A paper transfer control method for an image forming device having a plurality of paper feeding cassettes for storing paper sheets; a pickup roller for picking up a paper sheet from one of the plurality of paper feeding cassettes to load the picked up paper on a paper transfer path; a transfer roller for feeding the loaded paper sheet; an image forming unit having a photosensitive medium for forming an image on the paper sheet; a driving motor for driving the photosensitive medium, the transfer roller and the pickup roller; and a plurality of sensors for sensing whether the paper sheet is transferred. The method includes: selecting a paper feeding cassette which picks up a paper sheet according to a received printing command; transmitting a linear-velocity control command to the driving motor, the linear-velocity control command based on a paper transfer path of the selected paper feeding cassette; and picking up the paper sheet, and transferring the picked up paper along the paper transfer path.
FIG. 1 (PRIOR ART)
FIG. 5

START

PRINT COMMAND?

NO

YES

SELECTING PAPER FEEDING CASSETTE S501

IS THERE ANY PAPER SHEET IN THE PAPER FEEDING CASSETTE?

NO

DISPLAYING ON OPERATING PANEL AND SUPPLEMENTING PAPER SHEET S505

YES

LINEAR-VELOCITY CONTROL COMMAND DEPENDING ON PAPER TRANSPORT PATH S503

TRANSPORTING PAPER SHEET S504

END
PAPER TRANSFER CONTROL METHOD FOR IMAGE FORMING DEVICE

CROSS-REFERENCE TO RELATED APPLICATION


BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to an image forming device, and more particularly, to a paper transfer control method for an image forming device in which a photosensitive medium, a transfer roller and a pickup roller have the same linear velocity so as to compensate for loads that are varied depending on where a plurality of paper feeding cassettes is located in the image forming device.

[0004] 2. Description of Related Art

[0005] In a conventional image-forming device, a laser beam is irradiated onto a photosensitive medium such as a photosensitive belt (or photosensitive drum) to form an electrostatic latent image on the photosensitive medium. Thereafter, the formed electrostatic latent image is developed using a development agent having a solid-state toner mixed with a liquid phase carrier functioning as a solvent to be transferred on paper sheets, thereby printing a desired image on the paper sheet. A typical image-forming procedure includes the following operations listed in order: changing; exposing; developing; transferring; and fixing.

[0006] FIG. 1 is a schematic view of the construction of an engine mechanism of an image-forming device.

[0007] Referring to FIG. 1, a laser beam printer includes a feeding unit 50 for feeding paper sheets; an image forming unit 10 for forming an image on the paper sheet fed from the feeding unit 50; a fixing unit for fixing the image formed on the paper sheet in the image forming unit 10; and a discharging unit 51 for discharging the paper sheet fixed in the fixing unit. Herein, paper discharge is a procedure of discharging a fixed paper sheet to the external.

[0008] As shown in FIG. 1, the image-forming unit 10 includes a belt type photosensitive medium 9 wound on a roller installed within a body (not shown) to travel along a certain path. A charging unit (not shown), an exposing unit (not shown), a developing unit (not shown), a drying unit, a transferring/fixing unit (not shown) are installed at a circumference of the photosensitive medium.

[0009] The image forming unit 10 can be changed. For example, instead of the photosensitive belt, a photosensitive drum (not shown) can be used as the photosensitive medium in a dry printer using a solid-state toner as a development material.

[0010] The electrostatic latent image is formed and developed on the photosensitive medium using the exposing unit and the developing unit, respectively. The developing unit jets the developing agent onto the photosensitive medium such that only toner of the developing agent remains in a region of the electrostatic latent image of the photosensitive medium to develop the electrostatic latent image on a surface of the photosensitive medium. The drying unit removes carrier, which has not yet been removed up to a developable level in the developing unit. The transferring/fixing unit transfers the image formed on the photosensitive medium to the paper sheet. Herein, the paper sheet is transferred toward the transferring/fixing unit in the image forming unit.

[0011] As shown in FIG. 1, the image-forming device includes several paper feeding cassettes 11, 12, and 13 for storing paper sheets according to paper size; and a paper transfer path 30 along which the paper sheet is transferred from the paper feeding cassettes 11, 12, and 13 to the transferring/fixing unit.

