



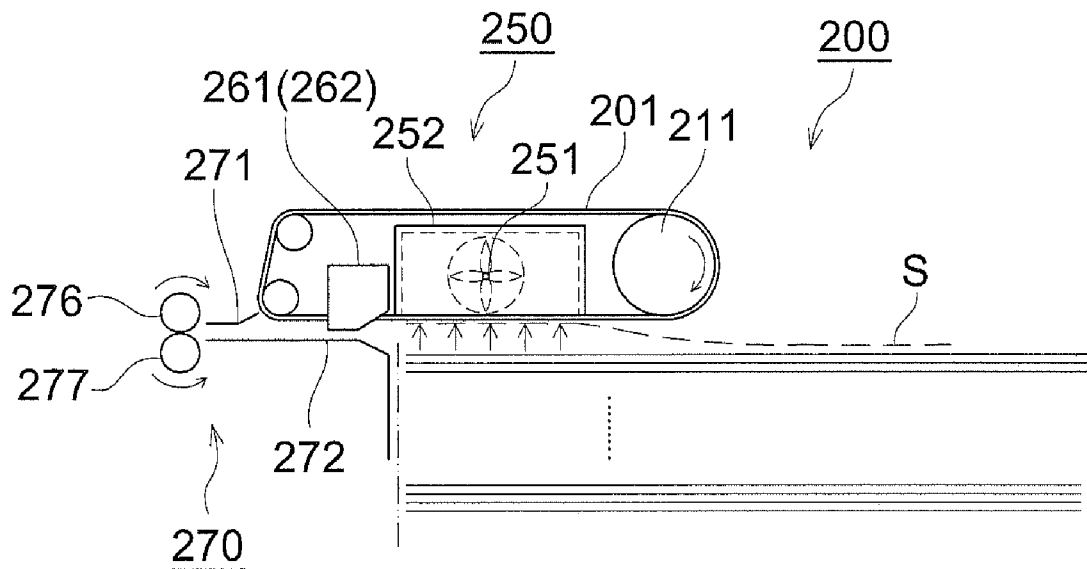
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(19) **United States**(12) **Patent Application Publication**
SUZUKI(10) **Pub. No.: US 2010/0181716 A1**(43) **Pub. Date: Jul. 22, 2010**(54) **SHEET SUPPLY APPARATUS****Publication Classification**(75) Inventor: **Tomoo SUZUKI**, Tokyo (JP)Correspondence Address:
CANTOR COLBURN, LLP
20 Church Street, 22nd Floor
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B65H 5/08 (2006.01)**B65H 9/04** (2006.01)(52) **U.S. Cl.** **271/12; 271/243**(57) **ABSTRACT**

A sheet supply apparatus includes: an endless belt which has a plurality of vents penetrating from a front surface to a rear surface and is stretched around a plurality of rollers including a drive roller and driven by the drive roller; a suction section having a suction port which suctions air and faces to a rear surface of the belt, wherein the sheet supply apparatus suctions a sheet to the front surface of the belt through vents of the belt facing to the suction port and carries the sheet, and the sheet supply apparatus further includes a guide member which guides a leading edge of the sheet being conveyed to a down stream side of the suction port in a conveyance direction, in a direction separating from the front surface of the belt.

(73) Assignee: **KONICA MINOLTA BUSINESS TECHNOLOGIES, INC.**, Tokyo (JP)(21) Appl. No.: **12/686,420**(22) Filed: **Jan. 13, 2010**(30) **Foreign Application Priority Data**

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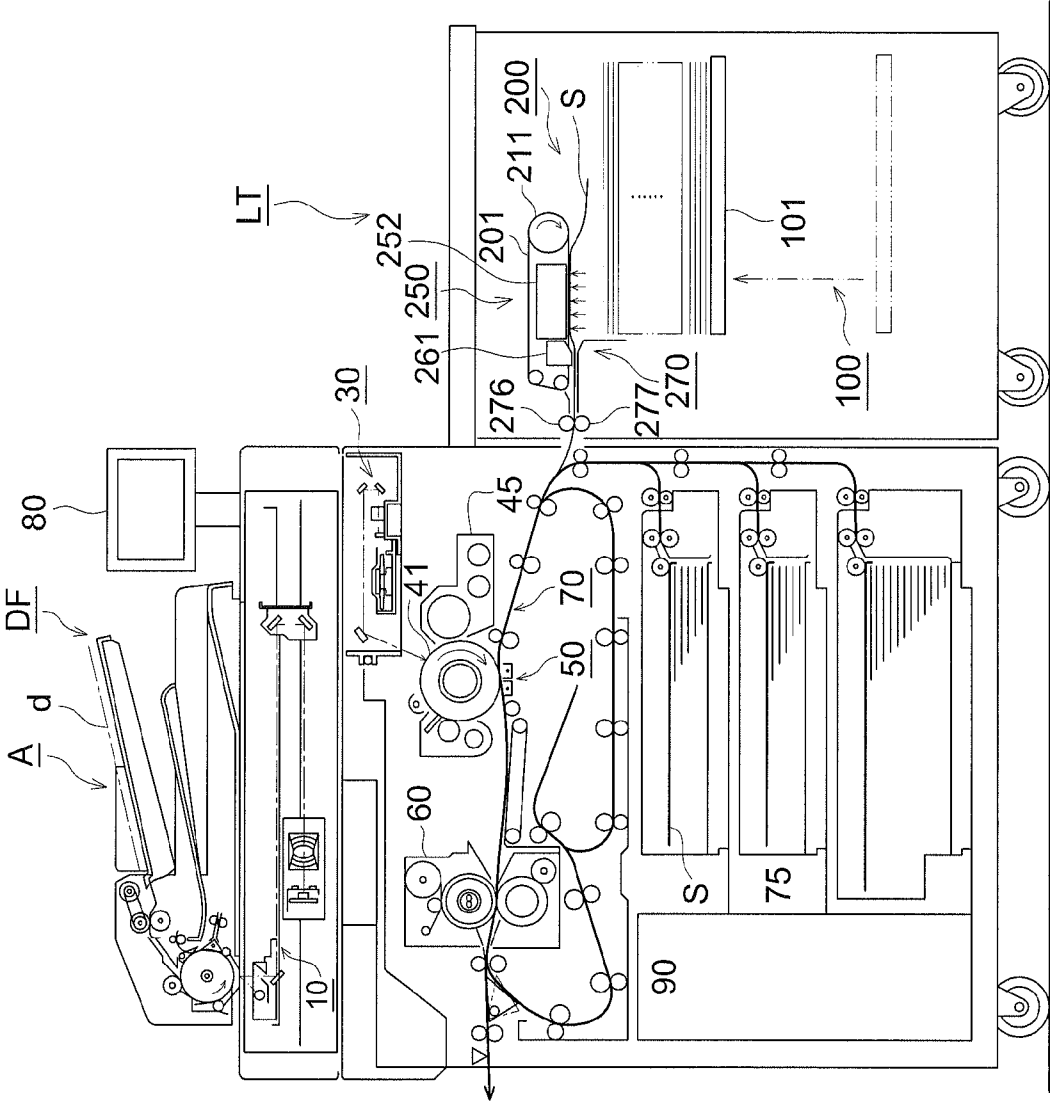


