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MEDIUM CONVEYANCE DEVICE AND IMAGE FORMING APPARATUS

Abstract

A medium conveyance device includes a housing, a stage, a stage conveyor, a medium conveyor, a driver, and a switcher. A medium is placed on the stage. The stage conveyor holds the stage to convey the stage: from a first position outside the housing to a second position inside the housing; and from the second position to the first position. The medium conveyor conveys the stage conveyor and the stage: from the second position to a third position at a rear side from the second position; and from the third position to the second position. The driver generates a driving force to drive the stage conveyor and the medium conveyor. The switcher transmits the driving force to: the stage conveyor when the stage is positioned between the first position and the second position; and the medium conveyor when the stage is positioned between the second position and the third position.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This patent application is based on and claims priority pursuant to 35 U.S.C. § 119(a) to Japanese Patent Application No. 2024-018928, filed on Feb. 9, 2024, in the Japan Patent Office, the entire disclosure of which is hereby incorporated by reference herein.

BACKGROUND

Technical Field

[0002] The present disclosure relates to a medium conveyance device and an image forming apparatus.

Related Art

[0003] In the related art, an image forming apparatus is known which applies an image forming material to a medium to form an image on the medium. The image forming apparatus includes a discharge head and a medium conveyor. The discharge head discharges a liquid as the image forming material onto a medium, and the medium conveyor conveys the medium toward the discharge head. In addition, a medium conveyance device is also known which includes a stage conveyor and a medium conveyor. A cloth (e.g., a T-shirt) is placed on a stage, and the stage conveyor conveys the stage to the inside of the device, and the medium conveyor conveys the stage conveyor relative to the discharge head. An image forming apparatus that forms an image on a cloth as a medium is typically called a garment printer.

SUMMARY

[0004] The present disclosure described herein provides an improved medium conveyance device including a housing, a stage, a stage conveyor, a medium conveyor, a driver, and a switcher. A medium is placed on the stage. The stage conveyor holds the stage to convey the stage: from a first position outside the housing to a second position inside the housing in a first direction; and from the second position to the first position in a second direction opposite to the first direction. The medium conveyor conveys the stage conveyor and the stage: from the second position to a third position at a rear side from the second position in the first direction; and from the third position to the second position in the second direction. The driver generates a driving force to drive the stage conveyor and the medium conveyor. The switcher transmits the driving force to: the stage conveyor when the stage is positioned between the first position and the second position; and the medium conveyor when the stage is positioned between the second position and the third position.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] A more complete appreciation of embodiments of the present disclosure and many of the attendant advantages and features thereof can be readily obtained and understood from the following detailed description with reference to the accompanying drawings, wherein:

[0006] FIGS. 1A and 1B are diagrams each illustrating an overall configuration of an image forming apparatus;

[0007] FIGS. 2A and 2B are diagrams each illustrating the feature of the image forming apparatus of FIGS. 1A and 1B;

[0008] FIGS. 3A and 3B are diagrams each illustrating an overall configuration of a medium conveyance device;

[0009] FIGS. **4A** and **4B** are diagrams each illustrating an operation state of the medium

conveyance device of FIGS. **3A** and **3B**;

[0010] FIG. **5** is a flowchart of a first part of processing executed by the medium conveyance device of FIGS. **3A** and **3B**;

[0011] FIG. **6** is a flowchart of a second part of processing executed by the medium conveyance device of FIGS. **3A** and **3B**;

[0012] FIG. **7** is a flowchart of a third part of processing executed by the medium conveyance device of FIGS. **3A** and **3B**;

[0013] FIG. **8** is a flowchart of another processing executed by the medium conveyance device of FIGS. **3A** and **3B**; and

[0014] FIG. **9** is a flowchart of yet another processing executed by the medium conveyance device of FIGS. **3A** and **3B**.