[0012] At a rear end portion of each of the paper feeding cassettes 11, 12, and 13 are installed pickup rollers 21 and 22 for picking up the paper sheet received in the paper feeding cassettes 11, 12, and 13 to load the picked up paper on the paper transfer path 30. Additionally, a plurality of transfer rollers 23 through 27 is installed at a specified interval along the transfer path 30.

[0013] The pickup rollers 21 and 22, and the transfer rollers 23 through 27 are connected to a driving motor by a plurality of clutches (not shown).

[0014] Meanwhile, a plurality of sensors 40, 41, 42, and 43 are installed along the paper transfer path 30 to sense a transfer state and a jam state of the paper sheet and to transmit the sensed state to a controller.

[0015] In the conventional image-forming device having the above-described engine mechanism, the pickup rollers 21 and 22 of the feed unit 50 are designed to pick up all various paper sheets with a predetermined friction coefficient at a predetermined velocity. Specifically, the photosensitive belt (or photosensitive drum) 9, the transfer roller, the pickup roller 21 and 22 are designed to be driven by one driving motor thereby having the same linear velocity.

[0016] When the photosensitive belt (or the photosensitive drum) 9, the transfer rollers 23 through 27, and the pickup rollers 21 and 22 are driven by one driving motor, there are drawbacks as follows.

[0017] First, when the conventional image forming device transfers paper sheets along two paper transfer paths (not shown), loads applied to the motor with respect to each transfer path are different from each other. Therefore, real linear velocities of the motor are different from each other depending on the applied loads. Specifically, when the pickup roller applies a strong contact pressure to the printing medium so as to prevent mis-pickup of the printing medium or when the image forming device includes a retard roller at a circumference of the pickup roller so as to prevent a duplicate transfer, the difference between the linear velocities, which is caused by a difference between the paper transfer paths, increases. However, since system control timings are identically sensed and applied despite the difference between the linear velocities, a little variation or a delay causes a jam signal to be transmitted despite an absence of a jam, thereby erroneously stopping printing.

[0018] Second, when an exact image quality and image forming position is required, a skew of an image length is an important factor. Since the image length is different accord-
ing to the paper transfer path, the conventional driving method is not recommendable in this case.

[0019] Third, even a front-end margin is different according to the paper transfer path. This front end margin is not only unacceptable in stably realizing the image quality, but also in a control method requiring a constant front end margin as a precondition, a stable front end margin is more required.

[0020] In Japanese Patent Publication No. 03-042683 (JP '683), a disclosed device includes a plurality of units for housing paper sheets, and controls a feeding speed and a scanning speed every housing unit to form an image with no relation to a position of the housing unit. JP '683 provides a unit having two driving units that are integrated to adjust a speed rate, so as to improve a difference between the speed rates of a paper feeding system and a scanning system.

[0021] Further, Japanese Patent Publication No. 05-105255 (JP '255) discloses a recording device provided with a plurality of paper feeding trays, which controls a reverse transferring speed such that recording can be performed regardless of a length of a reverse transferring path of respective feeding trays. In JP '255, since lengths from start positions of the plurality of paper feeding trays to a common image region are different from each other, a control unit is provided to control a long-distance paper feeding unit to operate at a high speed, and a short-distance paper feeding unit to operate at a low speed such that paper sheets reaches only up to a common image region within a predetermined time.

[0022] Furthermore, Japanese Patent Publication No. 2001-154558 (JP '558) discloses an image forming device in which when a paper sheet is transferred to a resist roller, controlling is performed to reduce a linear velocity difference between a reverse transfer roller and the resist roller. In this invention, an image forming part is used in the image forming device concurrently using the ink-jet and the laser to improve a difference between a low speed of the ink-jet and a high speed of the laser. JP '558 discloses a unit for controlling a transfer of the paper sheet by installing a plate spring between an ink-jet unit and a laser unit.

[0023] Additionally, Japanese Patent Publication No. 2002-370837 (JP '837) discloses a paper feeding unit for controlling a speed of a motor provided with a plurality of trays for loading paper sheets thereon and supplying the paper sheet to an image forming device. JP '837 discloses a hard device (flip-flop, counter, or the like) installed at each of the trays to generate a speed control bit signal to control a corresponding speed. That is, only a motor speed of the tray whenever the tray is connected to the hardware device without controlling the motor using a main CPU to allow the paper sheet to be supplied from each of the trays in the image forming device having a plurality of trays.

