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Medium discharge device and image reading apparatus

Abstract

A medium discharge device includes a discharge roller pair that is provided with a discharge driving roller and a discharge driven roller which drivably rotates in contact with the discharge driving roller, and a medium receiving tray which receives the medium that is fed and discharged by the discharge roller pair, in which the medium receiving tray includes a guide member which guides such that a tip end of the medium which is discharged from the discharge roller pair enters the medium mounting surface at a predetermined angle, and the guide member is provided to be elastically displaceable in an advancing and retreating direction with respect to the medium mounting surface of the medium receiving tray and is displaced in a direction coming close to the medium mounting surface according to raising of a pressing load due to the medium that is discharged to the medium receiving tray.

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Background/Summary

BACKGROUND

1. Technical Field

(1) The present invention relates to a medium discharge device that stacks and discharges a medium to externally to the apparatus and an image reading apparatus which is provided with the medium discharge device.

2. Related Art

(2) An automatic feeding device of a document as the medium (referred to as an auto document feeder (ADF)) is provided in a scanner that is an example of the image reading apparatus, and is configured to perform automatic feeding and reading of a plurality of documents. The plurality of fed documents are read in an image reading portion that is provided on a transport direction downstream side of the auto document feeder.

(3) In such a scanner, the medium discharge device may be provided that is configured such that a discharge roller pair is provided on the downstream side of the image reading portion, the documents are discharged externally to the apparatus, and a plurality of discharged documents which are received are stacked in discharge order to a discharge paper receiving tray (also referred to as a discharge paper stacker and the like).

(4) For example, JP-A-2014-051338 discloses a medium discharge device with a configuration in which paper sheets are discharged outside of an apparatus by a second transport roller **140** and a second driven roller **141** which are provided on the downstream side of an imaging portion **130** as the image reading portion, and paper sheets are stacked on a front surface cover **105***a*, an upper surface cover **105***b*, and an auxiliary cover **105***c* as the discharge paper receiving tray.

(5) In such a medium discharge device, there is a configuration in which since a plurality of sheets of the medium are stacked in the discharge paper receiving tray, as shown in FIG. **17**, after a medium mounting surface **100***a* of the discharge paper receiving tray **100** is provided further on the lower side than the discharge roller pair **102** and the medium (reference numeral P) is fed from the

discharge roller pair **102**, the medium is held a predetermined distance L from the discharge roller pair **102** and is landed and discharged on the medium mounting surface **100***a* of the discharge paper receiving tray **100** at a predetermined angle θ**1**.

(6) Here, in a case where resilience of the medium P is strong, that is, in a case where the medium has high rigidity, a tip end of the medium P which is fed from the discharge roller pair **102** progresses approximately straight up to a landing point A, and is landed on the medium mounting surface **100***a* at the angle θ**1**. After landing of the tip end of the medium P, the medium P is further fed and discharged by the discharge roller pair **102**, and is mounted in the discharge paper receiving tray **100**.

(7) Meanwhile, in a case where resilience of the medium is weak, that is, in a case where there is a medium P′ with low rigidity such as thin paper (indicated by a dotted line in FIG. **17**), the medium P′ which is fed from the discharge roller pair **102** may hang down under self weight prior to reaching the landing point A, and land further on the upstream side in the medium transport direction upstream side than the landing point A (for example, landing point B in FIG. **17**) at an angle θ**2** which is larger than the angle θ**1**.

(8) When landing on the medium mounting surface **100***a* with the tip end of the medium P′ with weak resilience at the large angle θ**2**, and the medium P′ is further fed to the downstream side by the discharge roller pair **102**, there is a risk that the tip end of the medium P′ is caught and buckles on the medium mounting surface **100***a*. When the already discharged medium buckles, a concern that a defect such as jamming due to impact with the medium that is buckled by a subsequent medium, or reversing of loading order increases.

SUMMARY

(9) An advantage of some aspects of the invention is to reduce or avoid a concern of a medium buckling during discharge of the medium on a discharge paper receiving tray, and appropriately discharge a plurality of media stacked in the discharge paper receiving tray.

(10) According to a first aspect of the invention, there is provided a medium discharge device including a discharge roller pair that is provided with a discharge driving roller which feeds a medium by being driven with motive force of a driving source and a discharge driven roller which drivably rotates in contact with the discharge driving roller, and a medium receiving tray which receives the medium that is fed and discharged by the discharge roller pair, in which the medium receiving tray includes a guide member which guides such that a tip end of the medium which is discharged from the discharge roller pair enters a medium mounting surface at a predetermined angle, and the guide member is provided elastically displaceable in an advancing and retreating direction with respect to the medium mounting surface of the medium receiving tray and displaced in a direction coming close to the medium mounting surface according to raising of a pressing load due to the medium that is discharged to the medium receiving tray.