[0015] The accompanying drawings are intended to depict embodiments of the present disclosure and should not be interpreted to limit the scope thereof. The accompanying drawings are not to be considered as drawn to scale unless explicitly noted. Also, identical or similar reference numerals designate identical or similar components throughout the several views.

DETAILED DESCRIPTION

[0016] In describing embodiments illustrated in the drawings, specific terminology is employed for the sake of clarity. However, the disclosure of this specification is not intended to be limited to the specific terminology so selected and it is to be understood that each specific element includes all technical equivalents that have a similar function, operate in a similar manner, and achieve a similar result.

[0017] Referring now to the drawings, embodiments of the present disclosure are described below. As used herein, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise.

[0018] According to a comparative example, a stage on which the medium is placed is moved and conveyed into a housing of a medium conveyance device by a stage conveyor and a medium conveyor. Accordingly, in the medium conveyance device including the stage, even when the medium conveyance device is on standby for processing or is not in operation, the stage is positioned outside the housing (exterior) of the device, and a part of the stage conveyor projects outward from an end of the housing of the device. In other words, the part of the stage conveyor is also disposed outside the housing of the device even when an image forming process is on standby or suspended, or the power source of the device is turned off. A part of the device projecting outward from the housing hinders the entire apparatus from being downsized.

[0019] An image forming apparatus according to an embodiment of the present disclosure is described below with reference to the drawings. FIGS. **1A** and **1B** are external views of a garment printer **1** as the image forming apparatus using a cloth as a recording medium. FIGS. **1A** and **1B** illustrate a state of the garment printer **1** when a medium on which an image is to be recorded is placed on a platen **101**, i.e., a stage on which the medium is placed. The medium used in the garment printer **1** is a cloth such as a “T-shirt.” The garment printer **1** has a function of forming an image on the T-shirt placed (set) on the platen **101** as the stage.

[0020] The garment printer **1** includes the platen **101** as the stage and a platen conveyor **110** as a stage conveyor that conveys the platen **101**. As illustrated in FIGS. **1A** and **1B**, the platen **101** and a part of the platen conveyor **110** are disposed outside a housing **150**. In other words, the platen **101** and the part of the platen conveyor **110** project from the housing **150**.

[0021] When the medium is set on the platen conveyor **110**, the platen conveyor **110** moves the platen **101** so that a user can easily perform the operation. At this time, a part of the platen conveyor **110** that moves the platen **101** projects outward from the end of the housing **150** of the garment printer **1**. In other words, the part of the platen conveyor **110** and the platen **101** fixed to the platen conveyor **110** correspond to projecting portions of the garment printer **1**.

[0022] FIGS. 2A and 2B illustrate the feature of the garment printer **1** including a medium conveyance device **100** (see FIGS. 3A and 3B). A medium conveyance device according to the comparative example does not become the state corresponding to FIGS. 2A and 2B. FIGS. 2A and 2B illustrate a standby state or a power-off state of the garment printer **1** (i.e., the medium conveyance device **100** is powered off). As illustrated in FIGS. 2A and 2B, when a medium is not set on the platen **101**, the platen **101** and the platen conveyor **110** are mostly accommodated (housed) in the housing **150**. In other words, when a medium is not set on the platen **101** and the medium conveyance device **100** is not in operation (e.g., when the power is off or when an image forming process is not performed), a part of the platen conveyor **110** and the platen **101** do not project from the housing **150**. Thus, the garment printer **1** does not have a projecting portion when the image forming process is not performed.

[0023] As described above, the medium conveyance device **100** moves the platen **101** together with the platen conveyor **110** to allow the garment printer **1** to accommodate the platen **101** and the platen conveyor **110**. The platen conveyor **110** is a base of the platen **101** when a medium is placed on the platen **101**. As a result, when the garment printer **1** is not performing an image forming process, or when the garment printer **1** is on standby, the size of the entire medium conveyance device **100** is reduced, and thus the installation area can be reduced.

