***a* moves from the second position to the first position. In other words, when the trailing edge of the medium M is separated from the medium abutting portion **61***b*, the discharge assisting member **61** rotates about the rotation shaft **62** in the second direction R2. Further, the medium pressing portion **61***a* moves from the second position to the first position as the discharge assisting member **61** rotates in the second direction R2. Further, the medium pressing portion **61***a* presses down the medium M in the process of moving from the second position to the first position.

[0123] Note that, as illustrated in FIG. **18** and FIG. **21**, when the medium pressing portion **61***a* is positioned at the first position (see FIG. **18**), a region in which the medium pressing portion **61***a* and the first roller **31***a* as viewed in the +Y direction being the axial direction of the first roller **31***a* is larger than that in a case in which the medium pressing portion **61***a* is positioned at the second position (see FIG. **21**). Further, when the medium pressing portion **61***a* is positioned at the first position (see FIG. **18**), an angle φ of the medium pressing portion **61***a* with respect to the vertical direction is smaller than that in a case in which the medium pressing portion **61***a* is positioned at the second position (see FIG. **21**). Herein, the angle φ of the medium pressing portion **61***a* with respect to the vertical direction indicates an angle formed between an abutting surface **61***c* of the medium pressing portion **61***a*, which contacts with the medium M, and the vertical direction, and indicates an angle formed between a linear line extending vertically downward from the rotation shaft **62** and the abutting surface **61***c*.

[0124] As described above, according to the medium discharge unit **60** and the image reading apparatus **1** of the embodiment, the following effects can be obtained.

[0125] According to the embodiment, when the leading edge of the medium M passes through the nipping position Pn, and the medium abutting portion **61***b* abuts against the medium M, the medium pressing portion **61***a* moves upward. With this, the edges of the medium M in the width direction can be prevented from being pressed down. In other words, the entry angle of the downstream edge of the medium M, in other words, the angle of the medium M with respect to the horizontal plane is reduced. As a result, collision between the leading edge of the discharged medium M and the trailing edge of the medium M on the sheet ejection unit **14** is avoided, and hence disorganization of the medium M on the sheet ejection unit **14** is suppressed. In contrast, when the trailing edge of the medium M passes through the nipping position Pn, the medium

pressing portion **61***a* moves downward. With this, the medium M is pressed against the first roller **31***a* by the medium pressing portion **61***a*. With this, a force of transporting the medium M downstream is increased. As a result, the medium M moves as the first roller **31***a* rotates. Thus, the trailing edge of the medium M can be prevented from remaining at the discharge roller pair **31**.

[0126] Further, according to the embodiment, the medium M transported by the medium transport unit **21** abuts against the medium abutting portion **61***b*, which enables elevation of the medium pressing portion **61***a* from the first position to the second position. In other words, according to the embodiment, the medium pressing portion **61***a* can be elevated with a simple configuration.

[0127] Further, according to the embodiment, the discharged medium M is separated from the medium abutting portion **61***b*, which enables the medium pressing portion **61***a* to be lowered from the second position to the first position. In other words, according to the embodiment, the medium pressing portion **61***a* can be lowered with a simple configuration.

[0128] Further, according to the embodiment, when the medium pressing portion **61***a* is positioned at the first position, a region in which the medium pressing portion **61***a* and the first roller **31***a* overlap with each other is larger than that in a case in which the medium pressing portion **61***a* is positioned at the second position. In other words, when the medium pressing portion **61***a* is positioned at the first position, the medium M is pressed against the first roller **31***a*. Thus, the trailing edge of the medium M can be prevented from remaining at the discharge roller pair **31**. In contrast, when the medium pressing portion **61***a* is positioned at the second position, a region in which the medium pressing portion **61***a* and the first roller **31***a* overlap with each other is smaller than that in a case in which the medium pressing portion **61***a* is positioned at the first position. Thus, at the leading edge of the medium M, the edges thereof in the width direction can be prevented from being pressed down.

