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(54) **CARTRIDGE WITH SELECTIVELY DISRUPTABLE TONER TRANSFER FOR IMAGE FORMING DEVICE**

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G03G 21/18 (2006.01)

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(58) **Field of Classification Search**
None
See application file for complete search history.

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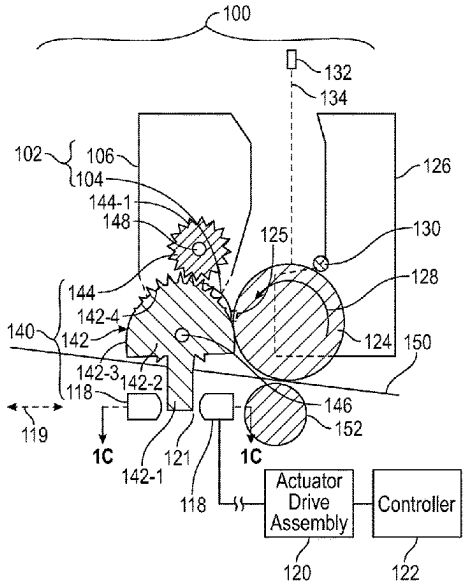
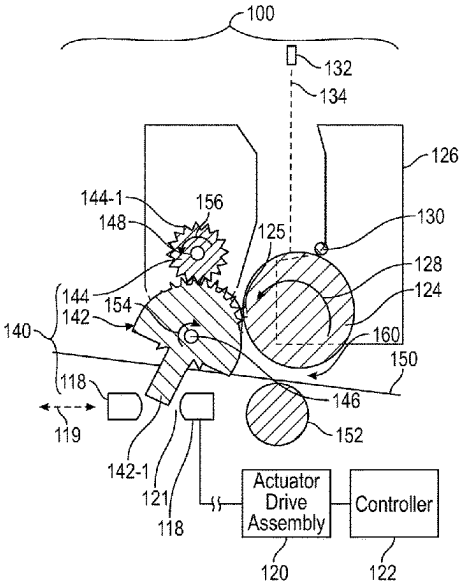
(57) **ABSTRACT**

An apparatus includes a developer and a photoreceptor, where the developer is to transfer a toner to the photoreceptor. The apparatus includes a housing that is moveable in an image forming device, and an actuator assembly engaged with the housing. The actuator assembly is actuatable between different states in response to control by the image forming device during an image forming operation of the image forming device, where a first state of the different states corresponds to the housing being at a first position that disrupts a transfer of the toner to a transfer member of the image forming device during the image forming operation, and a second state of the different states corresponds to the housing being at a second position that allows the transfer of the toner to the transfer member.

16 Claims, 6 Drawing Sheets





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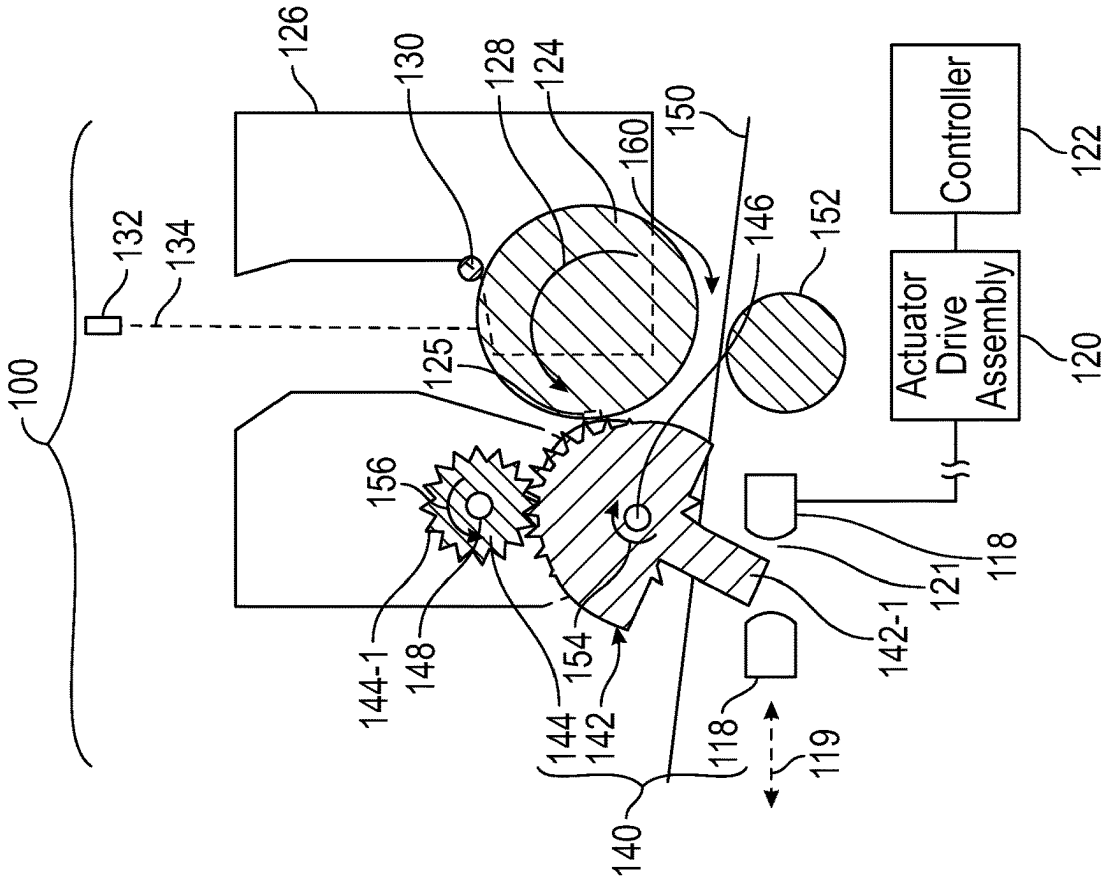
100
132
134
126
130
128
124
160
150
146
152
125
156
144-1
148
154
144
142
140
118
119
121
142-1
Actuator Drive Assembly
120
Controller
122

FIG. 1B

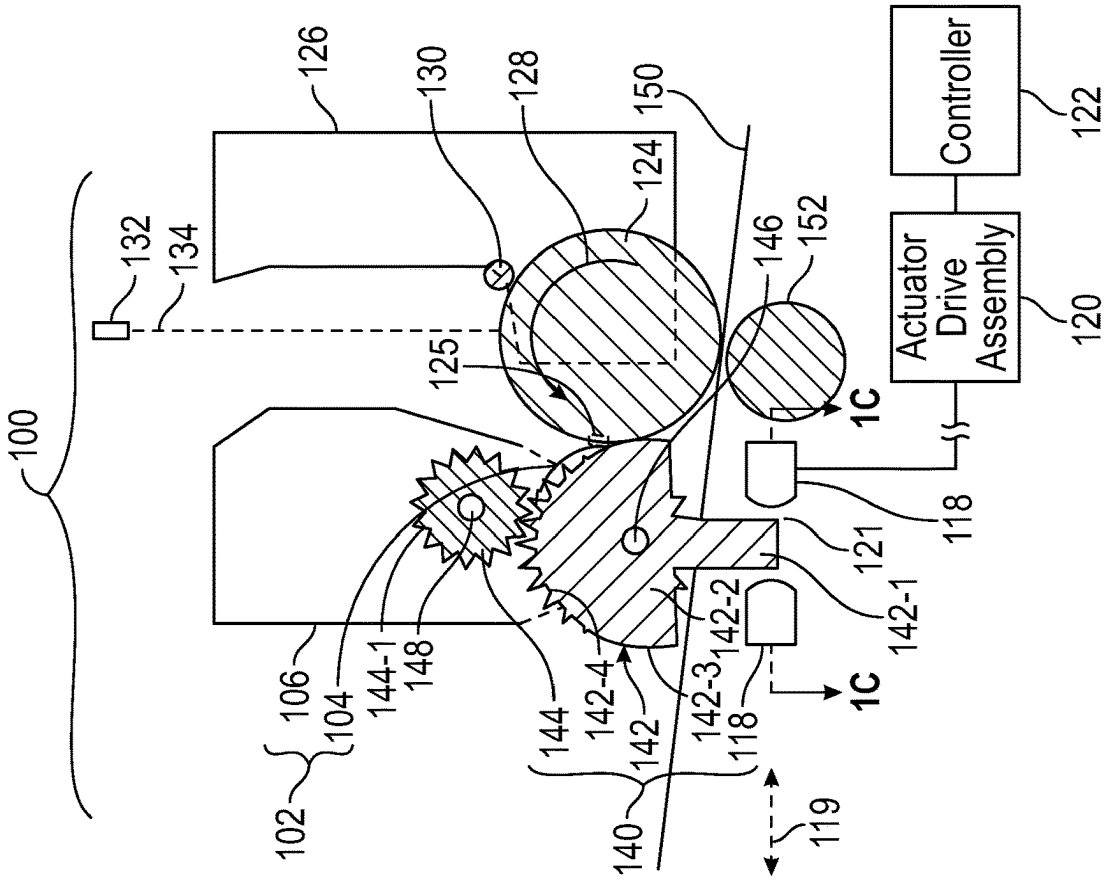
100
132
134
126
130
128
124
150
146
152
125
1C
1C
106
104
102
144-1
148
144
142-4
142
142-3
142-2
118
140
119
121
142-1
Actuator Drive Assembly
120
Controller
122

