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(54) **PRESSING DEVICE AND IMAGE FORMING APPARATUS**

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(57) **ABSTRACT**

A pressing device includes an intermediate transfer unit, a secondary transfer unit, a presser, and a drive transmitter. The intermediate transfer unit transfers and conveys a toner image. The secondary transfer unit faces the intermediate transfer unit to form a nip portion between the secondary transfer unit and the intermediate transfer unit and transfers the toner image onto a conveyed material at the nip portion. The presser applies a pressing force for pressing the secondary transfer unit to the intermediate transfer unit at the nip portion. The drive transmitter transmits the pressing force and a conveyance driving force to a driven transmitter of the secondary transfer unit, is restricted in position by the presser, and is movable together with the presser.

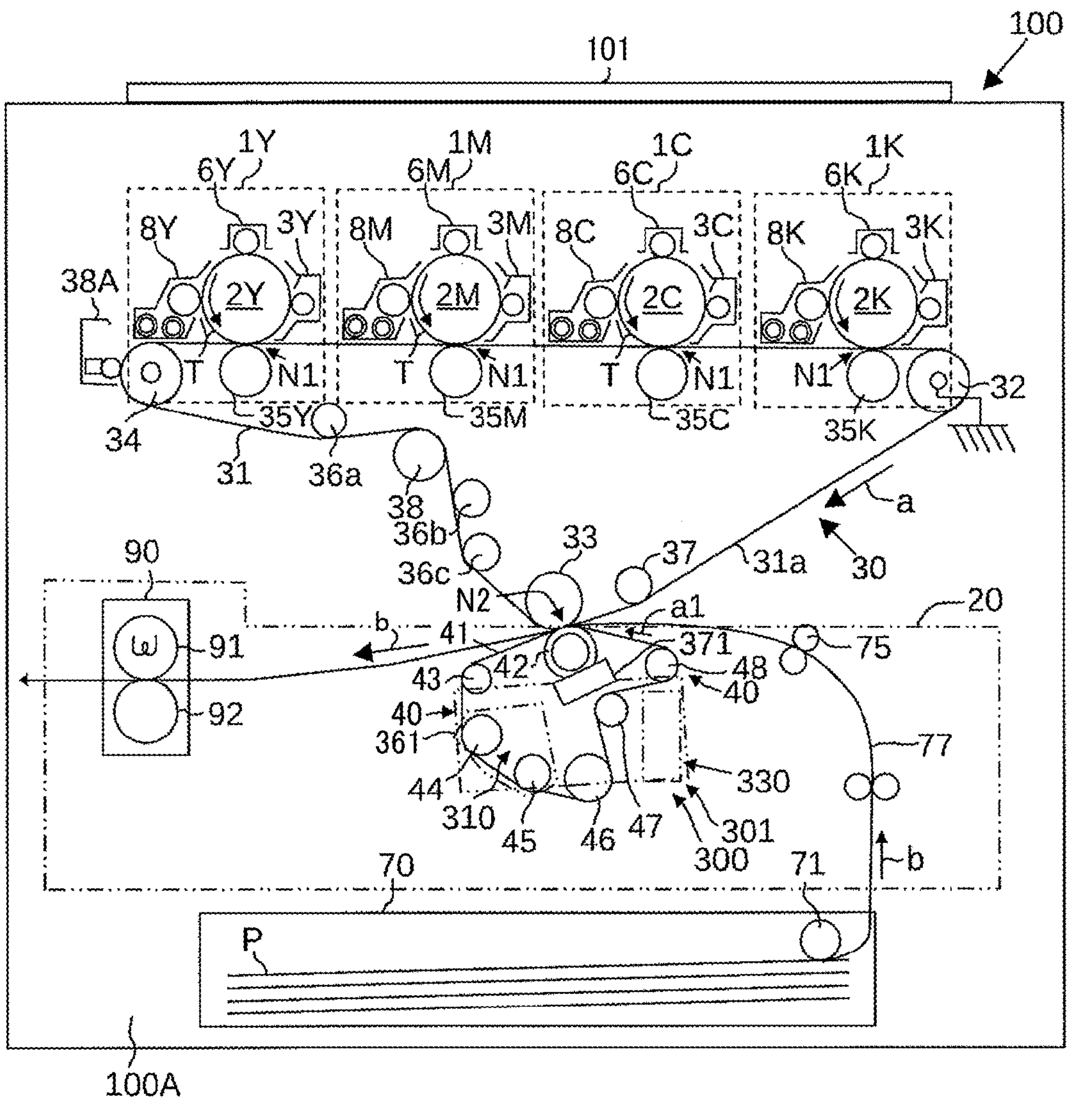
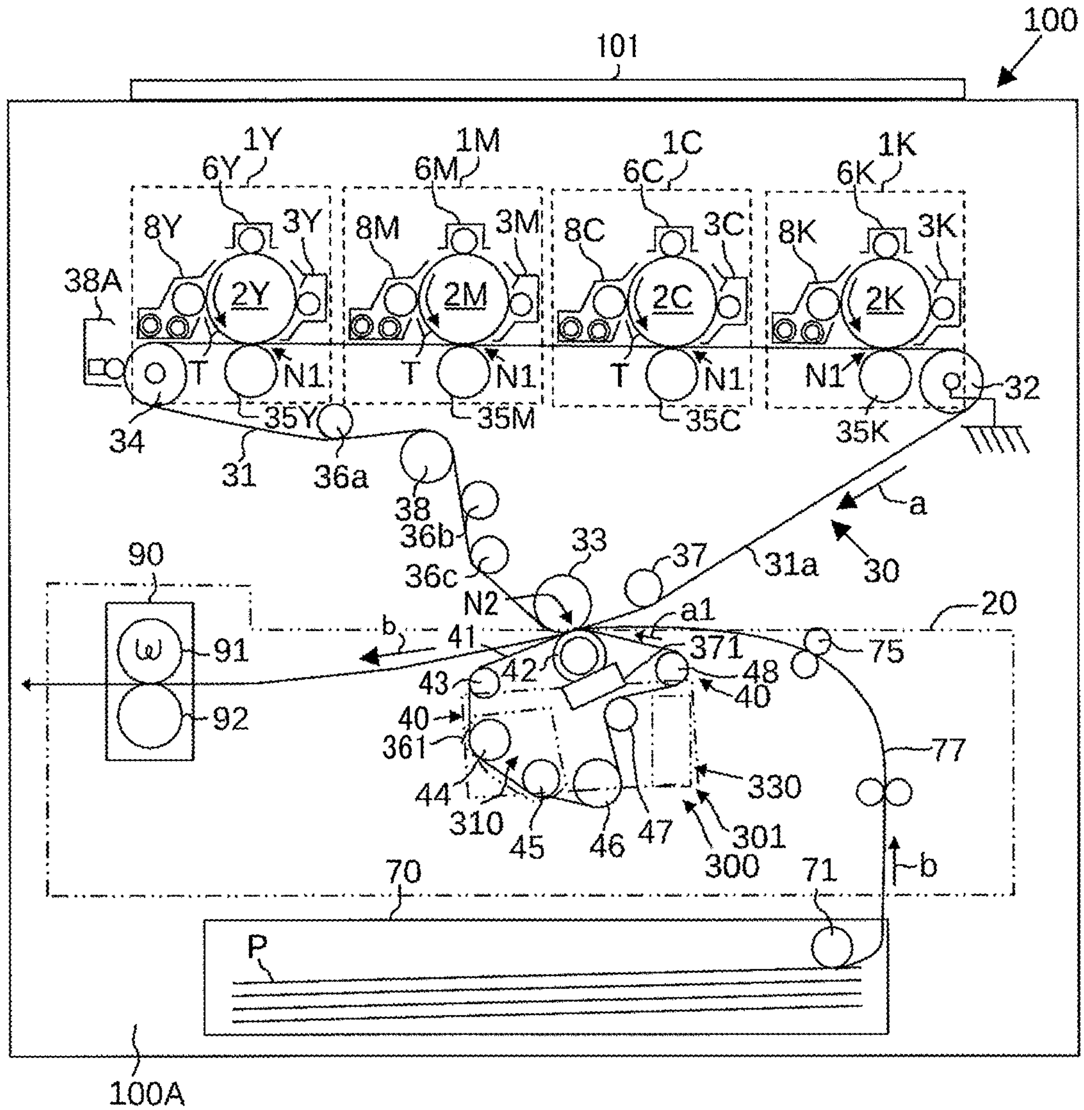


FIG. 1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6Y
8Y
3Y
2Y
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1K
6K
8K
3K
2K
38A
T
N1
35Y
35M
35C
35K
34
32
31
36a
38
36b
36c
33
37
31a
30
a
N2
a1
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90
91
92
b
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P
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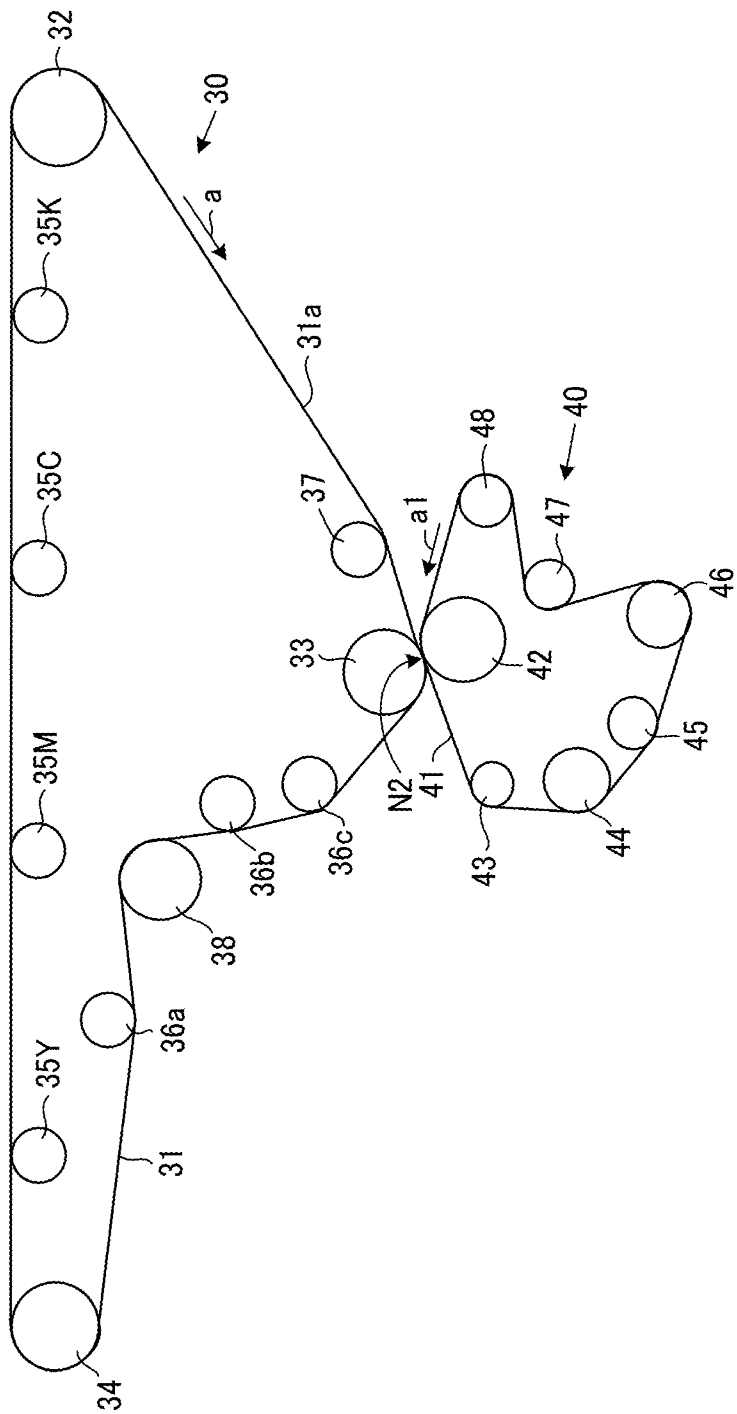
FIG. 2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a1
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35C
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33
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N2
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36b
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38
36a
35Y
31
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FIG. 3B