FIG. 1

FIG. 2a

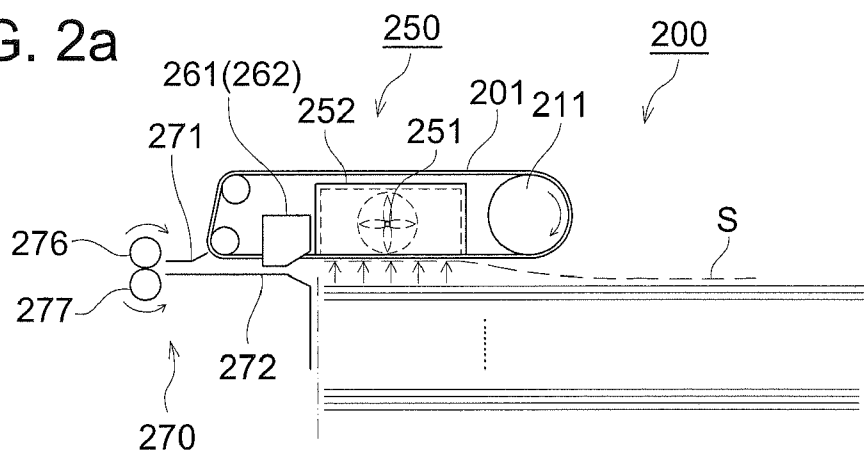


FIG. 2b

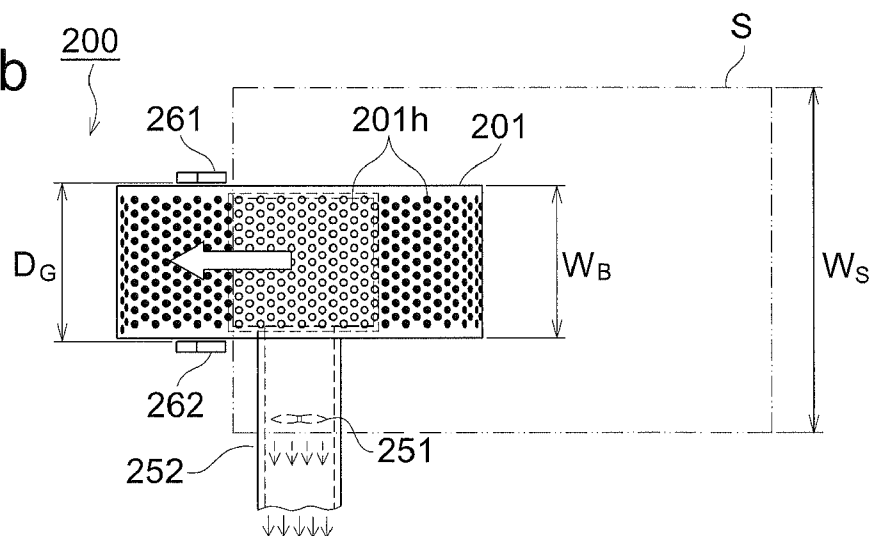


FIG. 2c

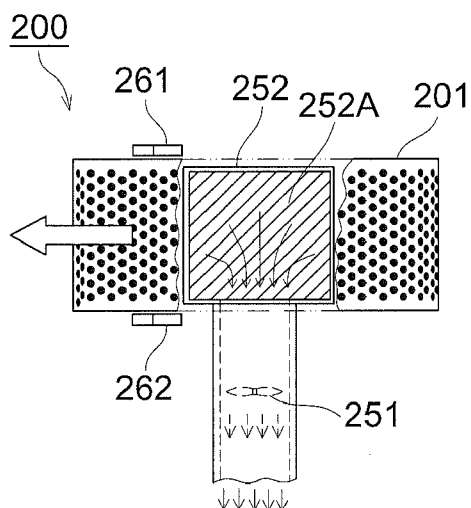


FIG. 3a

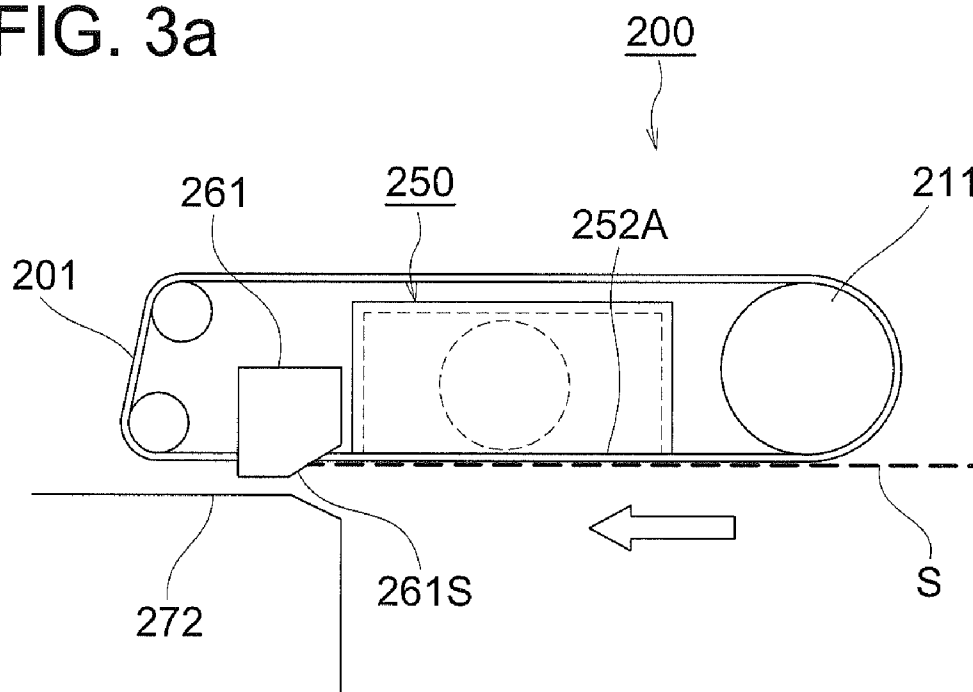