[0129] Further, according to the embodiment, when the medium pressing portion **61***a* is positioned at the first position, the angle of the medium pressing portion **61***a* with respect to the vertical direction is smaller than that in a case in which the medium pressing portion **61***a* is positioned at the second position. In other words, when the medium pressing portion **61***a* is positioned at the first position, the medium M is pressed against the first roller **31***a*. Thus, the trailing edge of the medium M can be prevented from remaining at the discharge roller pair **31**. In contrast, when the medium pressing portion **61***a* is positioned at the second position, the angle of the medium pressing portion **61***a* with respect to the vertical direction is larger than that in a case in which the medium pressing portion **61***a* is positioned at the first position. Thus, at the leading edge of the medium M, the edges thereof in the width direction can be prevented from being pressed down.

[0130] Further, according to the embodiment, the medium pressing portion **61***a* presses the medium M downstream of the nipping position Pn in the discharge direction. Thus, the trailing edge of the medium M can effectively be prevented from remaining at the discharge roller pair **31**.

[0131] Further, according to the embodiment, the medium pressing portion **61***a* does not contact with the medium M at the second position. With this, the medium M can further be prevented from being pressed down.

[0132] Further, according to the embodiment, the plurality of discharge assisting members **61** are arrayed along the axial direction of the first roller **31***a*. Thus, the medium M having various sizes can effectively be pressed by the discharge assisting member **61**.

[0133] Further, according to the embodiment, the medium M is scraped from the discharge roller pair **31** by the scraping member **32**. Thus, the trailing edge of the medium M can further be prevented from remaining at the discharge roller pair **31**.

5. Fifth Embodiment

[0134] Next, the image reading apparatus **1** according to a fifth embodiment is described.

[0135] The image reading apparatus **1** of the embodiment includes a medium discharge unit **60**A different from the medium discharge unit **60** of the fourth embodiment. The configurations other than the medium discharge unit **60** are similar to those in the fourth embodiment, and hence

description thereof is omitted.
[0136] FIG. **23** is a side view schematically illustrating the medium discharge unit **60**A of the embodiment, and FIG. **24** is a plan view illustrating the medium discharge unit **60**A.
[0137] As illustrated in FIG. **23**, the medium discharge unit **60**A of the embodiment includes a third pressing member **71** in place of the discharge assisting member **61** in the fourth embodiment.
[0138] The third pressing member **71** includes a medium pressing portion **71***a* extending from a rotation shaft **72** to the −X side. The third pressing member **71** rotates. With this, the medium pressing portion **71***a* is movable below the nipping position Pn of the discharge roller pair **31**. Further, the medium pressing portion **71***a* moves downward. With this, the third pressing member **71** presses down the medium M discharged from the discharge roller pair **31**.
[0139] While the discharge roller pair **31** does not nip the medium M, the medium pressing portion **71***a* is displaced downward due to the own weight. Specifically, as illustrated in FIG. **23**, the medium pressing portion **71***a* is positioned below the nipping position Pn of the discharge roller pair **31**. In this state, the medium pressing portion **71***a* extends in a direction containing a −X component and a −Z component, and intersects with the transport path **15**. While the discharge roller pair **31** does not nip the medium M, the position of the medium pressing portion **71***a* corresponds to the first position. Note that, in the present specification, the position of the medium pressing portion **71***a* is a position of a part of the medium pressing portion **71***a*, which actually contacts with the medium M.
[0140] As illustrated in FIG. **24**, the medium discharge unit **60**A includes the plurality of third pressing members **71**. The plurality of third pressing members **71** are arrayed along the ±Y direction being the axial direction of the first roller **31***a*. In the embodiment, the medium discharge unit **60**A includes the three third pressing members **71**. The third pressing members **71** are arranged, with one placed between each of the four discharge roller pairs **31**. Each of the third pressing members **71** can rotate about the rotation shaft **72** positioned on the commonly-shared imaginary linear line. The rotation shaft **72** of the third pressing member **71** is arranged on the +X side, in other words, upstream of the rotation shaft **35** of the first roller **31***a* and the rotation shaft **36** of the second roller **31***b* in the discharge direction. For example, the rotation shaft **72** is supported rotatably by the casing of the upper unit **12** or other structural bodies. The rotation shaft **72** is an example of the fourth rotation shaft. In the embodiment, the three third pressing members **71** are coupled to each other by two coupling members **73** extending in the ±Y direction. Specifically, the three third pressing members **71** are formed integrally with the two coupling members **73**. Thus, the three third pressing members **71** rotate interlockingly with each other.
[0141] In the embodiment, the four discharge roller pairs **31** are referred to as discharge roller pairs **311**, **312**, **313**, and **314** sequentially from the −Y side, and the three third pressing members **71** are referred to as third pressing members **711**, **712**, and **713** sequentially from the −Y side. In this case, the third pressing member **712** at the center is arranged between the two discharge roller pairs **312** and **313** that are adjacent to each other at the center. Further, the third pressing member **711** on the −Y side and the third pressing member **713** on the +Y side are arranged on the outer sides of the two discharge roller pairs **312** and **313** that are adjacent to each other at the center. The third pressing member **712** at the center corresponds to an inner pressing member, and the third pressing member **711** on the −Y side and the third pressing member **713** on the +Y side correspond to outer pressing members.
[0142] FIG. **25** to FIG. **27** are side views schematically illustrating a state in which the medium discharge unit **60**A of the embodiment discharges the medium M.
[0143] As illustrated in FIG. **25**, the medium M transported by the medium transport unit **21** abuts against the medium pressing portion **71***a* of the third pressing member **71** in the vicinity of the nipping position Pn of the discharge roller pair **31**, and then the medium pressing portion **71***a* moves downstream. With this, the third pressing member **71** rotates about the rotation shaft **72** in the first direction R1, that is, a counterclockwise direction in FIG. **25**.

