United States Patent Application Publication 20250263262
Kind Code A1
Publication Date August 21, 2025
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FEED MECHANISM, IMAGE FORMING APPARATUS, AND FEED TRAY

Abstract

A feed mechanism includes: a feed tray accommodating a roll body, a first sheet-shaped medium being rolled in a roll shape as the roll body, the feed tray including: a first accommodation portion accommodating the roll body; a pair of side walls respectively provided on both sides of the first accommodation portion in an axial direction of the roll body that is accommodated in the first accommodation portion; and a side guide disposed inside the pair of side walls.

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Family ID: **1000008578238**

Appl. No.: **19/200360**

Filed: **May 06, 2025**

Foreign Application Priority Data

JP 2020-219745 Dec. 29, 2020

Related U.S. Application Data

parent US continuation 17563486 20211228 parent-grant-document US 12319527 child US 19200360

Publication Classification

Int. Cl.: **B65H23/032** (20060101); **B65H1/26** (20060101)

U.S. Cl.:

CPC **B65H23/0322** (20130101); **B65H1/266** (20130101); B65H2301/415085 (20130101); B65H2801/03 (20130101)

Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application is a Continuation of application Ser. No. 17/563,486 filed on Dec. 28, 2021, which is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2020-219745 filed on Dec. 29, 2020, the contents of which are incorporated herein by reference.

TECHNICAL FIELD
[0002] The present disclosure relates to a feed mechanism including a feed tray that is configured to accommodate a roll body around which a long sheet-shaped medium is rolled in a roll shape and is configured to be inserted into and removed from a housing of an image forming apparatus, the image forming apparatus, and the feed tray.
BACKGROUND
[0003] A related-art facsimile (an image forming apparatus) includes a paper feed cassette (a feed tray) that is attachable to and detachable from a facsimile main body. The paper feed cassette includes a support portion for roll paper (a roll medium) and accommodates the roll paper.
SUMMARY
[0004] A feed mechanism according to the present disclosure includes: a feed tray configured to accommodate a roll body, a first sheet-shaped medium being rolled in a roll shape as the roll body. The feed tray may include: a first accommodation portion configured to accommodate the roll body; a pair of side walls respectively provided on both sides of the first accommodation portion in an axial direction of the roll body that is accommodated in the first accommodation portion; and a side guide disposed inside the pair of side walls.
[0005] An image forming apparatus according to the present disclosure includes a housing and the above-described feed mechanism including the feed tray being insertable into and removable from the housing.
[0006] A feed tray according to the present disclosure is configured to accommodate a roll body, a first sheet-shaped medium being rolled in a roll shape as the roll body. The feed tray may include: a first accommodation portion configured to accommodate the roll body; a pair of side walls respectively provided on both sides of the first accommodation portion in an axial direction of the roll body that is accommodated in the first accommodation portion; and a side guide disposed inside the pair of side walls.
[0007] According to a feed mechanism, an image forming apparatus, and a feed tray of the present disclosure, a position of at least one of a roll body or a roll medium in an axial direction is determined by a side guide that is provided to the feed tray accommodating the roll body. Therefore, it is possible to prevent position deviation of at least one of the roll body and the roll medium in the axial direction.

Description

BRIEF DESCRIPTION OF DRAWINGS
[0008] Illustrative embodiments of the disclosure will be described in detail based on the following figures, wherein:
[0009] FIG. **1** is a schematic side view illustrating an internal structure of a printer according to an

illustrative embodiment of the present disclosure;
[0010] FIG. **2** is a perspective view of a feed tray illustrated in FIG. **1**;
[0011] FIG. **3** is a cross-sectional view taken along a line III-III of the feed tray illustrated in FIG. **2**;
[0012] FIG. **4** is a top view of the feed tray illustrated in FIG. **2**;
[0013] FIG. **5** is a side view of the feed tray illustrated in FIG. **2** in a state where a side wall thereof is removed;
[0014] FIG. **6** is a diagram illustrating a state in which upward rotation of a support plate is regulated by a regulating portion;
[0015] FIGS. **7**A and **7**B are cross-sectional views taken along a line VII-VII of the feed tray illustrated in FIG. **4**, FIG. **7**A is a diagram illustrating a state in which the side guide is in a non-overlapping position, and FIG. **7**B is a diagram illustrating a state in which the side guide is in an overlapping position;
[0016] FIG. **8** is a diagram illustrating a state in which a second side guide is in an overlapping position;
[0017] FIGS. **9**A and **9**B are cross-sectional views of a feed tray according to a first modification, FIG. **9**A corresponds to a cross-sectional view taken along a line IXA-IXA of the feed tray illustrated in FIG. **4**, and FIG. **9**B corresponds to a cross-sectional view taken along a line VII-VII of the feed tray illustrated in FIG. **4**; and
[0018] FIG. **10** is a top view of a feed tray according to a second modification.

DETAILED DESCRIPTION

[0019] In the above-described related-art, when a roll body, around which a long sheet-shaped medium is rolled in a roll shape, positionally deviates in a paper feed cassette, and when the roll medium unrolled from the roll body and conveyed in the paper feed cassette positionally deviates in a width direction (an axial direction of the roll body), a jam may occur.
[0020] Therefore, illustrative aspects of the present disclosure provide a feed mechanism, an image forming apparatus, and a feed tray that prevent position deviation of at least one of a roll body or a roll medium in an axial direction.
[0021] A printer **100** (an image forming apparatus of the present disclosure) according to an illustrative embodiment of the present disclosure will be described below with reference to FIG. **1**. An up and down direction, a front and rear direction, and a left and right direction illustrated in FIG. **1** are defined as an up and down direction, a front and rear direction, and a left and right direction of the printer **100**.