Accommodation Mechanism for Platen and Platen Conveyor

[0024] FIG. 3A is a side cutaway view of the medium conveyance device **100** that accommodates the platen **101** and the platen conveyor **110** in the housing **150**. FIG. 3B is a top cutaway view of the medium conveyance device **100**.

[0025] As illustrated in FIGS. 3A and 3B, the medium conveyance device **100** includes the housing **150**, the platen **101** as the stage, the platen conveyor **110** as the stage conveyor, a platen conveyance belt **111** as a stage drive belt, a medium conveyor **120** as a medium conveyor, a medium conveyance belt **121** as a medium drive belt, a drive switcher **130** as a driving force switcher or simply as a switcher, and a driving force transmission belt **131** and a motor **180** as a driver that generates the driving force. The medium conveyor **120** conveys the platen **101** together with the platen conveyor **110** inside the housing **150**.

[0026] The platen **101** is fixed to the platen conveyor **110**. In other words, the platen conveyor **110** holds the platen **101**. The platen conveyor **110** conveys the platen **101** relative to the housing **150** in a front-rear direction of the medium conveyance device **100** (i.e., the Y direction in FIGS. 3A and 3B). Specifically, the direction toward a rear side of the medium conveyance device **100** is a first direction (the positive Y direction in FIGS. 3A and 3B), and the direction toward a front side of the medium conveyance device **100** is a second direction (the negative Y direction in FIGS. 3A and 3B) opposite to the first direction. The platen conveyor **110** moves relative to the housing **150** to convey the platen **101**.

[0027] The platen conveyor **110** is movably held relative to the medium conveyor **120**.

Accordingly, when the platen conveyor **110** moves relative to the medium conveyor **120** in the Y direction, the platen **101** fixed to the platen conveyor **110** also moves in the same direction as the platen conveyor **110**.

[0028] The platen conveyor **110** moves by receiving a driving force transmitted from the driving force transmission belt **131** via the platen conveyance belt **111**. The medium conveyor **120** moves by receiving a driving force transmitted from the driving force transmission belt **131** via the medium conveyance belt **121**, and the platen conveyor **110** also moves in accordance with the movement of the medium conveyor **120**.

[0029] The medium conveyor **120** conveys the platen conveyor **110** in the front-rear direction of the housing **150** (i.e., the Y direction). As a result, a medium placed on the platen **101** is conveyed relative to a liquid discharge unit **160** as a processing unit that performs a predetermined process (e.g., discharges a liquid) on the medium. The medium is conveyed by the medium conveyor **120**, and a discharge head of the liquid discharge unit **160** discharges liquid ink (i.e., a liquid) onto the

medium at appropriate timing while the medium moves relative to the discharge head to form an image on the medium. The discharge head of the liquid discharge unit **160** is a serial head that moves in the direction orthogonal to the front-rear direction as illustrated in FIG. 3B. Alternatively, the liquid discharge unit may include a line head that extends in the direction orthogonal to the front-rear direction and does not move.

[0030] The driving force transmission belt **131**, which is a transmission source of the driving force to the platen conveyor **110** and the medium conveyor **120**, transmits the driving force from a driving source such as the motor **180** to the platen conveyance belt **111** or the medium conveyance belt **121** via the drive switcher **130**. As described above, the conveyance of the platen **101** is divided into the movement by the medium conveyance belt **121** and the movement by the platen conveyance belt **111**.

[0031] A platen driving force transmitter **112** as a stage driving force transmitter and a medium driving force transmitter **122** as a medium driving force transmitter are attached to the drive switcher **130**. The driving force from the driving force transmission belt **131** is switched between to be transmitted to the platen driving force transmitter **112** and to be transmitted to the medium driving force transmitter **122** by the drive switcher **130**.