FIG. 1A

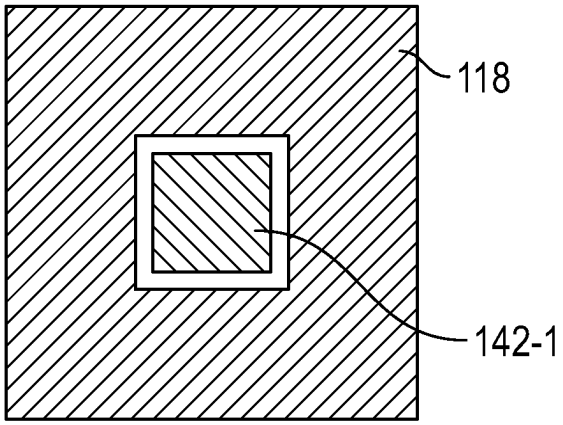

FIG. 1C

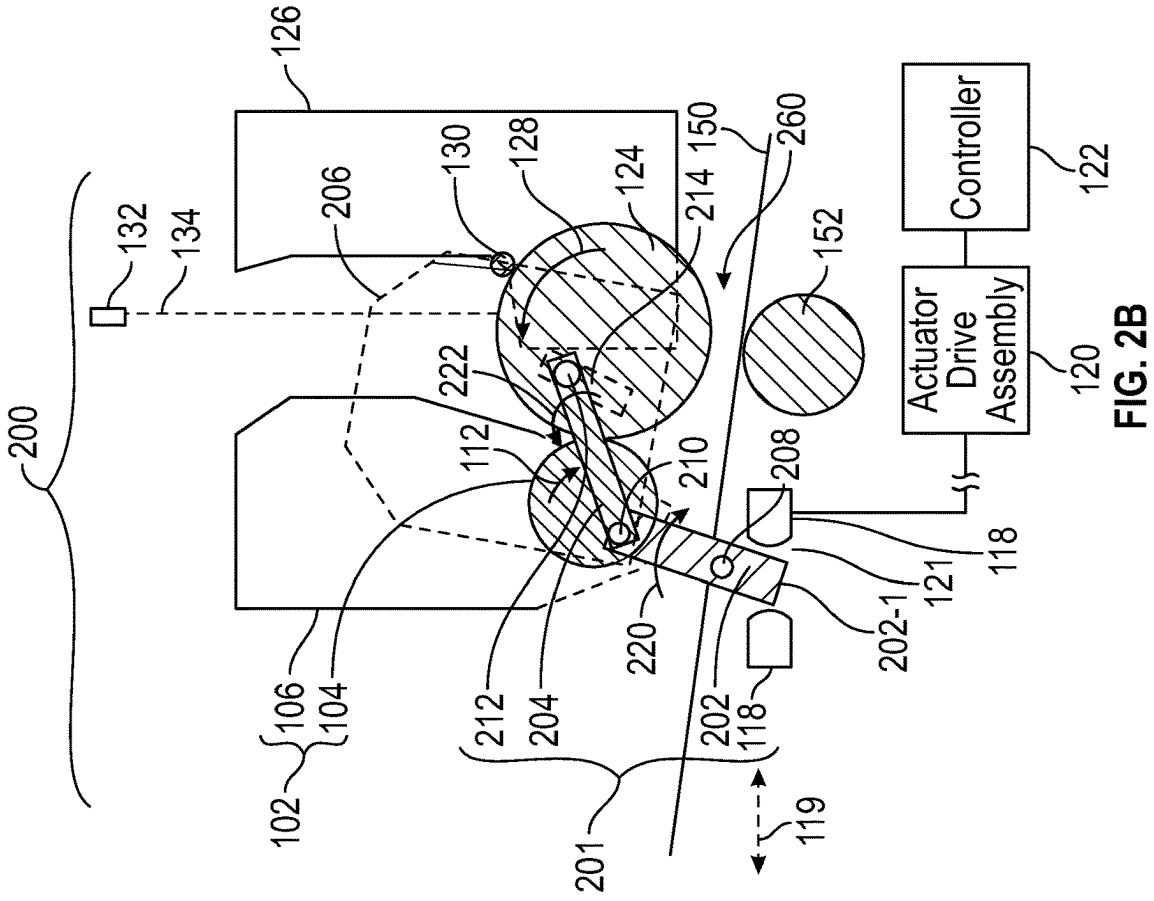
126
132
134
206
130
128
124
214
150
260
152
Controller
122
Actuator Drive Assembly
120
200
222
112
210
208
121
118
202-1
220
106
104
212
204
202
118
102
201
119

FIG. 2B

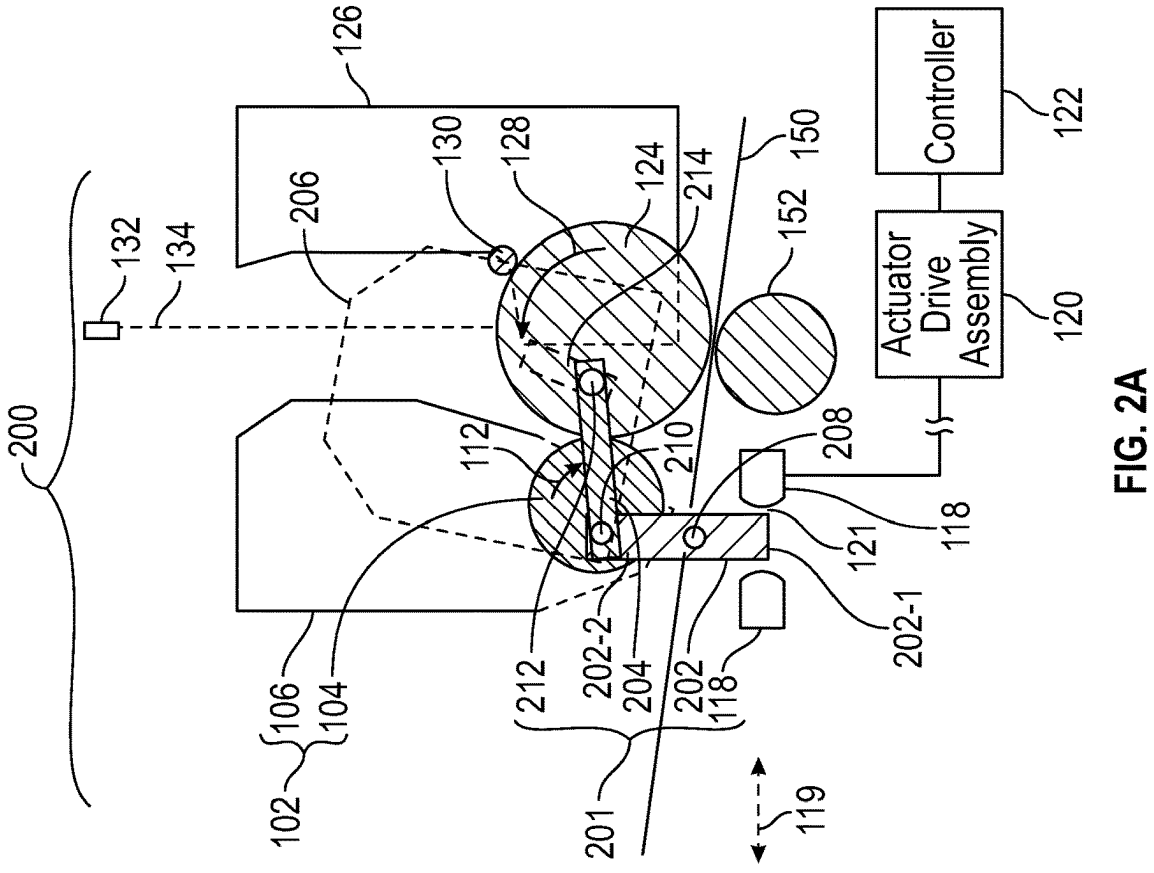
126
132
134
206
130
128
124
214
150
152
Controller
122
Actuator Drive Assembly
120
200
112
210
208
121
118
202-1
106
104
212
202-2
204
202
118
102
201
119