Overall Configuration of Printer **100**

[0022] The printer **100** mainly includes a housing **100***a*, a feed mechanism **3**, a conveyance mechanism **4**, a cutter **5**, a head **6**, a paper discharge tray **7**, and a controller **10**. The feed mechanism **3** includes a feed tray **1**, a feed roller **2**, and a separation piece **31**. The feed tray **1** is detachable to a lower part of the housing **100***a*. The feed tray **1** is disposed below the head **6** in the housing **100***a*. The paper discharge tray **7** is disposed in in front of the head **6** in the housing **100***a* and above the feed tray **1**. The feed tray **1** is insertable and removable into and from the housing **100***a* along the front and rear direction through an opening **101** formed in a front wall of the housing **100***a*. The paper discharge tray **7** is insertable and removable into and from the housing **100***a* along the front and rear direction through an opening **102** formed in the front wall of the housing **100***a*.
[0023] The feed tray **1** may accommodate both the cut paper Kp and roll body R. The feed tray **1** includes a first accommodation portion **8** and a second accommodation portion **9**. The first accommodation portion **8** may accommodate the roll body R. The second accommodation portion **9** may accommodate a plurality of sheets of cut paper Kp stacked in the up and down direction. The roll body R may be formed by rolling long paper in a roll shape around an outer peripheral surface of a cylindrical core member Rc. A width direction of the cut paper Kp and the roll paper Rp

unrolled from the roll body R in the feed tray **1** coincides with the left and right direction. The cut paper Kp is shorter than the long paper rolled therearound in the roll shape.

[0024] The feed roller **2** feeds the roll paper Rp unrolled from the roll body R accommodated in the first accommodation portion **8** or the cut paper Kp accommodated in the second accommodation portion **9** from the feed tray **1**. In the following description, when the cut paper Kp and the roll paper Rp are not distinguished, the cut paper Kp and the roll paper Rp are referred to as "paper P". The feed roller **2** is pivotally supported at a tip of an arm **2***a* and rotates by driving a feeding motor which is not illustrated. The arm **2***a* is rotatably supported in a support shaft **2***b*. The arm **2***a* is urged by an urging member which is not illustrated so that the feed roller **2** approaches a bottom surface **11***a* of the feed tray **1**. When the feeding motor is driven by the control of the controller **10**, the feed roller **2** rotates to apply a conveying force in a direction directed from the front to the rear with respect to the paper P in contact with the feed roller **2**. As a result, the paper P is fed from the feed tray **1**. The arm **2***a* is configured to be retractable upward when the feed tray **1** is attached to or detached from the housing **100***a*.

[0025] The separation piece **31** is provided for preventing overlapping feeding when the cut paper Kp is fed from the feed tray **1**. The separation piece **31** is located on a downstream side of the feed tray **1**, with respect to a conveyance direction of the paper P by the feed roller **2** (a direction from the front to the rear: simply referred to as "a conveyance direction" in the following description). The separation piece **31** is inclined such that a rear end portion thereof is located above a front end portion thereof. A fine uneven pattern is formed on a surface of the separation piece **31**. The separation piece **31** contacts a central portion of the cut paper Kp in the width direction and separates the cut paper Kp that contacts the feed roller **2** from the rest of cut paper Kp. The paper P fed from the feed tray **1** and contacting the separation piece **31** is guided diagonally upward.

[0026] The conveyance mechanism **4** includes a pair of intermediate rollers **41**, a pair of conveying rollers **42**, a pair of paper discharging rollers **43**, and a guide member **44**. The pair of intermediate rollers **41** is formed of a drive roller that rotates by driving an intermediate motor which is not illustrated and a driven roller that rotates in association with the rotation of the drive roller. When the intermediate motor which is not illustrated is driven by the control of the controller **10**, the pair of intermediate rollers **41** rotates while sandwiching the paper P to convey the paper P. The pair of intermediate rollers **41** is located above the separation piece **31**. The pair of intermediate rollers **41** conveys the paper P upward, which is fed from the feed tray **1** by the feed roller **2** and then guided diagonally upward by the separation piece **31**, while sandwiching the paper P. The guide member **44** is located above the pair of intermediate rollers **41**. The guide member **44** guides the paper P to be conveyed upward by the pair of intermediate rollers **41** forward.

[0027] The pair of conveying rollers **42** is formed of a drive roller that rotates by driving a conveying motor which is not illustrated and a driven roller that rotates in association with the rotation of the drive roller. The pair of paper discharging rollers **43** is formed of a drive roller that rotates by driving a paper discharging motor which is not illustrated and a driven roller that rotates in association with the rotation of the drive roller. When the conveying motor and the paper discharging motor which are not illustrated are driven by the control of the controller **10**, the pair of conveying rollers **42** and the pair of paper discharging rollers **43** rotate while sandwiching the paper P to convey the paper P. The pair of conveying rollers **42** is located behind the head **6**, and the pair of paper discharging rollers **43** is located in front of the head **6**. The pair of conveying rollers **42** conveys the paper P to be guided forward by the guide member **44** forward while sandwiching the paper P. The pair of paper discharging rollers **43** conveys the paper P to be conveyed forward by the pair of conveying rollers **42** forward while sandwiching the paper P.

[0028] The cutter **5** is located between the separation piece **31** and the pair of intermediate rollers **41**. The cutter **5** is formed of, for example, a disk-shaped rotary blade and a driven blade. The rotary blade of the cutter **5** rotates by driving a cutting motor which is not illustrated, and reciprocates along the left and right direction. The roll paper Rp unrolled from the roll body R and

conveyed is cut in the width direction of the roll paper Rp by the cutter **5** by driving the cutting motor under the control of the controller **10**.

[0029] The head **6** includes a plurality of nozzles (not illustrated) formed on a lower surface thereof and a driver IC (not illustrated). When the driver IC is driven by the control of the controller **10**, ink is ejected from the nozzle, and the paper P conveyed by the conveyance mechanism **4** passes through an image forming position facing the lower surface of the head **6**, an image is formed on the paper P. The head **6** may be either a line type that ejects ink from a nozzle in a state where a position thereof is fixed, or a serial type that ejects ink from a nozzle while moving in the left and right direction. The paper P on which the image is formed by the head **6** is received by the paper discharge tray **7**.