[0032] When the driving force is transmitted to the platen driving force transmitter **112**, the driving force transmission belt **131** coupled to the motor **180** is coupled to the platen conveyance belt **111**, and thus the driving force is transmitted to the platen conveyance belt **111**. Since the platen conveyance belt **111** is coupled to the platen conveyor **110**, when driving force is transmitted to the platen conveyance belt **111**, the platen conveyor **110** moves relative to the medium conveyor **120** by receiving the driving force.

[0033] When the driving force is transmitted to the medium driving force transmitter **122**, the driving force transmission belt **131** coupled to the motor **180** is coupled to the medium conveyance belt **121**, and thus the driving force is transmitted to the medium conveyance belt **121**. Since the medium conveyance belt **121** is coupled to the medium conveyor **120**, when the driving force is transmitted to the medium conveyance belt **121**, the medium conveyor **120** moves relative to the housing **150** by receiving the driving force. At this time, the platen conveyor **110** also moves together with the medium conveyor **120** relative to the housing **150**.

[0034] As described above, the motor **180** as the driving source generates the driving force, and the drive switcher **130** as the driving force switcher switches between coupling the motor **180** and the platen conveyance belt **111** via the platen driving force transmitter **112** and coupling the motor **180** and the medium drive belt **121** via the medium driving force transmitter **122**.

Operation of Medium Conveyance Device

[0035] FIGS. 4A and 4B illustrate an operation of the medium conveyance device **100**. FIG. 4A illustrates the medium conveyance device **100** which does not accommodate the platen **101** inside the housing **150**. FIG. 4B illustrates the medium conveyance device **100** which accommodates the platen **101** inside the housing **150**. In FIG. 4A, the illustration of an upper part of the housing **150** that accommodates (houses) the platen **101** is omitted for ease of understanding of the position of the platen **101**.

[0036] A section Sa illustrated in FIGS. 4A and 4B indicates a movement range of the platen **101**. A position Y1 (i.e., a second position), which is one of the predetermined positions, indicates a position at which the drive switcher **130** switches the destination of the driving force for moving the platen **101**. A position Y2 (i.e., a first position) indicates a position at which a medium is set on the platen **101**. When the medium is set on the platen **101**, the platen **101** is disposed at the position Y2 which is another one of the predetermined positions.

[0037] In a section S1 illustrated in FIGS. 4A and 4B, the driving force for moving the platen **101** is transmitted to the platen conveyor **110** by the platen conveyance belt **111**. In a section S2, inside the housing **150**, illustrated in FIGS. 4A and 4B, the driving force for moving the platen **101** is transmitted to the medium conveyor **120** by the medium conveyance belt **121**.

[0038] For example, when the platen **101** in the state of FIG. 4A moves to be accommodated in the housing **150**, the platen **101** is moved by the driving force from the platen conveyance belt **111** in the section S1. When the platen **101** reaches the position Y1, the drive switcher **130** switches the driving force from the driving force transmission belt **131** to be transmitted to the medium conveyance belt **121** instead of the platen conveyance belt **111**. Subsequently, the platen **101** is moved by the medium conveyance belt **121** in the section S2 as illustrated in FIG. 4B.

[0039] The medium conveyance device **100** can reduce a projecting portion of the platen **101** or the platen conveyor **110** projecting outward from the housing **150**, and in particular, can reduce the size of the device during standby. Further, the garment printer **1** having an appearance close to a box shape can be easily transported while keeping the balance.

Driving Force Switching Mechanism: Printing Process

[0040] A process involving the conveyance of the platen **101** by the medium conveyance device **100** will be described below. FIGS. 5 to 7 illustrate a printing process when the garment printer **1** including the medium conveyance device **100** forms an image on a cloth.

[0041] Before the printing process, the platen **101** is accommodated in the housing **150**. In other words, the platen **101** is positioned in the section S2. First, a user performs a “print start” operation with a predetermined operating procedure to start the printing process. In other words, in step S501, the garment printer **1** accepts the print start operation. Subsequently, the medium conveyor **120** moves the platen **101** to the position Y1 (see FIGS. 4A and 4B) for power switching (driving force switching).