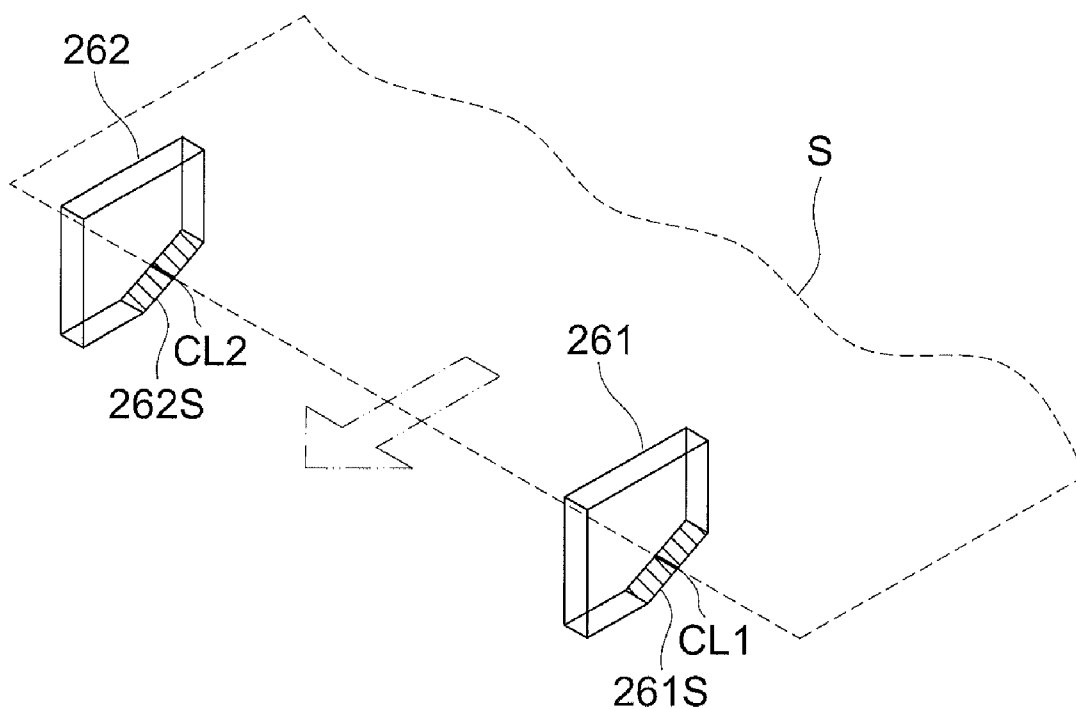
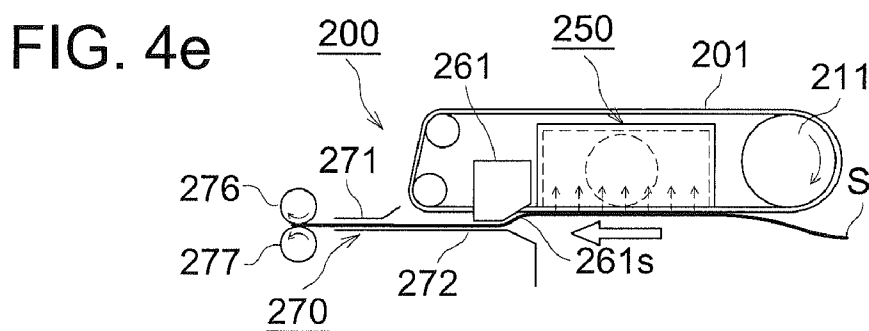
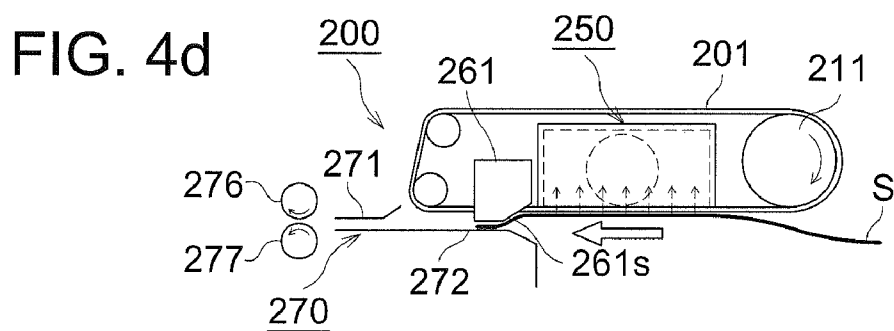
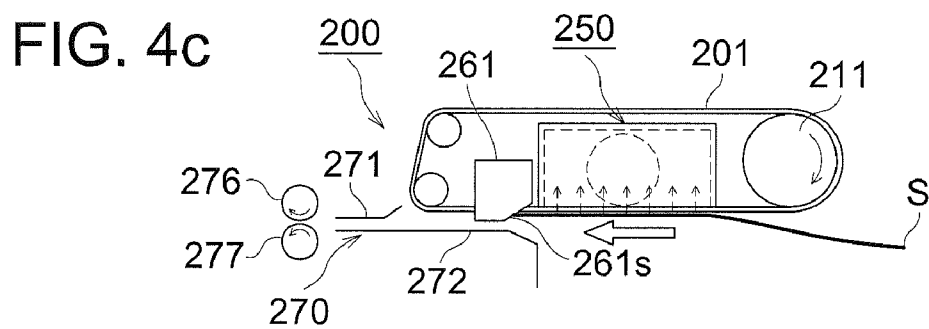
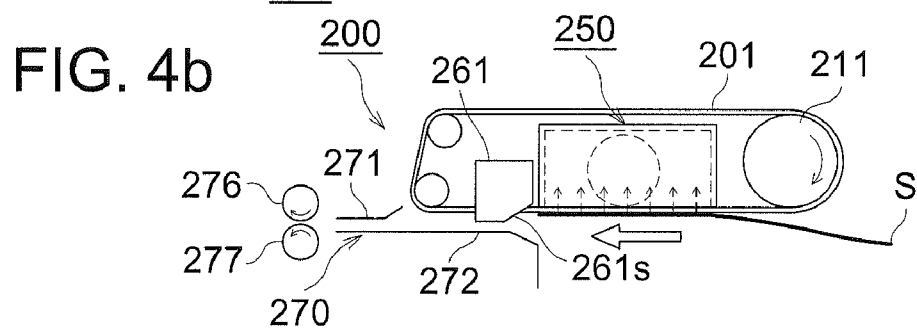
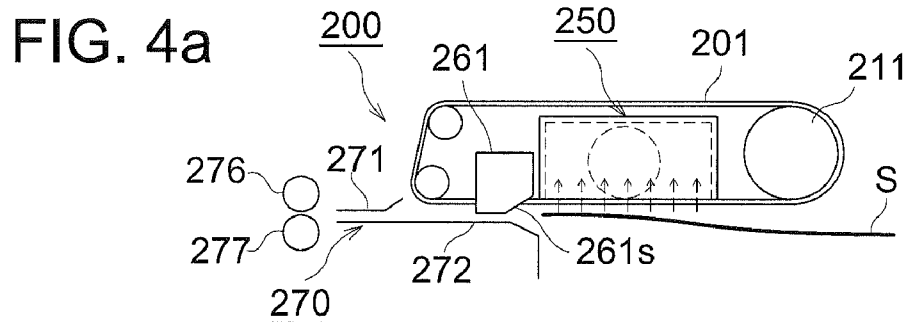


