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⑦③ Proprietor : **MITA INDUSTRIAL CO., LTD.**
2-28, 1-chome, Tamatsukuri
Chuo-ku
Osaka 540 (JP)

⑦② Inventor : **Nakao, Masahiko**
102, 3-2-9, Kasuga
Suita-City, Osaka (JP)

⑦④ Representative : **TER MEER - MÜLLER -**
STEINMEISTER & PARTNER
Mauerkircherstrasse 45
D-81679 München (DE)

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Description

The present invention relates to an image-forming apparatus for achieving complex image structures such as an overlapped formation of manuscript images on one side of a paper and a formation of an image on both sides of said paper.

A conventional example of the above-described image-forming apparatus is disclosed in for example Japanese Patent Application Laid-Open No. Hei 1-236 155. This image-forming apparatus comprises an image-forming apparatus body provided with an intermediate tray, a paper-discharging device provided with a plurality of paper-discharging portions and paper-discharging guides that can be switched over to a posture allowing the paper to go toward the downstream side in the respective paper-discharging portions other than a paper-discharging portion on the final end of a paper-discharging course. This known apparatus is further equipped with a paper-resupplying device arranged on the downstream side of said paper-supplying cassette, which is inserted and can be extracted from the front side of said body, and a paper-discharging tray for discharging the paper, on which an image has been formed, housed in the image-forming apparatus body.

With this known image-forming apparatus the said overlapped formation of manuscript images on one side of the paper and of an image on both sides of the paper can be achieved. The paper-supplying cassette for supplying the paper, on which an image is to be formed, and said paper-discharging tray for discharging the paper, on which said image has been formed, are arranged within said apparatus with the advantage that the body has no projection and thus smaller overall circumference dimensions, with the result that a reduced space is required for installing.

However, in the above-described conventional image-forming apparatus, said intermediate tray and the paper-discharging tray are separately arranged one above the other and the installing construction becomes complicated and the required vertical space within the image-forming apparatus body increases its height.

It is an object of the present invention to provide an image-forming section with a simplified construction within the body of an image-forming apparatus, with a reduced height and a compact overall size.

In order to achieve the above-described object, according to the present invention, in an image-forming apparatus comprising an image-forming apparatus body and a paper-housing device, which can be inserted into and extracted from said image-forming apparatus body, a tray for stocking paper on which an image has been formed, a paper-discharging device provided with a plurality of paper-discharging portions for discharging said paper to said tray and a paper-resupplying device arranged on the downstream side of said paper-discharging device for resupplying the paper stocked in the tray housed in said image-forming apparatus body is characterized in that the tray serving for both, i.e. as an intermediate tray for temporarily stocking the paper midway between copying operations when the paper is copied a plurality of times and as a paper-discharging tray for stocking the paper subject to a final copying process is arranged on the upstream side of said paper-resupplying device, said tray being composed of a first paper-stocking portion and a second paper-stocking portion separated from each other, such that at least a trailing end portion of the paper, which has been subjected to a final copying process is housed on said first paper-stocking portion, whereas a front end side portion of the paper to be resupplied being deposited on said second paper-stocking portion.

According to the above-described construction, in the case where a complex image is to be formed, that is when the manuscript images should be overlappedly formed on one side of the paper or the image should be formed on both sides of the paper, the paper to be resupplied is housed in the tray under the condition that it arrives at the paper-resupplying means in the paper-resupplying device in the same manner as in a conventional image-forming apparatus of this kind. In this case, the tray serves at the intermediate tray according to the prior art.

The paper on which the complex image has been formed, and the paper for use in the usual image formation are discharged on the tray through said branching guide but the paper, on which a specific image has been formed, is positioned within the tray under the condition that it does not arrive at the paper-resupplying means even though the paper, on which an image is to be formed, has a maximum size. In this case, the tray serves as the paper-discharging tray according to the prior art.

The invention and advantageous details thereof will be further explained with reference to the accompanying drawings, in which

Fig. 1 is a side view showing a construction of principle parts of an image-forming apparatus according to the present invention;

Fig. 2 is a rough longitudinally sectioned side view showing an electrostatic photographic copying machine as one example of said image-forming apparatus;

Fig. 3 is a perspective view showing said electrostatic photographic copying machine;

Figs. 4 to 6 are side views corresponding to Fig. 1 depicting different operational states of the apparatus housing during paper transportation and paper supply;

Figs. 7 to 9 are again side views corresponding to Fig. 1 for showing different operational states of a paper subjected to the final copying; and

Fig. 10 is a further side view corresponding to Fig. 1 for showing an operation state of said paper to be resupplied and subjected to a final copying process.

Figs. 2, 3 show an electrostatic photographic copying machine as one example of an image-forming apparatus according to the present invention. Referring to Figs. 2, 3, reference numeral 1 designates a copying machine body provided with a manuscript-carrying table 2 and a manuscript-weight 3 on an upper surface portion thereof. Said copying machine body 1 contains a drum photoreceptor 4 rotating in the direction of an arrow R (in Fig. 2 laid crossways), a charging device 5, developing devices 6, 7, a transfer device 8, a paper-separating device 9, a cleaning device 10 and the like arranged at appointed positions around said photoreceptor 4 in the order described along said rotation direction R and an optical system movement-type exposing device 11 arranged in a space there-above. In addition, reference numeral 12 designates a deelectrifying device.

In addition, the copying machine body 1 is provided with a supplied paper conveying device 14 for conveying a paper P housed in a cassette 13 adapted to be inserted and extracted from a front side toward said transfer device 8 and a discharge paper-conveying device 16 for conveying said paper P, which has been transferred and separated, toward a fixing device 15.

A stocking course 18 for guiding the paper P, which has been fixed, toward a paper-discharging device 17 (its construction will be mentioned later) and a switch-back course 19 for switching back and guiding the paper P toward said paper-discharging device 17 are arranged on the downstream side of said fixing device 15. Reference numeral 20 designates a first course-switching over member provided in a branching portion of said both courses 18, 19. Reference numerals 21, 22 designate a second course-switching over member and a pair of conveying rollers provided in said switch-back course 19, respectively.

In addition, reference numeral 23 designates a tray (its construction will be mentioned later) provided below said paper-discharging device 17 for receiving the paper P discharged from the paper-discharging device 17 to house it in a certain state. Reference numeral 24 designates a paper-resupplying device provided on the downstream side of said tray for jointly supplying the paper P to said supplied paper-conveying device 14 in an appointed timing and reference numeral 25 designates paper-resupplying rollers as paper-resupplying means. A complex image is to be formed on said paper P, that is on the one hand manuscript images are to be formed overlappedly on one side or an image is to be formed on both sides on the other hand. Reference numeral 26 designates a width-keeping mechanism for keeping the papers P stocked on the tray 23 in uniform width. PS designates a paper-stopper.

Said constructions of the paper-discharging device 17 and the tray 23 will be described below with reference to Fig. 1 and Figs. 4 to 9. At first, the paper-discharging device 17 is provided with three pairs of paper-discharging rollers 27, 28, 29, each comprising an upper roller and a lower roller mounted on a pair of frames (an upper frame and a lower frame) (not shown) at a suitable interval, paper-guiding members 30, 31 arranged between the respective paper-discharging rollers 27, 28, 29, paper-discharging portions 32, 33 arranged immediately downstream of the pair of paper-discharging rollers 27 and the pair of paper-discharging rollers 28, respectively. Paper-discharging guides 34, 35 are pivotably mounted immediately downstream of said paper-discharging portions 32, 33, respectively, and a guide member 37 is arranged in a paper-discharging portion 36 composed of the pair of paper-discharging rollers 29 on the downstream side for guiding the paper P downward.