[0042] Steps S502 and S503 are repeated until the platen **101** reaches the position Y1 (No in step S503). When the platen **101** reaches the position Y1 (Yes in S503), in step S504, the drive switcher **130** switches the coupling with the driving force transmission belt **131** so that the driving force from the motor **180** is transmitted to the platen conveyance belt **111**. In other words, the drive switcher **130** switches the destination of the driving force when the platen **101** passes by the position Y1.

[0043] In step S505, the platen conveyor **110** moves the platen **101** to the position Y2 (see FIGS. 4A and 4B). Steps S505 and S506 are repeated until the platen **101** reaches the position Y2 (No in step S506). When the platen **101** reaches the position Y2 (Yes in step S506), in step S507, the platen conveyor **110** stops conveying the platen **101**.

[0044] In step S601, the user sets a medium (e.g., a T-shirt) on the platen **101**. Then, the user performs a print execution operation. In other words, the garment printer **1** accepts the print execution operation.

[0045] In step S603, the platen conveyor **110** moves the platen **101** to the position Y1 (see FIGS. 4A and 4B). Steps S603 and S604 are repeated until the platen **101** reaches the position Y1 (No in step S604). When the platen **101** reaches the position Y1 (Yes in S604), in step S605, the drive switcher **130** switches the coupling with the driving force transmission belt **131** so that the driving force from the motor **180** is transmitted to the medium conveyance belt **121**.

[0046] In step S606, the garment printer **1** performs the image forming process by the liquid discharge unit **160** while the medium conveyor **120** moves the platen **101**. After the image forming process is completed, in step S701, the medium conveyor **120** moves the platen **101** to the position Y1. Steps S701 and S702 are repeated until the platen **101** reaches the position Y1 (No in step S702). When the platen **101** reaches the position Y1 (Yes in S702), in step S703, the drive switcher **130** switches the coupling with the driving force transmission belt **131** so that the driving force from the motor **180** is transmitted to the platen conveyance belt **111**.

[0047] Subsequently, in step S704, the platen conveyor **110** moves the platen **101** to the position Y2 (see FIGS. 4A and 4B). Steps S704 and S705 are repeated until the platen **101** reaches the position Y2 (No in step S705). When the platen **101** reaches the position Y2 (Yes in step S705), the platen conveyor **110** stops conveying the platen **101** (S706).

[0048] After the platen **101** reaches the position Y2 (i.e., a working position or a set position), and

the platen **101** stops being conveyed, in step **S707**, the user takes out the medium set on the platen **101**. Thus, the printing process ends.

Driving Force Switching Mechanism: Standby Process

[0049] A process executed during standby of the medium conveyance device **100** after the printing process ends will be described below with reference to FIG. **8**.

[0050] First, the process loops until a predetermined time elapses while the platen **101** stays at the position **Y2** (No in step **S801**). When the predetermined time has elapsed (Yes in step **S801**), the platen conveyor **110** moves the platen **101** to the position **Y1** (see FIGS. **4A** and **4B**). Steps **S802** and **S803** are repeated until the platen **101** reaches the position **Y1** (No in step **S803**).

[0051] When the platen **101** reaches the position **Y1** (Yes in **S803**), in step **S804**, the drive switcher **130** switches the coupling with the driving force transmission belt **131** so that the driving force from the motor **180** is transmitted to the medium conveyance belt **121**.

[0052] Subsequently, the platen **101** is moved to the section **S2**, and steps **S805** and **S806** are repeated until the platen **101** reaches a predetermined position (e.g., a third position disposed deeper into the housing **150** than the second position or at the rear side from the second position in the first direction) in the section **S2** (No in step **S806**). When the platen **101** reaches the predetermined position in the section **S2** (Yes in step **S806**), the standby process ends.