FIG. 3b





SHEET SUPPLY APPARATUS

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application is based on Japanese Patent Application No. 2009-007384 filed on Jan. 16, 2009 in Japanese Patent Office, the entire content of which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of Technology

[0003] The present invention relates to a sheet supply apparatus to be connected and used with an image forming.

[0004] 2. Description of Related Art

[0005] The sheet supply apparatus has a sheet stacking section loaded with a plurality of sheets and is connected and used with the image forming apparatus such as a photocopier, printer, facsimile, printing machine and multi-functional peripheral, and feeds out sheets one by one to the image forming apparatus.

[0006] If a sheet cannot be taken out of a sheet stacking section successfully, a feed error occurs to the sheet supply apparatus. If more than one sheet is taken out in one operation, a paper jam occurs.

[0007] Thus, means are provided to ensure positive feeding out of sheets one by one. For example, in the method of using a sheet supply roller, the friction coefficient between the roller and sheet is increased to ensure positive feeding of the topmost one of the stacked sheets, whereby a feed error is prevented. To prevent two or more sheets from being fed in, the second and later sheets are pushed back by separation of sheets using a separation roller and pad or a separation claw. Thus, only the topmost one of the stacked sheets is taken out, whereby a feed error is prevented.

[0008] This take-up method using a roller is effective when only the normally used sheets—for example, plain sheets—are utilized. However, with the expansion in the range of using an image forming apparatus, sheets having a great variety of paper quality including coated sheets have come to be employed. When stacked, some of these sheets have a high degree of adhesion to one another. This take-up method using a roller has failed to provide a positive means to avoid a multiple feed error in some cases.

[0009] Thus, one of the proposals made so far includes a sheet supply apparatus wherein air is blasted to the side of the stacked sheets which are separated thereby, and the topmost one of the separated sheets is sucked by a suction device to the belt traveling in the form applied to multiple rollers (Japanese Unexamined Patent Application Publication No. 2000-198557).

[0010] In the sheet supply apparatus described in the Japanese Unexamined Patent Application Publication No. 2000-198557, sheets are sucked to the surface of the portion facing to the suction area by the suction device of a traveling belt, and are conveyed. The portion of the belt facing to the suction area varies with the traveling of the belt, the portions upstream in the traveling direction of the sheets sucked and traveling with the belt are sequentially sucked to the belt facing to the suction area, and the sheets are conveyed downstream. Sheet suction force does not work on the portion of the belt having traveled to the position not facing to the suction area. Accordingly, the sheets having been sucked and conveyed by the belt are subjected to curvature-separation

under its own weight or at the roller section wherein the belt is applied. These sheets are then separated from the belt surface. The leading edges of the sheets separated from the belt surface are fed in the sheet conveyance path downstream of the belt, and the sheets are conveyed from the sheet supply apparatus to the image forming apparatus by a conveying device arranged on the sheet conveyance path.

[0011] Incidentally, an endless belt having many vents penetrating from front to rear is used as the belt sucking and carrying the sheet. Such an endless belt is normally made of a rubber material. The belt applied to a plurality of rollers and driven thereby is driven by repeatedly coming in contact with rollers and other peripheral parts, and moving apart from them. This makes the belt becomes electrostatically charged easily. Particularly, the belt made of an insulating material such as a rubber material tends to be electrostatically charged easily. When the belt is electrostatically charged, thin sheets in particular will be sucked to the surface of the belt by static electricity even if the belt has moved to the position not facing to the suction area. Thus, the sheets fail to be separated from the belt in some cases. If the sheets fail to be separated from the belt surface, the sheets cannot be fed into the sheet conveyance path provided downstream of the belt conveyance mechanism. This may cause a sheet conveyance failure.

[0012] In view of the problems described above, it is an object of the present invention to provide a sheet supply apparatus that ensures positive separation of sheets from a belt, without a sheet conveyance failure being caused by sheet separation failure.

SUMMARY OF THE INVENTION

[0013] One aspect of the present invention is a sheet supply apparatus comprising: an endless belt which has a plurality of vents penetrating from a front surface to a rear surface and is stretched around a plurality of rollers including a drive roller and driven by the drive roller; a suction section including a suction port which suctions air and faces a rear surface of the belt, wherein the sheet supply apparatus suctions a sheet to the front surface of the belt through vents of the belt facing the suction port and carries the sheet, and the sheet supply apparatus further comprises a guide member which guides a leading edge of the sheet being conveyed to a downstream side of the suction port in a conveyance direction, in a direction separating from the front surface of the belt.