[0030] The controller **10** is connected to the feeding motor, the intermediate motor, the conveying motor, the paper discharging motor, the cutting motor, and the driver IC via an internal bus (not illustrated). The controller **10** includes a central processing unit (CPU), a read only memory (ROM), and a random access memory (RAM). The ROM stores a program and data for allowing the CPU to perform various controls. The RAM temporarily stores data to be used by the CPU when executing the program.

Configuration of Feed Tray **1**

[0031] Next, a configuration of the feed tray **1** will be described with reference to FIGS. **2** to **8**. In the following description, a direction of each portion of the feed tray **1** will be described based on a posture of the feed tray **1** in a state of being mounted on the housing **100***a*. The feed tray **1** has an approximately square shape when viewed from the top. The feed tray **1** includes a bottom wall **11** and side walls **12** to **15** provided on edges of the bottom wall **11**, and is formed in a box shape opened upward.

[0032] As illustrated in FIGS. **3** and **5**, the bottom wall **11** extends in a plane orthogonal to the up and down direction. An upper surface of the bottom wall **11** becomes the bottom surface **11***a* of the feed tray **1**. The side walls **12** and **13** extend upward from both left and right end edges of the bottom wall **11**. The side walls **12** and **13** extend from a front end portion to a rear end portion of the bottom wall **11** along the front and rear direction. The side wall **14** extends upward from a front end edge of the bottom wall **11**. The side wall **14** extends from a right end portion to a left end portion of the bottom wall **11** along the left and right direction.

[0033] Four side walls **15** are provided on a rear end edge of the bottom wall **11**. The side wall **15** includes a guide surface **15***a* that is connected to the rear end portion of the bottom surface **11***a* and is inclined so that an upper end portion of the guide surface **15***a* is located behind a lower end portion thereof. The four side walls **15** are separated from each other in the left and right direction. As illustrated in FIG. **4**, when the feed tray **1** is mounted on the housing **100***a*, the separation piece **31** is located between the two side walls **15** located inside among the four side walls **15** disposed side by side in the left and right direction. The guide surface **15***a* of the side wall **15** guides the paper P, which is conveyed rearward by the feed roller **2**, diagonally upward together with the separation piece **31**.

[0034] A convex portion **16** protruding upward is formed at a central portion of the rear end portion of the bottom wall **11** in the left and right direction. An upper surface **16***a* of the convex portion **16** becomes a horizontal surface. The convex portion **16** includes a base portion **16***b* and an extending portion **16***c* of which length in the left and right direction is shorter than that of the base portion **16***b*. The extending portion **16***c* is located on an upstream side of the base portion **16***b* in the conveyance direction, and extends from a central portion of the base portion **16***b* in the left and right direction toward the upstream side in the conveyance direction.

[0035] When no paper P is provided on the upper surface **16***a* of the convex portion **16**, as illustrated in FIG. **3**, the feed roller **2** contacts the upper surface **16***a* of the base portion **16***b* of the convex portion **16**. When the paper P is provided on the upper surface **16***a* of the convex portion **16**, the feed roller **2** contacts the paper P. That is, a position where the base portion **16***b* is provided

on the convex portion **16** in the conveyance direction becomes a conveying position where the feed roller **2** applies the conveying force to the paper P.

[0036] In the feed tray **1**, as described above, the first accommodation portion **8** accommodating the roll body R and the second accommodation portion **9** accommodating a plurality of sheets of cut paper Kp stacked in the up and down direction are provided. The first accommodation portion **8** and the second accommodation portion **9** are disposed side by side along the conveyance direction. The second accommodation portion **9** is located on a downstream side of the first accommodation portion **8** in the conveyance direction.

[0037] The first accommodation portion **8** accommodates the roll body R in a posture in which axial directions thereof coincide with each other in the left and right direction. As illustrated in FIG. **3**, the first accommodation portion **8** includes a support base **81** and two rollers **81***a* and **81***b* that support the roll body R. The support base **81** extends along the left and right direction. Both the rollers **81***a* and **81***b* extend in the left and right direction and are disposed to be separated from each other in the front and rear direction. Both the rollers **81***a* and **81***b* are supported by an upper end portion of the support base **81** to be rotatable around a rotating shaft extending along the left and right direction. The rollers **81***a* and **81***b* support the roll body R from below in a state of contacting an outer peripheral surface of a lower portion of the roll body R.

[0038] A gap G is formed between a lower surface of the support base **81** and the bottom surface **11***a* of the feed tray **1**. As will be described later, when the roll paper Rp is set in the feed tray **1**, the roll body R supported by the support base **81** rotates clockwise in FIG. **3**, and the roll paper Rp is pulled out from a front side portion of the roll body R. Next, the roll paper Rp pulled out from the roll body R is pulled out from a front side of the support base **81** to a rear side of the support base **81** through the gap G.

[0039] As illustrated in FIG. **3**, the first accommodation portion **8** includes a cover **82** formed of a rear portion **82***a* that covers a rear side of the roll body R supported by the support base **81** and an upper portion **82***b* that covers an upper side of the roll body R supported by the support base **81**. The rear portion **82***a* is located behind the roll body R supported by the support base **81**, and extends in a plane orthogonal to the front and rear direction. The upper portion **82***b* is connected to an upper end portion of the rear portion **82***a*. The upper portion **82***b* is located above the roll body R supported by the support base **81**, and extends in a plane orthogonal to the up and down direction. The cover **82** is rotatable rearward around a rotating shaft **82***c* located at a lower end portion of the rear portion **82***a* and extending in the left and right direction. As illustrated in FIG. **3**, the cover **82** located at a position of covering the roll body R supported by the support base **81** rotates to the rear side, such that an accommodation space of the roll body R above the support base **81** is exposed.