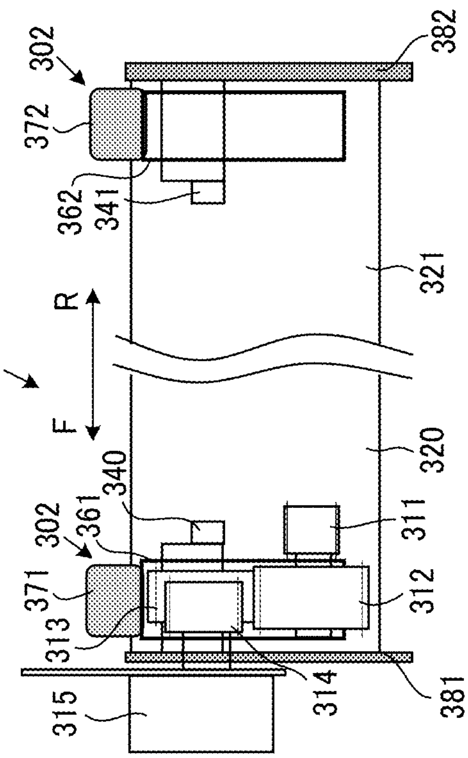
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FIG. 3A

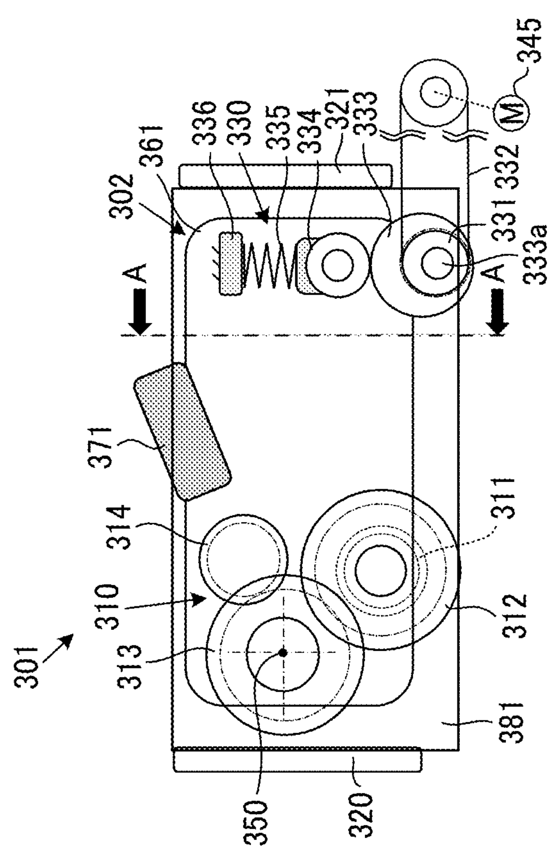
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FIG. 4B

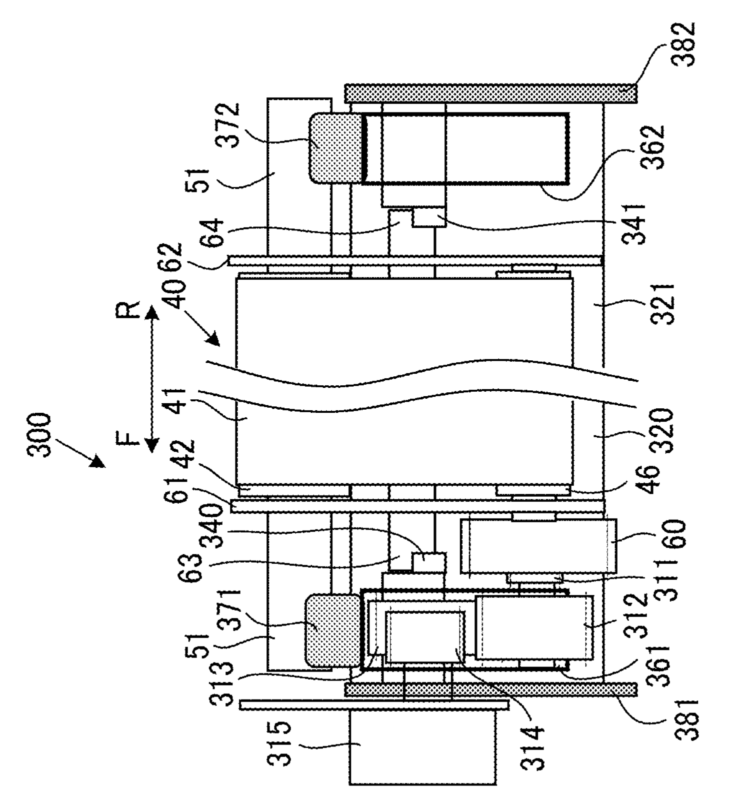
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FIG. 4A

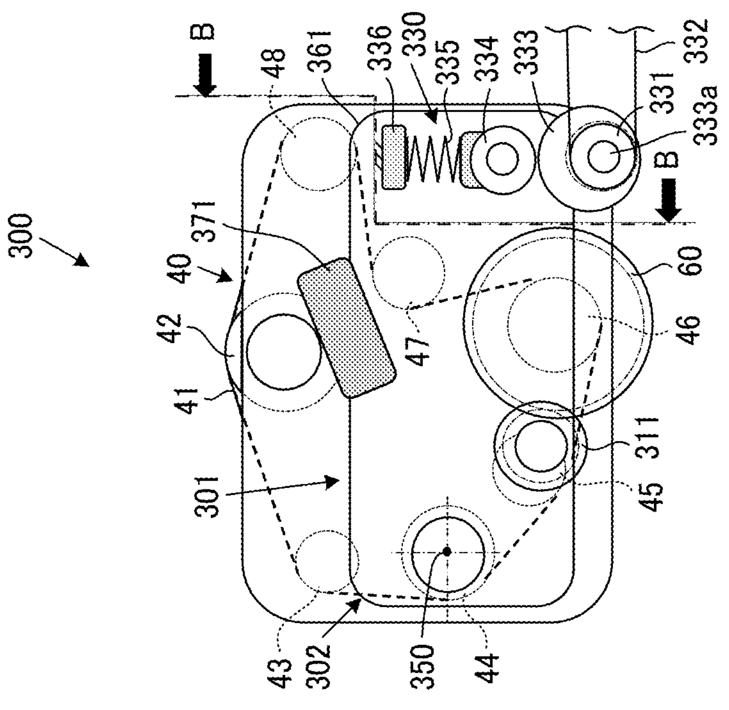
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FIG. 5A