[0014] Another aspect of the present invention is an image forming system comprising an image forming apparatus and a sheet supply apparatus which includes: an endless belt which has a plurality of vents penetrating from a front surface to a rear surface and is stretched around a plurality of rollers including a drive roller and driven by the drive roller; a suction section having a suction port which suctions air and faces to a rear surface of the belt, wherein the sheet supply apparatus suctions a sheet to the front surface of the belt through vents of the belt facing to the suction port and carries the sheet, and the sheet supply apparatus further includes a guide member which guides a leading edge of the sheet being conveyed to a downstream side of the suction port in a conveyance direction, in a direction separating from the front surface of the belt.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 is a diagram representing the image forming system formed by connecting an image forming apparatus to a sheet supply apparatus as an example of the embodiment of the present invention;

[0016] FIG. 2a is a front view of the belt conveying section;
 [0017] FIG. 2b is a diagram showing the belt conveying section as viewed from the sheet side;
 [0018] FIG. 2c is a diagram showing that a part of the belt 201 of FIG. 2b is cut away;
 [0019] FIG. 3a is an enlarged front view of the belt conveying section 200;
 [0020] FIG. 3b is a perspective view of the leading edge guide plate (A) 261; and
 [0021] FIGS. 4a through 4e are diagrams explaining the suction and conveyance of sheets by the belt conveying section 200 and the separation of sheets from the belt 201.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] The following describes the embodiment of the present invention with reference to drawings, without the present invention being restricted to the embodiments described below:

[0023] Referring to the drawing, the following describes the embodiment of the present invention:

[0024] FIG. 1 is a diagram representing the image forming system formed by connecting an image forming apparatus to a sheet supply apparatus as an example of the embodiment of the present invention. The sheet supply apparatus LT in the image system shown in FIG. 1 is capable of storing a great number of sheets and feeds the stored sheets in synchronism with the operation of the image forming apparatus A. Using the sheets having been fed by the sheet supply apparatus LT, the image forming apparatus A performs continuous formation of a great amount of images.

<Image Forming Apparatus A>

[0025] The image forming apparatus A transfers an image or letter onto the sheets using electrophotographic process, and ejects these sheets.

[0026] The image forming apparatus A includes a document reading section 10, image writing section 30, image forming section 40, transfer section 50, fixing section 60, sheet supply and conveying section 70, sheet storage section 75, operation/display section 80, and control section 90.

[0027] The operation/display section 80 is used to input the job information including the conditions for operating the image forming apparatus A as an image forming system, and the sheet supply apparatus LT—for example, the conditions such as the number of sheets for image formation, the size of these sheets, and a choice of whether the sheets S stored in the sheet storage section 75 or the sheets S stored in the sheet supply apparatus LT are to be used. The operation/display section 80 is provided with a START button. Turning on the START button starts the operations of the image forming apparatus A as an image forming system and sheet supply apparatus LT in conformity to the job information having been inputted.

[0028] The control section 90 controls the image forming operation of the image forming apparatus A in conformity to the job information inputted from the operation/display section 80. The operation of the sheet supply apparatus LT is also controlled by the control section 90.

[0029] An automatic document feeder DF is mounted on the top of the image forming apparatus A. The document d placed on the document platen of the automatic document feeder DF is fed in the arrow direction and the image of the

document is read by the optical system of the document reading section 10, whereby the image information is acquired.

[0030] The acquired image information is subjected to the required image processing by an unillustrated image processing section, and is sent to the image writing section 30.

[0031] The image writing section 30 applies the output light in conformance to the image information from a semiconductor laser to the photoreceptor drum 41 of the image forming section 40.

[0032] The image forming section 40 includes a photoreceptor drum 41 and a developer 45, wherein the photoreceptor drum 41 is driven in the arrow direction by an unillustrated drive device.

[0033] When the photoreceptor drum 41 has been exposed to the output light in conformance to the image information by the image writing section 30, the latent image based on image information is formed. This latent image is developed by a developer 45, and is turned into a toner image.

[0034] The toner image of the photoreceptor drum 41 is transferred by a transfer section 50 onto the sheet conveyed from the sheet supply and conveying section 70.

[0035] The sheets conveyed by the sheet supply and conveying section 70 can be the sheets stored in the sheet storage section 75 of the image forming apparatus A, or the sheets stored in the sheet supply apparatus LT. The choice between the two is determined by the job information having been inputted from the operation/display section 80.

[0036] The toner image transferred on the sheet S is fixed by the fixing section 60 and the sheet S is ejected out of the image forming apparatus A.

<Sheet Supply Apparatus LT>

[0037] The sheet supply apparatus LT includes a sheet storage section 100, belt conveying section 200 and sheet feed-out section 270. Based on the job information inputted from the operation/display section 80 of the image forming apparatus A, the sheets S stored in the sheet storage section 100 are fed out one by one by the belt conveying section 200, and are conveyed to the sheet feed-out section 270. The sheets S are then fed out to the image forming apparatus A by the sheet feed-out section 270.

[0038] The sheet storage section 100 includes a sheet platen 101 wherein a plurality of stored sheets S can be stacked and loaded. The sheet platen 101 can be moved in the vertical direction by an unillustrated sheet platen elevation mechanism.

[0039] The number of the sheets placed on the sheet platen 101 is reduced as the sheets are supplied to the image forming apparatus A. Thus, as the sheets are supplied, the sheet platen 101 is moved in the vertical direction by the sheet platen elevation mechanism so that the topmost sheet position is kept within a predetermined range that is appropriate to the sheet supply operation performed by the belt conveying section 200.

[0040] The belt conveying section 200 includes a belt 201, drive roller 211 connected to a drive source, driven roller (A) 212, driven roller (B) 213, suction section 250, leading edge guide plate (A) 261 and leading edge guide plate (B) 262.

[0041] The leading edge guide plate (A) 261 is mounted on the front side surface of the belt 201 in FIG. 1, and the leading edge guide plate (B) 262 is installed on the back side surface of the belt 201. In FIG. 1, only the leading edge guide plate (A) 261 is shown. The leading edge guide plate (B) 262

arranged on the back side of the leading edge guide plate (A) **261** cannot be viewed from the front side of FIG. 1, and therefore, is not shown.