[0040] The second accommodation portion **9** accommodates the cut paper Kp in a posture in which axial directions thereof coincide with each other in the left and right direction. The second accommodation portion **9** includes a support plate **91** (corresponding to a “support member” of the present disclosure) that supports a plurality of sheets of cut paper Kp placed in a stacked state from below. When the roll paper Rp unrolled from the roll body R accommodated in the first accommodation portion **8** is fed from the feed tray **1** to form an image, the cut paper Kp is removed from the second accommodation portion **9**.

[0041] The support plate **91** is located at an end portion of the front side. The support plate **91** is rotatable up and down around a rotating shaft **91***a* extending along the left and right direction. Here, as illustrated in FIG. **3**, an opening **12***a* having an elliptical shape elongated in the up and down direction is formed on the side wall **12** of the feed tray **1**. One end portion (a right end portion) of the rotating shaft **91***a* of the support plate **91** is inserted into the opening **12***a* of the side wall **12**. In the same manner, the side wall **13** is formed with an opening (not illustrated) having an elliptical shape elongated in the up and down direction. The other end portion (a left end portion) of the rotating shaft **91***a* of the support plate **91** is inserted into the opening. The rotating shaft **91***a* is

movable up and down within the opening **12***a* of the side wall **12** and the opening (not illustrated) of the side wall **13**.

[0042] The rotating shaft **91***a* is located between the support base **81** and the rear portion **82***a* of the cover **82** in the conveyance direction. The support plate **91** extends, toward the downstream side in the conveyance direction, from the rotating shaft **91***a* to a position of an end portion on a downstream side of the bottom wall **11** of the feed tray **1** in the conveyance direction.

[0043] The support plate **91** functions as a partitioning material that vertically partitions the cut paper Kp accommodated in the second accommodation portion **9** and the roll paper Rp unrolled from the roll body R. The roll paper Rp unrolled from the roll body R passes between the bottom wall **11** of the feed tray **1** and the support plate **91**. That is, the bottom wall **11** of the feed tray **1** and the support plate **91** define an introduction path for guiding the roll paper Rp unrolled from the roll body R accommodated in the first accommodation portion **8**.

[0044] The feed tray **1** is disposed inside a pair of side walls **12** and **13** respectively provided on both sides of the first accommodation portion **8** in the left and right direction, and includes a pair of side guides **17** separated from each other in the left and right direction. The side guides **17** are supported by the bottom wall **11** to be movable in the left and right direction, and are disposed to face each other in the left and right direction. A first side guide **17**, which is the side guide **17** provided on one side, and a second side guide **17**, which is the side guide **17** provided on the other side, are configured to be interlocked and are movable in a direction in which the side guides **17** are separated from each other by, for example, a known interlocking mechanism (not illustrated) formed of racks facing each other and pinions that mesh with both racks.

[0045] As illustrated in FIG. **5**, the pair of side guides **17** respectively extends from a portion corresponding to the first accommodation portion **8** to a portion corresponding to the second accommodation portion **9** along the conveyance direction. A portion of the side guide **17** located at the first accommodation portion **8** is a first side guide **18** that guides the roll body R accommodated in the first accommodation portion **8**. A portion of the side guide **17** located on a downstream side of the second accommodation portion **9** in the conveyance direction is a second side guide **19** that guides the cut paper Kp accommodated in the second accommodation portion **9** and the roll paper Rp unrolled from the roll body R. The first side guide **18** and the second side guide **19** are connected to each other by a connecting portion **22**.

[0046] The first side guide **18** has a plate shape parallel to the side walls **12** and **13**. The first side guide **18** is located in an inner space of the cover **82** of the first accommodation portion **8**. Facing surfaces of the respective first side guides **18** of the pair of side guides **17** become first side contact surfaces **18***a* contactable with an end in the axial direction (or an end of the core member Rc in the axial direction) of the roll body R accommodated in the first accommodation portion **8**. By guiding the roll body R by the first side contact surface **18***a* of the pair of first side guides **18**, a position of the roll body R in the first accommodation portion **8** in the left and right direction is determined.

[0047] The second side guide **19** includes a plate-shaped first portion **20** parallel to the side walls **12** and **13**, and a second portion **21** parallel to the bottom wall **11**. Facing surfaces of the first portions **20** of the respective second side guides **19** in the pair of side guides **17** become second side contact surfaces **20***a* contactable with an end of the paper P in the width direction. By guiding the paper P by the second side contact surfaces **20***a* of the pair of second side guides **19**, a position of the paper P in the feed tray **1** in the left and right direction is determined.

[0048] The second portion **21** of the second side guide **19** extends from a lower end portion of the first portion **20** toward the right or left toward a side of the opposite second side guide **19**. An upper surface of the second portion **21** of the pair of second side guides **19** becomes a lower contact surface **21***a* that contacts a lower surface of the paper P. The lower contact surface **21***a* is connected to the second side contact surface **20***a*.

[0049] A regulating portion **19***a* that regulates upward rotation of the support plate **91** is formed on an upper portion of an end portion on a downstream side of the second side guide **19** in the

conveyance direction. The regulating portion **19***a* protrudes from the end portion on the downstream side of the second side guide **19** in the conveyance direction toward the downstream side in the conveyance direction. As illustrated in FIG. **6**, when the support plate **91** rotates upward, both ends on a downstream side of the support plate **91** in the conveyance direction contact lower ends of the regulating portions **19***a* respectively formed on the pair of second side guides **19**. A portion of the support plate **91** that contacts the lower end of the regulation portion **19***a* is a portion on a downstream side of a notch **91***c*, which will be described later, in the conveyance direction. Accordingly, the upward rotation of the support plate **91** is regulated.