Said paper-discharging guides 34, 35 can be changed over to a paper-discharging posture for discharging the paper P into the tray 23 crossing a paper-discharging course and a posture for retreating from said paper-discharging course to let the paper P go toward the downstream side. For example, a paper P₁ of large size having a relatively large length in the conveying direction is guided toward the tray 23 by giving said paper-discharging posture to the paper-discharging guide 34 on the downstream side of the pair of rollers 27, as shown in Fig. 4, while a paper P₂ of middle size is guided toward the tray 23 by giving the paper-discharging posture merely to the paper-discharging guide 35 on the downstream side of the pair of paper-discharging rollers 28 positioned midway, as shown in Fig. 5. In addition, a paper P₃ of small size is guided toward the tray 23 from said paper-discharging portion 31 composed of said pair of paper-discharging rollers 29 on the downstream side by changing-over the two paper-discharging guides 34, 35 to said posture for letting the paper go toward the downstream side, as shown in Fig. 6. The papers P₁, P₂, P₃ guided onto the tray 23 through the paper-discharging portions 32, 33, 36, respectively, are uniformly kept in width by means of said width-keeping mechanism 26 regardless of the widths thereof and housed such that the front ends thereof abut against said paper-stopper PS.

A branching guide 38 is provided on the upstream side of the paper-discharging portion 32 for branching the paper P₁ of large size in the direction toward the tray 23. Said branching guide 38, as becomes obvious from the later description, is used for changing-over to a temporary stocking of the paper P within the tray 23

midway between the copying operations and a stocking of the paper P subjected to a final copying step when the paper is copied a plurality of times. A pair of paper-discharging rollers 39 composed of an upper paper-discharging roller and a lower paper-discharging roller are mounted on said pair of frames (said upper frame and said lower frame) in the vicinity of a confluence of the stocking course 18 and the switch-back course 19 on the downstream side of said confluence. Paper-guiding members 40, 41 are arranged between said pair of paper-discharging rollers 39 and the pair of paper-discharging rollers 27. A paper-discharging portion 42 is provided at the immediate downstream side of said pair of paper-discharging rollers 39, and the branching guide 38 is arranged at the downstream portion of said paper-discharging portion 42. The position of the branching guide 38 is set so that a front end of the paper P₁ does not arrive at the paper-resupplying roller 25, preferably said front end of the paper P₁ should not reach to the end portion on the downstream side of a paper-keeping side plate 43 of the width-keeping mechanism 26, when the paper of maximum size (for example the paper P₁), on which an image is to be formed by the electrostatic photographic copying machine, is guided toward the tray 23 and deposited there, as shown in Fig. 7. In addition, the papers P₂, P₃ shorter than the paper P₁ are guided to the branching guide 38 and then housed on the tray 23, as shown in Fig. 8 and Fig. 9, respectively.

The tray 23 is divided into a first paper-stocking portion 44 for housing all of the papers P subjected to the final copying step or a major part thereof including their rear end, and a second paper-stocking portion 45 for housing a front end part of the paper P to be resupplied. Said first paper-stocking portion 44 comprises a first inclined tray portion 46 inclined so as to be slightly lower than the upstream side (the left side in Fig. 1), and having a longer extensional area and a second inclined tray portion 47 inclined so as to be lower than on the downstream side, being shorter and having a smaller area connected with said first inclined tray portion 46. Said paper-stocking portion 45 is separated from said second inclined tray portion 47 on the downstream side of the second inclined tray portion 47 and is positioned below the paper-keeping side plate 43 of the width-keeping mechanism 26.

Tray guide members 48, 49 are arranged crossways in the direction vertical to the paper surface within the image-forming apparatus body 1 while the members 52, 53 to be guided and engaged with said tray guide members 48, 49 are provided on the outer side of a side plate 50 on the upstream side of the first inclined tray portion 46 of the first paper-stocking portion 44 and on the back side of a downwardly bent portion 51 of the second inclined tray portion 47, respectively, so that the first paper-stocking portion 44 can be separately moved from the second paper-stocking portion 45 and can be inserted and extracted from the front side of the image-forming apparatus body 1 (see Fig. 3).

The paper P to be resupplied or the paper P subjected to the final copying step is housed on the tray 23 having the above-described construction in the following manner. At first, the paper P to be resupplied is housed so as to extend over the first paper-stocking portion 44 and the second paper-stocking portion 45 except for paper of remarkably small size. That is to say, the paper P₁ of large size is housed on the tray 23 so as to be engaged by the paper-stopper PS at the front end portion thereof and supported by the second paper-stocking portion 45 at a rear end portion thereof, as shown in Fig. 4. Paper P₂ of middle size and paper P₃ of small size are housed on the tray 23 as shown in Fig. 5 and Fig. 6, respectively.

In addition, a paper P subjected to a final copying step is housed merely on the first paper-stocking portion 44 excluding one of relatively large size (for example the paper P₁). That is to say, the paper P₁ of large size is deposited on the tray 23 so as to be engaged by said side plate 50 on the upstream side of the first inclined tray portion 46 at a rear end B thereof and held by the second paper-stocking portion 45 at said front end portion thereof. And, the paper P₂ of middle size and the paper P₃ of small size are housed on the tray 23 so as to be held by the first paper-stocking portion 44 as shown in Fig. 8 and Fig. 9, respectively.

The operation of the image-forming apparatus having the above-described construction will be described in the following.

Since a manuscript image is usually formed on one side of a paper P merely one time in most cases, the branching guide 38 is held under the condition shown by full line in Fig. 1. Further, it is assumed that the first course-changing over member 20 and the branching guide 38 are changed-over to positions shown by full lines in Fig. 1.

At first, the manuscript is placed on said manuscript-carrying table 2 and covered with said manuscript weight 3 and then upon pushing down a copy key in an operation display portion 54 (refer to Fig. 3) provided on an upper surface of the image-forming apparatus body 1, said exposing device 11 exposes and scans the manuscript and at the same time the papers P are sent out toward said transfer device 8 from said paper supplying cassette 13 in an appointed timing. An electrostatic latent image is formed on the photoreceptor 4 on the basis of said exposure scanning and the formed electrostatic latent image is turned into a toner image by said developing device 6. Said toner image is transferred onto the paper P in the transfer device 8. The paper P then passes the fixing device 15 by action of said discharged paper-conveying device 16 to achieve a fixing

of the toner image within a predetermined timing.

The paper P which has been fixed is guided to the stocking course 18 by the first course-changing over member 20 to arrive at the paper-discharging device 17, where it is introduced into the tray 23 through the paper-discharging portion 42 by means of the branching guide 38. In this case, the paper is housed on the main tray portion 46 on the upstream side of the main tray 23 under the condition that the image-forming surface is faced down. In this case, the branching guide 38 is arranged on the upstream side of the paper-discharging portion 32 for branching the paper of maximum size, on which an image is to be formed, toward the tray 23 and positioned so that its front end may not arrive at the paper-resupplying rollers 25, so that the front end of the paper P does not arrive at the paper-resupplying rollers 25 even though the paper P arriving at the tray 23 through the paper-discharging portion 42 may not only be small-sized but also large-sized (refer to Figs. 7 to 9).

After a copying cycle, the paper P, which has been copied and fixed, is stocked on the tray 23, and a copy can be taken out by extracting the main tray portion 44 of the tray 23 to the front side of the image-forming apparatus body 1, as shown in Fig. 3.

On the other hand, in the case where the first course-changing over member 20 and the second course-changing over member 21 are switched to the state shown by an imaginary line in Fig. 1, the paper P which has been fixed, arrives at the paper-discharging device 17 through the switch-back course 19 and is housed with the image-forming surface facing up.

In addition, the taking out of paper which has been copied with facing down or up image may be selected by operating the selection key in said operation display portion 54.

Subsequently, in the case where a manuscript image is to be overlappedly formed on one side of the paper to obtain for example a bi-colored copy, a selection key for setting such the copying mode in the operation display portion 54 is operated.

In this copying mode, it is required that the paper P which has been subjected to the appointed fixing treatment in the first image formation, is housed on the tray 23 under the condition that its image faces down, so that the first course-changing over member 20 is held under the state shown by a full line in Fig. 1 and the branching guide 38 is held under the state shown by an imaginary line in Fig. 1. The paper-discharging guides 34, 35 are suitably changed over depending upon the size (large, middle, small) of the paper P but now, provided that the manuscript image is overlappedly formed on one side of the paper P of large size, the paper-discharging guide 34 is held under the state shown by said full line in Fig. 1.