FIG. 2A

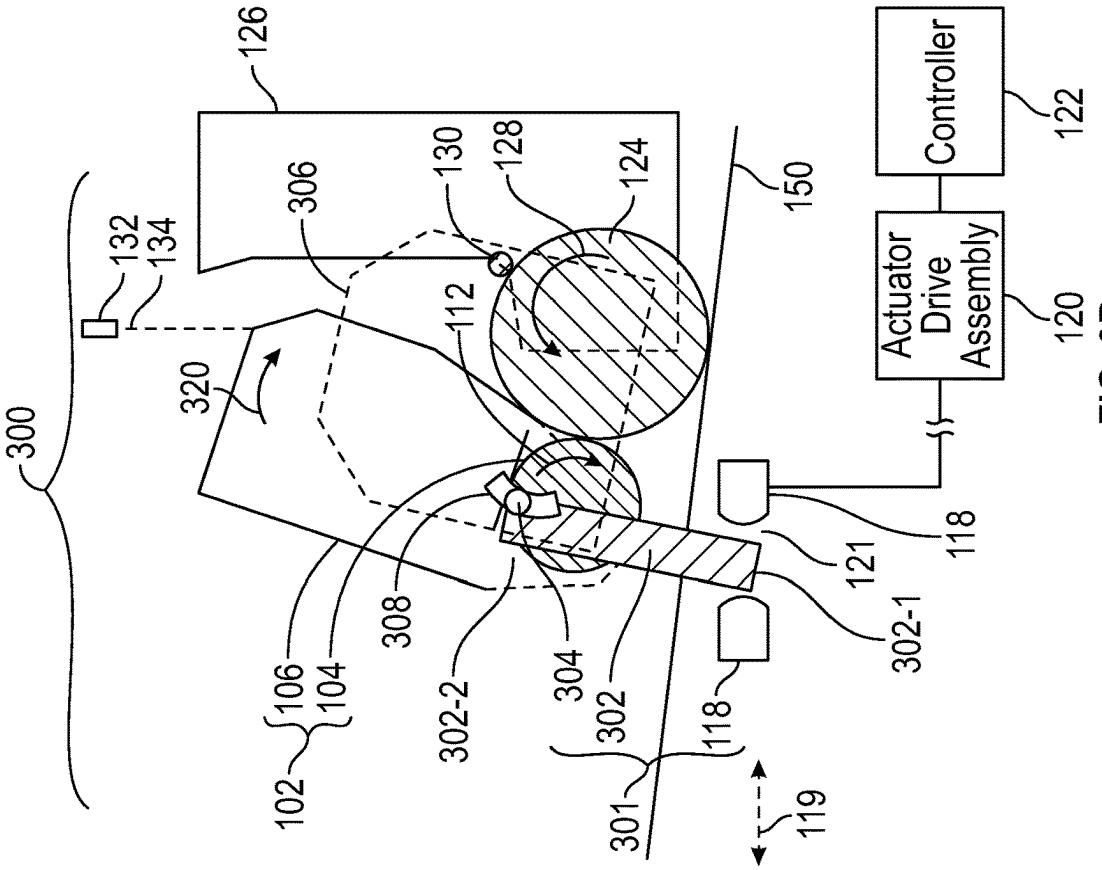
126
306
130
128
124
150
132
134
112
320
300
Controller
122
Actuator Drive Assembly
120
118
121
302-1
308
304
302
302-2
106
104
102
301
118
119

FIG. 3B

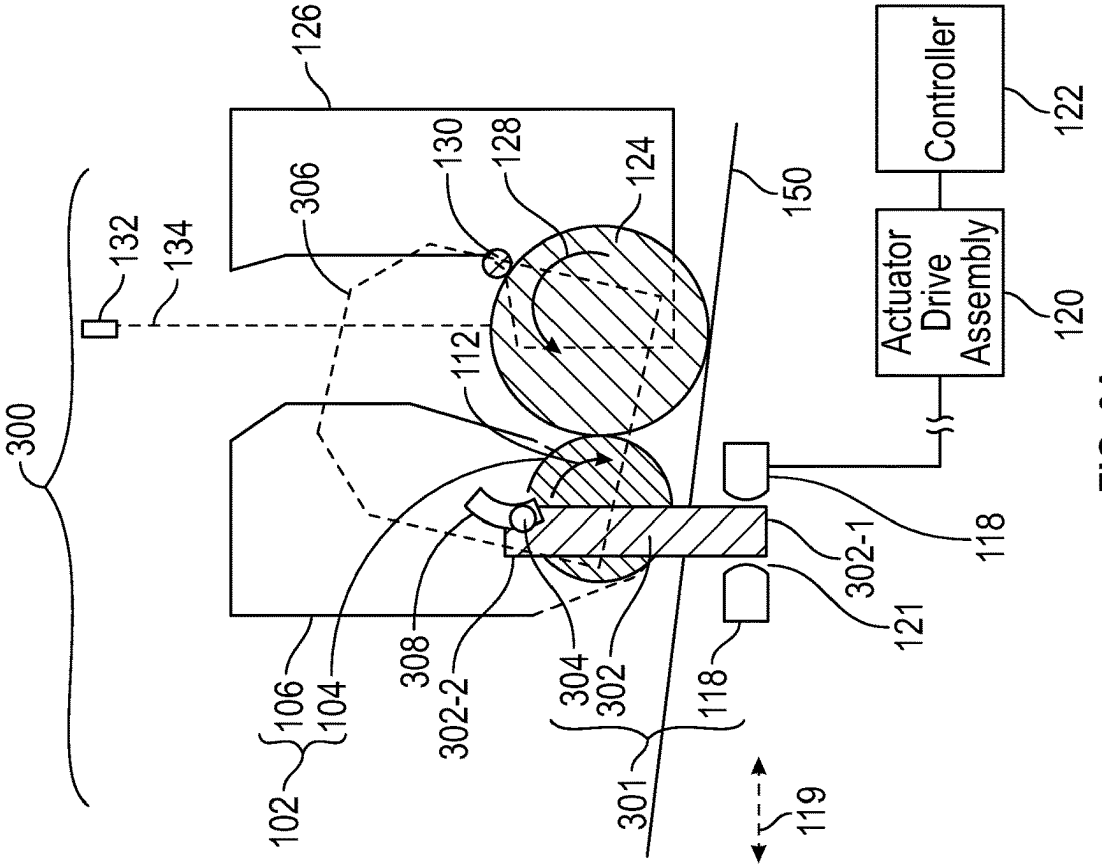
126
306
130
128
124
150
132
134
112
300
Controller
122
Actuator Drive Assembly
120
118
121
302-1
308
304
302
302-2
106
104
102
301
118
119