[0144] As illustrated in FIG. **26**, as the third pressing member **71** rotates in the first direction R1, the medium pressing portion **71***a* moves upward. In this state, the medium pressing portion **71***a* extends along the discharge direction, and an abutting surface **71***c* facing the medium M contacts with the upper surface of the medium M. Further, while the medium M is transported, the third pressing member **71** is in a substantially constant posture where the medium pressing portion **71***a* moves upward. The position of the medium pressing portion **71***a* after elevation due to the medium M being transported corresponds to the second position.

[0145] Further, as illustrated in FIG. **27**, when the medium M is further discharged, and the trailing edge of the medium M passes through the nipping position Pn of the discharge roller pair **31**, the medium pressing portion **71***a* is lowered due to the own weight. With this, the third pressing member **71** rotates about the rotation shaft **72** in the second direction R2 opposite to the first direction R1. As a result, the medium pressing portion **71***a* presses the medium M downstream of the nipping position Pn in the discharge direction. Specifically, the medium pressing portion **71***a* presses down the medium M by the own weight, and presses the medium M against the first roller **31***a*. In this state, the medium M is warped downward between the two first rollers **31***a*. Thus, the position of the medium pressing portion **71***a* is below the nipping position Pn of the discharge roller pair **31**. Further, the medium pressing portion **71***a* continues pressing the medium M until the medium M is separated. Note that, in FIG. **27**, the part of the medium M that contacts with the circumferential surface of the first roller **31***a* and the like are also omitted in illustration.

[0146] After that, the medium M is separated from the medium pressing portion **71***a*, the position of the medium pressing portion **71***a* returns to the first position before the medium M is charged. In this manner, when the upstream trailing edge of the medium M in the discharge direction passes through the nipping position Pn, the medium pressing portion **71***a* moves from the second position to the first position. In other words, when the trailing edge of the medium M is separated from the nipping position Pn, the third pressing member **71** rotates about the rotation shaft **72** in the second direction R2. Further, the medium pressing portion **71***a* moves from the second position to the first position as the third pressing member **71** rotates in the second direction R2. Further, the medium pressing portion **71***a* presses down the medium M in the process of moving from the second position to the first position.