Upon operating said copy key under this state, the manuscript is exposed to form an electrostatic latent image on the photoreceptor 4 in the same manner as above described but this electrostatic latent image is first developed by the developing device 6. Then, the paper P₁ which has been subjected to the appointed transfer and fixing treatments, is guided to the stocking course 18 by means of the first course-changing over member 20 to arrive at the paper-discharging device 17, where it passes through the branching guide 38 to be introduced into the tray 23 through the paper-discharging portion 32 by means of the paper-discharging guide 34. In this case, however, it is housed on the tray 23 under the condition that it extends over the second paper-stocking portion 45 of the tray 23 and the downstream side portion of the first paper-stocking portion 44 and with facing down image. The papers P₁ stocked on the tray 23 are kept in width by means of the width-keeping mechanism 26, as shown in Fig. 4.

After the completion of the first copying cycle, upon operating a paper-resupplying key in the operation display portion 54, the first course-changing over member 20 and the branching guide 38 are changed over to a position shown by full line in Fig. 1 and an electrostatic latent image is formed on the photoreceptor 4 in the same manner as above described but this time the electrostatic latent image is developed by the other developing device 7. The paper P₁ which has been subjected to said transfer and fixing treatments, is guided to the stocking course 18 by means of the first course-changing over member 20 to arrive at the paper-discharging device 17 where it is introduced into the tray 23 through the paper-discharging portion 42 by means of the branching guide 38. In this case, it is housed on the tray 23 so as to extend over the first paper-stocking portion 44 and the second paper-stocking portion 45 of the tray 23 with its image facing down, as shown in Fig. 7.

In the case where an image is to be formed on both sides of the paper, the operation is same as that in the case where the image is overlappedly formed on one side of the paper except that the paper P which has been subjected to the transfer and fixing treatments on one side thereof, is housed on the tray 23 with facing up image, so that its detailed description is omitted.

Furthermore, a fixed guide 55 may be provided above the first inclined tray portion 46. In this case, a paper P' which has been subjected to the final copying step, can be separately housed so as to go under a paper P'' to be resupplied, as shown in Fig. 10.

In the image-forming apparatus having the above described construction, other copying modes than those

described above are possible but the description is omitted here.

Although in the above described preferred embodiment the first paper-stocking portion 44 can be inserted and extracted from the front side of the image-forming apparatus body 1, according to a further modification, also the second paper-stocking portion 45 may be adapted to be inserted and extracted from the front side of the image-forming apparatus body 1 in a similar manner.

As above described, according to the present invention, it is sufficient that merely one tray serves not only as the intermediate tray for temporary deposition of the paper but also as the paper-discharging tray for housing the paper on which an appointed image has been formed. In other words, according to the invention, the conventional intermediate tray is used also as the paper-discharging tray, so that the installing structure of the tray becomes more simple and the required space in height direction for an extra tray becomes unnecessary with the result that an image-forming apparatus according to the invention has a remarkably smaller and compact size.

According to the present invention, the tray housed in the image-forming apparatus body is divided into the first paper-stocking portion for stocking the paper, which has been subjected to the final copying step, and the second paper-stocking portion for stocking the paper to be resupplied, so that the first paper-stocking portion can be simply extracted from for example the front side of the image-forming apparatus body without any hindrance to other members, for example the paper-resupplying rollers. Thus, the paper which has been subjected to the final copying, can be simply taken out by means of a handy tray which can be used very easily.

As a specific advantage of the present invention, it is not required to dislocate and specially control the part of the machine having many movable portions, such as the paper-resupplying means. This means that the construction becomes more simple and the reliability is improved at reduced cost.

Claims

1. An image-forming apparatus comprising an image-forming apparatus body (1), a paper-housing device (13) which can be inserted into and extracted from said image-forming apparatus body, a tray (23) for stocking paper on which an image has been formed, a paper-discharging device (17) provided with a plurality of paper-discharging portions (32, 33, 36) for discharging said paper to said tray and a paper-resupplying device (24) arranged on the downstream side of said paper-discharging device for resupplying the paper stocked in the tray housed in said image-forming apparatus body, **characterized** in that the tray (23) serving for both, i.e. as an intermediate tray for temporarily stocking the paper (P) midway between copying operations when the paper is copied a plurality of times and as a paper-discharging tray for stocking the paper subjected to a final copying process, is arranged on the upstream side of said paper-resupplying device (24), said tray (23) being composed of a first paper-stocking portion (44) and a second paper-stocking portion (45) separated from each other, such that at least a trailing end portion of the paper (P), which has been subjected to a final copying process, is housed on said first paper-stocking portion (44), whereas a front end side portion of the paper to be resupplied being deposited on said second paper-stocking portion (45).
2. The image-forming apparatus as set forth in claim 1, wherein the first paper-stocking portion (44) comprises a long inclined tray portion (46) inclined so as to be lower on the upstream side thereof for supporting a major large area of said copied paper.
3. The image-forming apparatus as set forth in claim 1, wherein the first paper-stocking portion (44) comprises a first long inclined tray portion (46) inclined so as to be lower on the upstream side thereof and a second short inclined tray portion (47) having a smaller area than said first inclined tray portion and being inclined so as to be lower on the downstream side thereof and connected with said first inclined tray portion, and wherein said second paper-stocking portion (45) is arranged on the downstream side of and separated from said second inclined tray portion (47).
4. The image-forming apparatus as set forth in claim 3, wherein tray guide members (48, 49) are arranged crossways within said image-forming apparatus body (1) while members (52, 53) to be guided and engaging with said tray guide members are provided on both sides of the first paper-stocking portion (44) such that the first paper-stocking portion (44) can be separated from the second paper-stocking portion (45) to be inserted and extracted from the front side of the image-forming apparatus body (1).
5. The image-forming apparatus as set forth in claim 1, wherein the paper-discharging device (17) is pro-

vided with a branching guide (38) arranged on the upstream side of said paper-discharging portion for branching off the paper (P_1) of maximum size bearing a copied image toward the tray (23) and to position said paper (P_1) so that a front end thereof housed on the tray does not reach to the paper-resupplying means (25) in said paper-resupplying device (24).

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6. The image-forming apparatus as set forth in claim 5, wherein the paper-discharging device (17) is provided with a pair of paper-discharging rollers (39) on the upstream side of said branching guide (38) and said plurality of paper-discharging portions comprising associated pairs of paper-discharging rollers (27, 28, 29) and a paper-discharging guide positioned on the downstream side of each pair of paper-discharging rollers for guiding the paper moving through a conveying course arranged at suitable intervals on the downstream side of the branching guide (38).

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7. The image-forming apparatus as set forth in claim 1, wherein a fixed guide (55) is provided above a first inclined tray portion of the first paper-stocking portion for guiding the paper discharged from the paper-discharging portion when paper (P_1) of maximum size is sent to the paper-supplying means and for supporting a rear end portion of the paper when it is stocked.

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8. An image-forming apparatus comprising an image-forming apparatus body (1), and a paper-housing device (13), which can be inserted into and extracted from said image-forming body, a tray (23) for stocking paper, on which an image has been formed, a paper-discharging device (17) provided with a plurality of paper-discharging portions (32, 33, 36) for discharging said paper to said tray and a paper-resupplying device (24) arranged on the downstream side of said paper-discharging device for resupplying the paper stocked in the tray housed in said image-forming apparatus body, **characterized** in that the tray serving for both, i.e. as an intermediate tray for temporarily stocking the paper (P) midway between copying operations when the paper is copied a plurality of times and as a paper-discharging tray for stocking the paper subjected to a final copying process, is arranged on the upstream side of said paper-resupplying device (24), said tray (23) being composed of a first paper-stocking portion (44) and a second paper-stocking portion (45), and a branching guide (38) for branching the paper (P_1) of maximum size, on which an image has been formed, to the tray (23) in the paper-discharging device is arranged at a position where the paper (P_1) of maximum size guided toward the tray and housed within the tray does not reach to the paper-resupplying means (25) in said paper-resupplying device (24) and at a front end of the upstream side of the paper-discharging portion.

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9. The image-forming apparatus as set forth in claim 8, wherein the dimensions of said first paper-stocking portion (44) and said second paper-stocking portion (45) are such that the paper (P_1) of maximum size housed on the tray extends over both portions.