(11) According to the aspect, since it is possible to guide the medium that is discharged from the discharge roller pair using the guide member and land on the medium mounting surface of the medium receiving tray at a predetermined entrance angle, it is possible to reduce or avoid a concern of the medium with weak resilience (with low rigidity) buckling during discharge of the medium on a medium receiving tray. Thereby, it is possible to suppress a concern that a subsequent medium is jammed and appropriately stack the media in the medium receiving tray.

(12) Additionally, the guide member is elastically displaced in the advancing and retreating direction with respect to the medium mounting surface of the medium receiving tray and is displaced in a direction coming close to the medium mounting surface according to raising of a pressing load due to the medium that is discharged to the medium receiving tray. That is, when the discharged number of sheets of media is great, the guide member is displaced so as to come close to the medium mounting surface. Consequently, it is possible to secure a loading space in a height direction (direction perpendicular to the medium mounting surface) in the medium receiving tray.

(13) In the medium discharge device according to the second aspect, the guide member is formed

on a downward slope extending on the medium mounting surface of the medium receiving tray from a transport direction upstream side, at the predetermined angle.
(14) According to the aspect, it is possible to reliably guide the medium which is discharged from the discharge roller pair so as to enter the medium mounting surface of the medium receiving tray at the predetermined angle.
(15) In the medium discharge device according to the third aspect, the guide member is provided with respect to a portion of a width direction which intersects with the medium transport direction on the medium receiving tray.
(16) According to the aspect, it is possible to more easily perform adjustment of elastic force of the guide member than in a case where the guide member is provided across the width direction by partially providing the guide member in the width direction. In addition, it is possible to provide the guide member with a simple configuration and at low cost.
(17) In the medium discharge device according to the fourth aspect, the guide member is provided in a center portion in the width direction.
(18) According to the aspect, it is possible for the guide member to reliably guide the medium which is discharged from the discharge roller pair in the center portion in the width direction which intersects with the medium transport direction in the medium receiving tray. In particular, it is possible to effectively guide the medium in a case where the medium is disposed on the center portion and fed in the direction which intersects with the medium transport direction, and the medium is transported from the upstream side of the medium discharge device by so-called center feeding.
(19) In the medium discharge device according to the fifth aspect, the guide member guides the medium at at least two locations in the width direction.
(20) According to the aspect, it is possible for the guide member to stably transport the medium since the guide member supports and guides the medium at at least two locations in the width direction.
(21) In the medium discharge device according to the sixth aspect, the guide member is configured by a leaf spring.
(22) According to the aspect, it is possible to simply and inexpensively realize a configuration in which the guide member is elastically displaced in the advancing and retreating direction with respect to the medium mounting surface of the medium receiving tray and is displaced in a direction coming close to the medium mounting surface according to raising of a pressing load due to the medium that is discharged to the medium receiving tray.
(23) According to a seventh aspect of the invention, there is provided an image reading apparatus including an apparatus main body which is provided with a reading portion that reads a medium, and the medium discharge device according to any one of the first to sixth aspects which discharges the medium that is read by the reading portion externally to the apparatus main body.
(24) According to the aspect, in the image reading apparatus which is provided with the reading portion that reads the medium within the apparatus main body, when the medium is fed toward the reading portion, the same actions and effects are obtained as any one of the first to fourth aspects.
(25) In the image reading apparatus according to the eighth aspect, the medium receiving tray is able to be accommodated in an accommodating portion which is provided within the apparatus main body, and the guide member is displaced in a direction coming close to the medium mounting surface in conjunction with an accommodating operation to the accommodating portion of the medium receiving tray and is accommodated in the accommodating portion along with the medium receiving tray.
(26) According to the other aspect, when the medium receiving tray is accommodated in the accommodating portion within the apparatus main body, it is possible to accommodate the guide member together in the accommodating portion. At that time, since the guide member is displaced

in the direction coming close to the medium mounting surface, it is possible to accommodate the guide member to save space.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) The invention will be described with reference to the accompanying drawings, wherein like numbers reference like elements.

(2) FIG. **1** is an outer appearance perspective view illustrating an example of a scanner according to the invention.

(3) FIG. **2** is a perspective view illustrating a feeding state in the scanner according to the invention.

(4) FIG. **3** is a perspective view of a case where an upper unit is in an open state with respect to a lower unit in the scanner according to the invention.

(5) FIG. **4** is a side sectional view illustrating a feeding path in the scanner according to the invention.

(6) FIG. **5** is a main portion enlarged view of the scanner according to the invention.