[0050] The connecting portion **22** has a plate shape parallel to the side walls **12** and **13**. The connecting portion **22** connects an end portion on a downstream side of the first side guide **18** in the conveyance direction and an end portion on an upstream side of the first portion **20** of second side guide **19** in the conveyance direction. A position of a lower end of the connecting portion **22** in the up and down direction is higher than a position of an upper surface of the support plate **91** in an inclined posture which will be described later. As illustrated in FIG. **5**, a position of an upper end of the connecting portion **22** in the up and down direction in a portion where the rear portion **82***a* of the cover **82** is provided in the conveyance direction is lower than a position of a lower end of the rear portion **82***a* of the cover **82**.

[0051] As illustrated in FIGS. **2** and **4**, notches **91***b* and **91***c* are formed in the support plate **91**. The notch **91***b* is formed at an end portion on the downstream side of the support plate **91** in the conveyance direction. When viewed from the top, the upper surface **16***a* of the convex portion **16** is located in the notch **91***b*.

[0052] The notches **91***c* are respectively formed at both end portions of the support plate **91** in the left and right direction. The first portion **20** of the second side guide **19** is located in the notch **91***c*. A lower end portion of the first portion **20** is located below the support plate **91**, and an upper end portion of the first portion **20** is located above the support plate **91**. That is, a pair of first portions **20** of the second side guide **19** is provided to be located on both sides of the support plate **91** in the left and right direction. The first portion **20** of the second side guide **19** moves in the left and right direction within a range of the notch **91***c*. As the first portion **20** of the second side guide **19** moves in the left and right direction, the first side guide **18** connected to the first portion **20** by the connecting portion **22** also moves in the left and right direction.

[0053] Here, a length in the left and right direction of a portion of the support plate **91** located between the pair of second side guides **19**, that is, a portion of the support plate **91** in which the notches **91***c* are respectively formed at both end portions thereof in the left and right direction is defined as a width W. The width W is equal to or less than a minimum width of the roll paper Rp that can be used in the printer **100**. Specifically, the minimum width of the roll paper Rp used in the printer **100** is 210 mm.

[0054] In the state illustrated in FIGS. **2** and **7**A, the pair of second side guides **19** is provided in a non-overlapping position where the lower contact surface **21***a* does not overlap with the support plate **91** when viewed from the top. The pair of second side guides **19** moves from a position illustrated in FIGS. **2** and **7**A toward a center of the paper P in the left and right direction to approach each other, such that as illustrated in FIGS. **7**B and **8**, the pair of second side guides **19** moves to an overlapping position where the lower contact surface **21***a* overlaps with the support plate **91** when viewed from the top. In the illustrative embodiment, when guiding the cut paper Kp accommodated in the second accommodation portion **9**, the second side guide **19** is located in the non-overlapping position.

[0055] As illustrated in FIG. **7**A, when the roll paper Rp is not set in the feed tray **1** and the pair of second side guides **19** is in the non-overlapping position where the lower contact surface **21***a* thereof does not overlap with the support plate **91** when viewed from the top, a lower surface of the support plate **91** contacts the bottom surface **11***a* of the feed tray **1**. Here, the support plate **91** becomes a posture in which a direction connecting a front end portion and a rear end portion almost

coincides with the conveyance direction.

[0056] When the pair of second side guides **19** is in the non-overlapping position, a height position of the upper surface of the support plate **91** is substantially the same as a height position of the lower contact surface **21***a* of the second side guide **19**. That is, when the pair of second side guides **19** is in the non-overlapping position, the upper surface of the support plate **91** and the lower contact surface **21***a* of the second side guide **19** are located substantially in the same plane. Here, a height position H**1** of the upper surface **16***a* of the convex portion **16** is higher than a height position H**2** of the upper surface of the support plate **91** and the lower contact surface **21***a* of the second side guide **19**.

[0057] When the second side guide **19** moves from the position illustrated in FIG. **7**A to the left and right direction, and moves to the overlapping position where the lower contact surface **21***a* overlaps with the support plate **91** when viewed from the top as illustrated in FIG. **7**B, the support plate **91** is pushed by the second portion **21** of the second side guide **19** and rotates upward. That is, when the second side guide **19** is in the overlapping position, the lower contact surface **21***a* of the second side guide **19** is located below the support plate **91**. When the roll paper Rp is not set in the feed tray **1** and the pair of second side guides **19** is in the overlapping position, the lower surface of the support plate **91** contacts the lower contact surface **21***a* of the second side guide **19**. A posture of the support plate **91** here is defined as an inclined posture.

[0058] Here, an example of a procedure for setting the roll paper Rp in the feed tray **1** will be described. First, the feed tray **1** is pulled from the rear to the front and is pulled out from the housing **100***a*. Next, the cover **82** of the first accommodation portion **8** rotates to expose the accommodation space of the roll body R of the first accommodation portion **8**, such that the support base **81** is caused to support the roll body R. Continuously, the positions of the pair of side guides **17** in the left and right direction are adjusted, and both ends of the roll body R in the axial direction contact the first side contact surface **18***a* of the first side guide **18**. Accordingly, both ends of the roll body R supported by the support base **81** in the axial direction are guided by the first side guide **18**, and the position of the roll body R in the left and right direction is determined.

[0059] Continuously, the roll body R is manually rotated to unroll the roll paper Rp from the roll body R, and a tip portion of the roll paper Rp is fed to the upper surface **16***a* of the base portion **16***b* of the convex portion **16** on the bottom surface **11***a*. The roll paper Rp unrolled from the roll body R is first fed from the front side of the support base **81** to the rear side of the support base **81** through the gap G below the support base **81**. The roll paper Rp is fed into the introduction path defined by the bottom wall **11** of the feed tray **1** and the support plate **91** while moving the rotating shaft **91***a* of an end portion on an upstream side of the support plate **91** in the conveyance direction upward.

[0060] A lower surface of the roll paper Rp reaching a position where the side guide **17** is disposed in the introduction path I contacts the lower contact surface **21***a* of the second side guide **19**. Both ends of the roll paper Rp in the width direction contact the second side contact surface **20***a* of the second side guide **19**. Accordingly, both ends of the roll paper Rp fed into the introduction path in the width direction are guided by the second side guide **19**, such that the position of the roll paper Rp in the left and right direction is determined. Next, the roll paper Rp is fed to the downstream side in the conveyance direction until the tip portion of the roll paper Rp reaches the upper surface **16***a* of the base portion **16***b* of the convex portion **16**.