[0042] The belt **201** is an endless belt made of ethylene-propylene (EPDM), and is applied to a plurality of rollers including a drive roller **211**. The belt **201** is rotated by the rotation of the drive roller **211** through the rollers to which the belt is applied.

[0043] The entire surface of the belt **201** is provided with a plurality of vents penetrating from front to rear surfaces. In this case, the rear surfaced of the belt **201** refers to the side abutting on rollers, and the front surface refers to the side opposite the rear surface.

[0044] The suction section **250** includes a duct **252** and an unillustrated suction device. Air is sucked from the suction port provided at one end of the duct **252**.

[0045] The suction section **250** is arranged with the suction port of the duct **252** abutting on the rear surface of the belt **201** applied to the rollers.

[0046] When the belt conveying section **200** is operating, the force of suction in the direction indicated by arrow in the drawing is applied to the portion facing to the suction port of the duct **252** of the belt **201** rotating through the rollers to which the belt is applied. The sheet on the topmost layer on the sheet platen **101** is sucked onto the surface of the belt **201**.

[0047] An air blasting mechanism can be provided in such a way that, when the sheet on the topmost layer on the sheet platen **101** is sucked onto the belt **201**, air is blasted to the side of the stacked sheets so that the sheet S of the topmost layer is raised and separated from other sheets.

[0048] The sheet S sucked by the belt **201** is fed to the left as illustrated, by the rotation of the belt **201** and is separated from the surface of the belt **201** by the leading edge guide plate (A) **261** and leading edge guide plate (B) **262**. After that, the sheet S is conveyed to the sheet feed-out section **270**.

[0049] The details of the leading edge guide plate (A) **261** and leading edge guide plate (B) **262** will be described later.

[0050] The sheet feed-out section **270** includes an upper guide plate **271**, a lower guide plate **272**, and a pair of feed-out rollers **276** and **277** to be driven. The sheets having been conveyed are sandwiched between pair of feed-out rollers **276** and **277**, and are fed out to the image forming apparatus A.

[0051] The following further describes the belt conveying section **200**:

[0052] FIGS. **2a**, **2b** and **2c** are an enlarged views of a belt conveying section **200**.

[0053] FIG. **2a** is a front view of the belt conveying section **200**, and FIG. **2b** is the diagram showing the belt conveying section **200** as viewed from the sheet side. In FIG. **2c**, part of the belt **201** of FIG. **2b** is broken away. The white-out arrow in FIG. **2b** indicates the direction of the belt **201** rotating around the rollers.

[0054] As illustrated in FIGS. **2a**, **b** and **c**, the belt **201** contains a plurality of vents **201h** penetrating from front to back surfaces over the entire periphery. The inner diameter of the vent **201h** and the number of vents **201h** per unit area of the belt **201** are properly determined by giving consideration to the air suction capacity of the suction section **250** (to be described later), the dimensions of the opening **252A**, and the mass of the sheet to be sucked, to ensure that the sheets sucked onto the belt **201** will not fall down.

[0055] The belt **201** is arranged in such a way that the centerline thereof will be aligned with the centerline of the

sheets to be conveyed, as shown in FIG. **2b**. The width-wise dimension W_B thereof is set to be smaller than the distance D between the leading edge guide plate (A) **261** (to be described later) and leading edge guide plate (B) **262**. The distance D between the leading edge guide plate (A) **261** and leading edge guide plate (B) **262** is set at a value smaller than the width-wise dimension W_S of the sheet to be conveyed.

[0056] The suction section **250** includes a suction fan **251** driven by an unillustrated drive source, and a duct **252**. The portion of the duct **252** facing to and abutting on the rear surface of the belt **201** has an opening. The reference numeral **252A** shown by the slant line of FIG. **2c** indicates an opening. The opening **252A** serves as a suction port. When the suction fan **251** is driven, the air along the arrow mark in FIG. **2c** is sucked from the opening **252A**, and is discharged out of the duct **252** through the duct **252**. Thus, when the belt **201** with a vent **201h** penetrating from front to rear surfaces is facing to and is made to abut on the opening **252A**, air is sucked into the opening **252A** through the vent **201h**, and therefore, the sheet S is sucked onto the portion of the belt **201** facing to the opening **252A**.

[0057] In FIG. **2b**, the vent **201h** indicated by the white-out mark is facing to the opening **252A**, and forms a flow path of air being sucked toward the opening **252A**. If there is a sheet S at a position facing thereto, the sheet S is sucked and adsorbed to the surface of the belt **201**. The sheet S is adsorbed to the portion facing to the opening **252A** of the belt **201**, as shown in FIG. **2a**, and is conveyed by the rotation of the belt **201**. The vents **201h** indicated by the black circle are not facing to the opening **252A**, and the sheet S is not sucked to this portion.

[0058] The belt **201** rotating through rollers moves in the direction indicated by a white-out arrow in FIG. **2b**.

[0059] The relative position between the vent **201h** and opening **252A** is changed by the movement of the belt **201** in the direction indicated by a white-out arrow of FIG. **2b**. To be more specific, the vents **201h** facing to the opening **252A** are shifted by the movement of the belt **201** to the position wherein the vents **201h** are not facing. The vents **201h** not facing to the opening **252A** are shifted to the position wherein the vents **201h** are facing. The vents **201h** shifted to the position wherein the vents **201h** are not facing to the opening **252A** do not suck the sheet S located at the facing position, but the trailing edge of the sheet S is sucked to the surface of the belt **201** by the vents **201h** shifted to the position facing to the opening **252A**, whereby the sheets S are continuously conveyed.

[0060] As shown in FIGS. **2a**, **b** and **c**, the leading edge guide plate (A) **261** and leading edge guide plate (B) **262** are arranged at a symmetrical position with the centerline of the belt **201** sandwiched in-between, on the side surface of the belt **201** downstream of the opening **252A** in the direction of the conveyance of the sheet, wherein the distance D is set at a value smaller than the width-wise dimension W_S of the sheet which is to be conveyed. When the distance D is set at a value smaller than the width-wise dimension W_S of the sheet which is to be conveyed, the leading edge of the sheet having been conveyed to the leading edge guide plate (A) **261** and the leading edge guide plate (B) **262** by the movement of the belt **201** are allowed to abut thereon, respectively.