FIG. 3A

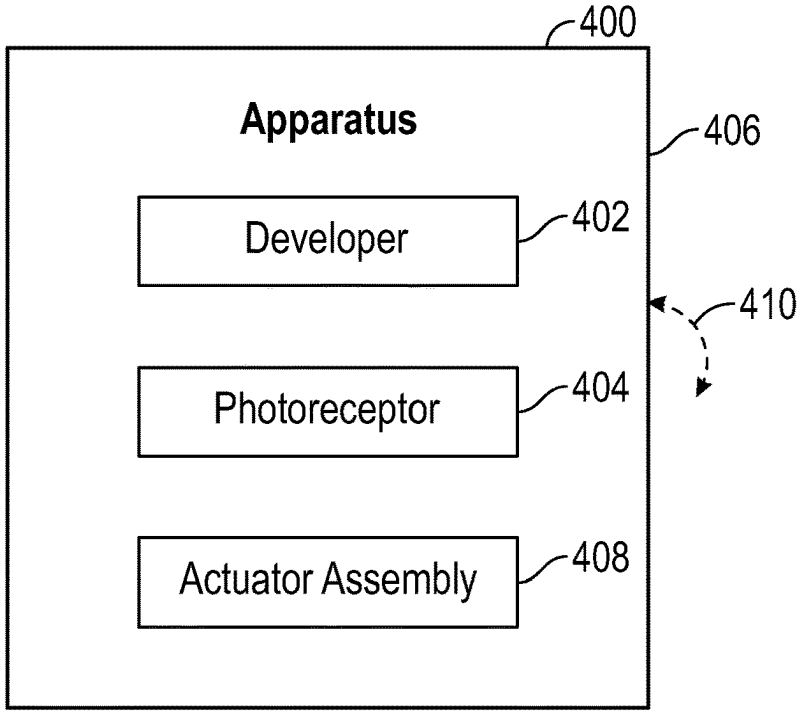
400
Apparatus
406
Developer
402
410
Photoreceptor
404
Actuator Assembly
408

FIG. 4

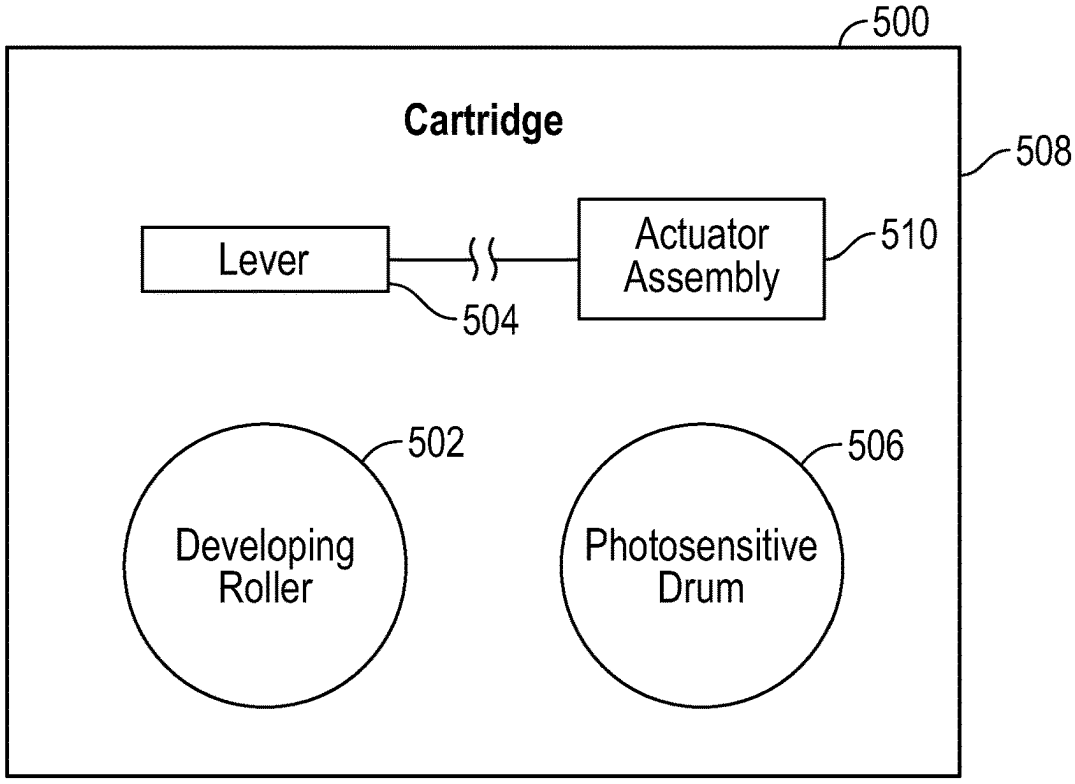
500
Cartridge
508
Lever
Actuator Assembly
510
504
502
506
Developing Roller
Photosensitive Drum

FIG. 5

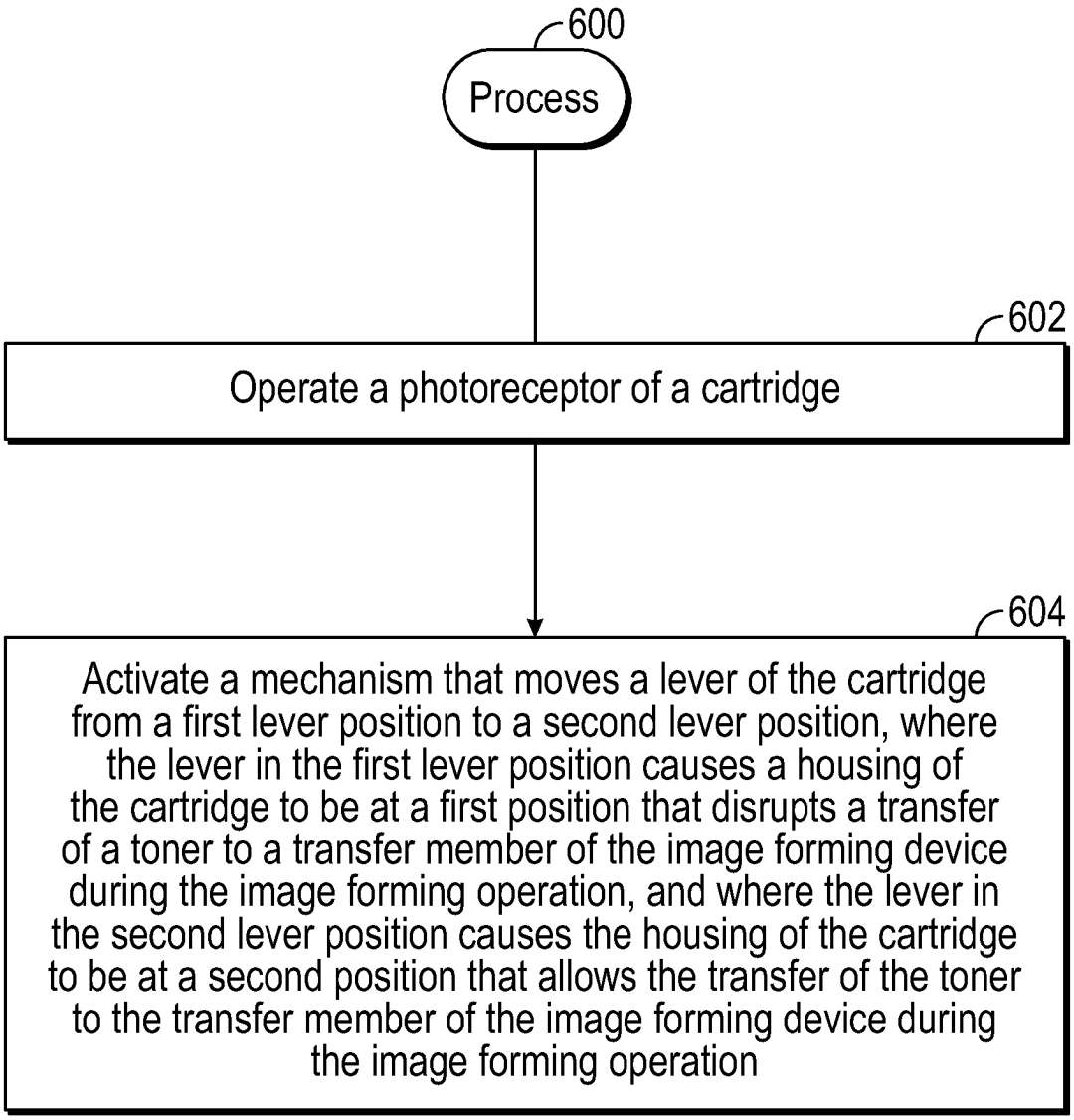
600
Process
602
Operate a photoreceptor of a cartridge
604
Activate a mechanism that moves a lever of the cartridge from a first lever position to a second lever position, where the lever in the first lever position causes a housing of the cartridge to be at a first position that disrupts a transfer of a toner to a transfer member of the image forming device during the image forming operation, and where the lever in the second lever position causes the housing of the cartridge to be at a second position that allows the transfer of the toner to the transfer member of the image forming device during the image forming operation

FIG. 6

CARTRIDGE WITH SELECTIVELY DISRUPTABLE TONER TRANSFER FOR IMAGE FORMING DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a U.S. National Stage Patent Application under 35 U.S.C. § 371 of PCT/US2021/041020, filed Jul. 9, 2021, which is hereby incorporated by reference in its entirety.