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10. The image-forming apparatus as set forth in claim 9, wherein a portion of the rear end side of the paper, which has been subjected to the final copying process, is housed on the first paper-stocking portion (44) while a front end side of the paper to be resupplied is housed in the second paper-stocking portion (45).

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11. The image-forming apparatus as set forth in claim 10, wherein the first paper-stocking portion (44) comprises a first long inclined tray portion (46) inclined so as to be lower on the upstream side thereof and having a larger area than said second inclined tray portion (47).

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12. The image-forming apparatus as set forth in claim 10, wherein said first paper-stocking portion (44) comprises a first long inclined tray portion (46) inclined so as to be lower on the upstream side thereof and having a large area than said second inclined tray portion (47) which is shorter and inclined so as to be lower on the downstream side thereof, both inclined tray portions being connected, and wherein the second paper-stocking portion (45) is arranged on the downstream side of said second inclined tray portion (47) but separated from the second inclined tray portion.

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13. The image-forming apparatus as set forth in claim 12, wherein tray guide members (48, 49) are arranged crossways within said image-forming apparatus body (1) while members (52, 53) to be guided and engaging with said tray guide members are provided on both sides of the first paper-stocking portion (44) such that the first paper-stocking portion (44) can be separated from the second paper-stocking portion (45) to be inserted and extracted from the front side of the image-forming apparatus body (1).

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14. The image-forming apparatus as set forth in claim 12, wherein the first paper-stocking portion (44) and

the second paper-stocking portion (45) are separated from each other.

- 5 15. The image-forming apparatus as set forth in claim 10, wherein the paper-discharging device (17) is provided with a pair of paper-discharging rollers (39) on the upstream side of said branching guide (38) and said plurality of paper-discharging portions comprising associated pairs of paper-discharging rollers (27, 28, 29) and a paper-discharging guide positioned on the downstream side of each pair of paper-discharging rollers for guiding the paper moving through a conveying course arranged at suitable intervals on the downstream side of the branching guide (38).
- 10 16. The image-forming apparatus as set forth in claim 10, wherein a fixed guide (55) is provided above a first inclined tray portion (46) of the first paper-stocking portion (44) for guiding the paper discharged from the paper-discharging portion when paper (P₁) of maximum size is sent to paper-resupplying means (24) and for supporting a rear end portion of the paper when it is stocked.

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Patentansprüche

- 20 1. Bilderzeugungsgerät mit einem Gerätegehäuse (1), einem in das Gerätegehäuse einsetzbaren und aus diesem herausziehbaren Papiervorratsbehälter (13), einer Ablage (23) zum Lagern von Papier, auf dem ein Bild erzeugt worden ist, einer Papierausgabevorrichtung (17) mit einer Mehrzahl von Papierausgabebereichen (32,33,36) zum Ausgeben des Papiers auf der Ablage, und mit einer an der stromab von der Papierausgabevorrichtung gelegenen Seite angeordneten Papierrückführvorrichtung (24) zum erneuten Zuführen des auf der im Gerätegehäuse vorhandenen Ablage lagernden Papiers, **dadurch gekennzeichnet**, daß die Ablage (23) sowohl als Zwischenablage zum temporären Lagern des Papiers (P) zwischen den Kopiervorgängen, wenn das Papier mehrmals bedruckt wird, als auch als Papierausgabeablage zum Lagern des Papiers nach einem letzten Kopiervorgang dient und an der stromauf von der Papierrückführvorrichtung (24) gelegenen Seite angeordnet ist, wobei die Ablage (23) einen ersten Papierlagerbereich (44) und einen zweiten Papierlagerbereich (45) aufweist, die so voneinander getrennt sind, daß mindestens ein Endbereich eines einem letzten Kopiervorgang unterzogenen Papiers (P) auf dem ersten Papierlagerbereich (44) aufliegt, während ein Führungsbereich eines erneut zuzuführenden Papiers auf dem zweiten Papierlagerbereich (45) aufliegt.
- 25 2. Bilderzeugungsgerät nach Anspruch 1, **dadurch gekennzeichnet**, daß der erste Papierlagerbereich (44) zum Tragen einer größeren Fläche des kopierten Papiers einen langen geneigten Ablagebereich (46) aufweist, der so geneigt ist, daß er an seiner stromauf gelegenen Seite niedriger ist.
- 30 3. Bilderzeugungsgerät nach Anspruch 1, **dadurch gekennzeichnet**, daß der erste Papierlagerbereich (44) einen ersten langen geneigten Ablagebereich (46) aufweist, der so geneigt ist, daß er auf seiner stromauf gelegenen Seite niedriger ist, sowie einen zweiten kurzen geneigten Ablagebereich (47) mit einem kürzeren Bereich als dem des ersten geneigten Ablagebereichs, welcher Bereich an der an seiner stromab gelegenen Seite niedriger ist und mit dem ersten geneigten Ablagebereich verbunden ist, und daß der zweite Papierlagerbereich (45) an der stromab von dem zweiten geneigten Ablagebereich (47) gelegenen Seite und von diesem getrennt angeordnet ist.
- 40 4. Bilderzeugungsgerät nach Anspruch 3, **dadurch gekennzeichnet**, daß innerhalb des Gerätegehäuses (1) Ablagenführungen (48,49) quer angeordnet sind, und daß von den Ablagenführungen zu führende und mit diesen im Eingriff stehende Teile (52, 53) an beiden Seiten des ersten Papierlagerbereichs (44) vorgesehen sind, so daß der erste Papierlagerbereich (44) von dem zweiten Papierlagerbereich (45) zum Einsetzen und Herausziehen an der Vorderseite des Gerätegehäuses (1) getrennt werden kann.
- 45 5. Bilderzeugungsgerät nach Anspruch 1, **dadurch gekennzeichnet**, daß die Papierausgabevorrichtung (17) eine an der stromauf von dem Papierausgabebereich angeordnete Abzweigführung (38) aufweist, zum Abzweigen des eine Kopie tragenden Papiers (P₁) mit dem größten Format zu der Ablage (23) und zum Positionieren des Papiers (P₁), so daß dessen auf der Ablage aufliegende Vorderkante nicht die Papierrückföhreinrichtung (25) der Papierrückführvorrichtung (24) erreicht.
- 50 6. Bilderzeugungsgerät nach Anspruch 5, **dadurch gekennzeichnet**, daß die Papierausgabevorrichtung (17) ein an der stromauf von der Abzweigführung (38) gelegenen Seite angeordnetes Paar von Papierausgabewalzen (39) aufweist, und daß die Mehrzahl von Papierausgabebereichen zugehörige Paare von
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Papierausgabewalzen (27, 28, 29) aufweist, sowie eine an der stromab gelegenen Seite einesjeweiligen Paars von Papierausgabewalzen gelegene Papierausgabeführung zum Führen des durch einen Transportweg bewegten Papiers, welche Papierausgabewalzen in geeigneten Intervallen stromab von der Abzweigung (38) angeordnet sind.

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7. Bilderzeugungsgerät nach Anspruch 1, **dadurch gekennzeichnet**, daß eine feststehende Führung (55) über einem ersten geeigneten Ablagebereich des ersten Papierlagerbereichs angeordnet ist, zum Führen des von dem Papierausgabebereich ausgegebenen Papiers, wenn Papier (P₁) mit dem größten Format in die Papierzuführeinrichtung transportiert wird und zum Tragen eines hinteren Bereichs des Papiers, wenn es gelagert wird.