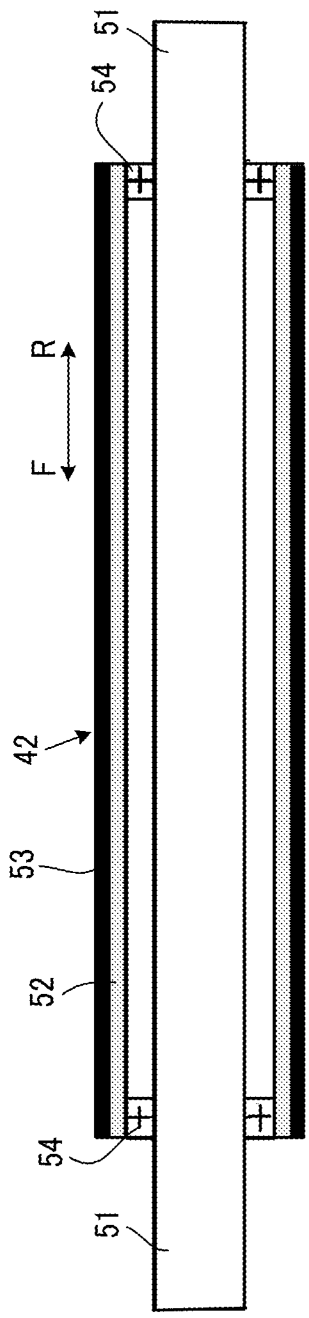

FIG. 5B

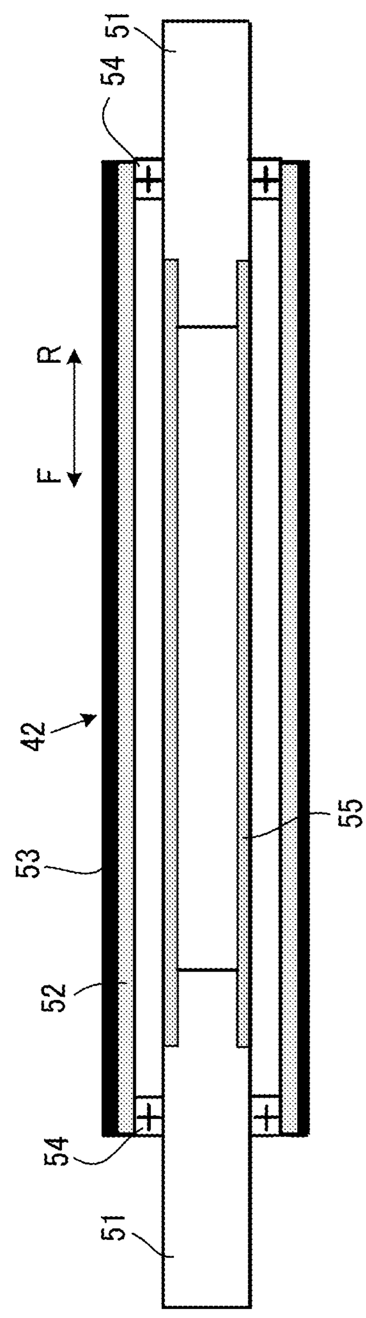

FIG. 6B

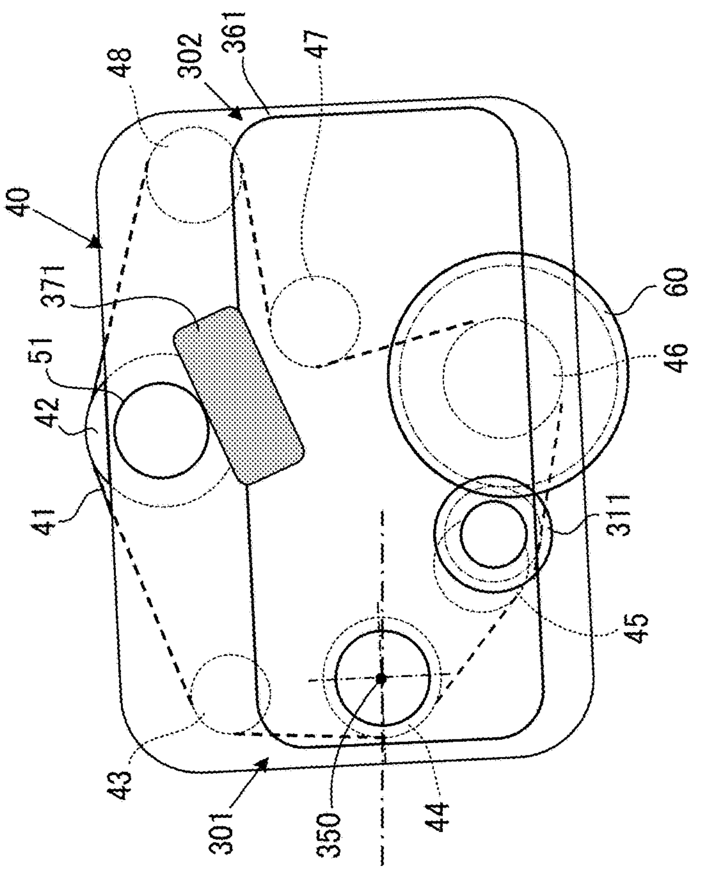
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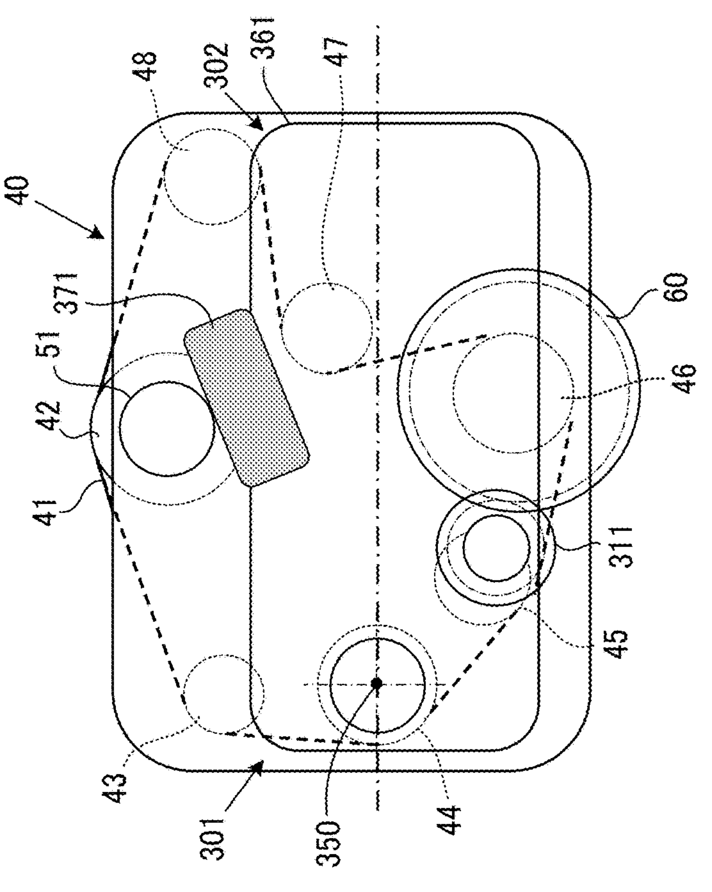
FIG. 6A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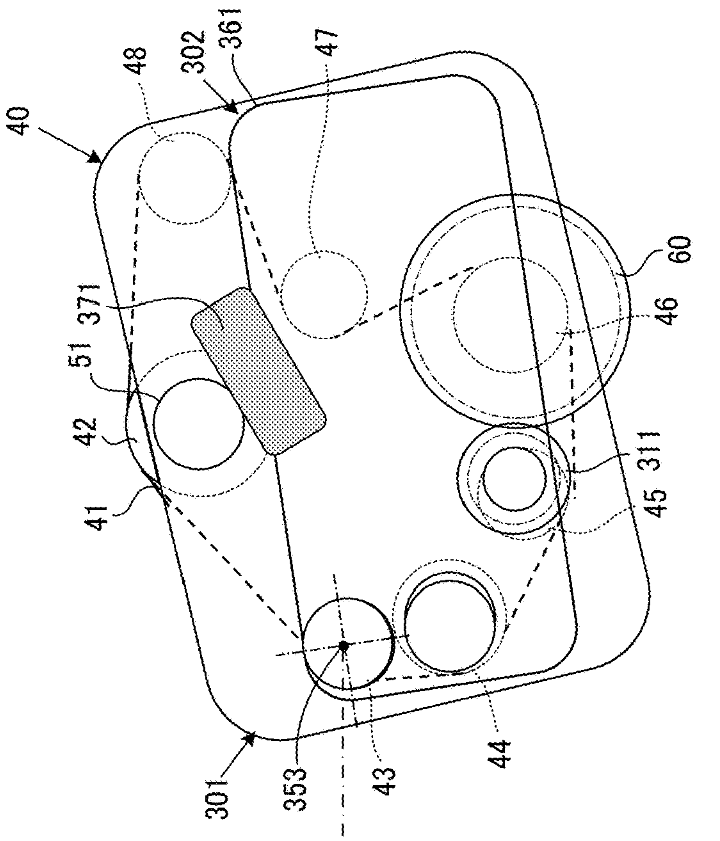
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FIG. 7B

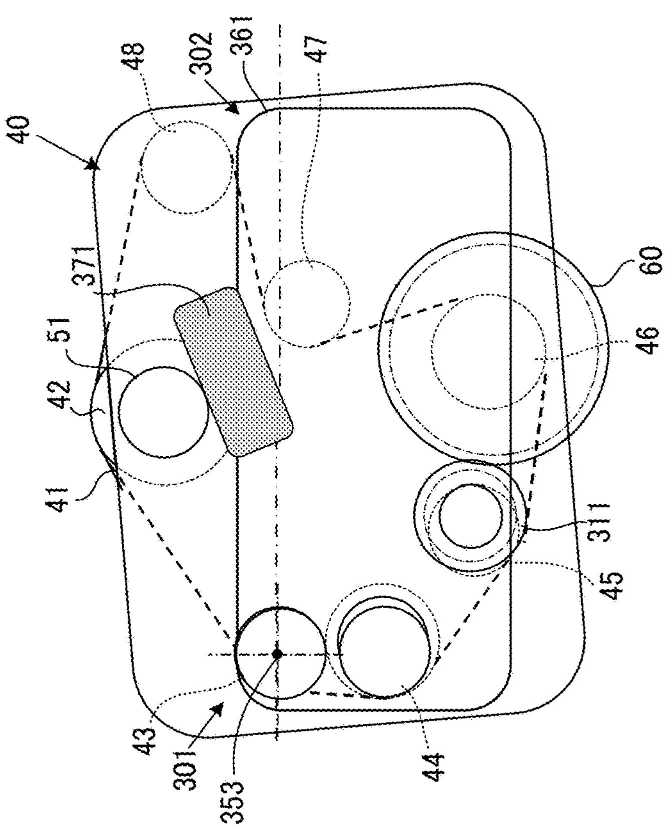
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FIG. 7A

FIG. 8B

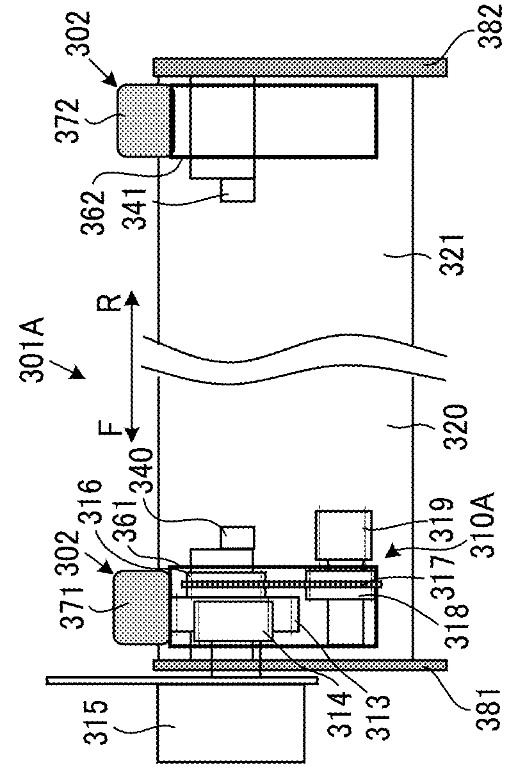
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FIG. 8A

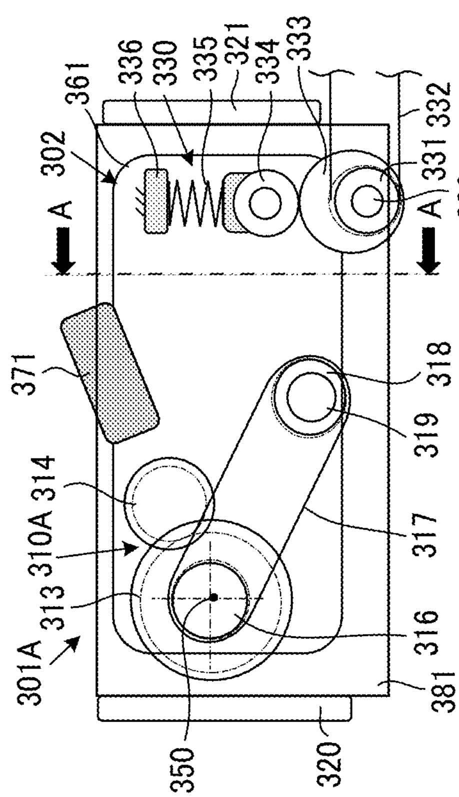
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FIG. 9B