[0061] FIGS. **3a** and **3b** are diagrams explaining a leading edge guide plate (A) **261** and leading edge guide plate (B) **262**.

[0062] FIG. 3a is an enlarged front view of the belt conveying section 200, and FIG. 3b is a perspective view of the leading edge guide plate (A) 261 and leading edge guide plate (B) 262 as observed from the left top in FIG. 3a. For ease of explanation, in FIG. 3b, the leading edge guide plate (A) 261 and leading edge guide plate (B) 262 are shown in a perspective view, but it is not always necessary to use a transparent body.

[0063] As shown in FIG. 3a, the leading edge guide plate (B) 262 arranged on the back of the sheet surface of the leading edge guide plate (A) 261 and leading edge guide plate (A) 261 is located downstream of the opening 252 A in the suction section 250 in the direction wherein the sheets are conveyed. The sheet S is adsorbed to the surface of the belt 201 and is conveyed in the direction marked by a white-out arrow. The reference numeral 261S denotes the inclined portion arranged on the leading edge guide plate (A) 261, and the sheet S to be conveyed is guided by the inclined portion 261S in the direction where the sheet S is separated from the surface of the belt 201. The leading edge guide plate (B) 262 arranged on the illustrated back side of the leading edge guide plate (A) 261 is also provided with the inclined portion 262S for ensuring that the sheet S to be conveyed is guided in the direction where the sheet S is separated from the surface of the belt 201.

[0064] The CL1 of FIG. 3b denotes a line of intersection wherein the leading edge of the sheet S adsorbed to the belt 201 and conveyed abuts on the inclined portion 261S. The line of intersection CL1 is flush with the surface of the belt 201, and the line of intersection CL1 is located at the same height as the surface of the belt 201. The inclined portion 261S forms a plane (the inclined surface) wherein the height from the surface of the belt 201 is continuously increased from the line of intersection CL1 toward the downstream side in the direction where the sheet is conveyed. The trailing edge of the sheet S conveyed toward the leading edge guide plate (A) 261 is separated from the surface of the belt 201 along the inclined portion 261S wherein the height from the surface of the belt 201 is increased toward the downstream side in the direction where the sheet is conveyed. To be more specific, the inclined portion 261S guides the conveyed sheet S in such a direction that the sheet S is separated and removed from the surface of the belt 201.

[0065] The inclined portion 261S of the present embodiment forms such a plane that the height from the surface of the belt 201 increases at a predetermined inclination from the line of intersection CL1 toward the downstream side in the direction of the conveyance of the sheet. In this case, if only the height from the surface of the belt 201 increases continuously from the line of intersection CL1 toward the downstream side in the direction of the conveyance of the sheet, the inclined surface can be a curve without being restricted to a plane.

[0066] Similarly, the CL2 of FIG. 3b denotes a line of intersection wherein the leading edge of the sheet S adsorbed to the belt 201 and conveyed abuts on the inclined portion 262S. The line of intersection CL2 is flush with the surface of the belt 201, and the line of intersection CL2 is located at the same height as the surface of the belt 201. The inclined portion 262S forms a plane (the inclined surface) wherein the height from the surface of the belt 201 is continuously increased from the line of intersection CL2 toward the downstream side in the direction where the sheet is conveyed. The trailing edge of the sheet S conveyed toward the leading edge guide plate (B) 262 is separated from the surface of the belt 201 along the inclined portion 262S wherein the height from the surface of the belt 201 is increased toward the downstream side in the direction where the sheet is conveyed. To be more specific, the inclined portion 262S guides the conveyed sheet

S in such a direction that the sheet S is separated and removed from the surface of the belt 201.

[0067] The inclined portion 262S of the present embodiment forms such a plane that the height from the surface of the belt 201 increases at a predetermined inclination from the line of intersection CL2 toward the downstream side in the direction of the conveyance of the sheet. In this case, if only the height from the surface of the belt 201 increases continuously from the line of intersection CL2 toward the downstream side in the direction of the conveyance of the sheet, the inclined surface can be a curve without being restricted to a plane.

[0068] In the present embodiment, the leading edge guide plate (A) 261 and leading edge guide plate (B) 262 are designed in the same configuration. As described above, each of the leading edge guide plate (A) 261 and leading edge guide plate (B) 262 is arranged at a symmetrical position with the centerline of the belt 201 sandwiched in-between, wherein the distance D is set at a value smaller than the width-wise dimension W_s of the sheet which is to be conveyed.

[0069] When the leading edge guide plate (A) 261 and leading edge guide plate (B) 262 are arranged in the above-mentioned manner, the sheet S adsorbed to the belt 201 and conveyed can be positively separated from the surface of the belt 201.

[0070] FIGS. 4a through 4e are diagrams explaining the suction and conveyance of sheets by a belt conveying section 200 and the separation of sheets from belt 201.

[0071] When the image forming apparatus A forms an image in conformance to the inputted job information using the sheet S stored in the sheet supply apparatus LT, the suction fan 251 of the suction section 250 of the sheet supply apparatus LT operates first, and the suction of air from the opening 252 A of the duct 252 then starts. By the suction of air from the opening 252 A, the sheet S is sucked to the belt 201 through the vents 201h of the belt 201 facing to the opening 252 A. This is shown in FIG. 4a.

[0072] The sheet S is adsorbed to the belt 201 by the operation of the suction section 250. Upon adsorption of the sheet S to the belt 201, the rotation of the drive roller 211 starts so that the belt 201 applied to the rollers is driven. Further, a pair of feed-out rollers 276 and 277 of the sheet feed-out section 270 also starts rotation. By the rotation of the belt 201, the sheet S adsorbed to the belt 201 together with the belt 201 is shifted in the direction indicated by a white-out arrow. This is shown in FIG. 4b.