BACKGROUND

A printing device can deliver a print material to a print medium to form an image on the print medium. In some examples, a printing device can be an electrophotographic printing device that supplies a toner (which is a type of print material) to an electrostatic latent image formed on a photoreceptor to form a visible toner image on the photoreceptor. The electrophotographic printing device transfers the toner image to a print medium, and then fixes the transferred toner image to the print medium, to form an image on the print medium.

BRIEF DESCRIPTION OF THE DRAWINGS

Some implementations of the present disclosure are described with respect to the following figures.

FIGS. **1**A-**1**B, **2**A-**2**B, and **3**A-**3**B are schematic diagrams of a portions of image forming devices according to some examples.

FIG. **1**C is a cross-sectional view of an actuator of an actuator assembly, according to some examples.

FIG. **4** is a block diagram of an apparatus according to some examples.

FIG. **5** is a block diagram of a cartridge for an image forming device, according to some examples.

FIG. **6** is a flow diagram of a process according to some examples.

Throughout the drawings, identical reference numbers designate similar, but not necessarily identical, elements. The figures are not necessarily to scale, and the size of some parts may be exaggerated to more clearly illustrate the example shown. Moreover, the drawings provide examples and/or implementations consistent with the description; however, the description is not limited to the examples and/or implementations provided in the drawings.

DETAILED DESCRIPTION

In the present disclosure, use of the term "a," "an," or "the" is intended to include the plural forms as well, unless the context clearly indicates otherwise. Also, the term "includes," "including," "comprises," "comprising," "have," or "having" when used in this disclosure specifies the presence of the stated elements, but do not preclude the presence or addition of other elements.

An image forming device such as an electrophotographic printing device can employ a photoreceptor on which an electrostatic latent image is formed, for use in transferring an image to a target medium (e.g., a print medium such as a paper substrate or a substrate of another material). The photoreceptor can be in the form of a photosensitive drum that includes a cylindrical tubular structure and a photosensitive layer on the cylindrical tubular structure.

A charging element can be used to charge a surface of the photosensitive drum to a uniform electrical potential (e.g., a negative electrical potential). In some examples, the charging element can include a charging roller. In other examples, a charging element can be in the form of a corona charger that can charge the surface of the photosensitive drum to a uniform electrical potential without making physical contact with the surface of the photosensitive drum.

A light source (e.g., a laser source, light emitting diode(s) (LEDs), etc.) can be activated by a controller of the image forming device to irradiate selected portions of the charged surface of the photosensitive drum, to form an electrostatic latent image on the photosensitive drum.

A developing device in the image forming device includes a developer (e.g., a developing roller) onto which a developing agent including an electrically charged toner is adhered. During operation of the image forming device, as the developing roller rotates relative to the photosensitive drum (which also rotates in the opposite rotational direction of the developing roller), the developing agent on the developing roller is conveyed to a supply region facing the photosensitive drum. In this supply region, a layer of toner adhered to the surface of the developing roller can be transferred to the photosensitive layer of the photosensitive drum on which the electrostatic latent image has been formed, which develops the electrostatic latent image on the surface of the photosensitive drum to form a visible toner image on the photosensitive drum.

In some examples, the developing device including the developing roller can be part of a cartridge that is removably inserted into the image forming device. The cartridge can include a reservoir containing a toner, and the toner in the reservoir can be transferred to the developing roller.

When the cartridge is inserted into an image forming device, the developing roller is energized by applying a bias voltage to the outer surface of the developing roller. The electrically charged toner in the reservoir of the cartridge is electrically attracted by the bias voltage to the outer surface of the developing roller.

In some cases, the developing roller is continually energized (the bias voltage is continually applied to the developing roller) so long as the cartridge remains inserted in the image forming device and the image forming device is in an active state (e.g., the image forming device is not powered off or in a sleep mode). When the developing roller is energized, rotation of the developing roller continues to attract toner to the developing roller, and in conjunction with a rotation of the photosensitive drum, the toner is transferred to the photosensitive drum.

In some examples, an ability to selectively control whether or not toner can be transferred from the developing roller to the photosensitive drum during an active operation of an image forming device is not available. As a result, a user of the image forming device is not provided with the flexibility to selectively disrupt the transfer of toner from the developing roller to the photosensitive drum while the image forming device is active, such as during an image forming operation (e.g., performed as part of a maintenance of the image forming device, or a test of the image forming device, or during normal use by a customer of the image forming device). The ability to selectively disrupt a transfer of the toner from the developing roller to the photosensitive drum can be useful for various purposes, such as to test the cartridge or the image forming device, to perform maintenance of the cartridge or the image forming device, to check a status of the cartridge or the image forming device, and so forth.

The disruption of the transfer of a toner to the photoreceptor or the transfer member can include: 1) modifying a transfer the toner from the developer to the photoreceptor (by disabling the transfer of the toner from the developer to the photoreceptor, or by changing the amount of the toner transferred from the developer to the photoreceptor that deviates from an expected amount based on image data representing an image to be formed on a target medium), or 2) modifying a transfer of the toner from the photoreceptor to a transfer member.

In accordance with some implementations of the present disclosure, techniques or mechanisms are provided to selectively disrupt a transfer of toner from a developer (e.g., a developing roller) to a photoreceptor (e.g., a photosensitive drum) during an image forming operation of an image forming device (e.g., during a print operation), or to disrupt the toner a transfer of toner from the photoreceptor to a transfer member (e.g., an intermediate transfer member) during the image forming operation. In some examples, the selective disruption uses an actuator assembly of a cartridge that includes the developer and the photoreceptor. The actuator assembly is to cause movement (e.g., rotation, translation, a combination of different movements, etc.) of a housing of the cartridge during the image forming operation.

The housing of the cartridge being at a first position (e.g., a first pivotal position, a first translation position, etc.) disrupts a transfer of a toner to a photoreceptor or a transfer member (e.g., an intermediate transfer member such as an intermediate transfer belt, a target member such as a print medium, etc.) of the image forming device during the image forming operation. The housing being at a second position (e.g., a second pivotal position, a second translation position, etc.) allows the transfer of the toner to the photoreceptor or the transfer member of the image forming device during the image forming operation.

In the ensuing discussion, reference is made to examples in which a developer is in the form of a developing roller, and a photoreceptor is in the form of a photosensitive drum. In other examples, other types of developers and/or photoreceptors can be employed.

FIGS. **1**A-**1**B illustrate portions of an image forming device **100** that includes an actuator assembly at respective different states to move a housing to which a developing roller **104** and a photosensitive drum **124** are attached between different positions, as shown in FIGS. at **1**A-**1**B. Note that some portions of the image forming device **100** are not shown in the FIGS. **1**A-**1**B for brevity.

Also, although a specific example actuator assembly is depicted in FIGS. **1**A-**1**B, it is noted that in other examples, actuator assemblies for moving a housing can have different arrangements.

The housing to which the developing roller **104** and the photosensitive drum **124** are attached can be the housing of a cartridge. As used here, a "housing" can refer to a single housing segment or multiple housing segments that are attached together.

The cartridge is removably insertable into the image forming device **100** in some examples. The cartridge contains a toner that is to be transferred to the developing roller **104**, which in turn transfers the toner to the photosensitive drum **124**. A user may remove an existing cartridge and insert a new cartridge into the image forming device **100**, such as when the toner of the existing cartridge is depleted.

In some examples, the housing of the cartridge can include a housing segment **126** that rotatably supports the photosensitive drum **124**. The cartridge housing can also include a wall of the reservoir **106**. The cartridge housing can include further housing segments that are not shown in FIGS. **1**A-**1**B.

The developing roller **104** is part of a developing device **102** (which is part of the cartridge) that further includes a reservoir **106** as well as other components (not shown). The reservoir **106** contains a developing agent that includes an electrically charged toner. For example, the developing agent can include the electrically charged toner, a mixture of the electrically charged toner and a liquid carrier, or the toner with carrier particles.

During an image forming operation of the image forming device **100**, a bias voltage can be applied to the developing roller **104**. The bias voltage is supplied from a voltage source (not shown) of the image forming device **100**.