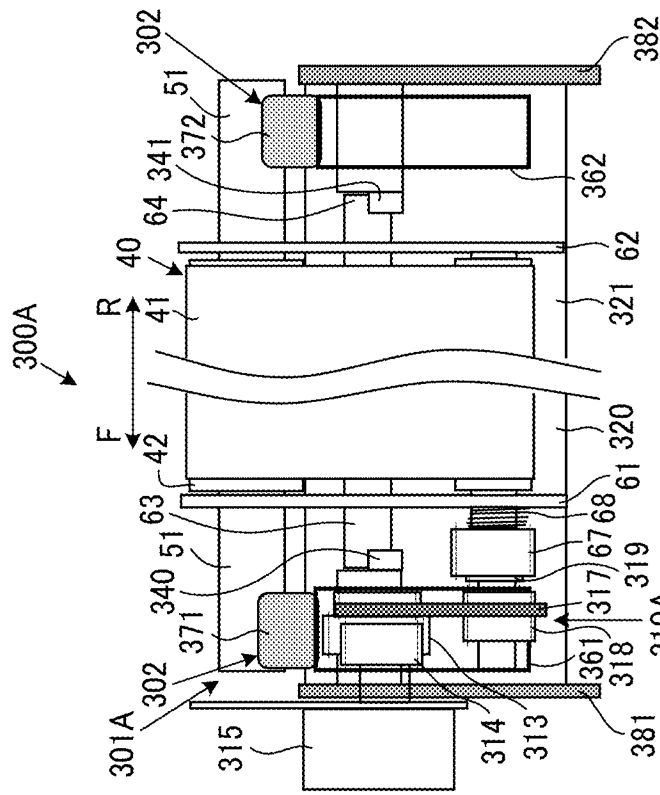
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FIG. 9A

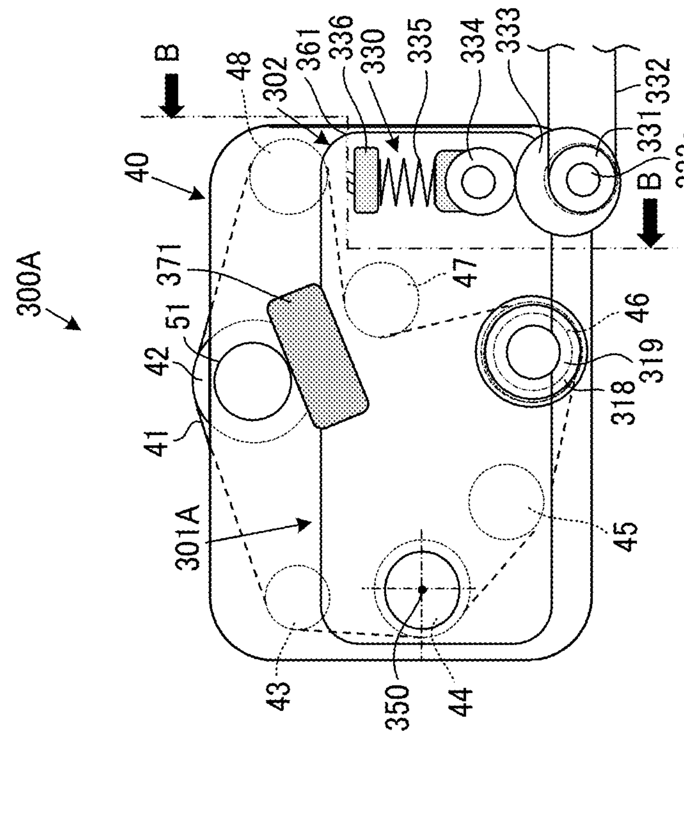
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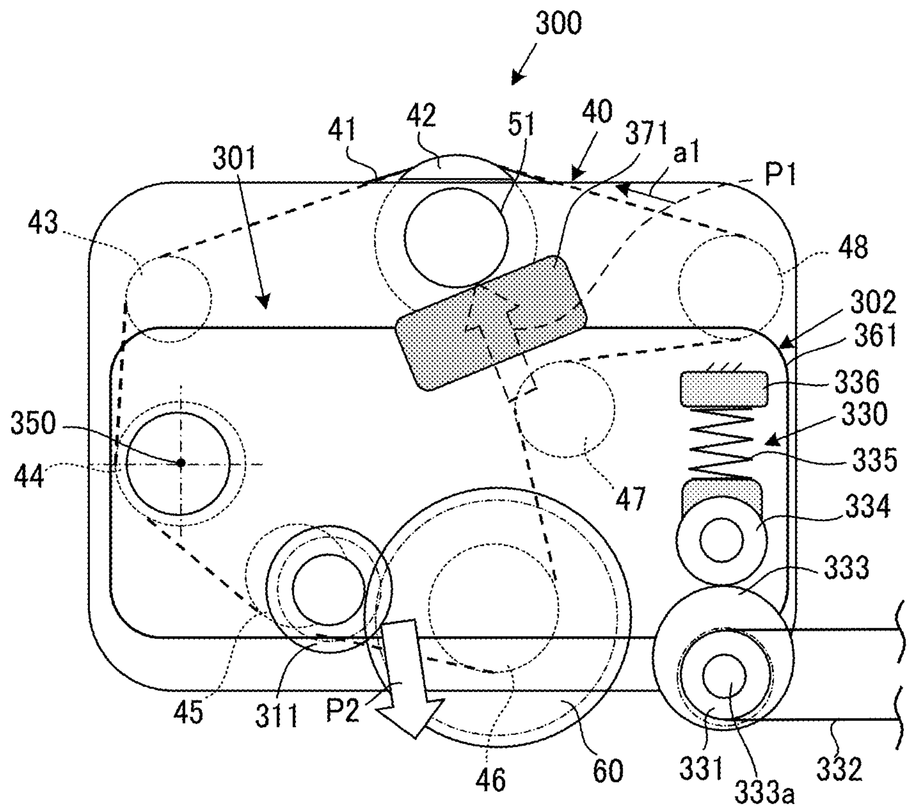
FIG. 10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PRESSING DEVICE AND IMAGE FORMING APPARATUS

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. 2022-189478, filed on Nov. 28, 2022, in the Japan Patent Office, the entire disclosure of which is hereby incorporated by reference herein.

BACKGROUND

Technical Field

[0002] Embodiments of the present disclosure relate to a pressing device and an image forming apparatus.

Related Art

[0003] Some technologies have been proposed that an image forming apparatus causes a pressing mechanism to increase pressure between a secondary transfer roller and an intermediate transfer roller facing the secondary transfer roller to transfer toner onto a sheet. In such a pressing mechanism, the position of the secondary transfer nip moves according to the applied pressing force, the secondary transfer unit is driven by a flexible drive train such as a belt.

SUMMARY

[0004] In an embodiment of the present disclosure, there is provided a pressing device that includes an intermediate transfer unit, a secondary transfer unit, a presser, and a drive transmitter. The intermediate transfer unit transfers and conveys a toner image. The secondary transfer unit faces the intermediate transfer unit to form a nip portion between the secondary transfer unit and the intermediate transfer unit and transfers the toner image onto a conveyed material at the nip portion. The presser applies a pressing force for pressing the secondary transfer unit to the intermediate transfer unit at the nip portion. The drive transmitter transmits the pressing force and a conveyance driving force to a driven transmitter of the secondary transfer unit, is restricted in position by the presser, and is movable together with the presser.

[0005] In another embodiment of the present disclosure, there is provided an image forming apparatus that includes the pressing device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] 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:

[0007] FIG. **1** is a front view of an image forming apparatus including a pressing device according to an embodiment of the present disclosure;

[0008] FIG. **2** is a diagram illustrating components of an intermediate transfer unit and a secondary transfer unit disposed in the image forming apparatus of FIG. **1**;

[0009] FIG. **3**A is a front view of a pressure base unit including a pressing device according to an embodiment of the present disclosure;

[0010] FIG. **3**B is an A-A cross-sectional view of a pressure base unit as indicated in FIG. **3**A;

[0011] FIG. **4**A is a front view of a pressing device illustrating the relative positions of a secondary transfer unit and a pressure base unit, according to an embodiment of the present disclosure;

[0012] FIG. **4**B is a B-B cross-sectional view of a pressing device as indicated in FIG. **4**A;

[0013] FIG. **5**A is a diagram illustrating a configuration in which a secondary transfer roller and a secondary pressure shaft are integrated, according to an embodiment of the present disclosure;

[0014] FIG. **5**B is a diagram illustrating a configuration in which a secondary-transfer pressure shaft is divided into a front portion and a rear portion and these front and rear portions of the secondary pressure shaft are coupled by pipe material, according to an embodiment of the present disclosure;

[0015] FIG. **6**A is a diagram illustrating the positional states of components when a pressing force is small, according to an embodiment of the present disclosure;

[0016] FIG. **6**B is a diagram illustrating the positional states of components when a pressing force is large, according to an embodiment of the present disclosure;

[0017] FIG. **7**A is a diagram illustrating the positional states of components in a case where a rotation fulcrum of a secondary transfer unit is separately disposed in a front pressing lever when a pressing force is small, according to an embodiment of the present disclosure;

[0018] FIG. **7**B is a diagram illustrating the positional states of components in a case where a rotation fulcrum of a secondary transfer unit is separately disposed in a front pressing lever when a pressing force is large, according to an embodiment of the present disclosure;

[0019] FIG. **8**A is a front view of a pressure base unit according to an alternative embodiment of the present disclosure;

[0020] FIG. **8**B is an A-A cross-sectional view of a pressure base unit as indicated in FIG. **8**;

[0021] FIG. **9**A is a front view of a pressing device **300**A illustrating the relative positions of a secondary transfer unit and a pressure base unit, according to an alternative embodiment of the present disclosure;

[0022] FIG. **9**B is a B-B cross-sectional view of a pressing device as indicated in FIG. **9**A; and

[0023] FIG. **10** is a diagram illustrating a case where the direction of a force is determined by the rotation direction in which a secondary transfer belt is driven and the arrangement of gears, according to an embodiment of the present disclosure.

[0024] 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

[0025] 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.

[0026] 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.

[0027] In the drawings, Y, M, C, and K are subscripts given to components related to colors of yellow; magenta, cyan, and black, respectively, and are omitted as appropriate.

[0028] Descriptions are given below of an image forming apparatus including a pressing device according to an embodiment of the present disclosure with reference to FIGS. **1** and **2**. FIG. **1** is a front view of an image forming apparatus including a pressing device according to an embodiment of the present disclosure. FIG. **2** is a diagram illustrating components of an intermediate transfer unit **30** and a secondary transfer unit **40** disposed in the image forming apparatus of FIG. **1**. The image forming apparatus such as an electrophotographic color printer **100** illustrated in FIG. **1** includes four image forming units **1**Y, **1**M, **1**C, and **1**K, an intermediate transfer unit **30** as an intermediate transfer device, a secondary transfer device **39** including a secondary transfer unit **40** and a pressing device **300**, a sheet tray **70** that stores recording materials P as objects to be conveyed such as sheet-like recording media, and a fixing device **90**. In the following description, such an electrophotographic color printer **100** may be referred to simply as a printer **100**. Four image forming units **1**Y, **1**M, **1**C, and **1**K form toner images in colors of yellow (Y), magenta (M), cyan (C), and black (K), respectively. In the present embodiment, features are given to the pressing device **300** indicated by a long dashed double-dotted line in FIG. **1**. A description is given of this part is described in detail after the description of the overall configuration of the printer **100**.

[0029] Four image forming units **1**Y, **1**M, **1**C, and **1**K serving as image forming devices are powder and use Y, M, C, and K toners of different colors as developers, but otherwise have a similar configuration and are replaced when the image forming units reach their lives. In other words, the four image forming units **1**Y, **1**M, **1**C, and **1**K are detachably attachable relative to a body **100**A of the printer **100** as an image forming apparatus main body to be replaceable.