Driving Force Switching Mechanism: Power Off Process

[0053] A process executed in a power off process of the medium conveyance device **100** at the end of use will be described below with reference to FIG. **9**.

[0054] The platen **101** is at the position **Y2** at the end of use of the medium conveyance device **100** (e.g., the end of the printing process). In step **S901**, the garment printer **1** determines whether to accept a power off operation when the platen **101** is at the position **Y2**. The garment printer **1** waits to accept the power off operation (No in step **S901**). When the garment printer **1** accepts the power off operation (Yes in step **S901**), in step **S902**, the platen conveyor **110** moves the platen **101** to the position **Y1** (see FIGS. **4A** and **4B**). Steps **S902** and **S903** are repeated until the platen **101** reaches the position **Y1** (No in step **S903**). When the platen **101** reaches the position **Y1** (Yes in **S903**), in step **S904**, the drive switcher **130** switches the coupling with the driving force transmission belt **131** so that the driving force from the motor **180** is transmitted to the medium conveyance belt **121**.

[0055] Subsequently, the platen **101** is moved to the section **S2**, and steps **S905** and **S906** are repeated until the platen **101** reaches a predetermined position in the section **S2** (No in step **S906**). When the platen **101** reaches the predetermined position in the section **S2** (Yes in step **S906**), in step **S907**, the garment printer **1** is powered off, and thus the power off process ends.

[0056] According to the medium conveyance device **100** described above, the destination of the driving force is switched when the platen **101** is conveyed. Accordingly, the installation area of the medium conveyance device **100** and the garment printer **1** can be reduced when the garment printer **1** is on standby. In other words, the apparatus can be downsized when not in use or during transportation.

[0057] Embodiments of the present disclosure are not limited to the above-described embodiments, and various modifications and variations can be made without departing from the technical scope of the present disclosure. It is therefore to be understood that the disclosure of this patent specification may be practiced otherwise by those skilled in the art than as specifically described herein. Such modifications are also included in the technical scope of the appended claims.

[0058] Aspects of the present disclosure are, for example, as follows.

Aspect 1

[0059] A medium conveyance device conveys a medium relative to a processing unit that performs a predetermined process on the medium. The medium conveyance device includes a stage conveyor that fixes a stage on which the medium is placed and conveys the stage outside a predetermined position in a housing of the device, a medium conveyor that conveys the medium relative to the processing unit together with the stage conveyor, a driver that supplies a driving force to the stage

conveyor and the medium conveyor, and a driving force switcher that switches the driving force from the driver to be transmitted to the stage conveyor when the stage is outside the predetermined position and to be transmitted to the medium conveyor when the stage is inside the predetermined position.

[0060] In other words, a medium conveyance device includes a housing, a stage, a stage conveyor, a medium conveyor, a driver, and a switcher. A medium is placed on the stage. The stage conveyor holds the stage to convey the stage: from a first position outside the housing to a second position inside the housing in a first direction; and from the second position to the first position in a second direction opposite to the first direction. The medium conveyor conveys the stage conveyor and the stage: from the second position to a third position at a rear side from the second position in the first direction; and from the third position to the second position in the second direction. The driver generates a driving force to drive the stage conveyor and the medium conveyor. The switcher transmits the driving force to: the stage conveyor when the stage is positioned between the first position and the second position; and the medium conveyor when the stage is positioned between the second position and the third position.

Aspect 2

[0061] In the medium conveyance device according to Aspect 1, the driving force switcher switches the destination of the driving force when the stage passes by the predetermined position.

[0062] In other words, the switcher switches a destination of the driving force between the stage conveyor and the medium conveyor when the stage passes the second position.

Aspect 3

[0063] In the medium conveyance device according to Aspect 1 or 2, the predetermined position is a position at which the stage is accommodated in the housing of the device.

[0064] In other words, the housing houses the stage positioned at the second position.