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8. Bilderzeugungsgerät mit einem Gerätegehäuse (1), einem in das Gerätegehäuse einsetzbaren und aus diesem herausziehbaren Papiervorratsbehälter (13), einer Ablage (23) zum Lagern von Papier, auf dem ein Bild erzeugt worden ist, einer Papierausgabevorrichtung (17) mit einer Mehrzahl von Papierausgabebereichen (32, 33, 36) zum Ausgeben des Papiers auf der Ablage, und mit einer an der stromab von der Papierausgabevorrichtung gelegenen Seite angeordneten Papierrückführvorrichtung (24) zum erneuten Zuführen des auf der im Gerätegehäuse vorhandenen Ablage lagernden Papiers, **dadurch gekennzeichnet**, daß die Ablage (23) sowohl als Zwischenablage zum temporären Lagern des Papiers (P) zwischen den Kopiervorgängen, wenn das Papier mehrmals bedruckt wird, als auch als Papierausgabebereich zum Lagern des Papiers nach einem letzten Kopiervorgang dient und an der stromauf von der Papierrückführvorrichtung (24) gelegenen Seite angeordnet ist, wobei die Ablage (23) einen ersten Papierlagerbereich (44) und einen zweiten Papierlagerbereich (45) aufweist, und daß eine Abzweigung (38) zum Abzweigen des Papiers (P₁) mit dem größten Format, auf dem ein Bild erzeugt ist, zu der Ablage (23) in der Papierausgabevorrichtung an einer Stelle angeordnet ist, wo das zu der Ablage geführte und auf der Ablage gelagerte Papier (P₁) mit dem größten Format nicht die Papierrückführeinrichtung (25) der Papierrückführvorrichtung (24) erreicht, und an einem vorderen Ende der stromauf vom Papierausgabebereich gelegenen Seite.

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9. Bilderzeugungsgerät nach Anspruch 8, **dadurch gekennzeichnet**, daß die Abmessungen des ersten Papierlagerbereichs (44) und des zweiten Papierlagerbereichs (45) so gewählt sind, daß sich das auf der Ablage gelagerte Papier (P₁) mit größtem Format sich über beide Bereiche erstreckt.

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10. Bilderzeugungsgerät nach Anspruch 9, **dadurch gekennzeichnet**, daß ein Bereich der Endkante des Papiers, das dem abschließenden Kopiervorgang unterzogen worden ist, auf dem ersten Papierlagerbereich (44) aufliegt, während eine Führungsseite des erneut zuzuführenden Papiers auf dem zweiten Papierlagerbereich (45) aufliegt.

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11. Bilderzeugungsgerät nach Anspruch 10, **dadurch gekennzeichnet**, daß der erste Papierlagerbereich (44) einen ersten langen geeigneten Ablagebereich (46) aufweist, der so geneigt ist, daß er an seiner stromauf gelegenen Seite niedriger ist, und der eine größere Fläche aufweist, als der zweite geeignete Ablagebereich (47).

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12. Bilderzeugungsgerät nach Anspruch 10, **dadurch gekennzeichnet**, daß der erste Papierlagerbereich (44) einen ersten langen geeigneten Ablagebereich (46) aufweist, der so geneigt ist, daß er an seiner stromauf gelegenen Seite niedriger ist, und der eine größere Fläche aufweist, als der zweite geeignete Ablagebereich (47), der kürzer ist und so geneigt ist, daß er an seiner stromab gelegenen Seite niedriger ist, wobei beide geeigneten Ablagebereiche miteinander verbunden sind und der zweite Papierlagerbereich (45) an der stromab von dem zweiten geeigneten Ablagebereich (47) gelegenen Seite, aber von dem zweiten geeigneten Ablagebereich getrennt angeordnet ist.

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13. Bilderzeugungsgerät nach Anspruch 12, **dadurch gekennzeichnet**, daß innerhalb des Gerätegehäuses (1) Ablagenführungen (48, 49) quer angeordnet sind, und daß von den Ablagenführungen zu führende und mit diesen im Eingriff stehende Teile (52, 53) an beiden Seiten des ersten Papierlagerbereichs (44) vorgesehen sind, so daß der erste Papierlagerbereich (44) von dem zweiten Papierlagerbereich (45) zum Einsetzen und Herausziehen an der Vorderseite des Gerätegehäuses (1) getrennt werden kann.

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14. Bilderzeugungsgerät nach Anspruch 12, **dadurch gekennzeichnet**, daß der erste Papierlagerbereich (44) und der zweite Papierlagerbereich (45) voneinander getrennt sind.

15. Bilderzeugungsgerät nach Anspruch 10, **dadurch gekennzeichnet**, daß die Papierausgabevorrichtung (17) ein an der stromauf von der Abzweigung (38) gelegenen Seite angeordnetes Paar von Papierausgabewalzen (39) aufweist, und daß die Mehrzahl von Papierausgabebereichen zugehörige Paare von Papierausgabewalzen (27, 28, 29) aufweist, sowie eine an der stromab gelegenen Seite eines jeweiligen Paares von Papierausgabewalzen gelegene Papierausgabeführung zum Führen des durch einen Transportweg bewegten Papiers, welche Papierausgabewalzen in geeigneten Intervallen stromab von der Abzweigung (38) angeordnet sind.
16. Bilderzeugungsgerät nach Anspruch 10, **dadurch gekennzeichnet**, daß eine feststehende Führung (55) über einem ersten geeigneten Ablagebereich (46) des ersten Papierlagerbereichs (44) angeordnet ist, zum Führen des von dem Papierausgabebereich ausgegebenen Papiers, wenn Papier (P₁) mit dem größten Format in die Papierrückführeinrichtung (24) transportiert wird und zum Tragen eines hinteren Bereichs des Papiers, wenn es gelagert wird.

Revendications

1. Appareil de formation d'image comportant un corps d'appareil de formation d'image (1), un magasin de feuilles de papier (13) pouvant être introduit dans et extrait dudit corps d'appareil de formation d'image, un plateau (23) pour stocker le papier sur lequel une image a été formée, un dispositif de déchargement de papier (17) équipé d'une pluralité de parties de déchargement de papier (32, 33, 36) pour décharger ledit papier sur ledit plateau et un dispositif de réalimentation en papier (24) disposé sur le côté aval dudit dispositif de déchargement de papier pour délivrer à nouveau le papier stocké dans le plateau logé dans ledit corps d'appareil de formation d'image, caractérisé en ce que le plateau (23) servant pour les deux, c'est-à-dire en tant que plateau intermédiaire pour stocker temporairement le papier (P) à mi-chemin entre des opérations de reproduction lorsque le papier est reproduit une pluralité de fois et en tant que plateau de déchargement de papier pour stocker le papier soumis à un traitement de reproduction final, est disposé sur le côté amont dudit dispositif de réalimentation en papier (24), ledit plateau (23) étant constitué d'une première partie de stockage de papier (44) et d'une seconde partie de stockage de papier (45) séparées l'une de l'autre, de telle sorte qu'au moins une partie terminale postérieure du papier (P), qui a été soumis à un traitement de reproduction final, est logée sur ladite première partie de stockage de papier (44), tandis qu'une partie latérale terminale antérieure du papier devant être délivrée à nouveau est déposée sur ladite seconde partie de stockage de papier (45).
2. Appareil de formation d'image selon la revendication 1, dans lequel la première partie de stockage de papier (44) comporte une partie de plateau inclinée allongée (46) inclinée de manière à être plus basse sur son côté amont pour supporter une surface importante majeure dudit papier reproduit.
3. Appareil de formation d'image selon la revendication 1, dans lequel la première partie de stockage de papier (44) comporte une première partie de plateau inclinée allongée (46) inclinée de manière à être plus basse sur son côté amont et une seconde partie de plateau inclinée courte (47) ayant une surface plus faible que ladite première partie de plateau inclinée et étant inclinée de manière à être plus basse sur son côté aval et reliée à ladite première partie de plateau inclinée, et dans lequel ladite seconde partie de stockage de papier (45) est disposée sur le côté aval de et séparée de ladite seconde partie de plateau inclinée (47).
4. Appareil de formation d'image selon la revendication 3, dans lequel des éléments de guidage de plateau (48, 49) sont disposés transversalement à l'intérieur dudit corps d'appareil de formation d'image (1) tandis que des éléments (52, 53) devant être guidés et en contact avec lesdits éléments de guidage de plateau sont prévus sur les deux côtés de la première partie de stockage de papier (44) de telle sorte que la première partie de stockage de papier (44) peut être séparée de la seconde partie de stockage de papier (45) pour être introduite et extraite du côté antérieur du corps (1) d'appareil de formation d'image.
5. Appareil de formation d'image selon la revendication 1, dans lequel le dispositif de déchargement de papier (17) est muni d'un guidage de dérivation (38) disposé sur le côté amont de ladite partie de déchargement de papier pour dériver le papier (P₁) de taille maximale supportant une image reproduite vers le plateau (23) et pour positionner ledit papier (P₁) de sorte qu'une extrémité antérieure de celui-ci logée sur le plateau n'atteigne pas les moyens de réalimentation en papier (25) dans ledit dispositif de réalimentation.

mentation en papier (24).