[0030] The image forming units **1**Y, **1**M, **1**C, and **1**K include drum-shaped photoconductors **2**Y, **2**M, **2**C, and **2**K serving as image bearers, photoconductor cleaners **3**Y, **3**M, **3**C, and **3**K, electric-charge removing devices, charging devices **6**Y, **6**M, **6**C, and **6**K, and developing devices **8**Y, **8**M, **8**C, and **8**K, respectively. The components of each of the image forming units **1**Y, **1**M, **1**C, and **1**K are held in a common casing and construct a process cartridge installable in and removable from the body **100**A of the printer **100**. In other words, each of the image forming units **1**Y, **1**M, **1**C, and **1**K is replaceable as a single unit.

[0031] The photoconductors **2**Y, **2**M, **2**C, and **2**K are driven to rotate counterclockwise in FIG. **1** by a driver such as a motor. Each of the charging devices **6**Y, **6**M, **6**C, and **6**K includes a charging roller serving as a charger to which a charging bias is applied. The charging rollers contact or approach the photoconductors **2**Y, **2**M, **2**C, and **2**K, respectively, to generate electrical discharges therebetween, thereby charging uniformly the surfaces of the photoconductors **2**Y, **2**M, **2**C, and **2**K. Instead of the method in which charging members such as charging rollers are brought into contact with or close to photoconductors **2**Y, **2**M, **2**C, and **2**K, a method using corona chargers may be adopted.

[0032] The surfaces of the photoconductors **2**Y, **2**M, **2**C, and **2**K are uniformly charged by the charging devices **6**Y, **6**M, **6**C, and **6**K and are optically scanned by exposure light such as the laser beams emitted from an optical writing unit **101** disposed above the image forming units **1**Y, **1**M, **1**C, and **1**K to form electrostatic latent images of yellow; magenta, cyan, and black images. The developing devices **8**Y, **8**M, **8**C, and **8**K develop the electrostatic latent images on the photoconductors **2**Y, **2**M, **2**C, and **2**K with yellow; magenta, cyan, and black toners, respectively, into visible toner images T. Thus, the toner images T are formed on the photoconductors **2**Y, **2**M, **2**C, and **2**K. The toner images T on the photoconductors **2**Y, **2**M, **2**C, and **2**K are primarily transferred and borne on a front face **31***a* of an intermediate transfer belt **31** as an endless belt. The photoconductor cleaners **3**Y, **3**M. **3**C, and **3**K remove transfer residual toner adhering to the surfaces of the photoconductors **2**Y, **2**M, **2**C, and **2**K after a primary transfer process (a primary transfer nip to be described below). The electric-charge removing devices remove residual electric charges remaining on the photoconductors **2**Y, **2**M, **2**C, and **2**K after the surfaces thereof are cleaned by the photoconductor cleaners **3**Y, **3**M, **3**C, and **3**K. The surfaces of the photoconductors **2**Y, **2**M, **2**C, and **2**K are initialized by the discharge devices in preparation for the subsequent imaging cycle.

[0033] The intermediate transfer unit **30**, which is a primary transfer device and is also referred to as a primary transfer unit, is disposed below the image forming units **1**Y, **1**M, **1**C, and **1**K and drives to rotate the intermediate transfer belt **31** clockwise in FIG. **1** while stretching the intermediate transfer belt **31**. In the present embodiment, the direction of rotation of the intermediate transfer belt **31** is referred to as a "belt travel direction a" **20**) indicated by an arrow a in FIG. **1**. The intermediate transfer unit **30** is freely attachable to and detachable from (replaceable with) the body **100**A of the printer **100**. The intermediate transfer unit **30** includes an intermediate transfer drive roller **32**, a secondary-transfer counter roller **33**, a cleaning backup roller **34**, four primary transfer rollers **35**Y, **35**M, **35**C, and **35**K, a tension roller **38**, three driven rollers **36***a*, **36***b*, and **36***c*, and a pre-transfer roller **37**, in addition to an intermediate transfer belt **31** that is a belt-shaped image bearer and also an intermediate transferor. Among the rollers, the secondary-transfer counter roller **33** is a nip forming member as a pressed body, is placed inside a loop of the intermediate transfer belt **31** that is an endlessly moving transfer member, and is a repulsive roller.

[0034] The intermediate transfer belt **31** is looped around, supported by, and stretched between the intermediate transfer drive roller **32**, the secondary-transfer counter roller **33**, the cleaning backup roller **34**, the four primary transfer rollers **35**Y, **35**M, **35**C, and **35**K, the driven rollers **36***a*, **36***b*, and **36***c*, and the pre-transfer rollers **37**, serving as rotators disposed inside the loop of the intermediate transfer belt **31**. The intermediate transfer belt **31** is driven by a driving force by the intermediate transfer drive roller **32**, which is driven to rotate clockwise in FIG. **1** by a driver such as a drive motor, moves clockwise as an endless belt, and is conveyed. In the present embodiment, the intermediate transfer belt **31** is an endless elastic belt constructed of a plurality of layers. The intermediate transfer belt **31** serves as the intermediate transferor onto which the toner images are primarily transferred from the photoconductors **2**Y, **2**M, **2**C, and **2**K.

[0035] The intermediate transfer belt **31** is interposed between the primary transfer rollers **35**Y, **35**M, **35**C, and **35**K, and the photoconductors **2**Y, **2**M, **2**C, and **2**K, thereby forming primary transfer nips N**1** for yellow; magenta, cyan, and black, where the surfaces of the photoconductors **2**Y, **2**M, **2**C, and **2**K contact the front face **31***a* or an image bearing face of the intermediate transfer belt **31**. Primary transfer biases are applied to the primary transfer rollers **35**Y and **35**M, the **35**C, and the **35**K from a known transfer bias power source. Accordingly, transfer electric fields are generated between the primary transfer rollers **35**Y, **35**M, **35**C, and **35**K, and the toner images of yellow, magenta, cyan, and black on the photoconductors **2**Y, **2**M, **2**C, and **2**K, respectively.

[0036] A yellow toner image formed on the photoconductor **2**Y enters the primary transfer nip N**1** for yellow as the photoconductor **2**Y rotates. Subsequently, the yellow toner image is primarily transferred from the photoconductor **2**Y to the intermediate transfer belt **31** by the primary transfer electric field and a nip pressure. The intermediate transfer belt **31**, on which the yellow toner image has been transferred, passes through the primary transfer nips N**1** of magenta, cyan, and black. Then, a magenta toner image, a cyan toner image, and a black toner image are primarily transferred from the photoconductors **2**M, **2**C, and **2**K and sequentially superimposed on the yellow toner image. Accordingly, a composite toner image, in which the toner images of four colors are superimposed, is formed on the intermediate transfer belt **31** in the primary transfer process. The description above concerns full-color image formation to form the composite toner image with four color toners. The configuration is not limited to this. The printer **100** may form a single-color image with one of yellow; magenta, cyan, and black toners and may transfer the single-color image to the intermediate transfer belt **31**. Alternatively, the printer **100** may form a multi-color image with at least two of yellow; magenta, cyan, and black toners and may transfer the multi-color image to the intermediate transfer belt **31**.

[0037] As illustrated in FIG. **2**, the belt-type secondary transfer device **39** including the secondary transfer unit **40** including a secondary transfer belt **41** that is a belt member and a transfer member is disposed below an outside of the loop of the intermediate transfer belt **31**. In the present embodiment, as illustrated in FIG. **3**A to be described below; the secondary transfer device **39** includes a pressure base unit **301** that forms the pressing device **300**. The secondary transfer belt **41** is looped around a secondary transfer roller **42**, a secondary-transfer drive roller **46**, driven rollers **43**, **44**, **45**, and **48**, and a tension roller **47**, which are multiple rotators. The secondary transfer belt **41** is looped around the outer circumferential surfaces of the above-described rollers and is applied with tension from the outside toward the inside of the secondary transfer belt **41** by the tension roller **47**. The secondary transfer belt **41** is rotated and moved in a counterclockwise direction indicated by an arrow al in FIG. **2** by transmission of a driving force from a drive source to be described below to the secondary-transfer drive roller **46**. The secondary transfer unit **40** includes a plurality of cleaners, and thus cleaning failure is reduced.

[0038] The secondary transfer belt **41** is a polyimide (PI) belt made of a material (for example, a polyimide resin) harder than the intermediate transfer belt **31** made of resin. The secondary transfer unit **40** is attached to the pressing device **300** having a specific configuration. The specific configuration of the pressing device **300** is described below. The secondary transfer unit **40** nips the intermediate transfer belt **31** between the secondary-transfer counter roller **33** and the secondary transfer belt **41** disposed inside the loop of the intermediate transfer belt **31**. The contact portion between the front face **31***a* of the intermediate transfer belt **31** and the secondary transfer belt **41** is referred to as a secondary transfer nip N**2**. In the present embodiment, a secondary transfer bias is applied to the secondary-transfer counter roller **33** by a known power source as a transfer bias output device. Accordingly, a secondary transfer electric field is generated between the secondary-transfer counter roller **33** and the secondary transfer belt **41**. The secondary-transfer electric field electrostatically moves the toner, which has a negative polarity, from the secondary-transfer counter roller **33** toward the secondary transfer belt **41**.

[0039] In the present embodiment, the toner image on the intermediate transfer belt **31** is transferred onto a recording medium P in the secondary transfer nip N**2** serving as a secondary transfer section. The intermediate transfer belt **31** is an image bearer that forms the secondary transfer nip N**2** together with the secondary transfer belt **41** that is a conveyor belt. The intermediate transfer belt **31** also serves as the intermediate transferor onto which the toner images are transferred primarily from the photoconductors **2**Y, **2**M, **2**C, and **2**K. The toner image transferred onto the secondary transfer belt **41** is a toner image used for image density measurement.

[0040] In the present embodiment, a power supply applies a secondary transfer bias to the secondary-transfer counter roller **33**. Alternatively, the power supply may apply the secondary transfer bias to the secondary transfer roller **42** serving as a pressing member disposed opposite the secondary-transfer counter roller **33**. When the secondary transfer bias is applied to the secondary transfer roller **42**, the secondary transfer bias is opposite in polarity to the toner. When the secondary transfer bias is applied to the secondary-transfer counter roller **33**, the secondary transfer bias is identical in polarity to the toner. The secondary transfer roller **42** is also referred to as a nip forming roller. In other words, the secondary transfer device **39** is a transfer device in which the secondary transfer roller **42** serving as a nip forming member as a pressed object that contacts the intermediate transfer belt **31** to form the secondary transfer nip N**2** can be pressed toward the intermediate transfer belt **31** over the entire width direction orthogonal to the face-moving direction a in the front face **31***a* of the intermediate transfer belt **31** serving as an image bearer that moves on the face thereof.