[0061] Next, an example of a procedure for feeding the roll paper Rp from the feed tray **1** will be described. First, after setting the roll paper Rp in the feed tray **1** according to the above-described procedure, the feed tray **1** is mounted on the housing **100***a* without accommodating the cut paper Kp in the second accommodation portion **9**. By mounting the feed tray **1** on the housing **100***a*, the feed roller **2** contacts a portion of the roll paper Rp disposed on the upper surface **16***a* of the base portion **16***b* in the convex portion **16**. After that, the feed roller **2** rotates by driving the feeding motor to apply a conveying force to the roll paper Rp, such that the roll paper Rp is fed from the

feed tray **1**.
[0062] When the image is not immediately formed on the roll paper Rp and when the image is formed on the cut paper Kp, the roll paper Rp is set, and then the feed tray **1** is mounted on the housing **100***a* in a state where the cut paper Kp is accommodated in the second accommodation portion **9**. Here, when the image is formed on the roll paper Rp, the feed tray **1** is pulled out from the housing **100***a* again and the cut paper Kp is removed from the second accommodation portion **9**, and then the feed tray **1** is mounted on the housing **100***a*.
[0063] Next, an example of a procedure for feeding the cut paper Kp from the feed tray **1** will be described. First, the feed tray **1** is pulled out from the housing **100***a*, and a plurality of sheets of cut paper Kp in the stacked state are placed on the upper surface of the support plate **91**. Next, the positions of the pair of side guides **17** in the left and right direction are adjusted so that both ends of the cut paper Kp in the width direction contact the second side contact surface **20***a* of the second side guide **19**. After that, the feed tray **1** is mounted on the housing **100***a*. By mounting the feed tray **1** on the housing **100***a*, the feed roller **2** contacts the cut paper Kp located at the uppermost position among the plurality of sheets of cut paper Kp in the stacked state. After that, the feed roller **2** rotates by driving the feeding motor to apply a conveying force to the cut paper Kp, such that the cut paper Kp is fed from the feed tray **1**.
[0064] As described above, the feed mechanism **3** mounted on the printer **100** of the illustrative embodiment includes the feed tray **1** that is configured to accommodate the roll body R around which the long paper is rolled in the roll shape and is configured to be inserted into and removed from the housing **100***a* of the printer **100**. The feed tray **1** includes: the first accommodation portion **8** configured to accommodate the roll body R; the pair of side walls **12** and **13** respectively provided on both sides of the first accommodation portion **8** in the axial direction of the roll body accommodated in the first accommodation portion **8**; and the side guide **17** that is disposed inside the pair of side walls **12** and **13** and is contactable with the roll body R accommodated in the first accommodation portion **8** and the end of the roll paper Rp unrolled from the roll body R in the left and right direction.
[0065] According to the above-described configuration, the positions of the roll body R and the roll paper Rp in the left and right direction are determined by causing the ends thereof in the left and right direction to contact the side guide **17**. Therefore, it is possible to prevent position deviation of the roll body R and the roll paper Rp in the left and right direction.
[0066] In the feed mechanism **3** of the illustrative embodiment, the side guide **17** is movable in the left and right direction. Therefore, the side guide **17** is movable according to a width of the roll body R (the roll paper Rp), such that the positions of the roll body R and the roll paper Rp in the left and right direction can be more accurately determined. Even when the roll body R (the roll paper Rp) having various widths is used in the printer **100**, it is possible to determine the positions of the roll body R and the roll paper Rp in the left and right direction.
[0067] The feed mechanism **3** of the illustrative embodiment includes the second accommodation portion **9** configured to accommodate the cut paper Kp in a posture in which the width direction thereof coincides with the left and right direction. The side guide **17** is also contactable with an end of the cut paper Kp accommodated in the second accommodation portion **9** in the left and right direction. Therefore, the positions of the roll paper Rp and the cut paper Kp in the left and right direction may be determined by the same side guide **17**.
[0068] In the feed mechanism **3** of the illustrative embodiment, the second accommodation portion **9** includes the support plate **91** that supports a plurality of sheets of cut paper Kp placed in the stacked state from below. A pair of side guides **17** is provided to be located on both sides of the support plate **91** in the left and right direction, and includes the second side contact surface **20***a* that contacts the end of the paper P in the left and right direction and the lower contact surface **21***a* that is connected to the second side contact surface **20***a* and is in contact with the lower surface of the paper P. The roll paper Rp unrolled from the roll body R passes below the support plate **91**. The

side guide **17** moves toward the center in the left and right direction of the roll paper Rp with respect to the left and right direction, thereby making it possible to move from the non-overlapping position where the lower contact surface **21***a* does not overlap with the support plate **91** when viewed from the top to the overlapping position where the lower contact surface **21***a* is located below the support plate **91**. Therefore, since the side guide **17** is movable toward the center of the paper P in the left and right direction and is movable to the overlapping position where the lower contact surface **21***a* is located below the support plate **91**, it is also possible to handle the roll paper Rp having a relatively narrow width.

[0069] In the feed mechanism **3** of the illustrative embodiment, when the side guide **17** is in the non-overlapping position, the upper surface of the support plate **91** and the lower contact surface **21***a* of the side guide **17** are located substantially in the same plane. Therefore, when the side guide **17** is in the non-overlapping position, the upper surface of the support plate **91** that contacts the lower surface of the cut paper Kp and the lower contact surface **21***a* of the side guide **17** are in the same plane, such that the cut paper Kp may be stably supported.