(7) FIG. **6** is a side sectional view of a medium discharge device which is provided with the scanner.

(8) FIG. **7** is a diagram which describes a guide member in the medium discharge device.

(9) FIG. **8** is a diagram illustrating a state in which a paper sheet is guided to the guide member.

(10) FIG. **9** is a diagram illustrating a state in which a plurality of paper sheets are mounted in the guide member.

(11) FIG. **10** is a schematic side surface view illustrating a configuration of the medium discharge device according to Embodiment 2.

(12) FIG. **11** is a perspective sectional view of a state in which a paper discharge tray is pulled out from the apparatus main body of the scanner.

(13) FIG. **12** is a side sectional view of a state in which the paper discharge tray is accommodated in the apparatus main body of the scanner.

(14) FIG. **13** is a perspective view illustrating the main portion of the medium discharge device according to Embodiment 3.

(15) FIG. **14** is a perspective view illustrating the main portion of the medium discharge device according to Embodiment 4.

(16) FIG. **15** is a perspective view describing another example of the medium discharge device according to Embodiment 4.

(17) FIG. **16** is a perspective view illustrating the main portion of the medium discharge device according to Embodiment 5.

(18) FIG. **17** is a diagram describing the related art.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

Embodiment 1

(19) First, an outline of a recording apparatus according to an embodiment of the invention will be described. An example is given of a document scanner (hereinafter referred to simply as a scanner **10**) that is able to read at least one surface of a front surface and a rear surface of the medium as an example of an image reading apparatus of the embodiment.

(20) FIG. **1** is an outer appearance perspective view illustrating an example of a scanner according to the invention. FIG. **2** is a perspective view illustrating a feeding state in the scanner according to the invention. FIG. **3** is a perspective view of a case where an upper unit is in an open state with respect to a lower unit in the scanner according to the invention. FIG. **4** is a side sectional view illustrating a feeding path in the scanner according to the invention.

(21) FIG. **5** is a main portion enlarged view of the scanner according to the invention. FIG. **6** is a side sectional view of a medium discharge device which is provided in the scanner. FIG. **7** is a diagram which describes a guide member in the medium discharge device. FIG. **8** is a diagram illustrating a state in which a paper sheet is guided to the guide member. FIG. **9** is a diagram illustrating a state in which a plurality of paper sheets are mounted in the guide member.

(22) Overview of Scanner

(23) As shown in FIG. **1**, the scanner **10** as the image reading apparatus according to the invention is provided with a lower unit **12** and an upper unit **14** which configure an apparatus main body **11** that is provided with a reading portion (image reading portion **34** described later) which reads an image of a document, a paper support **16** which opens and closes with respect to the upper unit **14**, and a paper discharge tray **18** as a "medium receiving tray" that receives a paper sheet P which is discharged from the apparatus main body **11**.

(24) Note that, in an X-Y-Z coordinate system illustrated in each drawing, an X direction is a paper sheet width direction that is an apparatus width direction and a Y direction is a paper sheet transport direction. A Z direction is a direction which intersects with the Y direction, and indicates a direction which is orthogonal to a surface of the paper sheet which is generally transported. In addition, a +Y direction side is the apparatus front surface side, and a −Y direction side is the apparatus rear surface side. In addition, viewed from the apparatus front surface side, a right side is set as a +X direction and a left side is a −X direction. In addition, a +Z direction is an apparatus top (including an upper portion, an upper surface, and the like), and a −Z direction is an apparatus bottom (including a lower portion, a lower surface, and the like).

(25) In addition, in the scanner **10**, there is a configuration in which the paper sheet P as the medium is transported in the +Y direction of each drawing. Hereinafter, a direction (+Y direction side) in which the paper sheet P is transported is referred to as "downstream", and a direction which is opposite thereto (−Y direction side) is referred to as "upstream".

(26) The upper unit **14** is attached to the lower unit **12** to be rotatable with a paper sheet transport direction downstream side as a rotary support point with respect to the lower unit **12**. The upper unit **14** can take a closed state (refer to FIG. **2**) which is closed with respect of the lower unit **12** and configures a paper sheet transport path of the paper sheet P along with the lower unit **12** and an open state (refer to FIG. **3**) in which it is possible to easily perform a process of paper jamming of the paper sheet P by exposing the paper sheet transport path of the paper sheet P by rotating to the apparatus front surface side with respect to the lower unit **12**.

(27) In addition, the paper support **16** is provided which opens and closes the upper portion of the upper unit **14**.