[0041] The sheet tray **70** that is a container to store a bundle of multiple sheets P is disposed below the secondary transfer device **39** in FIG. **1**. In the sheet tray **70**, a feed roller **71** contacts an uppermost recording medium P of the bundle of recording media. The feed roller **71** is driven to rotate at a specified timing to feed the recording medium P from the sheet tray **70** to a conveyance passage **77** toward the secondary transfer nip N**2**. A registration roller pair **75** feeds the recording medium P fed in the conveyance passage **77** to the secondary transfer nip N**2** at a timing synchronized with the toner image on the front face **31***a* of the intermediate transfer belt **31**.

[0042] A toner image on the front face **31***a* of the intermediate transfer belt **31** is collectively transferred onto the recording medium P by a secondary-transfer electric field and a nip pressure in the secondary transfer nip N2, thereby forming a full-color toner image in combination with the white color of the recording medium P. After the intermediate transfer belt **31** passes through the secondary transfer nip N2, untransferred residual toner adhere to the front face **31***a* of the intermediate transfer belt **31**. The untransferred residual toner is cleaned from the belt face by an intermediate belt cleaner **38**A in contact with the front face **31***a* of the intermediate transfer belt **31**. The fixing device **90** is disposed downstream from the secondary transfer nip N2 in a recording-medium conveyance direction b. The recording material P on which the toner image is transferred is fed into the fixing device **90**. The recording material P fed in the fixing device **90** is nipped in a fixing nip formed between a fixing roller **91** having a heat source therein and a pressing roller **92** in contact with each other, and then the toner in the full-color toner image is softened and fixed by the application of heat and pressure. After the toner image is fixed on the recording material P, the recording material P is ejected from the fixing device **90** and ejected outside of the printer **100**.

[0043] A description is given of the pressure base unit **301** that forms a pressing device according to an embodiment with reference to FIGS. **1**, **3**A, **3**B, **4**A, and **4**B. FIG. **3**A is a front view of the pressure base unit **301** according to the present embodiment. FIG. **3**B is an A-A cross-sectional view of the pressure base unit **301** as indicated in FIG. **3**A. FIG. **4**A is a front view of a pressing device **300** illustrating the relative positions of the secondary transfer unit **40** and the pressure base unit **301**, according to the present embodiment. FIG. **4**B is a B-B cross-sectional view of the pressing device **300** as indicated in FIG. **4**A. In FIG. **4**A, a pressure base left plate **320**, a pressure base right plate **321**, a pressure front face plate **381**, and a pressure rear face plate **382** constitute a pressing section **302** illustrated in FIG. **3**A. As illustrated in FIGS. **1**, **3**A, and **4**A, the pressing device **300** of FIG. **1** includes the pressure base unit **301** having a pressure mechanism for pressing the secondary transfer unit **40**, and the pressing section **302** serving as a pressing mechanism of the pressure base unit **301** for pressing the secondary transfer unit **40**.

[0044] As illustrated in FIGS. **3**A and **4**A, the pressure base unit **301** as a pressing mechanism for pressing the secondary transfer unit **40** includes a pressing-force transmission section **330** as a drive transmitter for transmitting a pressing force to the secondary transfer roller **42**. The pressure base unit **301** also includes a conveyance-driving-force transmission section **310** as a drive transmitter that transmits a conveyance driving force to the secondary transfer belt **41** via the secondary-transfer drive roller **46**. The pressure base left plate **320** and the pressure base right plate **321** are members that support the pressure front face plate **381** and the pressure rear face plate **382**, respectively (the same applies to FIG. **9**A to be described below).

[0045] The pressing section **302** includes a front pressing lever **361** movably supported by the pressure front face plate **381** and a rear pressing lever **362** movably supported by the pressure rear face plate **382**. A front pressing section **371** that forms the pressing-force transmission section **330** and a rear pressing section **372** that forms the pressing-force transmission section **330** are fixed to the front pressing lever **361** and the rear pressing lever **362**, respectively. The front pressing section **371** may be integrally formed of the same metal plate as the front pressing lever **361** to ensure needed rigidity. Similarly, the rear pressing section **372** may be integrally formed of the same metal plate as the rear pressing lever **362** to ensure needed rigidity.

[0046] A pressing-section front fixing plate **336** of the pressing-force transmission section **330** is positioned and fixed to the front pressing lever **361**. A member similar to the pressing-section front fixing plate **336** is also positioned and fixed on the rear pressing lever **362**. The pressing-force transmission section **330** having a similar configuration is disposed in the front pressing lever **361** and the rear pressing lever **362**. In the following description, a description is given with a simplified member name as a representative of the pressing-force transmission section **330** disposed near the front pressing lever **361**. The pressing-force transmission section **330** disposed in each of the front pressing lever **361** and the rear pressing lever **362** includes, for example, a pressing-section front fixing plate **336**, a pressing spring **335**, a pressing cam follower **334**, a pressing cam **333**, a pressing cam shaft **333***a*, a pressing-cam-shaft upper pulley **331**, and a pressing-cam-drive timing belt **332**. The pressing spring **335** is disposed between the pressing-section front fixing plate **336** and the pressing cam follower **334**.

[0047] In addition to the configuration described above, the pressing-force transmission section **330** is provided with a drive pulley that is disposed on the right side of the pressing-cam-drive timing belt **332** in FIG. **3**A, and a cam motor **345** that drives the pressing cam **333** to rotate via the drive pulley, which is schematically illustrated in FIG. **3**A. The pressing cam shaft **333***a* that supports the pressing cam **333** is disposed and fixed near the pressure front face plate **381** and the pressure rear face plate **382**. The cam motor **345** is fixed to the outside of the pressure base right plate **321**. Although illustrated as detached from the pressure base right plate **321** in FIG. **3**A for convenience of illustration, in actuality, the cam motor **345** is fixed to the outside of the pressure base right plate **321** and reduces a load when the cam motor **345** rotates with the front pressing lever **361** and the rear pressing lever **362**. Peripheral mechanisms including the cam motor **345** are schematically illustrated only in FIG. **3**A and are omitted in the drawings below.

[0048] As simply surrounded by a rectangular shape with a long dashed double-dotted line in FIG. **1**, when, for example, a jam (including replacement of components of the secondary transfer unit **40** and cleaning) occurs in the recording material P fed on a feeding passage above the sheet tray **70** and around the pressing device **300** and the fixing device **90**, a layout configuration in which a drawer unit **20** that can be attached to and detached from the body **100**A of the printer **100** may be adopted. In the case of such a layout, the cam motor **345** may be fixed to the drawer unit **20**. In a case where, for example, a jam (including replacement of components of the secondary transfer unit **40** and cleaning) occurs, when the drawer unit **20** is pulled out from the body **100**A of the printer **100** and is inserted into the body **100**A of the printer **100** after needed jam processing has ended, the output shafts of the cam motor **345** may be engaged with the drive pulley.

[0049] As illustrated in FIGS. **5**A and **5**B to be described in detail below; the front pressing section **371** and the rear pressing section **372** contact and press pressure shafts **51** at the front and rear ends of the secondary transfer roller **42** in positions at which the pressing force is transmitted to the secondary transfer roller **42** by the pressing-force transmission section **330**.

[0050] The pressing cam **333**, whose cam shape is described as a simple eccentric cam having a large diameter portion and a small diameter portion for simplifying the drawing in FIG. **3**, has a specific cam configuration (e.g., a multi-stage cam) in which the rotation amount of the cam is controlled so that the pressing force can be controlled for multiple paper types of the recording material P. In actuality, it is needless to say that the pressing force can be changed to several patterns for multiple paper types. When the pressing cam **333** is driven to rotate and the large-diameter portion of the pressing cam **333** and the pressing cam follower **334** come into contact and press with each other, the front pressing section **371** and the rear pressing section **372** are pushed up to apply the greatest pressure to the pressure shaft **51** of the secondary transfer roller **42**. In contrast, when the pressing cam **333** is driven to rotate and the small diameter portion of the pressing cam **333** and the pressing cam follower **334** come into contact and press with each other, the front pressing section **371** and the rear pressing section **372** move downward and separate from the pressure shaft **51** of the **20**) secondary transfer roller **42**. As a result, the secondary transfer roller **42** can be located at either a position where the secondary transfer roller **42** contacts the secondary transfer belt **41** or a position where the secondary transfer roller **42** is separated from the secondary transfer belt **41**.

[0051] As illustrated in FIG. **3**A, the conveyance-driving-force transmission section **310** includes a secondary-transfer drive gear **311**, a gear **312** fixed coaxially with the secondary-transfer drive gear **311** and operated at the same number of rotations, an idler gear **313** meshed with the gear **312**, a motor output gear **314** meshed with the idler gear **313**, and a secondary-transfer drive motor **315** connected to the motor output gear **314**. The gear **312** and the idler gear **313** are axially supported by the front pressing lever **361** to be rotatable via respective gear shafts.

[0052] The secondary-transfer drive motor **315** is a drive source that drives to rotate the secondary-transfer drive roller **46** via the conveyance-driving-force transmission section **310**, and is fixed to the pressure front face plate **381** that is a place that does not serve as a load for the pressing section **302** as illustrated in FIGS. **3**B and **4**B. The motor output gear **314** is integrally disposed to an output shaft of the secondary-transfer drive motor **315**, and thus does not serve as a load of the pressing section **302** in the same manner as the secondary-transfer drive motor **315**.

[0053] A secondary-transfer drive coaxial upper gear **60** is disposed coaxially with the secondary-transfer drive roller **46**. The secondary-transfer drive gear **311** meshes with the secondary-transfer drive coaxial upper gear **60** disposed coaxially with the secondary-transfer drive roller **46**. As a result, a conveyance driving force generated by the rotational driving of the secondary-transfer drive motor **315** is sequentially transmitted from the motor output gear **314**, the idler gear **313**, the gear **312**, the secondary-transfer drive gear **311**, and the secondary-transfer drive coaxial upper gear **60** to the secondary-transfer drive roller **46**.

[0054] As illustrated in FIG. **3**B, a secondary-transfer front fixing shaft **340** is disposed at a portion extending from an inner side of the front pressing lever **361** toward a right center in FIG. **3**B, and a secondary-transfer rear fixing shaft **341** is disposed at a portion extending from an inner side of the rear pressing lever **362** toward the left center in FIG. **3**B. The secondary-transfer front fixing shaft **340** and the secondary-transfer rear fixing shaft **341** are formed in such a manner that the central portions thereof are engaged with each other to form a recess and a protrusion. As illustrated in FIG. **4**B, the secondary transfer unit **40** is inserted between the front pressing lever **361** and the rear pressing lever **362**, the secondary-transfer front fixing shaft **340** is engaged with a front secondary-transfer-unit reference **63**, and the secondary-transfer rear fixing shaft **341** is engaged with a rear secondary-transfer-unit reference **64**. As a result, the secondary transfer unit **40** and the pressure base unit **301** are assembled together, and thus positioning of both units in a three-dimensional direction and phase alignment are performed.