**BRIEF SUMMARY**

[0024] Embodiments of the present invention provide a paper transfer control method for an image forming device, in which loads which are different from one another depending on where a plurality of paper feeding cassettes is located, are compensated to allow a transfer roller and a pickup roller to have the same linear velocity.

[0025] Also, embodiments of the present invention provides a paper transfer control method for an image forming device, in which a transfer roller and a pickup roller have the same linear velocity such that an image is outputted with a predetermined length, thereby improving an image quality.

[0026] Further, embodiments of the present invention provides a paper transfer control method for an image forming device, in which an erroneous system timing is not caused by different linear velocities to prevent an erroneous jam signal, thereby stably controlling the image forming device.

[0027] Furthermore, embodiments of the present invention provides a paper transfer control method for an image forming device in which a part of the image forming device, a part of a toner cartridge or the like contacting on a paper transfer path does not wear due to an irregular linear velocity of the transfer path.

[0028] Still further, embodiments of the present invention provides a paper transfer control method for an image forming device in which a front end margin of a paper is kept constant to solve a drawback resulting from a variation of the front end margin of the paper caused by the paper transfer path that varies according to a position of a paper feeding cassette.

[0029] According to an aspect of the present invention, there is provided a paper transfer control method for an image forming device having a plurality of paper feeding cassettes for storing paper sheets, a pickup roller for picking up a paper sheet from one of the plurality of paper feeding cassettes to load the picked up paper on a paper transfer path; a transfer roller for feeding the loaded paper sheet; an image forming unit having a photosensitive medium for forming an image on the paper sheet; a driving motor for driving the photosensitive medium, the transfer roller and the pickup roller; and a plurality of sensors for sensing whether the paper sheet is transferred. The method includes: selecting a paper feeding cassette which picks up a paper sheet according to a received printing command; transmitting a linear-velocity control command to the motor; the linear-velocity control command based on a paper transfer path of the selected paper feeding cassette; and picking up the paper sheet, and transferring the picked up paper along the paper transfer path.

[0030] The linear-velocity control command may be determined by a real measured value according to at least an angle and a friction coefficient of every paper transfer path.

[0031] The linear-velocity control command may dictate that the transfer roller, the pickup roller and the photosensitive medium are driven at the same linear velocity.

[0032] The method may include storing the linear-velocity control command.

[0033] According to another aspect of the present invention, there is provided an image forming device including: a plurality of paper feeding cassettes which store paper sheets; a pickup roller which picks up a paper sheet from one of the plurality of paper feeding cassettes to load the picked up paper on a paper transfer path; a transfer roller which feeds the loaded paper sheet; an image forming unit having a photosensitive medium which forms an image on the paper sheet; a driving motor which drives the photosensitive medium, the transfer roller and the pickup roller; a plurality of sensors which sense whether the paper sheet is transferred; and a memory unit which stores a linear-velocity
control command for rotating the photosensitive medium, the pickup roller and the transfer roller at the same linear velocity.

[0034] According to still another aspect of the present invention, there is provided a paper transfer control method, including: selecting a paper feeding cassette in response to an input print command; determining whether there is a paper sheet in the selected paper feeding cassette; transmitting, when it is determined that a paper sheet is not present in the selected paper feeding cassette, a linear-velocity control command to a driver, the linear-velocity control command based on a type of the selected paper feeding cassette, and driving the driver at a real linear velocity based on the linear-velocity control command; and picking up the paper sheet from the selected paper feeding cassette, transferring the picked up paper along the paper transfer path, and outputting the sheet of paper.

[0035] According to still another aspect of the present invention, there is provided a printing method, including: selecting a cassette from a plurality of paper feeding cassettes; using compensation data to generate a linear-velocity control command which to drive a motor and which compensates for a difference between paper feeding cassettes; and driving the motor to pick up the paper sheet from the selected paper feeding cassette, transfer the picked up paper along the paper transfer path, and output the sheet of paper.

[0036] As described above, an advantage of embodiments of the present invention is that, loads, which are different depending on where a plurality of paper feeding cassettes is located, are compensated to allow the transfer roller and the pickup roller to have the same linear velocity.

[0037] Second, an advantage of embodiments of the present invention is that the transfer roller and the pickup roller have the same linear velocity such that an image is outputted with a predetermined length, thereby improving an image quality.

[0038] Third, an advantage of embodiments of the present invention is that an erroneous system timing is not caused by different linear velocities to prevent an erroneous jam signal, thereby stably controlling the image forming device.