[0147] Herein, as illustrated in FIG. **24**, it is assumed that one edge of the medium M in the width direction, in other words, the +Y direction is positioned between the discharge roller pair **311** and the discharge roller pair **312** and the other edge of the medium M in the width direction is positioned between the discharge roller pair **313** and the discharge roller pair **314**. In this case, while the medium M is nipped by the discharge roller pair **31**, the center part of the medium M in the width direction is not significantly warped even when being pressed by the third pressing member **712** at the center. This is because both the sides of the medium M are supported by the two adjacent discharge roller pairs **312** and **313**. In other words, the third pressing member **712** at the center is in a state in which rotation thereof is suppressed. In contrast, the edges of the medium M in the width direction may significantly be warped downward by the third pressing member **71** since one side is not supported by the discharge roller pair **31**.

[0148] However, in the embodiment, the three third pressing members **71** are coupled to each other, and rotate interlockingly with each other. In other words, the rotation angles of the three third pressing members **71** are substantially the same at all times. Thus, rotation of the third pressing member **712** at the center is suppressed, and hence rotation of the two outer third pressing members **711** and **713** is also suppressed. In other words, the edge of the medium M in the width direction are not excessively pressed down by the two outer third pressing members **711** and **713**. In this manner, in the embodiment, the plurality of third pressing members **71** rotate interlockingly with each other. With this, the edges of the medium M in the width direction can be prevented from being pressed down.

[0149] As described above, according to the medium discharge unit **60**A and the image reading

apparatus **1** of the embodiment, the following effects can be obtained.

[0150] According to the embodiment, the discharged medium M is pressed against the first roller **31***a* by the third pressing member **71**. Thus, a force of transporting the medium M downstream is increased. As a result, the medium M moves as the first roller **31***a* rotates. Thus, the trailing edge of the medium M can be prevented from remaining at the discharge roller pair **31**. Further, according to the embodiment, the third pressing member **712** arranged between the two adjacent discharge roller pairs **312** and **313** and the two third pressing members **711** and **713** arranged on the outer sides of the two discharge roller pairs **312** and **313** rotate interlockingly with each other. Thus, for the reason described above, even when the outer third pressing members **711** and **713** face the edges of the medium M in the width direction, the edges of the medium M are prevented from being pressed down. In other words, the entry angle of the downstream edge of the medium M, in other words, the angle of the medium M with respect to the horizontal plane is reduced. As a result, collision between the leading edge of the discharged medium M and the trailing edge of the medium M on the sheet ejection unit **14** is avoided, and hence disorganization of the medium M on the sheet ejection unit **14** is suppressed.

6. Modification Examples

[0151] The embodiment is based on the configuration described above, and partial modifications, omissions, and the like may be made to the configuration without departing from the gist of the present disclosure. Further, the embodiment and modification examples described below can be combined with each other as long as no technical contradiction arises due to the combination. The modification examples are described below.

[0152] The respective embodiments described above illustrate a configuration in which the first pressing member **33**, **41**, the second pressing member **40**, the third pressing member **71**, and the discharge assisting member **61** press the medium M by the own weights, but the configuration is not limited thereto. For example, those members may be configured to press the medium M while receiving a biasing force from a biasing means such as a spring. Further, those members may be configured by elastic members such as a plate spring, and may be configured to press the medium M by the own elastic force.

[0153] The first and second embodiments described above illustrate a configuration in which the medium pressing portion **33***a* contacts with the medium M while being lifted up by the lifting member **34**. However, the medium pressing portion **33***a* in a lifted state may not contact with the medium M. In other words, the second position of the medium pressing portion **33***a* may be above the nipping position Pn of the discharge roller pair **31**. Further, the second position of the medium pressing portion **33***a* may be below the nipping position Pn of the discharge roller pair **31**.

[0154] The fourth embodiment described above illustrates a configuration in which the medium pressing portion **61***a* does not contact with the medium M at the second position. However, the medium pressing portion **61***a* may contact with the medium M at the second position as long as the medium M is not excessively pressed.

[0155] The fourth embodiment described above illustrates a configuration in which all the discharge assisting members **61** include the medium abutting portions **61***b*, but the configuration is not limited thereto. For example, among the three discharge assisting members **61**, only the two outside discharge assisting members **61**, which are highly likely to contact with the edges of the medium M in the width direction, may be provided with the medium abutting portion **61***b*, and the discharge assisting member **61** at the center may not be provided with the medium abutting portion **61***b*. In this case, the discharge assisting member **61** at the center may be configured similarly to the third pressing member **71** in the fifth embodiment.