[0055] A description is given of the cross-sectional configuration of the secondary transfer roller with reference to FIGS. **5**A and **5**B. The secondary transfer roller **42** illustrated in FIG. **5**A has an example configuration in which a secondary-transfer pressure shaft is integrated, and the secondary transfer roller **42** illustrated in FIG. **5**B has an example configuration in which the secondary-transfer pressure shaft is divided into a front portion and a rear portion and these front and rear portions of the secondary-transfer pressure shaft are coupled by pipe material. The secondary transfer roller **42** in FIG. **5**A includes the pressure shaft **51** for the secondary transfer roller, which extends integrally in the front direction F and the rear (or back) direction R, bearings **54** disposed at two positions of front and rear ends of the pressure shaft **51**, a pipe material **52** disposed on the outer circumferential surface of the bearings **54** via the bearings **54** at the front and rear ends, and a surface layer **53** disposed to be fixed to the further circumferential surface of the pipe material **52**. The front and rear ends of the pressure shaft **51** protrude further from the front and rear end portions of the bearing **54**, the pipe material **52**, and the surface layer **53**.

[0056] The secondary transfer roller **42** in FIG. **5**A includes the pressure shaft **51** for the secondary transfer roller, which extends integrally in the front direction F and the rear (or back) direction R, bearings **54** disposed at two positions of front and rear ends of the pressure shaft **51**, a pipe material **52** disposed on the outer circumferential surface of the bearings **54** via the bearings **54** at the front and rear ends, and a surface layer **53** disposed to be fixed to the further circumferential surface of the pipe material **52**.

[0057] By adopting the above-described configurations, when the secondary transfer roller **42** of FIGS. **5**A and **5**B presses the front and rear ends of the pressure shaft **51**, the pressure shaft **51** is prevented from rotating so that the front and rear ends of the pressure shaft **51** can be pressed directly by the front pressing section **371** and the rear pressing section **372** as illustrated in FIGS. **4**A and **4**B.

[0058] As illustrated in FIG. **4**A, a pressing force generated by the pressing-force transmission section **330** is transmitted to the front pressing section **371**, the rear pressing section **372**, and the front and rear ends of the pressure shaft **51** of the secondary transfer roller **42**, and thus the front pressing lever **361** and the rear pressing lever **362** rotate (which means to swing within an acute angle range of a specified angle). In the example illustrated in FIG. **4**A, a rotation fulcrum **350** of the front pressing section **371** and the rear pressing section **372** and a rotation fulcrum of the secondary transfer unit **40** (an axial center of a driven roller **44**) are coaxial with each other.

[0059] As illustrated in FIG. **4**A, even if a rotation fulcrum is positioned in the front pressing lever **361**, a positional relation between the front pressing lever **361** and the secondary transfer unit **40** does not change. Thus, similarly, in that case, the distance and positional relationship between gears of the secondary-transfer drive gear **311** and the secondary-transfer drive coaxial upper gear **60** do not change. In the following description, the rear pressing lever **362** may be omitted for purposes of simplification.

[0060] FIG. **6**A illustrates the positions of components in a pressing state of the front pressing lever **361** and the pressure shaft **51** of the secondary transfer roller **42**, and in a meshing state of the secondary-transfer drive gear **311** and the secondary-transfer drive coaxial upper gear **60**, in the case where the pressing force is small. FIG. **6**B illustrates the positions of components in a pressing state of the front pressing lever **361** and the pressure shaft **51** of the secondary transfer roller **42**, and in a meshing state of the secondary-transfer drive gear **311** and the secondary-transfer drive coaxial upper gear **60**, in a case where the pressing force is large. Even if the pressing force changes in this way, the distance and positional relation between the secondary-transfer drive gear **311** and the secondary-transfer drive coaxial upper gear **60** do not change. In FIGS. **6**A and **6**B, the description has been given with respect to the rotation fulcrum **350** in a case where the secondary-transfer front fixing shaft **340** for positioning the secondary transfer unit **40** is located on the same axis of the idler gear **313**. Then, it can be seen that the distance and the positional relation between the secondary-transfer drive gear **311** and the secondary-transfer drive coaxial upper gear **60** do not change.

[0061] FIGS. **7**A and **7**B illustrate a case where a rotation fulcrum **353** of the secondary transfer unit **40** is separately disposed in the front pressing lever **361**. FIG. **7**A illustrates the positional state of components in the case where a pressing force is small, and FIG. **7**B illustrates the positional state of components in the case where a pressing force is large. Even in such a case, it can be seen that the distance and the positional relationship between the gears of the secondary-transfer drive gear **311** and the secondary-transfer drive coaxial upper gear **60**) do not change.

[0062] A description is given of an alternative embodiment different from the embodiments of the present disclosure described with reference to FIGS. **2** to **7**B, with reference to FIGS. **8**A to **9**B. FIG. **8**A is a front view of a pressure base unit **301**A according to an alternative embodiment of the present disclosure. FIG. **8**B is an A-A cross-sectional view of the pressure base unit **301**A as indicated in FIG. **8**A. FIG. **9**A is a front view of a pressing device **300**A illustrating the relative positions of the secondary transfer unit **40**) and the pressure base unit **301**A, according to the present alternative embodiment. FIG. **9**B is a B-B cross-sectional view of the pressing device **300**A as indicated in FIG. **9**A. The pressing device **300**A and the pressure base unit **301**A illustrated in FIGS. **8**A and **9**A are different from the pressing device **300** and the pressure base unit **301** illustrated in FIGS. **3**A, **3**B, **4**A, and **4**B in that a conveyance-driving-force transmission section **310**A formed by attachable and detachable joint engagement is used instead of the conveyance-driving-force transmission section **310**.

[0063] The conveyance-driving-force transmission section **310**A is different from the conveyance-driving-force transmission section **310** in that a drive connection of the secondary transfer unit **40** and the pressure base unit **301** is performed with attachable and detachable joint engagement instead of meshing by gears. As illustrated in FIGS. **8**A and **8**B, the conveyance-driving-force transmission section **310**A includes the idler gear **313**, the motor output gear **314**, and the secondary-transfer drive motor **315**, which are the same members as the conveyance-driving-force transmission section **310**. The conveyance-driving-force transmission section **310**A is different from the conveyance-driving-force transmission section **310** in that a pressure-base idler gear pulley **316**, a pressure-base timing belt **317**, a pressure-base drive shaft pulley **318**, and a secondary-transfer drive joint **319** are newly disposed instead of the gear **312**. The pressure-base idler gear pulley **316** is disposed coaxially with the idler gear **313**. The pressure-base timing belt **317** is looped around the pressure-base idler gear pulley **316** and the pressure-base drive shaft pulley **318** to establish a driving force transmission relation therebetween.

[0064] The pressure-base drive shaft pulley **318** is disposed to correspond to the secondary-transfer drive roller **46** near the secondary transfer unit **40**. The secondary-transfer drive joint **319** is disposed coaxially with the pressure-base drive shaft pulley **318**.

[0065] As illustrated in FIG. **9**B, a secondary-transfer drive joint **67** and a secondary-transfer drive-joint spring **68** are disposed on the left of the secondary-transfer drive roller **46** near the secondary transfer unit **40** in FIG. **9**B. The secondary-transfer drive-joint spring **68** is disposed to enhance the engagement between the secondary-transfer drive joint **67** and the secondary-transfer drive joint **319** when the conveyance-driving-force transmission section **310**A of the pressing section **302** is assembled to the secondary transfer unit **40**. The secondary-transfer drive joint **319** is engaged with the secondary-transfer drive joint **67** to transmit the conveyance driving force when the conveyance-driving-force transmission section **310**A of the pressing section **302** is assembled to the secondary transfer unit **40**.

[0066] It is preferable to use a flexible joint, such as the secondary-transfer driving joint **319** and the secondary-transfer driving joint **67**, which is used in a drive transmission device and allows the misalignment of the shaft centers. The joint used in the drive transmission device is a joint in which at least one joint (corresponding to the secondary-transfer drive joint **319** illustrated in FIG. **9**B) has a degree of freedom with respect to the rotating shaft, and the other joint is inclined to be a joint provided with a gap with respect to the rotating shaft (corresponding to the other secondary-transfer drive joint **67** illustrated in FIG. **9**B).

[0067] The fitting and connection by the flexible joints (the secondary-transfer drive joint **67** and the secondary-transfer drive joint **319**) as described above does not apply an unnecessary force to the secondary transfer unit **40**. Accordingly, there is an advantageous effect that the front-and-rear pressure deviation between the secondary-transfer drive joint **67** and the secondary-transfer drive joint **319** can be reduced. The conveyance-driving-force transmission section **310** based on the meshing of the gears as described above may apply a force to the pressure base unit **301** in response to a change in the load of the secondary transfer unit **40**. However, the above-described effect does not occur in the case of joint engagement and connection in the conveyance-driving-force transmission section **310**A, and thus it can be said that the mechanism is preferable in this point. In the case where the above-described configuration is adopted for the convenience of layout, it is necessary to avoid joints from each other in assembly, and the pressure base unit **301** is assembled to the secondary transfer unit **40** in the up and down direction, so that some ways for avoiding the joints from each other without any problem. In a case where the force turns to be large enough to generate a gap in the pressing section **302**, an abnormal sound may be generated in the pressing section **302**.

[0068] Similarly, in the pressing device **300**A illustrated in FIGS. **9**A and **9**B, a deviation in the positional relation between the joints (axis deviation) does not change according to the pressure amount, and thus occurrence of the axis deviation by the pressing force to prevent problems such as a front-rear deviation in the pressure amount due to a shaft reaction force.

[0069] As described above, according to an embodiment illustrated in FIGS. **2** to **7**B and another embodiment illustrated in FIGS. **8**A and **9**B, a pressing device without an increase in working time and without an increase in service cost can be provided, for example, when a secondary transfer unit is replaced.

[0070] A description is given of a direction in which the secondary transfer unit **40** receives a force from the pressure base unit **301** in an embodiment illustrated in FIGS. **2** to **7**B with reference to FIG. **10**. FIG. **10** is a diagram illustrating a case where the direction of a force is determined by the rotation direction in which the secondary transfer belt is driven and the arrangement of gears, according to an embodiment of the present disclosure. In the pressing device **300** illustrated in FIGS. **2** to **7**B, the direction of a force P**2** that the secondary transfer unit **40** receives from the pressing section **302** of the pressure base unit **301** is determined by the rotation direction in which the secondary transfer belt **41** is driven and the arrangement of the gears. In other words, as illustrated in FIG. **10**, a direction P**2** of a force applied from the conveyance-driving-force transmission section **310** of the pressure base unit **301** to the drive transmitter of the secondary transfer unit **40** is substantially opposite to a direction of a pressing force P**1** applied from the pressure base unit **301** to the secondary transfer unit **40**.