[0039] Fourth, an advantage of embodiments of the present invention is that a part of the image forming device, a part of a toner cartridge or the like contacting the paper transfer path does not wear due to an irregular linear velocity.

[0040] Further, an advantage of embodiments of the present invention is that a front end margin of a paper is kept constant to solve a drawback resulting from a variation of the front end margin of the paper caused by the paper transfer path that varies according to a position of a paper feeding cassette.

[0041] Additional and/or other aspects and advantages of the present invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0042] These and/or other aspects and advantages of the present invention will become apparent and more readily appreciated from the following detailed description, taken in conjunction with the accompanying drawings of which:

[0043] FIG. 1 is a view illustrating a schematic construction of an engine mechanism of a conventional laser-beam image forming device;

[0044] FIG. 2 is a block diagram illustrating an image forming device according to an embodiment of the present invention;

[0045] FIG. 3 is a view illustrating a relation between a linear-velocity control command and a linear velocity reduced by a resistance factor in a manual paper feeding cassette;

[0046] FIG. 4 is a view illustrating a relation between a linear-velocity control command and a linear velocity reduced by a resistance factor in the paper feeding cassette; and

[0047] FIG. 5 is a flowchart illustrating a method for controlling a linear velocity of a motor by considering a paper transfer path, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

[0048] Reference will now be made in detail to embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. The embodiments are described below in order to explain the present invention by referring to the figures.

[0049] FIG. 2 is a block diagram illustrating an image forming device according to an embodiment of the present invention.

[0050] Referring to FIG. 2, a controller 230, which is a main controlling unit of the image forming device according to the present embodiment, controls each unit of the image forming device to form an image on paper sheets in an electrophotographic development process.

[0051] A memory unit 240 includes a ROM for storing a control program for controlling each unit of an image forming device; and a RAM for temporarily storing data generated when controlling the image forming device. In order to compensate for a difference between the real linear velocities, which is caused by a resistance factor (for example, an angle regarding a paper transfer path, a friction coefficient and the like), every paper transfer path, the memory unit 240 stores compensation data in the RAM, and is upgradable considering a part abrasion or future circumstances.

[0052] An operating panel equipment 220 includes a plurality of manipulation keys for allowing key data to be inputted by a user and to be outputted to the controller 230; and a display unit for displaying an operation state of the image forming device.

[0053] A host interfacing unit 210 interfaces a host computer with the controller 230.

[0054] A sensing circuit 250 includes sensors 40, 41, 42, and 43 positioned along a paper transfer path to sense an operation state of each unit of the image forming device, that
is a paper transfer state, a manual feeding or not, a toner residue and the like to output the sensed operation state to the controller 230.

[0055] As shown in FIG. 1, an image forming unit 260 includes a plurality of rollers necessary for performing the electrophotographic development process, and a power supplying unit for applying a bias voltage to each of the rollers. The image forming unit 260 is controlled by the controller 230.

[0056] As shown in FIG. 2, a driving unit 270 includes a transfer roller 275, a pickup roller 274, a driving motor 272 for driving a photosensitive medium 9, and an electronic clutch 273 for switching an operation of the pickup roller and the transfer roller. The driving unit 270 is driven under control of the controller 230. For example, the photosensitive medium 9, a charge roller, a transfer roller and the like are rotated at a velocity of the electrophotographic development process by driving of the driving motor. Additionally, the pickup roller or the transfer roller is also rotated using the driving of the driving motor. At this time, a rotation of the photosensitive medium, the pickup roller and the transfer roller is controlled by the electronic clutch 273. Since an operation of the electronic clutch and a rotation control of the pickup roller using the same are already known in the art, a detailed description thereof is omitted. It is to be understood that although the present embodiment is described as having a single driving motor 272 which drives the photosensitive belt (or the photosensitive drum) 9, the transfer roller 275, and the pickup roller 274, the present embodiment is not limited to a single driving motor. Rather, it is contemplated that two or more driving motors may be used. And, when two or more driving motors are used, a transfer velocity of the paper sheet can be accelerated or decelerated along the transfer path depending on the paper feeding cassette.