Aspect 4

[0065] In the medium conveyance device according to any one of Aspects 1 to 3, the stage is positioned inside the predetermined position when the processing unit is not in operation.

[0066] In other words, in the image forming apparatus according to Aspect 6, the stage is positioned between the second position and the third position when the liquid discharge unit is on standby or powered off.

Aspect 5

[0067] In the medium conveyance device according to any one of Aspects 1 to 4, the driver includes a stage drive belt that drives the stage conveyor, a stage driving force transmitter that transmits the driving force to the stage drive belt, a medium drive belt that drives the medium conveyor, and a medium driving force transmitter that transmits the driving force to the medium drive belt. The switcher switches whether to couple the stage drive belt and the stage driving force transmitter or to couple the medium drive belt and the medium driving force transmitter.

[0068] In other words, the driver includes a driving source to generate the driving force, a stage drive belt to drive the stage conveyor, a stage driving force transmitter to transmit the driving force to the stage drive belt, a medium drive belt to drive the medium conveyor, and a medium driving force transmitter to transmits the driving force to the medium drive belt. The driving force switcher switches between coupling the driving source and the stage drive belt via the stage driving force transmitter and coupling the driving source and the medium drive belt via the medium driving force transmitter.

Aspect 6

[0069] An image forming apparatus includes a liquid discharge unit as the processing unit that performs the predetermined process on the medium and a medium conveyance unit that conveys the medium relative to the liquid discharge unit. The medium conveyance unit is the medium conveyance device according to any one of Aspects 1 to 5.

[0070] In other words, an image forming apparatus includes a liquid discharge unit to discharge a

liquid onto the medium and the medium conveyance device according to Aspects 1 to 4, to convey the medium relative to the liquid discharge unit.

[0071] According to one aspect of the present disclosure, the installation area of the device can be reduced when an image forming process is not performed.

[0072] The above-described embodiments are illustrative and do not limit the present invention. Thus, numerous additional modifications and variations are possible in light of the above teachings. For example, elements and/or features of different illustrative embodiments may be combined with each other and/or substituted for each other within the scope of the present invention.

[0073] Any one of the above-described operations may be performed in various other ways, for example, in an order different from the one described above.

Claims

1. A medium conveyance device comprising: a housing; a stage on which a medium is placed; a stage conveyor holding the stage to convey the stage: from a first position outside the housing to a second position inside the housing in a first direction; and from the second position to the first position in a second direction opposite to the first direction; a medium conveyor to convey the stage conveyor and the stage: from the second position to a third position at a rear side from the second position in the first direction; and from the third position to the second position in the second direction; and a driver to generate a driving force to drive the stage conveyor and the medium conveyor; a switcher to transmit the driving force to: the stage conveyor when the stage is positioned between the first position and the second position; and the medium conveyor when the stage is positioned between the second position and the third position.
 2. The medium conveyance device according to claim 1, wherein the switcher switches a destination of the driving force between the stage conveyor and the medium conveyor when the stage passes the second position.
 3. The medium conveyance device according to claim 1, wherein the housing houses the stage positioned at the second position.
 4. The medium conveyance device according to claim 1, wherein the driver includes: a driving source to generate the driving force; a stage drive belt to drive the stage conveyor; a stage driving force transmitter to transmit the driving force to the stage drive belt; a medium drive belt to drive the medium conveyor; and a medium driving force transmitter to transmit the driving force to the medium drive belt, and the switcher switches between: coupling the driving source and the stage drive belt via the stage driving force transmitter; and coupling the driving source and the medium drive belt via the medium driving force transmitter.
 5. An image forming apparatus comprising: a liquid discharge unit to discharge a liquid onto the medium; and the medium conveyance device according to claim 1, to convey the medium relative to the liquid discharge unit.
 6. The image forming apparatus according to claim 5, wherein the stage is positioned between the second position and the third position when the liquid discharge unit is on standby or powered off.
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