In some examples, a regulator (not shown) of the developing device **102** regulates a thickness of a toner that is adhered to the outer surface of the developing roller **104**. The regulator can be in the form of a regulating blade or another type of regulator. A tip of the regulating blade can come into contact or close proximity with the outer surface of the developing roller **104**. As the developing roller **104** rotates in a first rotational direction **112**, the electrically charged toner is transferred from the reservoir **106** to the outer surface of the developing roller **104** (the electrically charged toner is attracted to the outer surface of the developing roller **104** by the bias voltage applied to the developing roller **104**). The regulator sets the thickness of the toner on the developing roller **104** to be uniform as the developing roller **104** rotates. In some examples, the regulator can also be set to the bias voltage from the voltage source.

The cartridge further includes an actuator assembly **140** that includes an actuator **118**, a pivot transfer member **142** that is pivotally attached at a pivot point **146** to the cartridge housing, and a gear **144**.

The pivot transfer member **142** has a lever (in the form of a stem **142-1**) that is received in a receptacle **121** of the actuator **118**. Movement of the actuator **118** along an axis **119** causes a pivoting motion of the pivot transfer member **142** about the pivot point **146**. The actuator **118** engages the stem **142-1** to cause a rotation of the pivot transfer member **142**. FIG. **1**C shows a cross-sectional view of the actuator **118** taken along section **1**C-**1**C in FIG. **1**A. The actuator **118** is generally ring-shaped (a square ring in the example shown in FIG. **1**C, although other shapes can be used in other examples). The opening in the center corresponds to the receptacle **121** of FIGS. **1**A-**1**B. In other examples, the actuator **118** does not surround all sides of the stem **142-1** of the pivot transfer member **142**.

The pivot transfer member **142** further includes an enlarged segment **142-2** that has a general profile of half a disk. The enlarged segment **142-2** is attached to the stem **142-1**, and has a generally curved outer surface **142-3** on which a teeth profile **142-4** is formed. The rotation of the pivot transfer member **142** due to movement of the actuator **118** causes a corresponding rotation of the teeth profile **142-4**.

The teeth profile **142-4** of the enlarged segment **142-2** engages with a teeth profile **144-1** of the gear **144**.

The gear **144** of the actuation assembly **140** is fixed to the cartridge housing, which in the example of FIGS. **1**A-**1**B is the wall of the reservoir **106**. The gear **144** that is fixedly attached to the cartridge housing can be rotated about a pivot point **148**. Rotation of the gear **144** (in response to engagement of the teeth profiles **142-4** and **144-1** and the rotation

of the pivot transfer member **142**) would cause rotation of the cartridge housing about the pivot point **148**.

The cartridge housing can be pivotally attached at the pivot point **148** with respect to a support (not shown) of the image forming device **100**. For example, the support of the image forming device **100** can include a carriage or another type of support.

In examples according to FIGS. **1A-1B**, an intermediate transfer member **150** (e.g., an intermediate transfer belt) can be passed between the photosensitive drum **124** and a transfer roller **152**. The intermediate transfer member **150** and the transfer roller **152** are part of the image forming device **100**. A small gap is provided between the photosensitive drum **124** and the transfer roller **152** through which the intermediate transfer member **150** can pass.

In examples with the intermediate transfer member **150**, a toner image is transferred from the photosensitive drum **124** to the intermediate transfer member **150**, which then transfers the toner image to a target medium, such as a print medium. In such examples, the toner image is indirectly transferred from the photosensitive drum **124** to the target medium through the intermediate transfer member **150**.

In other examples, the toner image can be transferred directly from the photosensitive drum **124** to the target medium. In this case, the intermediate transfer member **150** can be replaced with the target medium.

More generally, reference is made to transferring the toner image from the photosensitive drum **124** to a transfer member, where the transfer member can be the intermediate transfer member **150** or a target medium such as a print medium.

The actuator **118** is moved by a drive assembly **120** of the image forming device **100**. In some examples, the drive assembly **120** can include a motor, a solenoid mechanism, an assembly of gears, or any other type of assembly that can impart motion on the actuator **118**. The drive assembly **120** can be controlled by a controller **122** of the image forming device **100**. In some examples, the controller **122** can control image forming operations and/or other operations of the image forming device **100**.

As used here, a "controller" can refer to a hardware processing circuit, which can include any or some combination of a microprocessor, a core of a multi-core microprocessor, a microcontroller, a programmable integrated circuit, a programmable gate array, or another hardware processing circuit. Alternatively, a "controller" can refer to a combination of a hardware processing circuit and machine-readable instructions (software and/or firmware) executable on the hardware processing circuit.

In examples according to FIGS. **1A-1B**, the actuator **118** slides left and right (in the view of FIGS. **1A-1B**) along the axis **119** in response to being driven by the actuator drive assembly **120** under control of the controller **122**. In other examples, the actuator **118** can be pivoted, rotated, or caused to have another type of motion based on being driven by the actuator drive assembly **120** under control of the controller **122**.

The photosensitive drum **124** is located in close proximity with the developing roller **104** in a supply region **125** where the toner is to be transferred from the developing roller **104** to the photosensitive drum **124**. In some examples, an outer surface of the developing roller **104** can make physical contact with the outer surface of the photosensitive drum **124**. In other examples, the outer surface of the developing roller **104** is in sufficiently close proximity to the outer surface of the photosensitive drum **124** such the toner that is on the outer surface of the developing roller **104** can be transferred to the outer surface of the photosensitive drum **124** (or more specifically, to the outer surface of a photosensitive layer of the photosensitive drum **124**). In some examples, the photosensitive drum **124** is rotatably supported by the housing segment **126**.

During an image forming operation, the photosensitive drum **124** is rotated in a second rotational direction **128**, which is opposite a first rotational direction **112** (depicted in FIGS. **2A-2B**) of the developing roller **104**. For example, the first rotational direction **112** is a clockwise direction, while the second rotational direction **128** is a counterclockwise direction (or vice versa). In other examples, the developing roller **104** and the photosensitive drum **124** can rotate in the same direction.

As further shown in FIG. **1A**, an imaging charging element **130** when energized is used to charge the outer surface of the photosensitive drum **124** to a uniform electric potential. The imaging charging element **130** can include a charging roller or a corona charger, according to some examples.

The image forming device **100** further includes a light source **132** to irradiate selected portions of the electrically charged outer surface of the photosensitive drum **124** with light **134**. The light **134** from the light source **132** is modulated according to image data received by the controller **122**. The image data defines the image to be formed on a target medium **136**, such as a print substrate. Note that the light source **132** is external of the cartridge and is part of the image forming device **100**.

Each portion of the electrically charged outer surface of the photosensitive drum **124** irradiated with the light **134** will have the portion's electric potential changed (from the electric potential charged by the imaging charging element **130**). In first examples, the selected portions irradiated with the light **134** correspond to respective portions of an image to be formed on the target medium **136**.

In such first examples, toner is transferred from the developing roller **104** to the irradiated selected portions where the respective portions of the image are to be formed on the target medium. In the first examples, the toner is transferred to locations of the electrostatic latent image formed on the outer surface of the photosensitive drum **124**.

In second examples, the selected portions irradiated with the light **134** correspond to respective portions where an image is not to be formed on the target medium **136**. In such second examples, toner is transferred from the developing roller **104** to remaining portions of the outer surface of the photosensitive drum **124** where the light **134** has not irradiated. In the second examples, the toner is transferred to locations outside of the electrostatic latent image formed on the outer surface of the photosensitive drum **124**.

The irradiation of the outer surface of the photosensitive drum **124** with the light **134** forms an electrostatic latent image on the outer surface of the photosensitive drum **124**. Toner is transferred from the developing roller **104** to the outer surface of the photosensitive drum **124** based on the electrostatic latent image, to develop the electrostatic latent image to form a visible toner image on the outer surface of the photosensitive drum **124**.

The toner image on the photosensitive drum **124** can then be transferred to the intermediate transfer member **150** (or more generally, a transfer member) that passes between the photosensitive drum **124** and the transfer roller **152**.