[0057] FIGS. 3 and 4 are views illustrating linear-velocity control commands $V_{\text{command}}$, $V_{\text{real}}$ according to a paper transfer path of a paper feeding cassette, reduced linear velocities $V_{\text{res}}$, $V_{\text{res}}$ considering a friction force, and the angle of the paper transfer path, and real linear velocities $V_{\text{real}}$, $V_{\text{real}}$. Specifically, FIG. 3 represents a case of a manual paper feeding cassette, and FIG. 4 represents a case of an automatic-type paper feeding cassette. FIG. 3 includes an image forming unit 310, a pickup roller 324, and a paper feeding cassette 313. FIG. 4 includes an image forming unit 410, transfer rollers 423 and 424, and a pickup roller 422.

[0058] In FIG. 3, a paper sheet travels with the real linear velocity $V_{\text{real}}$. The real linear velocity $V_{\text{real}}$ is obtained by subtracting the reduced linear velocity $V_{\text{res}}$ from the linear-velocity control command $V_{\text{command}}$ inputted to the driving motor. The reduced linear velocity $V_{\text{res}}$ is caused by a resistance factor such as angle $\theta$ of the paper feeding cassette and the paper friction force.

[0059] Similarly in FIG. 4, the paper sheet travels with real linear velocity $V_{\text{real}}$ reduced by reduced velocity $V_{\text{res}}$ caused by a resistance factor ($\theta$ or a friction force). The relationships between the velocities in the two cases are expressed by the following Equations:

$$V_{\text{real}} = V_{\text{command}} - V_{\text{res}}$$  \hspace{1cm} \text{Equation (1)}

$$V_{\text{real}} = V_{\text{command}} - V_{\text{res}}$$  \hspace{1cm} \text{Equation (2)}

[0060] Assuming that the reduced linear velocity caused by the resistance factor of the manual feeding is $V_{\text{res}}$, a relation of $V_{\text{res}} = V_{\text{res}}$ is obtained in the Equation 2. In order for the real linear velocities to be identical with each other, $V_{\text{real}}$ and $V_{\text{real}}$ of the Equations (1) and (2) should be the same. Generally, considering that $V_{\text{res}}$ is larger than $V_{\text{res}}$, the real linear velocity $V_{\text{real}}$ of the paper feeding cassette is slower than the real linear velocity $V_{\text{real}}$ of the paper feeding cassette 1 by $\alpha$.

[0061] Accordingly, in order for the linear velocities of the paper feeding cassettes to be identical with each other, the linear-velocity control command $V_{\text{command}}$ inputted to the driving motor regarding the paper feeding cassette 2 should be increased by a corresponding to the difference between $V_{\text{res}}$ and $V_{\text{res}}$.

[0062] In the above cases, the velocities reduced by the resistance factor can be determined by experimental values. In these cases, the factors such as a bend angle of the paper transfer path or the friction force should be considered.

[0063] FIG. 5 is a flowchart illustrating a paper transfer control method for the image forming device according to an embodiment of the present invention.

[0064] Referring to FIG. 5, it is checked whether or not a printing command is inputted from the controller 230 (S500), and the paper feeding cassette is selected (S501). Next, it is checked whether or not there is a paper sheet in the paper feeding cassette (S502). When there is no paper sheet in the paper feeding cassette, the linear-velocity control command is transmitted to the driving motor, and the driving motor is rotated at the real linear velocity depending the linear-velocity control command (S503). The linear-velocity control command compensates for differences between paper feeding cassettes and thus depends on the selected paper feeding cassette. After that, a procedure is performed in which the photosensitive medium, the pickup roller, and the transfer roller are rotated at the same real linear velocity to pickup the paper sheet from the paper feeding cassette and to transfer the picked up paper along the paper transfer path, and the paper sheet transferred going through the image forming unit is outputted to a paper discharge cassette through a paper discharging unit (S504). Thereafter, operations (S500) through (S504) can be repeated to continuously print and output the image. When there is a paper sheet in the paper feeding cassette, a paper state is displayed on the operation panel (S505). If the paper sheet is supplemented, a procedure after operation 503 is performed.

[0065] Although a few embodiments of the present invention have been shown and described, the present invention is not limited to the described embodiments. Instead, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined by the claims and their equivalents.

1. A paper transfer control method for an image forming device having a plurality of paper feeding cassettes for storing paper sheets; a pickup roller for picking up a paper sheet from one of the plurality of paper feeding cassettes to load the picked up paper on a paper transfer path; a transfer roller for feeding the loaded paper sheet; an image forming unit having a photosensitive medium for forming an image
on the paper sheet; a driving motor for driving the photosensitive medium, the transfer roller and the pickup roller; and a plurality of sensors for sensing whether the paper sheet is transferred, comprising:

- selecting a paper feeding cassette which picks up a paper sheet according to a received printing command;
- transmitting a linear-velocity control command to the driving motor, the linear-velocity control command based on a paper transfer path of the selected paper feeding cassette; and
- picking up the paper sheet, and transferring the picked up paper along the paper transfer path.