- 5 6. Appareil de formation d'image selon la revendication 5, dans lequel le dispositif de déchargement de papier (17) est équipé d'un couple de rouleaux de déchargement de papier (39) sur le côté amont dudit guidage de dérivation (38) et ladite pluralité de parties de déchargement de papier comportant des paires associées de rouleaux de déchargement de papier (27, 28, 29) et un guidage de déchargement de papier disposé sur le côté aval de chaque couple de rouleaux de déchargement de papier pour guider le papier se déplaçant à travers un trajet d'acheminement agencés à des intervalles appropriés sur le côté aval du guidage de dérivation (38).
- 10 7. Appareil de formation d'image selon la revendication 1, dans lequel un guidage fixe (55) est prévu au-dessus d'une première partie de plateau inclinée de la première partie de stockage de papier pour guider le papier déchargé de la partie de déchargement de papier lorsqu'un papier (P1) de dimension maximale est envoyé aux moyens d'alimentation en papier et pour supporter une partie terminale postérieure du papier lorsqu'il est stocké.
- 15 8. Appareil de formation d'image comportant un corps (1) d'appareil de formation d'image, et un magasin de papier (13), qui peut être introduit dans et extrait dudit corps d'appareil de formation d'image, un plateau (23) pour stocker le papier sur lequel une image a été formée, un dispositif de déchargement de papier (17) équipé d'une pluralité de parties de déchargement de papier (32, 33, 36) pour décharger ledit papier sur ledit plateau et un dispositif de réalimentation en papier (24) disposé sur le côté aval dudit dispositif de déchargement de papier pour réalimenter le papier stocké dans le plateau logé dans le corps d'appareil de formation d'image, caractérisé en ce que le plateau servant pour les deux, c'est-à-dire en tant que plateau intermédiaire pour stocker temporairement le papier (P) à mi-chemin entre des opérations de reproduction lorsque le papier est reproduit une pluralité de fois et en tant que plateau de déchargement de papier pour stocker le papier soumis à un traitement de reproduction final, est disposé sur le côté amont dudit dispositif de réalimentation en papier (24), ledit plateau (23) étant constitué d'une première partie de stockage de papier (44) et d'une seconde partie de stockage de papier (45), et un guidage de dérivation (38) pour dériver le papier (P₁) de taille maximale, sur lequel une image a été formée, vers le plateau (23) dans le dispositif de déchargement de papier, est disposé en un endroit où le papier (P₁) de format maximal guidé vers le plateau et logé à l'intérieur du plateau n'atteint pas les moyens de réalimentation en papier (25) dans ledit dispositif de réalimentation en papier (24) et à une extrémité antérieure du côté amont de la partie de déchargement de papier.
- 20 25 30 35 9. Appareil de formation d'image selon la revendication 8, dans lequel les dimensions de ladite première partie de stockage de papier (44) et de ladite seconde partie de stockage de papier (45) sont telles que le papier (P₁) de format maximum logé sur le plateau s'étend au-dessus des deux parties.
- 40 10. Appareil de formation d'image selon la revendication 9, dans lequel une partie du côté terminal postérieur du papier, qui a été soumise au traitement de reproduction final, est logée sur la première partie de stockage de papier (44) tandis qu'un côté terminal antérieur du papier devant être réalimenté est logé dans la seconde partie de stockage de papier (45).
- 45 11. Appareil de formation d'image selon la revendication 10, dans lequel la première partie de stockage de papier (44) comporte une première partie de plateau inclinée allongée (46) inclinée de manière à être plus basse sur son côté amont et possédant une surface plus grande que ladite seconde partie de plateau inclinée (47).
- 50 12. Appareil de formation d'image selon la revendication 10, dans lequel ladite première partie de stockage de papier (44) comporte une première partie de plateau inclinée allongée (46) inclinée de manière à être plus basse sur son côté amont et possédant une surface plus grande que ladite seconde partie de plateau inclinée (47) qui est plus courte et inclinée de manière à être plus basse sur son côté aval, les deux parties de plateau inclinées étant reliées, et dans lequel la seconde partie de stockage de papier (45) est disposée sur le côté aval de ladite seconde partie de plateau inclinée (47), mais séparée de la seconde partie de plateau inclinée.
- 55 13. Appareil de formation d'image selon la revendication 12, dans lequel des éléments de guidage de plateau (48, 49) sont disposés en croix à l'intérieur dudit corps (1) d'appareil de formation d'image tandis que des éléments (52, 53) devant être guidés et en contact avec lesdits éléments de guidage de plateau sont dis-

posés sur les deux côtés de la première partie de stockage de papier (44), de telle sorte que la première partie de stockage de papier (44) peut être séparée de la seconde partie de stockage de papier (45) pour être introduite et extraite du côté antérieur du corps (1) d'appareil de formation d'image.

- 5 **14.** Appareil de formation d'image selon la revendication 12, dans lequel la première partie de stockage de papier (44) et la seconde partie de stockage de papier (45) sont séparées l'une de l'autre.
- 10 **15.** Appareil de formation d'image selon la revendication 10, dans lequel le dispositif de déchargement de papier (17) est équipé d'un couple de rouleaux de déchargement de papier (39) sur le côté amont dudit guidage de dérivation (38) et ladite pluralité de parties de déchargement de papier comportant des couples de rouleaux de déchargement de papier (27, 28, 29) et un guidage de déchargement de papier disposé sur le côté aval de chaque couple de rouleaux de déchargement de papier pour guider le papier en mouvement à travers un trajet d'acheminement agencés à des intervalles appropriés sur le côté aval du guidage de dérivation (38).
- 15 **16.** Appareil de formation d'image selon la revendication 10, dans lequel un guidage fixe (55) est prévu au-dessus d'une première partie de plateau inclinée (46) de la première partie de stockage de papier (44) pour guider le papier déchargé de la partie de déchargement de papier lorsqu'une feuille de papier (P₁) de format maximal est envoyée aux moyens de réalimentation en papier (24) et pour supporter une partie terminale postérieure du papier lorsqu'il est stocké.
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Fig.1