[0156] In the respective embodiments described above, the numbers of the discharge roller pairs **31**, the scraping members **32**, the first pressing members **33**, the second pressing members **40**, the third pressing members **71**, and the discharge assisting members **61** are not limited to the numbers described above. The numbers of the respective components may be less than the numbers

described above, or may be more than the numbers described above. Further, in the first and second embodiments described above, the number of the medium contacting portion **34***a* of the lifting member **34** is not limited to one, and the plurality of the medium contacting portions **34***a* may be provided.

[0157] The first and second embodiments described above illustrate a configuration in which the lifting member **34** lifts up all the three medium pressing portions **33***b*, but the configuration is not limited thereto. For example, among the three medium pressing portions **33***b*, only the two outer medium pressing portions **33***b*, which are highly likely to contact with the edges of the medium M in the width direction, may be lifted, and the medium pressing portion **33***a* at the center may not be lifted.

[0158] The first to third embodiments described above illustrate a configuration in which the plurality of first pressing members **33**, **41** that are separated from each other are arranged between the discharge roller pairs **31**, but the configuration is not limited thereto. For example, the first pressing members **33** and **41** may be configured so that the three medium pressing portions **33***b* are coupled to one rotation shaft extending in the ±Y direction. In this case, in the first and second embodiments described above, the number of the lever portions **33***b* extending to the +X side may be one.

[0159] Further, the fourth embodiment described above illustrates a configuration in which the plurality of discharge assisting members **61** that are separated from each other are arranged between the discharge roller pairs **31**, but the configuration is not limited thereto. For example, similarly to the fifth embodiment, there may be adopted a configuration in which the plurality of discharge assisting members **61** are coupled to each other to rotate interlockingly with each other.

[0160] The second and third embodiments illustrate a configuration in which the second pressing member **40** rotates about the rotation shaft **36** of the second roller **31***b*. However, the second pressing member **40** may be configured to rotate about a rotation shaft different from the rotation shaft **36**.

[0161] The respective embodiments described above illustrate a configuration in which the image reading apparatus **1** includes the two sensor units, namely, the first sensor unit **24** and the second sensor unit **25**. However, the number of sensor units is not limited to two, and may be one, three, or more.

[0162] The medium discharge units **30**, **30**A, **30**B, **60**, and **60**A of the respective embodiments described above are not limited to the configuration in which the medium discharge units are provided to the image reading apparatus **1**, and may be provided to other electronic apparatuses. For example, the medium discharge units **30**, **30**A, **30**B, **60**, and **60**A may be provided to an image recording apparatus that records an image on the medium M being transported.

Claims

1. A medium discharge device configured to discharge a medium to a placement unit on which the medium is placed, the medium discharge device comprising: a roller pair including a first roller and a second roller positioned above the first roller and being configured to nip the medium between the first roller and the second roller and discharge the medium to the placement unit; a first pressing member including a first member and being configured to press the medium by the first member, the first member being configured to move below a nipping position at which the roller pair nips the medium; and a lifting member configured to lift up the first member from a first position below the nipping position to a second position above the first position, wherein the first member is lifted up by the lifting member while a downstream leading edge of the medium in a discharge direction passes through the nipping position, and moves from the first position to the second position, and while an upstream trailing edge of the medium in the discharge direction passes through the nipping position, the first member moves from the second position to the first