(28) The paper support **16** is attached to the lower unit **12** to be rotatable with respect to the upper portion on the rear surface side of the lower unit **12**. As shown in FIG. **1**, it is possible for the paper support **16** to take a non-feeding state covering the upper portion and a feeding opening **20** (FIG. **2**) of the upper unit **14**, and as shown in FIG. **2**, a feeding state in which the paper support **16** rotates to the apparatus rear surface side from the non-feeding state in FIG. **1** and a rear surface of the paper support **16** (support surface **16***a* described later) extends to a medium mounting member **22** of the paper sheet P while opening the feeding opening **20**.

(29) In addition, a discharge opening **24** which discharges the paper sheet P from within the apparatus main body **11** and a medium discharge device **42** are provided on the apparatus front surface side of the lower unit **12**. The medium discharge device **42** is configured by a discharge roller pair **36** which will be described later, and a paper discharge tray **18** which is able to be pulled out from the discharge opening **24** toward the apparatus front surface side. It is possible for the paper discharge tray **18** to take a state (FIG. **1**) of being accommodated in an accommodating portion **50** (refer to FIG. **4**) which is provided on the bottom portion of the lower unit **12** and a state (FIG. **2**) of being pulled out to the apparatus front surface side. In addition, the paper discharge tray **18** in the embodiment is configured by connection of a plurality of tray members **46***a*, **46***b*, **46***c*,

and **46***d*, and it is possible to adjust a pull-out length from the discharge opening **24** according to the length of the discharged paper sheet P.
(30) Note that, details of the paper discharge tray **18** and an accommodating structure of the accommodating portion **50** of the paper discharge tray **18** will be described later in detail.
(31) Scanner Feeding Path
(32) Next, a paper sheet transport path in the scanner **10** will be described with reference to FIG. **4**.
(33) A tip end side (downstream side) of the paper sheet P which is set in the feeding opening **20** is supported on a medium mounting surface **22***a* of the medium mounting member **22**, and a rear end side (upstream side) is mounted supported by the support surface **16***a* which is a rear surface of the paper support **16** that has a posture of rotating to the apparatus rear surface side with respect to the lower unit **12**. A plurality of paper sheets P are able to be set in the feeding opening **20**.
(34) The paper sheet P which is mounted on the medium mounting member **22** is fed to downstream side (+Y direction side) by being picked up by a first feeding roller **26** that is provided to be rotatable with respect to the lower unit **12** on which the medium mounting member **22** is provided. In detail, the paper sheet P is fed toward the downstream side by rotating while contacting the first feeding roller **26** on the surface facing the medium mounting surface **22***a* of the paper sheet P. Accordingly, in a case where the plurality of paper sheets P are set to the feeding opening **20** in the scanner **10**, the paper sheets P are fed toward the downstream side in order from the paper sheets P on the medium mounting surface **22***a* side of the medium mounting member **22**. Note that, the first feeding roller **26** is disposed such that a portion protrudes with respect to the medium mounting surface **22***a* of the medium mounting member **22**.
(35) The medium mounting member **22** supports the paper sheet P that is set to the feeding opening **20** further on the upstream side than the first feeding roller **26**, and the medium mounting member **22** plays a role as a transport path of the paper sheet P which is fed by the first feeding roller **26** further on the downstream side than the first feeding roller **26**.
(36) In addition, a paper sheet return member **27** that is biased to the first feeding roller **26** side is provided at a position facing the first feeding roller **26**, and multifeed of the paper sheet P is suppressed.
(37) A second feeding roller **28** is rotatably provided as a “feeding roller” on the lower unit **12** at the downstream side of the first feeding roller **26**, and a separation roller **30** is rotatably provided in the upper unit **14**.
(38) In the same manner as the first feeding roller **26**, the second feeding roller **28** is disposed such that a portion protrudes with respect to the medium mounting surface **22***a* of the medium mounting member **22**, the paper sheet P is fed toward the downstream side by rotating while contacting the surface facing the medium mounting surface **22***a* of the paper sheet P.
(39) In the embodiment, a predetermined rotation resistance is applied to the separation roller **30**. Then, in a case where two or more paper sheets P are fed by the first feeding roller **26**, only the paper sheet P which is separated by the separation roller **30** and contacts the second feeding roller **28** is fed to the feeding direction downstream side due to nipping of the second feeding roller **28** and the separation roller **30**.
(40) The discharge roller pair **36** which is configured by a transport roller pair **32**, the image reading portion **34** as the “reading portion”, and the medium discharge device **42** is provided on the transport direction downstream side of the second feeding roller **28**.
(41) In the embodiment, the discharge roller pair **36** is provided with a discharge driving roller **36***a* which is provided on the lower unit **12** and a discharge driven roller **36***b* which is provided on the upper unit **14** and drivably rotates with respect to the discharge driving roller **36***a*.
(42) The paper sheet P which is fed to the transport direction downstream side is nipped in the transport roller pair **32** nipping using the second feeding roller **28** and the separation roller **30**, and is transported to the image reading portion **34** which is positioned on the downstream side of the transport roller pair **32**.