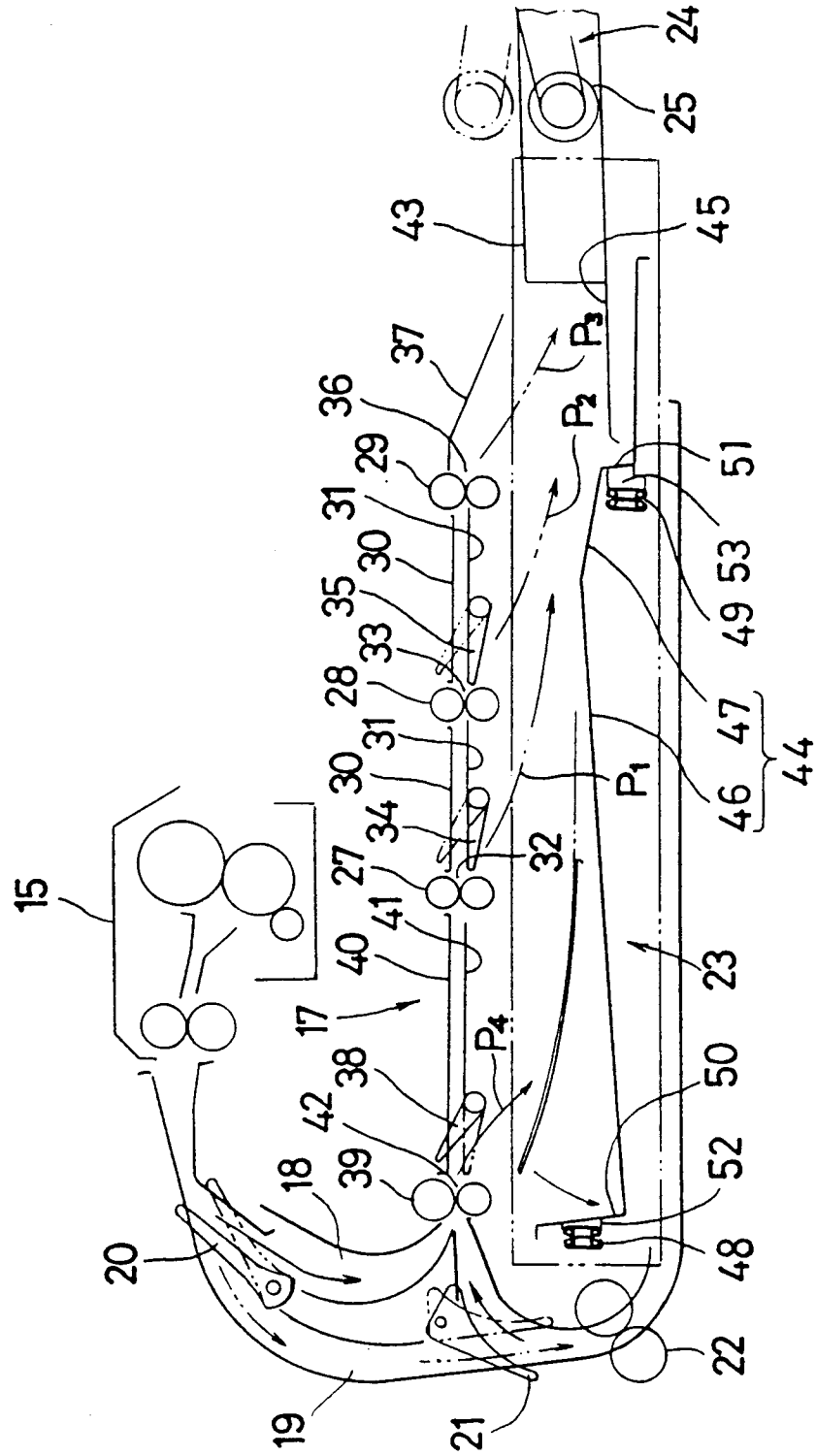


Fig. 2

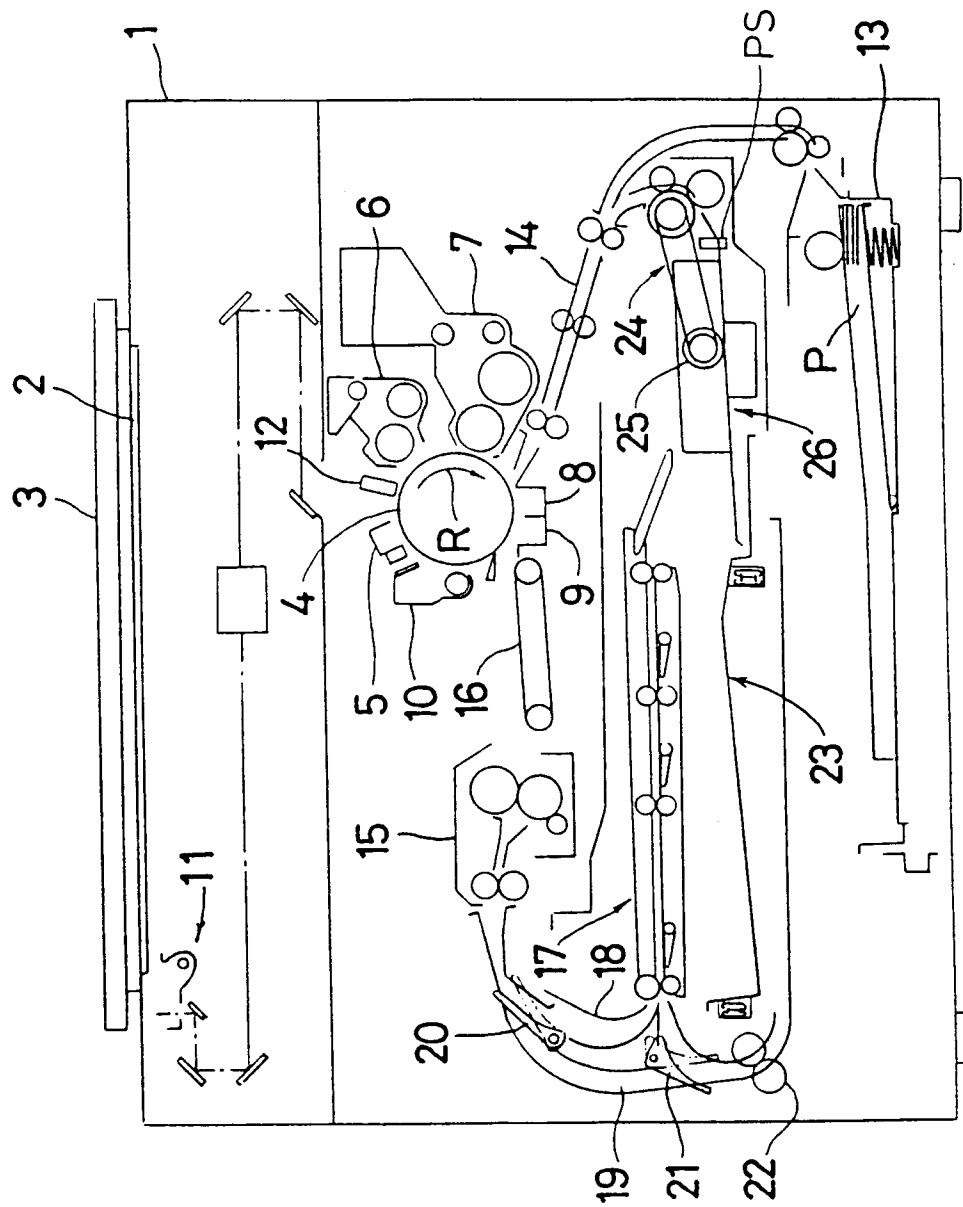


Fig.3

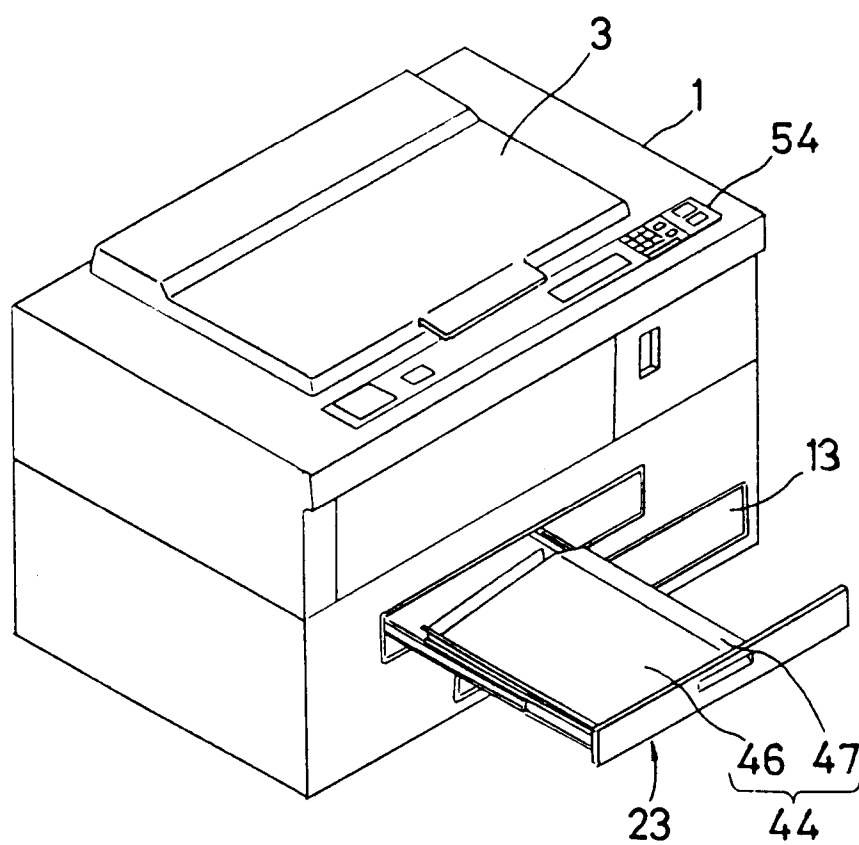


Fig.4