2. The method of claim 1, wherein the picking up is based on the driving of the driving motor.

3. The method of claim 1, wherein the linear-velocity control command is determined by a real measured value according to at least an angle and a friction coefficient of every paper transfer path.

4. The method of claim 3, wherein the linear-velocity control command dictates that the transfer roller, the pickup roller and the photosensitive medium are driven at the same linear velocity.

4. (Cancelled)

5. The method of claim 3, further comprising upgrading the linear-velocity control command.

6. The method of claim 5, wherein the upgrading is based on at least one of a part abrasion and future circumstances.

7. An image forming device comprising:
- a plurality of paper feeding cassettes which store paper sheets;
- a pickup roller which picks up a paper sheet from one of the plurality of paper feeding cassettes to load the picked up paper on a paper transfer path;
- a transfer roller which feeds the loaded paper sheet;
- an image forming unit having a photosensitive medium which forms an image on the paper sheet;
- a driving motor which drives the photosensitive medium, the transfer roller and the pickup roller;
- a plurality of sensors which sense whether the paper sheet is transferred; and
- a memory unit which stores a linear-velocity control command for rotating the photosensitive medium, the pickup roller and the transfer roller at the same linear velocity.

8. The device of claim 7, wherein the memory unit includes a ROM for storing a control program for controlling components of the image forming device and a RAM for temporarily storing data generated when controlling the image forming device.

9. The device of claim 7, wherein the memory unit stores compensation data to compensate for a difference between real linear velocities between paper transfer paths.

10. The device of claim 9, wherein the difference is caused by a resistance factor.

11. The device of claim 10, wherein the resistance factor is one of an angle regarding a paper transfer path and a friction coefficient.

12. The device of claim 9, wherein the compensation data is stored in the RAM.

13. The device of claim 12, wherein the compensation data is upgradable.

14. The device of claim 7, wherein the linear-velocity control command instructs that the photosensitive medium, the pickup roller and the transfer roller rotate at the same linear velocity.

15. The device of claim 7, wherein the real linear velocity for a paper transfer path is determined by the following equation:

\[ V_{real} = V_{command} - V_{res} \]

where \( V_{real} \) is the real linear velocity, \( V_{command} \) is a linear-velocity control command, and \( V_{res} \) is a reduced linear velocity.

16. The device of claim 15, wherein \( V_{res} \) is based on one of an angle of the paper transfer path and a friction force.

17. The device of claim 15, wherein the memory unit stores compensation data to compensate for a difference between real linear velocities (\( V_{real} \)) between paper transfer paths, the compensation data is based on a compensation factor \( \alpha \) determined by the following equation:

\[ \alpha = \frac{V_{real} - V_2}{V_1} \]

where \( V_1 \) is a real linear velocity of a first paper transfer path and \( V_2 \) is a real linear velocity of a second paper transfer path.

18. A paper transfer control method, comprising:
- selecting a paper feeding cassette in response to an input print command;
- determining whether there is a paper sheet in the selected paper feeding cassette;
- transmitting, when it is determined that a paper sheet is not present in the selected paper feeding cassette, a linear-velocity control command to a driver, the linear-velocity control command based on a type of the selected paper feeding cassette, and driving the driver at a real linear velocity based on the linear-velocity control command; and picking up the paper sheet from the selected paper feeding cassette, transferring the picked up paper along the paper transfer path, and outputting the sheet of paper.

19. The method of claim 18, further comprising displaying a paper state when it is determined that there is a paper sheet in the paper feeding cassette.

20. The method of claim 18, further comprising repeating the selecting and the determining to continuously print and output the image.

21. A printing method, comprising:
- selecting a cassette from a plurality of paper feeding cassettes;
- using compensation data to generate a linear-velocity control command which to drive a motor and which compensates for a difference between paper feeding cassettes; and
- driving the motor to pick up the paper sheet from the selected paper feeding cassette, transfer the picked up paper along the paper transfer path, and output the sheet of paper.

22. The method of claim 3, further comprising storing the linear-velocity control command.

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