position.
2. A medium discharge device according to claim 1, comprising: a transport unit configured to transport the medium toward the roller pair, wherein the first pressing member is a member configured to rotate about a first rotation shaft, and includes the first member and a second member that contacts the lifting member, the lifting member is configured to rotate about a second rotation shaft arranged upstream of the first rotation shaft in the discharge direction, and includes a third member that contacts the medium and a fourth member that contacts the second member, when the medium transported by the transport unit contacts the third member upstream of the nipping position in the discharge direction, the lifting member rotates about the second rotation shaft in a first direction, the second rotation shaft, when the lifting member rotates the first direction, and the fourth member presses the second member, the first pressing member rotates about the first rotation shaft in the first direction, and when the first pressing member rotates in the first direction, the first member moves from the first position to the second position.
3. A medium discharge device according to claim 2, wherein when the trailing edge of the medium is separated from the lifting member, and the lifting member rotates about the second rotation shaft in a second direction opposite to the first direction, the fourth member is separated from the second member, and when the fourth member is separated from the second member, and the first pressing member rotates about the first rotation shaft in the second direction, the first member moves from the second position to the first position.
4. A medium discharge device according to claim 2, wherein when the first member is positioned at the first position, a region in which the first member and the first roller overlap with each other as viewed in an axial direction of the first roller is larger than that in a case in which the first member is at the second position.
5. A medium discharge device according to claim 2, wherein when the first member is positioned at the first position, an angle of the first member with respect to a horizontal plane is larger than that in a case in which the first member is positioned at the second position.
6. A medium discharge device according to claim 1, comprising a plurality of the first pressing members arrayed along an axial direction of the first roller.
7. A medium discharge device according to claim 1, comprising a scraping member being configured by an elastic member rotating coaxially with the first roller and being configured to nip the medium with the second roller.
8. A medium discharge device according to claim 1, comprising a second pressing member configured to press, toward the placement unit, the medium discharged from the roller pair on the placement unit positioned in the discharge direction with respect to the first member of the first pressing member.
9. A medium discharge device configured to discharge a medium to a placement unit on which the medium is placed, the medium discharge device comprising: a roller pair including a first roller and a second roller positioned above the first roller and being configured to nip the medium between the first roller and the second roller and discharge the medium to the placement unit; and a discharge assisting member configured to assist a discharge operation of the medium to be discharged from the roller pair, wherein the discharge assisting member includes: a medium pressing portion configured to move between a first position below a nipping position at which the roller pair nips the medium and a second position above the first position and press down the medium in the process of moving from the second position to the first position; and a medium abutting portion against which the medium abuts upstream of the medium pressing portion in the discharge direction of the medium, when the medium abuts against the medium abutting portion while a downstream leading edge of the medium in the discharge direction passes through the nipping position, the medium pressing portion moves from the first position to the second position, and when the medium abutting portion is separated from the medium while an upstream trailing edge of the medium in the discharge direction passes through the nipping position, the medium

pressing portion moves from the second position to the first position.

10. A medium discharge device according to claim 9, comprising a transport unit configured to transport the medium toward the roller pair, wherein the discharge assisting member is a member configured to rotate about a third rotation shaft, when the medium transported by the transport unit abuts against the medium abutting portion, the discharge assisting member rotates about the third rotation shaft in a first direction, and the medium pressing portion moves from the first position to the second position as the discharge assisting member rotates in the first direction.

11. A medium discharge device according to claim 10, wherein when the trailing edge of the medium is away from the medium abutting portion, the discharge assisting member rotates about the third rotation shaft in a second direction opposite to the first direction, and the medium pressing portion moves from the second position to the first position as the discharge assisting member rotates in the second direction.

12. A medium discharge device according to claim 10, wherein when the medium pressing portion is positioned at the first position, a region in which the medium pressing portion and the first roller overlap with each other as viewed in an axial direction of the first roller is larger than that in a case in which the medium pressing portion is positioned at the second position.

13. A medium discharge device according to claim 10, wherein when the medium pressing portion is positioned at the first position, an angle of the medium pressing portion with respect to a vertical direction is smaller than that in a case in which the medium pressing portion is positioned at the second position.

14. A medium discharge device according to claim 10, wherein the medium pressing portion presses the medium downstream of the nipping position in the discharge direction.

15. A medium discharge device according to claim 10, wherein the medium pressing portion at the second position does not contact the medium.

16. A medium discharge device according to claim 9, comprising a plurality of the discharge assisting members arrayed along an axial direction of the first roller.

17. A medium discharge device according to claim 9, comprising a scraping member being configured by an elastic member rotating coaxially with the first roller and being configured to nip the medium with the second roller.

18. An electronic apparatus comprising: the medium discharge device according to claim 1.