FIG. **1B** show the actuator **118** being moved to the left by the actuator drive assembly **120**, under control of the controller **122**. Moving the actuator **118** to the left engages the stem **142-1** of the pivot transfer member **142**, which causes

rotation of the pivot transfer member **142** in a rotational direction **154** about the pivot point **146**. The rotation of the pivot transfer member **142** in the rotational direction **154** (e.g., clockwise direction in FIG. **1**B) causes the gear **144** to pivot in a rotational direction **156** (e.g., counterclockwise direction) about the pivot point **148**. The rotation of the gear **144** in the rotational direction **156** causes the cartridge housing that is fixedly attached to the gear **144** to also rotate in the rotational direction **156** relative to a support (not shown) of the image forming device **100**, as shown in FIG. **1**B.

The rotation of the cartridge housing in the rotational direction **156** causes lifting of the photosensitive drum **124** away from the upper surface of the intermediate transfer member **150**. As a result of the lifting of the photosensitive drum **124** away from the intermediate transfer member **150** by the rotation of the cartridge housing in the rotational direction **156**, a gap **160** is formed between the outer surface of the photosensitive drum **124** and the upper surface of the intermediate transfer member **150**. This gap **160** prevents transfer of any toner image from the outer surface of the photosensitive drum **124** to the upper surface of the intermediate transfer member **150**.

In a first state of the actuator assembly **140** shown in FIG. **1**A, the cartridge housing is set at its first position so that the photosensitive drum **124** is engaged with the upper surface of the intermediate transfer member **150** to allow for normal transfer of a toner image from the photosensitive drum **124** to the upper surface of the intermediate transfer member **150**. The "normal transfer" of the toner image can refer to a transfer of the toner image that is based on a target operation of the image forming device **100** for forming an image on a target medium according to image data received by the controller **122**.

In a second state of the actuator assembly **140** shown in FIG. **1**B, the cartridge housing is set at its second position so that the photosensitive drum **124** is moved away from the upper surface of the intermediate transfer member **150** to prevent the transfer of a toner image from the photosensitive drum **124** to the upper surface of the intermediate transfer member **150**. This effectively prevents formation of the image on the target medium according to the image data received by the controller **122**.

FIGS. **2**A-**2**B depicts another arrangement in which a cartridge housing can be moved from a first position (FIG. **2**A) to a second position (FIG. **2**B) by an actuator assembly **201** that includes the actuator **118** and other components depicted in FIGS. **2**A-**2**B.

Components of the image forming device **200** similar to those of the image forming device **100** of FIGS. **1**A-**1**B share the same reference numerals.

As shown in FIG. **2**A, the actuator assembly **201** includes the actuator **118**, a lever **202**, a link member **204**, and a pin **212**.

The image forming device **201** includes a motion transfer plate **206**, which is shown as being transparent to allow components behind the motion transfer plate **206** to be visible in FIGS. **2**A-**2**B. The motion transfer plate **206** can be part of the support for the cartridge of FIGS. **2**A-**2**B. For example, the motion transfer plate **206** can be part of a carriage or other support of the image forming device **200**.

The cartridge housing is moveable relative to the motion transfer plate **206** to allow for movement of the motion transfer plate **206** relative to the intermediate transfer member **150** (or more generally, a transfer member).

The lever **202** can be rotated about a pivot point **208** that is attached to the cartridge housing. A first end portion **202-1** of the lever **202** is received in the receptacle **121** of the actuator **118**. A second end portion **202-2** of the lever **202** is pivotally attached to a first end portion of the link member **204** at a pivot point **210**. A second end portion of the link member **204** is attached to the pin **212** that can slide along an elongated groove **214** of the motion transfer plate **206**.

FIG. **2**B shows the actuator **118** moving to the left along the axis **119**, as driven by the actuator drive assembly **120** under control of the controller **122**. The left movement of the actuator **118** engages the lower portion **202-1** of the lever **202**, which causes the lever **202** to rotate about the pivot point **208** in a rotational direction **220** (e.g., a clockwise direction).

The rotation of the lever **202** in the rotational direction **220** causes the link member **204** to rotate in a rotational direction **222** (e.g., counterclockwise direction) at the pivot point **210**. The rotation of the link member **204** in the rotational direction **222** causes the pin **212** attached to the second end portion of the link member **204** to slide generally upwardly along the elongated groove **214** of the motion transfer plate **206**.

The motion transfer plate **206** can be fixed in position in the image forming device **200**, and the cartridge housing is movable relative to the motion transfer plate **206**. As a result, since the pin **212** is attached to the cartridge housing, the pin **212** sliding generally upwardly in the elongated groove **214** of the fixed motion transfer plate **206** causes the cartridge housing to rise, as shown in FIG. **2**B, to create a gap **260** between the outer surface of the photosensitive drum **124** and the upper surface of the transfer member **150**.

FIGS. **3**A-**3**B show a different arrangement of an image forming device **300** in which the cartridge housing can be moved (e.g., rotated) from the first position shown in FIG. **3**A to the second position shown in FIG. **3**B.

Components of the image forming device **300** similar to those of the image forming device **100** of FIGS. **1**A-**1**B share the same reference numerals.

In the first position of FIG. **3**A, the cartridge housing does not block the light **134** emitted by the light source **132** from reaching the outer surface of the photosensitive drum **124**. In the second position shown in FIG. **3**B, the cartridge housing has been rotated such that the cartridge housing blocks the light **134** emitted by the light source **132** from reaching the outer surface of the photosensitive drum **124**.

The rotation of the cartridge housing according to FIGS. **3**A-**3**B is based on use of an actuator assembly **301** that includes the actuator **118**, a lever **302**, and a pin **304** that is pivotally attached to the lever **302** at a second end portion **302-2** of the lever **302**. A first end portion **302-1** of the lever **302** is received in the receptacle **121** of the actuator **118**.

FIGS. **3**A-**3**B also show a motion transfer plate **306** of the image forming device **300**. The motion transfer plate **306** is fixedly mounted in the image forming device **300**, and is part of the support for the cartridge. The motion transfer plate **306** has a curved groove **308** along which the pin **304** can slide. In the first position of the cartridge housing shown in FIG. **3**A, the pin **304** is near the bottom portion of the curved groove **308**.

When the actuator **118** is shifted to the left along the axis **119** to the position shown in FIG. **3**B, the lever **302** is engaged by the actuator **118**, which causes pivoting of the lever **302** relative to the motion transfer plate **306** such that the pin **304** slides upwardly along the curved groove **308** of the motion transfer plate **306**.

Since the motion transfer plate **306** is fixed relative to the image processing device **300**, the movement of the pin **304** (which is attached to the cartridge housing) causes a corre-

sponding motion that follows the curved profile of the curved groove **308**. This causes a rotation of the cartridge housing in a rotational direction **310** (e.g., a clockwise direction), to the position shown in FIG. **3**B where the cartridge housing blocks the light **134** emitted by the light source **132** from reaching the outer surface of the photosensitive drum **124**.

During an image forming operation of the image forming device **300**, if the cartridge housing has been moved to its second position (light blocking position) shown in FIG. **3**B, then the outer surface of the photosensitive drum **124** would remain at the uniform electric potential charged by the imaging charging element **130**. An electrostatic latent image based on the radiation of the light **134** from the light source **132** would not be produced on the outer surface of the photosensitive drum **124** when the cartridge housing blocks the light **134** from the outer surface of the photosensitive drum **124**.

As a result, in the first examples noted above where the toner is to be transferred from the developing roller **104** to the photosensitive drum **124** at locations of the electrostatic latent image, the blocking of the light **134** from the outer surface of the photosensitive drum **124** would disable the toner transfer from the developing roller **104** to the outer surface of the photosensitive drum **124**. Because there is no light irradiation of the uniform electric potential formed on the surface of the photosensitive drum **124** by the imaging charging element **130**, the outer surface of the photosensitive drum **124** at the uniform electric potential to prevent the transfer of the toner from the developing roller **104** to the photosensitive drum **124**.

On the other hand, in the second examples where the toner is transferred to locations outside of the electrostatic latent image formed on the outer surface of the photosensitive drum **124**, the blocking of the light **134** from the outer surface of the photosensitive drum **124** by the cartridge housing would cause the toner to be transferred from the developing roller **104** to the entire outer surface of the photosensitive drum **124** capable of receiving the toner from the developing roller **104** in the supply region **125**.

More generally, when the light **134** from the light source **132** is not blocked by the cartridge housing when the cartridge housing is in the first position of FIG. **3**A, toner transfer from the developing roller **104** to the photosensitive drum **124** can occur in the normal manner according to an electrostatic latent image formed on the outer surface of the photosensitive drum **124** according to image data received by the controller **122**. However, when the light **134** from the light source **132** is blocked by the cartridge housing when the cartridge housing is in the second position of FIG. **3**B, toner transfer from the developing roller **104** to the photosensitive drum **124** is disrupted (either no toner is transferred or toner is transferred to the entire outer surface of the photosensitive drum **124** capable of receiving the toner from the developing roller **104** in the supply region **125**).