(43) The transport roller pair **32** is provided with a transport driving roller **32***a* which is provided on the lower unit **12** and a transport driven roller **32***b* which is provided on the upper unit **14** and drivably rotates with respect to the transport driving roller **32***a*.
(44) Note that, in the embodiment, the first feeding roller **26**, the second feeding roller **28**, the transport driving roller **32***a*, and the discharge driving roller **36***a* are rotatably driven by at least one driving source **48** (FIG. **12**) that is provided within the lower unit **12**.
(45) In addition, there is a configuration in which the first feeding roller **26**, the second feeding roller **28**, the separation roller **30**, and the transport roller pair **32** are disposed on the center portion of the width direction (X axis direction) which intersects with the medium transport direction of the medium mounting member **22**, positional alignment of the paper sheet P with reference to the center of the width direction of the paper sheet P is performed, and so-called center feeding is performed. Accordingly, the discharge roller pair **36** is also provided in the X axis direction center portion.
(46) The image reading portion **34** is provided with an upper image reading sensor **38** which is provided on the upper unit **14** side and a lower image reading sensor **40** which is provided on the lower unit **12** side. In the embodiment, the upper image reading sensor **38** and the lower image reading sensor **40** are configured as a contact image sensor module (CISM) as an example.
(47) On the paper sheet P, after an image on at least one surface of the front surface and the rear surface is read on the image reading portion **34**, the paper sheet P is discharged toward the paper discharge tray **18** from the discharge opening **24** by nipping the discharge roller pair **36** that is positioned on the transport direction downstream side of the image reading portion **34**. Note that, a dashed line in FIG. **4** indicates a feeding path of the paper sheet P.
(48) Paper Discharge Tray
(49) Next, the paper discharge tray **18** is described with reference to FIGS. **5** to **9**.
(50) The paper discharge tray **18** is provided further on the lower side than the discharge roller pair **36**, and a stacking space of the plurality of paper sheets P is secured.
(51) A guide member **44** which guides the tip end of the paper sheet P which is discharged from the discharge roller pair **36** so as to enter the medium mounting surface **18***a* at a predetermined angle θ**1** is provided in the center portion of the width direction (X axis direction) which intersects with the medium transport direction of the paper discharge tray **18**. When the paper sheet P is fed further to the downstream side after landing on the medium mounting surface **18***a*, the predetermined angle θ**1** is set to an angle at which a concern of buckling is low on the medium mounting surface **18***a*.
(52) In further detail, the guide member **44** is formed on the downward slope from the transport direction upstream side toward the downstream side, and extend at the predetermined angle θ**1** with respect to the medium mounting surface **18***a* of the paper discharge tray **18**.
(53) The guide member **44** is elastically displaceably provided in the advancing and retreating direction (up and down direction in FIG. **6**) with respect to the medium mounting surface **18***a* of the paper discharge tray **18**. In the embodiment, elastic displacement in the advancing and retreating direction with respect to the medium mounting surface **18***a* is simply and inexpensively realized by forming the guide member **44** using a leaf spring.
(54) The guide member **44** is configured so as to be displaced in a direction coming close to the medium mounting surface **18***a* according to raising of a pressing load due to the paper sheet P that is discharged to the paper discharge tray **18**.
(55) Next, the operation of the guide member **44** will be described. First, in a case of a medium in which resilience of the paper sheet P is high (indicated by a dotted line in FIG. **7**), the paper sheet P which is fed from the discharge roller pair **36** progresses approximately straight without hanging down, and is landed on the medium mounting surface **18***a* at the angle θ**1**. Note that, normally, the medium with high rigidity is landed on the medium mounting surface **18***a* at the angle θ**1** even if the guide member **44** is not present. The guide member **44** is provided so as not to interfere with

the path of the medium with high rigidity, and in the guide member **44**, the tip end portion **44***b* of the slope **44***a* is formed bent slightly on the lower side.

(56) Meanwhile, in a case where the paper sheet P indicated by a solid line in FIG. **7** is the medium with low rigidity (medium with weak resilience) such as thin paper, the paper sheet P that is discharged from the discharge roller pair **36** tends to hang down due to self-weight, and without change, there is landing on the medium mounting surface **18***a* at an angle θ**2** which is larger than the angle θ**1** that has the trajectory indicated by a dashed line in the same drawing. However, as shown in FIG. **8**, since the paper sheet P is guided to contact the guide member **44**, it is possible to land the paper sheet P on the medium mounting surface **18***a* of the paper discharge tray **18** at the angle θ**1**.