[0073] The leading edge of the sheet adsorbed to the belt 201 and conveyed reaches the inclined portion 261S of the leading edge guide plate (A) 261 and the inclined portion 262S of leading edge guide plate (B) 262. This is shown in FIG. 4c. If the sheet S moved synchronously with the rotation of the belt 201 has shifted to the position not facing to the opening 252 A, the sheet S is not sucked, and is separated from the surface of the belt 201 and droops under its own weight. If the belt 201 is statically charged, the sheet S is kept adsorbed to the surface of the belt 201, and is conveyed to the position wherein the sheet S abuts on the inclined portion 261S of the leading edge guide plate (A) 261 and the inclined portion 262S of the leading edge guide plate (B) 262. FIG. 4c shows that the sheet S is kept adsorbed to the surface of the belt 201, and is conveyed to the position wherein the sheet S abuts on the inclined portion 261S of the leading edge guide plate (A) 261 and the inclined portion 262S of the leading edge guide plate (B) 262. The position wherein the leading edge of the sheet S conveyed in the form being adsorbed to the surface of the belt 201 abuts the inclined portion 261S and the inclined portion 262S is the line of intersection CL1 between

the leading edge of the sheet S and the inclined portion 261S of the leading edge guide plate (A) 261, and the line of intersection CL2 between the leading edge of the sheet S and the inclined portion 262S of leading edge guide plate (B) 262, as described with reference to FIG. 3b.

[0074] The line of intersection CL1 and the line of intersection CL2 are located downstream of the opening 252 A. The sheet S is not adsorbed to the belt 201 at least downstream of the line of intersection CL1 and the line of intersection CL2 in the direction wherein the sheet is conveyed.

[0075] The leading edge of the sheet S abutting on the inclined portion 261S of the leading edge guide plate (A) 261 and the inclined portion 262S of the leading edge guide plate (B) 262 is pushed out toward the sheet feed-out section 270 downward in the direction of the conveyance of the sheet along the inclined portions 261S and 262S of the leading edge guide plate (A) 261 and leading edge guide plate (B) 262, respectively, when the succeeding portion of the sheet S is adsorbed to the belt 201 and the sheet S is conveyed. Thus, the sheets S are sequentially separated from the surface of the belt 201. This is shown in FIG. 4d.

[0076] If the belt 201 is not statically charged, the leading edge of the sheet S is separated from the surface of the belt 201 and droops under its own weight. The sheet S is guided to each of the lower surfaces of the lower guide plate 272, the leading edge guide plate (A) 261 and the leading edge guide plate (B) 262, and is pushed out toward the sheet feed-out section 270.

[0077] The leading edge of the sheet conveyed by the belt 201 is guided to the upper guide plate 271 and lower guide plate 272 of the sheet feed-out section 270 and reaches wherein a pair of feed-out rollers 276 and 277 is arranged. Sandwiched between a pair of feed-out rollers 276 and 277 driven and rotated, the sheet S is fed out to the unillustrated image forming apparatus A. This is illustrated in FIG. 4e. The image forming apparatus A forms an image using the sheet having been fed in.

[0078] When the leading edge of the sheet has been sandwiched between a pair of feed-out rollers 276 and 277, the sheet S is conveyed by a pair of feed-out rollers 276 and 277. Accordingly, the operations of the suction fan 251 of the suction section 250 and the drive roller 211 can be suspended.

[0079] As described above, the sheet is positively removed from the belt 201 by the arrangement of:

[0080] a leading edge guide plate (A) 261 having an inclined portion 261S that guides the conveyed sheet S in the direction of being separated from the surface of the belt 201, along the side surface of the belt 201 including vents 201h, downstream of the opening 252 A of the suction section 250 in the direction of conveyance of the sheet; and

[0081] a leading edge guide plate (B) 262 having an inclined portion 262S that guides the conveyed sheet S in the direction of being separated from the surface of the belt 201. Thus, even when the belt 201 is statically charged, the sheet adsorbed to the belt can be positively removed from the belt 201. This makes it possible to provide a sheet supply apparatus free from any sheet conveyance failure caused by possible sheet separation failure.

[0082] In the present embodiment, two guide members—the leading edge guide plate (A) 261 and leading edge guide plate (B) 262—are installed on both sides of the belt 201, without the number of guide members being restricted to two. For example, one guide member, either the leading edge

guide plate (A) 261 or leading edge guide plate (B) 262, can be installed. Further, in a belt conveyance mechanism wherein the sheet is conveyed by a plurality of rows of belts divided along the length, the guide members can be placed outside each of the external belts in a plurality of rows and between the rows of adjacent belts. For example, in the system wherein the sheet is conveyed by two rows of belts, a total of three guide members can be installed; one on the side surface outside each of the two rows of belts and one between two rows of belts.

[0083] The present embodiment provides a sheet supply apparatus capable of positive separation of a sheet from a belt, free from any sheet conveyance failure resulting from sheet separation error.

1. A sheet supply apparatus comprising:

an endless belt which has a plurality of vents penetrating from a front surface to a rear surface and is stretched around a plurality of rollers including a drive roller and driven by the drive roller;

a suction section including a suction port which suctions air and faces a rear surface of the belt,

wherein the sheet supply apparatus suctions a sheet to the front surface of the belt through vents of the belt facing the suction port and carries the sheet, and the sheet supply apparatus further comprises a guide member which guides a leading edge of the sheet being conveyed to a down stream side of the suction port in a conveyance direction, in a direction separating from the front surface of the belt.

2. The sheet supply apparatus of claim 1, wherein the guide member is disposed along a side surface of the belt and includes an inclined portion which guide the sheet being conveyed in the direction where the sheet is separated from the front surface of the belt.

3. The sheet supply apparatus of claim 2, wherein the guide member is disposed such that the incline portion stretches from the front surface of the belt when viewing the side surface of the belt.

4. The sheet supply apparatus of claim 2, wherein the guide member is disposed such that the incline portion crosses with the front surface of the belt when viewing the side surface of the belt.

5. An image forming system comprising an image forming apparatus and a sheet supply apparatus which comprises:

an endless belt which has a plurality of vents penetrating from a front surface to a rear surface and is stretched around a plurality of rollers including a drive roller and driven by the drive roller;

a suction section having a suction port which suctions air and faces to a rear surface of the belt,

wherein the sheet supply apparatus suctions a sheet to the front surface of the belt through vents of the belt facing to the suction port and carries the sheet, and the sheet supply apparatus further comprises a guide member which guides a leading edge of the sheet being conveyed to a down stream side of the suction port in a conveyance direction in a direction separating from the front surface of the belt.

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