FIG. **4** is a block diagram of an apparatus **400** that includes a developer **402** (e.g., the developing roller **104**) and a photoreceptor **404** (e.g., the photosensitive drum **124**). The developer **402** is to transfer a toner to the photoreceptor **404**.

The apparatus **400** further includes a housing **406** that is moveable in an image forming device (e.g., any of **100**, **200**, **300**, etc.). The housing **406** can be a housing of a cartridge.

The apparatus **400** includes an actuator assembly **408** engaged with the housing **406**. The actuator assembly **408** is actuatable between different states in response to control by the image forming device during an image forming operation of the image forming device. A first state of the different states corresponds to the housing **406** being at a first position that disrupts a transfer of the toner to a transfer member (e.g., the intermediate transfer member **150** or a target medium) of the image forming device during the image forming operation. A second state of the different states corresponds to the housing **406** being at a second position (moved from the first position at **410**) that allows the transfer of the toner to the transfer member.

In some examples, in the first position of the housing **406** the photoreceptor **404** is separated away from the transfer member. In the second position of the housing **406** the photoreceptor **404** is in an engaged position to transfer the toner to the transfer member.

In some examples, the photoreceptor **404** when separated away from the transfer member is spaced apart from the transfer member by a greater distance than when the photoreceptor **404** is in the engaged position.

In some examples, in the first position the housing **406** blocks light from a light source from reaching the photoreceptor **404**, where the light is to form an electrostatic latent image on the photoreceptor **404**. In the second position the housing **406** allows the light from the light source to reach the photoreceptor **404**.

In some examples, the actuator assembly **408** includes a lever (e.g., **142-1** of FIGS. **1**A-**1**B, **202** of FIGS. **2**A-**2**B, **302** of FIGS. **3**A-**3**B) moveable by an actuator drive assembly **120** of the image forming device. The lever when moved causes actuation of the actuator assembly **408** between the different states.

In some examples, the actuator assembly **408** includes a teeth profile (e.g., **144-1** of FIGS. **1**A-**1**B) on the housing **406**.

In some examples, the actuator assembly **408** includes one of a groove and a pin slidable along the groove.

FIG. **5** is a block diagram of a cartridge **500** for an image forming device according to some examples. The cartridge **500** includes a developing roller **502**, and a lever **504** moveable between different positions by a mechanism (e.g., the actuator drive assembly **120**) of the image forming device during an image forming operation of the image forming device.

The cartridge **500** further includes a photosensitive drum **506**, where the developing roller **502** is to transfer a toner to the photosensitive drum **506**. The cartridge **500** includes a housing **508** moveable in the image forming device.

The cartridge **500** includes an actuator assembly **510** engaged with the housing **508**. The lever **504** when moved actuates the actuator assembly **510** between different states in response to control by the image forming device during the image forming operation. A first state of the different states corresponds to the housing **508** being at a first position that disrupts a transfer of the toner to a transfer member of the image forming device during the image forming operation, and a second state of the different states corresponds to the housing **508** being at a second position that does not disrupt the transfer of the toner to the transfer member.

FIG. **6** is a flow diagram of a process **600** according to some examples. During an image forming operation of an image forming device to form an image on a target medium, the process **600** includes tasks **602** and **604**.

The process **600** includes operating (at **602**) a photoreceptor of a cartridge. The process **600** includes activating (at **604**) a mechanism that moves a lever (e.g., **142-1** of FIGS. **1**A-**1**B, **202** of FIGS. **2**A-**2**B, **302** of FIGS. **3**A-**3**B) of the cartridge from a first lever position to a second lever position, where the lever in the first lever position causes a

housing of the cartridge to be at a first position that disrupts a transfer of a toner to a transfer member of the image forming device during the image forming operation, and where the lever in the second lever position causes the housing of the cartridge to be at a second position that allows the transfer of the toner to the transfer member of the image forming device during the image forming operation.

In the foregoing description, numerous details are set forth to provide an understanding of the subject disclosed herein. However, implementations may be practiced without some of these details. Other implementations may include modifications and variations from the details discussed above. It is intended that the appended claims cover such modifications and variations.

What is claimed is:

1. An apparatus comprising:

a developing roller;

a photoreceptor, the developing roller to transfer a toner to the photoreceptor;

a housing that is moveable in an image forming device; and

an lever and gear assembly engaged with the housing, wherein the lever and gear assembly is actuatable between different states in response to control by the image forming device during a continuous print operation of the image forming device to selectively disrupt toner transfer, wherein a first state of the different states corresponds to the housing being at a first position that disrupts a transfer of the toner to a intermediate transfer belt of the image forming device during the continuous print operation, and a second state of the different states corresponds to the housing being at a second position that allows the transfer of the toner to the intermediate transfer belt.

2. The apparatus of claim **1**, wherein in the first position of the housing the photoreceptor is separated away from the intermediate transfer belt.

3. The apparatus of claim **2**, wherein in the second position of the housing the photoreceptor is in an engaged position to transfer the toner to the intermediate transfer belt.

4. The apparatus of claim **3**, wherein the photoreceptor when separated away from the intermediate transfer belt is spaced apart from the intermediate transfer belt by a greater distance than when the photoreceptor is in the engaged position.

5. The apparatus of claim **1**, wherein in the first position the housing blocks light from a light source from reaching the photoreceptor, and wherein the light is to form an electrostatic latent image on the photoreceptor.

6. The apparatus of claim **5**, wherein in the second position the housing allows the light from the light source to reach the photoreceptor.

7. The apparatus of claim **1**, wherein the lever and gear assembly comprises:

a lever moveable by an motor of the image forming device, the lever when moved causing actuation of the lever and gear assembly between the different states.

8. The apparatus of claim **1**, wherein the lever and gear assembly comprises a teeth profile on the housing.

9. The apparatus of claim **1**, wherein the lever and gear assembly comprises one of a groove and a slidable pin.

10. The apparatus of claim **1**, wherein the developer and the photoreceptor are mounted to the housing.

11. The apparatus of claim **1**, wherein the toner is in the housing that is associated with the print operation.

12. A cartridge for an image forming device, comprising:

a developing roller;

a lever moveable between different positions during a continuous print operation of the image forming device to selectively disrupt toner transfer;

a photosensitive drum, the developing roller to transfer a toner to the photosensitive drum;

a housing moveable in the image forming device; and

an lever and gear assembly engaged with the housing, wherein the lever is to actuate the lever and gear assembly between different states in response to control by the image forming device during the continuous print operation, wherein a first state of the different states corresponds to the housing being at a first position that disrupts a transfer of the toner to a intermediate transfer belt of the image forming device during the continuous print operation, and a second state of the different states corresponds to the housing being at a second position that does not disrupt the transfer of the toner to the intermediate transfer belt.

13. The cartridge of claim **12**, wherein in the first position of the housing the photosensitive drum is separated away from the intermediate transfer belt so that transfer of the toner from the photosensitive drum to the intermediate transfer belt is disabled.

14. The cartridge of claim **12**, wherein in the first position the housing blocks light from a light source from reaching the photosensitive drum, and wherein the light is to form an electrostatic latent image on the photosensitive drum.

15. A method comprising:

during a continuous print operation of an image forming device to form an image on a target medium to selectively disrupt toner transfer:

operating a photoreceptor of a cartridge; and

selectively moving a lever of the cartridge from a first lever position to a second lever position, wherein the lever in the first lever position causes a housing of the cartridge to be at a first position that disrupts a transfer of a toner to a intermediate transfer belt of the image forming device during the continuous print operation, and wherein the lever in the second lever position causes the housing of the cartridge to be at a second position that allows the transfer of the toner to the intermediate transfer belt of the image forming device during the continuous print operation.

16. The method of claim **15**, wherein:

in the first position of the housing the photoreceptor is separated away from the intermediate transfer belt so that transfer of the toner from the photoreceptor to the intermediate transfer belt is disabled, or

wherein in the first position the housing blocks light from a light source from reaching the photoreceptor, and wherein the light is to form an electrostatic latent image on the photoreceptor.

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