(57) Accordingly, even if the paper sheet P is the medium with low rigidity such as thin paper, it is possible to reliably land the paper sheet P on the medium mounting surface **18***a* of the paper discharge tray **18** at the angle θ**1**, and it is possible to reduce or avoid a concern of the paper sheet P buckling on the medium mounting surface **18***a* of the paper discharge tray **18**. Thereby, it is possible to suppress a concern such that a subsequent paper sheet is jammed, the order of the paper sheets is switched, and the like, and appropriately stack the media in the paper discharge tray **18**.

(58) Additionally, the guide member **44** is elastically displaced in the direction coming close to the medium mounting surface **18***a* according to raising of the pressing load due to the paper sheet P that is discharged to the paper discharge tray **18**. That is, when the discharged number of sheets of the paper sheet P is great, the guide member **44** is displaced so as to come close to the medium mounting surface **18***a* (refer to FIG. **9**). Consequently, it is possible to secure a loading space in a height direction (direction perpendicular to the medium mounting surface **18***a*) in the paper discharge tray **18**. Note that, in FIG. **9**, the guide member **44** prior to displacement (angle θ**1** with respect to the medium mounting surface **18***a*) is indicated by a dotted line. The angle with respect to the medium mounting surface **18***a* of the guide member **44** after displacement according to raising of the pressing load from the paper sheet P is θ**3** which is smaller than θ**1**.

(59) For example, the guide member **44** is able to be provided across the entire width in the width direction of the paper discharge tray **18**, but it is possible to provide the guide member **44** with a simple configuration and at low cost by partially providing in the width direction in the paper discharge tray **18**, and it is possible to easily perform adjustment of elastic force of the guide member **44**.

(60) In addition, it is possible to partially provide a plurality of guide members **44** in the width direction of the paper discharge tray **18** as shown in the embodiment described later.

(61) Paper Discharge Tray Accommodating Structure

(62) Next, an accommodating structure of the paper discharge tray **18** will be described with reference to FIGS. **11** to **12**. FIG. **11** is a perspective sectional view of a state in which a paper discharge tray is pulled out from the apparatus main body of the scanner. FIG. **12** is a side sectional view of a state in which the paper discharge tray is accommodated in the apparatus main body of the scanner.

(63) In the embodiment, the paper discharge tray **18** is accommodatable in the apparatus main body **11**. In detail, the paper discharge tray **18** is configured so as to be accommodated in the accommodating portion **50** that is provided in the lower unit **12**.

(64) As described above, the paper discharge tray **18** in the embodiment is configured by connecting the plurality of tray members **46***a*, **46***b*, **46***c*, and **46***d*. As shown in FIG. **11**, the tray member **46***d* which is positioned furthest on the downstream side is slidably provided on the upper side of the tray member **46***c*, and the tray member **46***c* is slidably provided on the upper side of the tray member **46***b*.

(65) In addition, the tray member **46***b* is slidably provided on the lower side of the tray member **46***a*, and the tray member **46***a* in which the tray members **46***b*, **46***c*, and **46***d* are stored is accommodated in the accommodating portion **50** as shown in FIG. **12**.