[0070] In the feed mechanism **3** of the illustrative embodiment, the side guide **17** includes the regulating portion **19***a* that regulates the upward rotation of the support plate **91**. When the support plate **91** is pushed upward by the roll paper Rp and rotates above the second side contact surface **20***a* of the side guide **17**, the end of the roll paper Rp in the left and right direction is not able to contact the second side contact surface **20***a* of the side guide **17**, such that the position of the roll paper Rp in the left and right direction may not be determined. In the illustrative embodiment, since the upward rotation of the support plate **91** is regulated by the regulating portion **19***a* formed on the side guide **17**, the position of the roll paper Rp in the left and right direction can be reliably determined.

[0071] In the feed mechanism **3** of the illustrative embodiment, the width W of the portion of the support plate **91** located between the pair of second side guides **19** is equal to or less than the minimum width of the roll paper Rp used in the printer **100**. Therefore, the side guide **17** surely guides the end of the roll paper Rp (the roll body R) in the left and right direction used in the printer **100**, and the position of the roll paper Rp (the roll body R) can be determined.

[0072] The feed mechanism **3** of the illustrative embodiment includes: the feed roller **2** that feeds the cut paper Kp in contact with the cut paper Kp located at the uppermost position among the plurality of sheets of cut paper Kp placed on the support plate **91** in the stacked state; and the separation piece **31** that is located on the downstream side of the support plate **91** with respect to the conveyance direction of the cut paper Kp by the feed roller **2** and separates the cut paper Kp that contacts the feed roller **2** from the rest of cut paper Kp by contacting the central portion of the cut paper Kp in the width direction. The feed tray **1** is provided on the bottom surface **11***a* of the feed tray **1**, which is a conveying surface of the roll paper Rp, and includes the convex portion **16** protruding upward. The notch **91***b* is formed in the central portion in the left and right direction at the end portion on the downstream of the support plate **91** in the conveyance direction, and the convex portion **16** is located in the notch **91***b*. The height position H**1** of the upper surface **16***a* of the convex portion **16** is higher than the height position H**2** of the upper surface of the support plate **91** and the lower contact surface **21***a* of the second side guide **19**. Therefore, the end portion of the cut paper Kp placed on the support plate **91** on the downstream side in the conveyance direction becomes a convex shape in which the central portion in the left and right direction is lifted upward by the convex portion **16** and protrudes upward. Accordingly, the cut paper Kp fed from the feed tray **1** is caused to contact the separation piece **31** at a desired angle, thereby making it possible to appropriately separate the cut paper Kp.

[0073] The feed mechanism **3** of the illustrative embodiment includes: the first side guide **18** including the first side contact surface **18***a* contactable with the end of the roll body R accommodated in the first accommodation portion **8** in the left and right direction; and the second side guide **19** including the second side contact surface **20***a* contactable with the roll paper Rp

unrolled from the roll body R. The first side guide **18** and the second side guide **19** are interlocked with each other when moving in the left and right direction. Therefore, it is possible to prevent the first side contact surface **18***a* of the first side guide **18** and the second side contact surface **20***a* of the second side guide **19** from positionally deviating, thereby making it possible to prevent the roll paper Rp from being affected by a conveyance load and prevent the roll paper Rp from skewing.

[0074] Illustrative embodiments of the present disclosure have been described above with reference to the drawings, and it should be considered that a specific configuration is not limited to the illustrative embodiments. The scope of the present invention is indicated not by the description of the illustrative embodiments but by the scope of the present disclosure, and includes all modifications within the meaning equivalent to the scope of the present disclosure.

[0075] The illustrative embodiment describes a case in which the support plate **91** is rotatable up and down around the rotating shaft **91***a* extending along the left and right direction, and the support plate **91** may not be configured to be rotatable. However, from a viewpoint of eliminating jamming when the roll paper Rp is jammed below the support plate **91**, the support plate **91** may be configured to be removable from the feed tray **1**.

[0076] The illustrative embodiment describes a case in which the side guide **17** is movable in the left and right direction, and the position of the side guide **17** in the left and right direction may be fixed.

[0077] The illustrative embodiment describes a case in which the side guide **17** is contactable with the roll body R accommodated in the first accommodation portion **8** and the end of the roll paper Rp unrolled from the roll body R in the left and right direction, and the end of the cut paper Kp accommodated in the second accommodation portion **9** in the left and right direction, but is not limited thereto. The side guide **17** may be able to contact at least one of the roll body R accommodated in the first accommodation portion **8** and the end of the roll paper Rp unrolled from the roll body R in the left and right direction.

[0078] The illustrative embodiment describes a case in which the second side guide **19** is movable from the non-overlapping position where the lower contact surface **21***a* does not overlap with the support plate **91** when viewed from the top to the overlapping position where the lower contact surface **21***a* is located below the support plate **91**, but is not limited thereto. The second side guide **19** may be configured not to be able to move to the overlapping position where the lower contact surface **21***a* is located below the support plate **91**.

[0079] In a feed tray **201** according to a first modification of the illustrative embodiment illustrated in FIG. **9**, regulating portions **212***b* and **213***b* that regulate downward rotation of a support plate **291** are respectively formed on the side walls **12** and **13**. The regulating portion **212***b* protrudes from the lower end portion of the side wall **12** toward the side wall **13**. The regulating portion **213***b* protrudes from the lower end portion of the side wall **13** toward the side wall **12**. The downward rotation of the support plate **291** is regulated by causing both end portions of the support plate **291** in the left and right direction to contact the upper surfaces of the regulating portions **212***b* and **213***b*. In the modification, since the downward rotation of the support plate **291** is regulated by the regulating portions **212***b* and **213***b*, the bottom surface **11***a* of the feed tray **201** and the support plate **291** are separated from each other, such that a space is secured between the bottom surface **11***a* and the support plate **291**.

[0080] In the feed tray **201**, when the support plate **291** is in a regulated state in which the downward rotation thereof is regulated by the regulating portions **212***b* and **213***b*, the support plate **291** becomes a posture in which a direction connecting the front end portion and the rear end portion almost coincides with the conveyance direction. A height position H**3** of a lower surface of the support plate **291** in the regulated state is higher than a height position H**4** of the lower contact surface **21***a* of the second side guide **19**. Therefore, the second side guide **19** does not contact the support plate **291** even when the second side guide **19** is in an overlapping position where the lower contact surface **21***a* overlaps with the support plate **291** when viewed from the top.