[0071] As described in the above embodiments of the present disclosure described with reference to FIGS. **2** to **7**B, the secondary transfer unit **40** does not always form the secondary transfer nip N**2** with the intermediate transfer unit **30**, and is generally separated from the intermediate transfer unit **30** while being driven. During the separation, the secondary transfer unit **40** may be driven in the separated state by various adjustment operations. In such a case, since the direction of the force P**2** applied to the drive transmitted portion of the secondary transfer unit **40** is opposite to the direction of the force P**1** by the pressing section **302**, the force is applied in the direction in which the pressure base unit **301** (the device including the pressing mechanism that presses the secondary transfer unit) contacts the secondary transfer unit **40**. In contrast, in the case where a force is applied in a direction away from the secondary transfer unit **40**, as illustrated in FIG. **4**B as an example of the above-described embodiments of the present disclosure, although it depends on the method of fixing the secondary transfer unit **40** and the pressing section **302**, a force with which the secondary transfer unit **40** moves upward is applied in a state where the secondary transfer unit **40** is only placed from above. In a case of connection by the meshing of gears, a change in an inter-axis distance between gears causes a problem such as abrasion as described above. In the case of connection by joint engagement and the case of connection by gears as embodiments illustrated in FIGS. **8**A and **9**B, an abnormal sound may be generated in the pressing section **302** in a case where the force turns to be such a force that a gap is generated in the pressing section **302**.

[0072] As ways for solving the above-described problem, in a case where the drive connection of the secondary transfer unit **40** and the pressing section **302** is performed by meshing of gears, the problem may be solved by adjusting a rotation direction and an arrangement. As specifically illustrated in FIGS. **4**B and **10** of the embodiments described above, the force P**2** is directed to occur with respect to the secondary transfer unit **40** in a direction opposite the pressing force P**1**.

[0073] In the case of using the joints, there are some difficulties. In such a case, one of the joints has a degree of freedom with respect to the rotation axis and tilting the other joint to reduce the force itself, so that the force itself is lowered and the same effect can be obtained. In the case of the joint connection, when the force turns to such a degree that a gap is generated in the pressing section **302**, an abnormal sound may be generated in the pressing section **302**. As a way of solving this problem, the rotation direction and arrangement may be changed to solve the problem when gears are used. In FIG. **4**B, the force P**2** is generated in a direction opposite to the direction in which the pressing force P**1** with respect to the secondary transfer unit **40**.

[0074] The above embodiments and examples of the present disclosure described above substantially include, for example, the following aspects and advantageous effects.

[0075] In a first aspect, a pressing device (e.g., the pressing device **300**) includes an intermediate transfer unit (e.g., the intermediate transfer unit **30**), a secondary transfer unit (e.g., the secondary transfer unit **40**), a presser (e.g., the pressing section **302**), and a drive transmitter (e.g., the pressing-force transmission section **330**, the conveyance-driving-force transmission section **310**). The intermediate transfer unit transfers and conveys a toner image. The secondary transfer unit transfers the toner image onto a conveyed material (e.g., the recording material P) at a nip portion (e.g., the secondary transfer nip N**2**) formed between the intermediate transfer unit and the secondary transfer unit. The presser includes a front pressing lever (e.g., the front pressing lever **361**), a rear pressing lever (e.g., the rear pressing lever **362**), a front pressing portion (e.g., the front pressing section **371**), and a rear pressing portion (e.g., the rear pressing section **372**) that press the secondary transfer unit against the intermediate transfer unit at the nip portion. The drive transmitter transmits a driving force and a conveyance driving force to a driven transmitter of the secondary transfer unit. A position of the drive transmitter is restricted by the presser. The drive transmitter is movable together with the presser.

[0076] With such a configuration, according to the first aspect, the pressing device in which an operation time does not increase and a service cost does not increase can be provided in, for example, replacement of the secondary transfer unit.

[0077] In a second aspect, in the pressing device (e.g., the pressing device **300**) according to the first aspect, a relative positional relationship between the secondary transfer unit (e.g., the secondary transfer unit **40**) and the presser (e.g., the pressing section **302**) does not change regardless of the pressing force.

[0078] According to the second aspect, the positional relationship does not change, and then the amount of misalignment of the axial center is stable. Thus, the variation in force with respect to the change in the pressing force is reduced. In the case of coupling with, for example, gears, the pitch between the gears changes as the relative positions of the gears change. A change in the pitch causes, for example, an increase in an abrasion amount of a tooth face of the gear and degradation of rotation accuracy. In the case of connection by coupling, a change in the relative positions of the gears indicates a change in the amount of misalignment in axes. It is known that, even a flexible joint that can absorb the force changes, the force and the direction in which the force is applied change according to the axis displacement amount. An increase in force causes a side effect in which the pressing force changes.

[0079] In a third aspect, in the pressing device (e.g., the pressing device **300**) according to the first or second aspect, drive connection of the secondary transfer unit (e.g., the secondary transfer unit **40**) and the presser (e.g., the pressing section **302**) is performed by meshing of gears. With such a configuration, according to the third aspect, a change in an inter-axis distance of gear portions does not cause an inconvenience of such as abrasion. In a case where the force turns to be large enough to generate a gap in the presser, an abnormal sound may be generated in the presser. However, the problem of abnormal sounds can be solved.

[0080] In a fourth aspect, in the pressing device (e.g., the pressing device **300**) according to the first or second aspect, the drive connection of the secondary transfer unit (e.g., the secondary transfer unit **40**) and the presser (e.g., the pressing section **302**) is performed by removable joint engagement. With such a configuration, according to the fourth aspect, in a case where the force turns to be large enough to generate a gap in the presser, an abnormal sound may be generated in the presser. However, the problem of abnormal sounds can be solved.

[0081] In a fifth aspect, in the pressing device (e.g., the pressing device **300**) according to the first, second, or third aspect, a direction of a force (e.g., the force P**2**) that the secondary transfer unit (e.g., the secondary transfer unit **40**) receives from the presser (e.g., the pressing section **302**) is substantially opposite to the direction of the force (e.g., the force P**1**) by the presser (e.g., the pressing section **302**).

[0082] In a sixth aspect, in the pressing device (e.g., the pressing device **300**) according to the fourth aspect, the joint engagement is performed at a plurality of positions between the secondary transfer unit (e.g., the secondary transfer unit **40**) and the presser (e.g., the pressing section **302**). At least one position of the joint engagement is performed with a gap provided with respect to a rotation shaft that rotates and moves together with the drive transmitter (e.g., the pressing-force transmission section **330**, the conveyance-driving-force transmission section **310**) and the presser (e.g., the pressing section **302**).

[0083] In a seventh aspect, in the pressing device (e.g., the pressing device **300**) according to any one of the first to sixth aspects, a drive source of the drive transmitter (e.g., the pressing-force transmission section **330**, the conveyance-driving-force transmission section **310**) that transmits a conveyance driving force is disposed at a location that does not cause a load of the presser (e.g., the pressing section **302**). With such a configuration, according to the seventh aspect, the torque to be applied for pressure does not increase, and an environmental load does not increase.

[0084] In an eighth aspect, in the pressing device (e.g., the pressing device **300**) according to any one of the first to seventh aspects, the presser (e.g., the pressing section **302**) is disposed in two (front and rear) positions in a depth direction of the secondary transfer unit (e.g., the secondary transfer unit **40**) and includes the presser in at least one position. With such a configuration, according to the eighth aspect, two pressers are disposed so that the front-rear deviation can be adjusted.

[0085] In a ninth aspect, an image forming apparatus (e.g., the printer **100**) includes the pressing device (e.g., the pressing device **300**) according to any one of the first to eighth aspects, the toner image is formed by a secondary transfer process onto the sheet-like recording medium to be conveyed to the nip portion. With such a configuration, according to the ninth aspect, the image forming apparatus that achieves the effect of the pressing device of any one of the first to eighth aspects can be provided.

[0086] The above-described embodiments are illustrative and do not limit this disclosure. 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 disclosure. For example, the technical matters described in the above-described embodiments, examples, and modifications may be appropriately combined. For example, the image forming apparatus is not limited to the printer and may be, for example, a copier, a **20**) stand-alone fax machine, or a multifunction peripheral including at least two functions of a copier, a printer, a fax machine, and a scanner.

[0087] In the above-described embodiments, the image forming apparatus conveys a recording medium P in a horizontal direction in the secondary transfer position (the secondary transfer nip N**2**). However, embodiments of this disclosure are not limited to the configuration of horizontal conveyance. For example, the present disclosure is applicable to an image forming apparatus that conveys a recording medium P upward, downward, diagonally upward, or diagonally downward in a secondary transfer area. In the above-described embodiments, an object to be conveyed is not limited to the recording medium P like a paper sheet but can be a resin sheet like a prepreg sheet, a paper sheet, a film, or cloth.

[0088] The present disclosure is applicable to an apparatus having a mechanism for transferring a toner image onto a conveyed object such as paper after the toner image is formed on a transfer belt.

[0089] The base of the present disclosure is a pressing device, and the feature is that a pressing force can be varied. The purpose of varying the pressing force is to optimize transferability according to paper types. The pressing force is applied to the "LEATHAC" paper which has a large paper thickness and a rough face to enhance the transferability.

[0090] The effects appropriately described in the above-described embodiments and examples of the present disclosure are merely listing examples of the effects obtained from embodiments of the present disclosure, and the effects according to the present disclosure are not limited to those described in the embodiments and examples of the present disclosure.

[0091] The above-described embodiments are illustrative and do not limit the present disclosure. 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 disclosure.

1. A pressing device comprising:

an intermediate transfer unit to transfer and convey a toner image;

a secondary transfer unit facing the intermediate transfer unit to form a nip portion between the secondary transfer unit and the intermediate transfer unit, the secondary transfer unit to transfer the toner image onto a conveyed material at the nip portion;

a presser to apply a pressing force for pressing the secondary transfer unit to the intermediate transfer unit at the nip portion; and

a drive transmitter to transmit the pressing force and a conveyance driving force to a driven transmitter of the secondary transfer unit, the drive transmitter restricted in position by the presser, the drive transmitter movable together with the presser.

2. The pressing device according to claim **1**,

wherein relative positions of the secondary transfer unit and the presser are constant regardless of the pressing force.

3. The pressing device according to claim **1**,

wherein drive connection of the secondary transfer unit and the presser is performed by meshing of gears.

4. The pressing device according to claim **1**,

wherein drive connection of the secondary transfer unit and the presser is performed by removable joint engagement.

5. The pressing device according to claim **1**,

wherein a direction of a force that the secondary transfer unit receives from the presser is substantially opposite to a direction of the pressing force by the presser.

6. The pressing device according to claim **4**,

wherein the joint engagement is performed at a plurality of positions between the secondary transfer unit and the presser, and

wherein at least one of the plurality of positions, the joint engagement is performed with a gap from a rotation shaft that rotates and moves together with the drive transmitter and the presser.

7. The pressing device according to claim **1**,

wherein a drive source of the drive transmitter that transmits the conveyance driving force is disposed at a location at which the drive source applies no load to the presser.

8. The pressing device according to claim **1**,

wherein the presser is disposed at a front position and a rear position with respect to the secondary transfer unit in a depth direction of the pressing device and includes the presser in at least one position.

9. An image forming apparatus comprising the pressing device according to claim **1**,

wherein the secondary transfer unit transfers the toner image onto the conveyed material conveyed to the nip portion, to form the toner image on the conveyed material.

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