(66) The guide member **44** is attached to the slide portion **52** that is positioned one step lower than the medium mounting surface **18***a* in the tray member **46***b*. The slide portion **52** has a space in which the tray member **46***c* is accommodated to slide in the tray member **46***b*.
(67) When the tray member **46***c* is slidably accommodated in the tray member **46***b*, the tray member **46***c* is displaced in the direction coming close to the medium mounting surface **18***a* by pressing the slope **44***a* (FIG. **11**) of the guide member **44** on the tray member **46***c*. Note that, the guide member **44** indicated by a dotted line in FIG. **11** represents the guide member **44** which is displaced in the direction coming close to the medium mounting surface **18***a*.
(68) When the tray member **46***c* is completely accommodated in the tray member **46***b*, height of the guide member **44** is a height that is stored on a lower side of the tray member **46***a*, the tray member **46***b* is accommodatable in the tray member **46***a*, and furthermore the tray member **46***a* is accommodatable in the accommodating portion.
(69) As described above, it is possible to accommodate the guide member **44** which is provided in the paper discharge tray **18** in the accommodating portion **50** that is provided within the apparatus main body **11** along with the paper discharge tray **18** in conjunction with the accommodating operation to the accommodating portion **50** of the paper discharge tray **18**. Thereby, it is possible to accommodate the guide member **44** to save space.
Embodiment 2
(70) In Embodiment 2, another example of the medium discharge device is described based on FIG. **10**.
(71) FIG. **10** is a schematic side surface view illustrating a configuration of the medium discharge device according to Embodiment 2. In the embodiment, the same reference numerals as in Embodiment 1 are given and description is omitted for configurations which are the same as in Embodiment 1.
(72) In a medium discharge device **60** of the embodiment, the paper discharge tray **18** is provided with a guide member **62** as shown in FIG. **10**. That is, the guide member **62** is provided with a guide plate **64** which has a guide surface of the paper sheet P and a spring member **66** which is provided between the guide plate **64** and the slide portion **52** of the paper discharge tray **18**. The guide plate **64** is formed of a non-elastic material.
(73) The guide plate **64** is configured so as to be displaced in a direction coming close to the medium mounting surface **18***a* against biasing force of the spring member **66** according to raising of a pressing load due to the paper sheet P that is discharged to the paper discharge tray **18**.
(74) In the same manner as Embodiment 1, in the present embodiment, regardless of the rigidity of the paper sheet P, it is possible to reliably land the paper sheet P on the medium mounting surface **18***a* of the paper discharge tray **18** at the angle θ**1**, and it is possible to reduce or avoid a concern of the paper sheet P buckling on the medium mounting surface **18***a* of the paper discharge tray **18**. Thereby, it is possible to suppress a concern such that a subsequent paper sheet is jammed, the order of the paper sheets is switched, and the like, and appropriately stack the media in the paper discharge tray **18**.
(75) In addition, even in the present embodiment, it is possible to configure the guide member **62** to be accommodated in the accommodating portion **50** along with the paper discharge tray **18** in conjunction with the accommodating operation to the accommodating portion **50** of the paper discharge tray **18**.
Embodiment 3
(76) In Embodiment 3, yet another example of the medium discharge device is described based on FIG. **13**. FIG. **13** is a perspective view illustrating the main portion of the medium discharge device according to Embodiment 3.
(77) In a medium discharge device **70** of the embodiment, the paper discharge tray **18** is provided with three guide members **72**, **74**, and **76**. In detail, a guide member **72** which is provided on the center portion of the paper discharge tray **18**, a guide member **74** which is provided in an end

portion on the left side (−X side) of the guide member **72** viewed from the apparatus front surface side of the paper discharge tray **18**, and the guide member **76** which is provided on the end portion on the right side (+X side) of the guide member **72** are provided.

(78) In a case where a size of the width direction (X axis direction) of the discharged paper sheet P is large, or resilience of the medium is weak (rigidity is low), when the paper sheet P is supported by only the guide member **72** of the center portion, the side end of the paper sheet P may hang down due to self-weight and the tip end of a side edge of the paper sheet P may be landed on the medium mounting surface **18***a* further on the tip than the tip end of the center portion of the paper sheet P at an angle larger than the angle θ**1**.

(79) In the embodiment, since a part near the side edge of the paper sheet P with a large width size is able to be supported by the guide members **74** and **76** by providing the guide members **74** and **76** at the end portion side in the width direction of the paper discharge tray **18**, it is possible to reduce a concern that the tip end on the side edge of the paper sheet P as described above is landed at the medium mounting surface **18***a* in advance. Thereby, it is possible to reliably land the paper sheet P on the medium mounting surface **18***a* of the paper discharge tray **18** at the angle θ**1**.

(80) Note that, in the embodiment, a leaf spring which configures the center guide member **72** is formed to be wider than a leaf spring which configures the guide members **74** and **76**, and although elasticity is set to be high, it is also possible to set elasticity of the three guide members **72**, **74**, and **76** to be the same.

(81) In addition, it is also possible to dispose three or more guide members in the width direction. A case where a plurality of guide members are provided is not limited to a case of providing in contrast to the center portion in the width direction of the paper discharge tray **18**.

Embodiment 4

(82) In Embodiment 4, yet another example of the medium discharge device is described based on FIGS. **14** and **15**. FIG. **14** is a perspective view illustrating the main portion of the medium discharge device according to Embodiment 4. FIG. **15** is a perspective view describing another example of the medium discharge device according to Embodiment 4.

(83) In a medium discharge device **80** of the embodiment, guide members **82** and **84** are provided on the paper discharge tray **18** at both sides in the width direction (X axis direction) with respect to a center portion C in the width direction.

(84) In the embodiment, the guide members **82** and **84** are provided at a position to which the document (paper sheet P**1**) of a minimum size that is able to be read in the scanner **10** is guided.

(85) In the embodiment, since the paper sheet P is supported and guided by two guide members **82** and **84**, it is possible to realize transport of the paper sheet more stably.

(86) Note that, in the case of the scanner **10** of the center feeder in the manner of the embodiment, it is preferable to position the guide members **82** and **84** at a target with respect to the center portion C of the transported paper sheet P, that is, position at equal distance from the center portion C.