[0081] In the feed tray **201**, the space is secured between the bottom surface **11***a* and the support plate **291**. Therefore, it is possible to prevent conveyance resistance occurring when the roll paper Rp passing between the bottom surface **11***a* and the support plate **291** rubs against the bottom wall **11** and the support plate **291**. When the second side guide **19** is in the overlapping position, a space is secured between the lower contact surface **21***a* of the second side guide **19** and the support plate **291**. Therefore, it is possible to prevent conveyance resistance occurring when the roll paper Rp passing between the lower contact surface **21***a* and the support plate **291** rubs against the lower contact surface **21***a* and the support plate **291**. In the feed tray **201**, even when the second side guide **19** is in the overlapping position, the support plate **291** is in the posture in which the direction connecting the front end portion and the rear end portion almost coincides with the conveyance direction without rotating upward. Accordingly, the cut paper Kp can be normally fed even when the second side guide **19** is in the overlapping position, such that it is possible to cope with the cut paper Kp having a relatively narrow width.

[0082] In the feed mechanism **3**, the illustrative embodiment describes a case in which the second side guide **19** is formed with the regulating portion **19***a* that protrudes from the end portion on the downstream in the conveyance direction toward the downstream side in the conveyance direction and that regulates the upward rotation of the support plate **91**, and when the support plate **91** rotates upward, the portion of the support plate **91** on the downstream side of the notch **91***c* in the conveyance direction contacts the lower end of the regulating portion **19***a,* but is not limited thereto. That is, for example, the regulating portion **19***a* may not be formed, and the upward rotation of the support plate **91** may be configured not to be regulated.

[0083] For example, in a feed tray **301** according to a second modification of the illustrative embodiment illustrated in FIG. **10**, the second side guide **19** is formed with a regulating portion **319***a* that protrudes from the upper end portion on the downstream side of the second side portion contact surface **20***a* in the conveyance direction toward the facing second side contact surface **20***a*. In the feed tray **301**, notches **391***c* respectively formed at both ends of the support plate **391** in the left and right direction are opened to the downstream side in the conveyance direction. In the feed tray **301**, when the support plate **391** rotates upward in a state where the entire lower contact surface **21***a* of the second side guide **19** is located below the support plate **391**, a portion of the support plate **391** located between the pair of second side guides **19** contacts a lower end of the regulating portion **319***a.* Accordingly, upward rotation of the support plate **391** is regulated.

[0084] The illustrative embodiment describes a case in which the width W of the portion of the support plate **91** located between the second side contact surfaces **20***a* of the pair of second side guides **19** is equal to or less than the minimum width of the roll paper Rp used in the printer **100**, but is not limited thereto. The width W may be larger than the minimum width of the roll paper Rp used in the printer **100**.

[0085] The illustrative embodiment describes a case in which the height position HI of the upper surface **16***a* of the convex portion **16** formed on the bottom surface **11***a* of the feed tray **1** is higher than the height position H**2** of the upper surface of the support plate **91** and the lower contact surface **21***a* of the second side guide **19**, and the height position H**1** may be equal to or lower than the height position H**2**.

[0086] The illustrative embodiment describes a case in which the first side guide **18** and the second side guide **19** are formed to be integrated with each other, and are interlocked with each other when moving in the left and right direction, but is not limited thereto. The first side guide **18** and the second side guide **19** may be configured to be provided separately, and the first side guide **18** and the second side guide **19** may be configured to be interlocked with each other by an interlocking mechanism. The first side guide **18** and the second side guide **19** may be configured not to be interlocked with each other.

[0087] The illustrative embodiment describes a case in which the first accommodation portion **8** includes the support base **81** that supports the roll body R, but is not limited thereto. The first

accommodation portion **8** may include a support portion that rotatably supports the core member Rc.

[0088] The present invention may be applied to all image forming apparatuses including a feed mechanism including a feed tray configured to accommodate at least a roll medium. That is, for example, the present invention may be applied not only to an inkjet printer, but also to a laser type printer in which an electrostatic latent image is formed by exposing a photoreceptor with a laser and an LED type electrophotographic printer in which an electrostatic latent image is formed by exposing a photoreceptor with an LED (abbreviation of Light Emitting Diode). A sheet-like medium is not limited to paper, and may be cloth or the like as long as the sheet-like medium is in a form of a sheet.

Claims

1. A feed tray configured to be detachably inserted to a housing of an image forming apparatus, the feed tray comprising: a first accommodation portion configured to accommodate a roll body in which a sheet-shaped medium is rolled; a bottom wall that defines a bottom surface of an introduction path for guiding the sheet-shaped medium unrolled from the roll body in a guiding direction, the bottom wall extending in the guiding direction; a member that defines an upper surface of the introduction path, the member extending in the guiding direction; and a side guide configured to be movable to be contactable with the sheet-shaped medium located within the introduction path.

2. The feed tray according to claim 1, wherein the side guide is contactable with: at least one end of the roll body accommodated in the first accommodation portion in an axial direction of the roll body; or at least one end of the sheet-shaped medium unrolled from the roll body in the axial direction.

3. The feed tray according to claim 1 further comprising: a first side wall; and a second side wall.

4. The feed tray according to claim 3, wherein the first side wall and the second side wall are arranged to face each other and configured to extend in the guiding direction.

5. The feed tray according to claim 4, wherein the side guide is located at a position between the first side wall and the second side wall, and wherein the side guide is configured to be movable in a direction from the first side wall towards the second side wall to be contactable with the sheet-shaped medium located within the introduction path.

6. The feed tray according to claim 3, wherein the side guide is movable in an axial direction of the roll body independently from movement of the first side wall and the second side wall.