(87) In addition, in a case where the read document size is fixed in the scanner **10** and the paper sheet P of a determined size is discharged by the medium discharge device **80**, as shown in FIG. **15**, the two guide members **82** and **84** may be disposed at a position according to the size of the paper sheet P.

Embodiment 5

(88) In Embodiment 5, yet another example of the medium discharge device is described based on FIG. **16**. FIG. **16** is a perspective view illustrating the main portion of the medium discharge device according to Embodiment 5.

(89) In each embodiment that is described previously, although the guide member (for example, the guide member **44** of Embodiment 1) which is formed using the leaf spring is described, it is also possible to form the guide member according to the invention using a wire having elasticity such as a steel wire.

(90) As shown in FIG. **18**, a guide member **92** of a medium discharge device **90** of the embodiment is formed by bending the wire into an approximate U shape when viewed from the Z axis direction, and is provided with two foot portions **92***a* as an attachment portion to the slide portion **52** of the tray member **46***b* and a spring portion **92***b* in which a part that extends to two foot portions **92***a* that are attached to the slide portion **52** is bent at an angle θ**1** in a direction (+Z side) which is separated from the slide portion **52**.
(91) The guide members **94** and **96** which are provided at both end portions in the width direction of the paper discharge tray **18** are formed by bending the wire in the same manner as the guide member **92**.
(92) In this manner, also according to the formed guide members **92**, **94**, and **96**, it is possible to reliably land the paper sheet P on the medium mounting surface **18***a* of the paper discharge tray **18** at the angle θ**1**, and it is possible to reduce or avoid a concern of the paper sheet P buckling on the medium mounting surface **18***a* of the paper discharge tray **18**.
(93) It is possible to further reduce weight of the guide members **92**, **94**, and **96** by forming the guide members **92**, **94**, and **96** using wire that has elasticity.
(94) In addition, since adjustment of elastic force of the guide members **92**, **94**, and **96** is possible by changing wires with different elastic force (change thickness and material of the wire), or changing bending width of the wire, design freedom of the guide members is increased.
(95) Note that, it is also possible to form the guide members **92**, **94**, and **96** using one wire without bending the wire in a U shape.
(96) Note that, in each embodiment that is described above, the scanner **10** which feeds the paper sheet P using the center feeding method is described as an apparatus which is provided with the medium discharge device according to the invention, but it is also possible to adopt in an apparatus in which the paper sheet P is fed using a biasing method with reference to positional alignment of one side edge of the paper sheet P.
(97) In addition, the medium discharge device according to the invention is not limited to a case of being provided with the scanner **10**, and it is possible to provide various apparatuses with a configuration in which a plurality of sheets of a medium such as a paper sheet are continuously discharged from the within the apparatus main body and stacked. For example, it is also possible to adopt a medium discharge device of a recording apparatus which is represented by a printer that performs recording on the paper sheet as the medium.
(98) In addition, the invention is not limited to the embodiments described above, and various modifications are possible within the scope of the invention described in the claims which can be said to include the inventions included in the scope of the invention.

Claims

1. An image reading apparatus comprising: a document support section for placing a document in an inclined position; a feeding roller for feeding the document obliquely downward; a reading section for reading the document fed from the feeding roller; a discharge roller that discharges the read document in a first direction; a discharge tray that receives the document discharged from the discharge roller; and a plurality of displacement members that are provided on the discharge tray; wherein at least one of the displacement members is provided on both sides in a second direction with respect to a center portion in the second direction which intersects with the first direction, wherein each displacement member has a tip end, a base end provided downstream of the tip end in the first direction, and a first inclined portion, provided between the base end and the tip end, which guides the discharged document and each displacement member is configured to be displaceable in a vertical direction, wherein the tip end is provided at the highest portion of the displacement member in the vertical direction, and wherein the displacement member includes the first inclined portion and a second inclined portion whose inclines are different.

2. The image reading apparatus according to claim 1, wherein each displacement member is biased by a spring and displaced by a force of the discharged document being received by the discharge tray.
3. The image reading apparatus according to claim 2, wherein each displacement member is formed of a non-elastic member.
4. The image reading apparatus according to claim 1, wherein a plurality of ribs extending in the document first direction are formed in the discharge tray, and each displacement member is formed between the ribs.
5. The image reading apparatus according to claim 1, wherein the discharge tray has a wall portion projecting upward from an end portion of the discharge tray.
6. The image reading apparatus according to claim 1, wherein each displacement member has the tip end as a free end.
7. The image reading apparatus according to claim 1, wherein the base end is attached to the discharge tray and the tip end is displaceable.