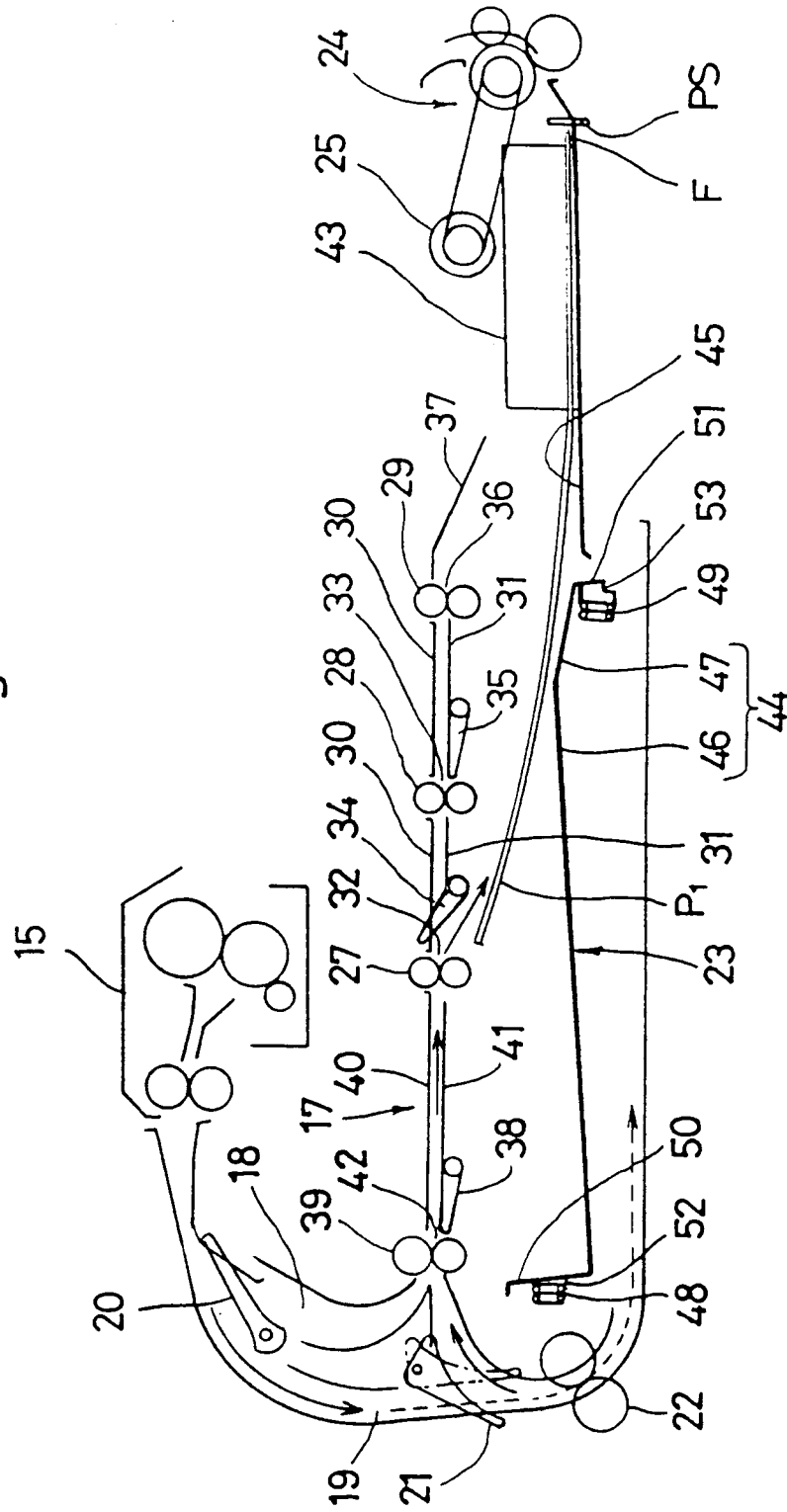
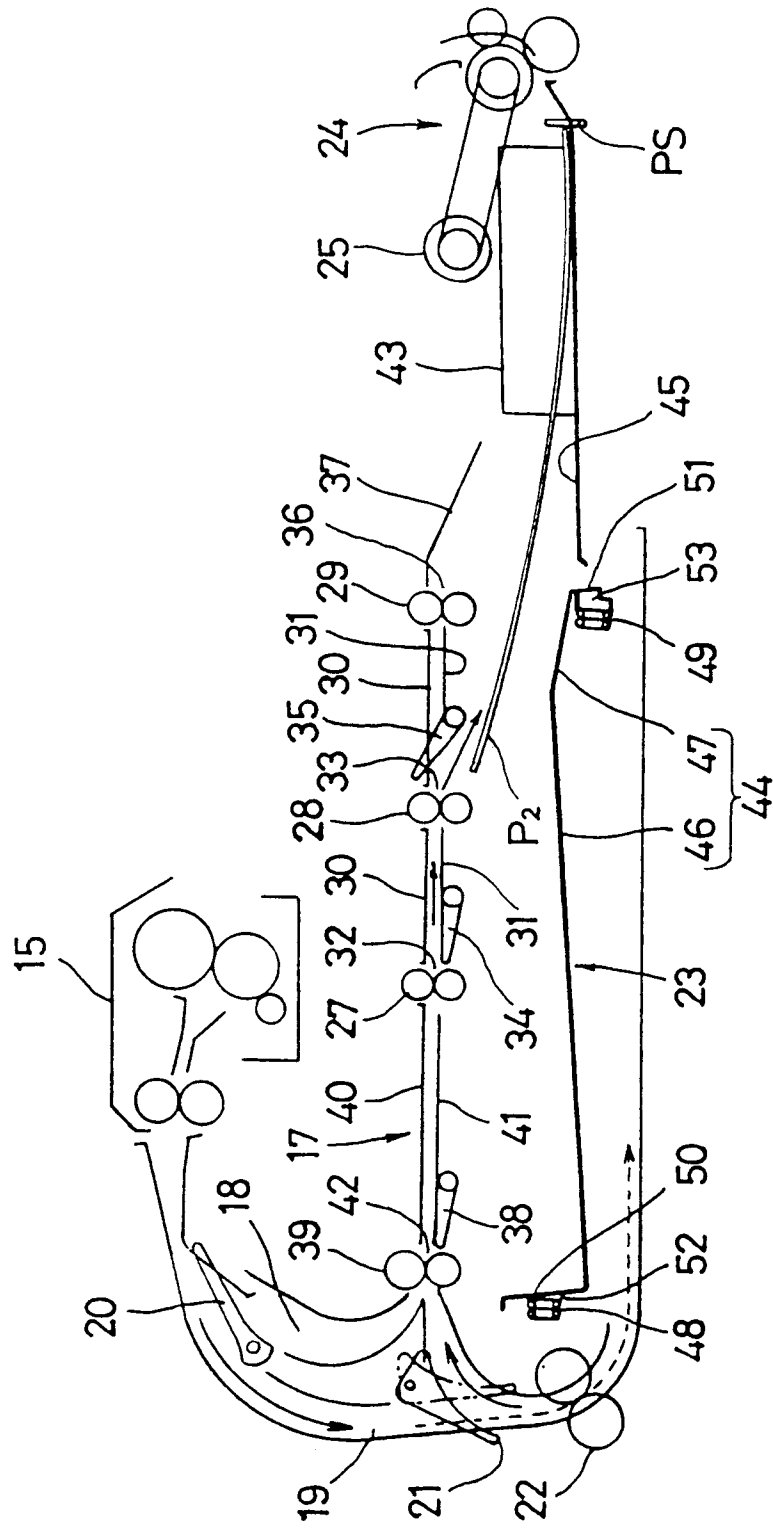


Fig. 5



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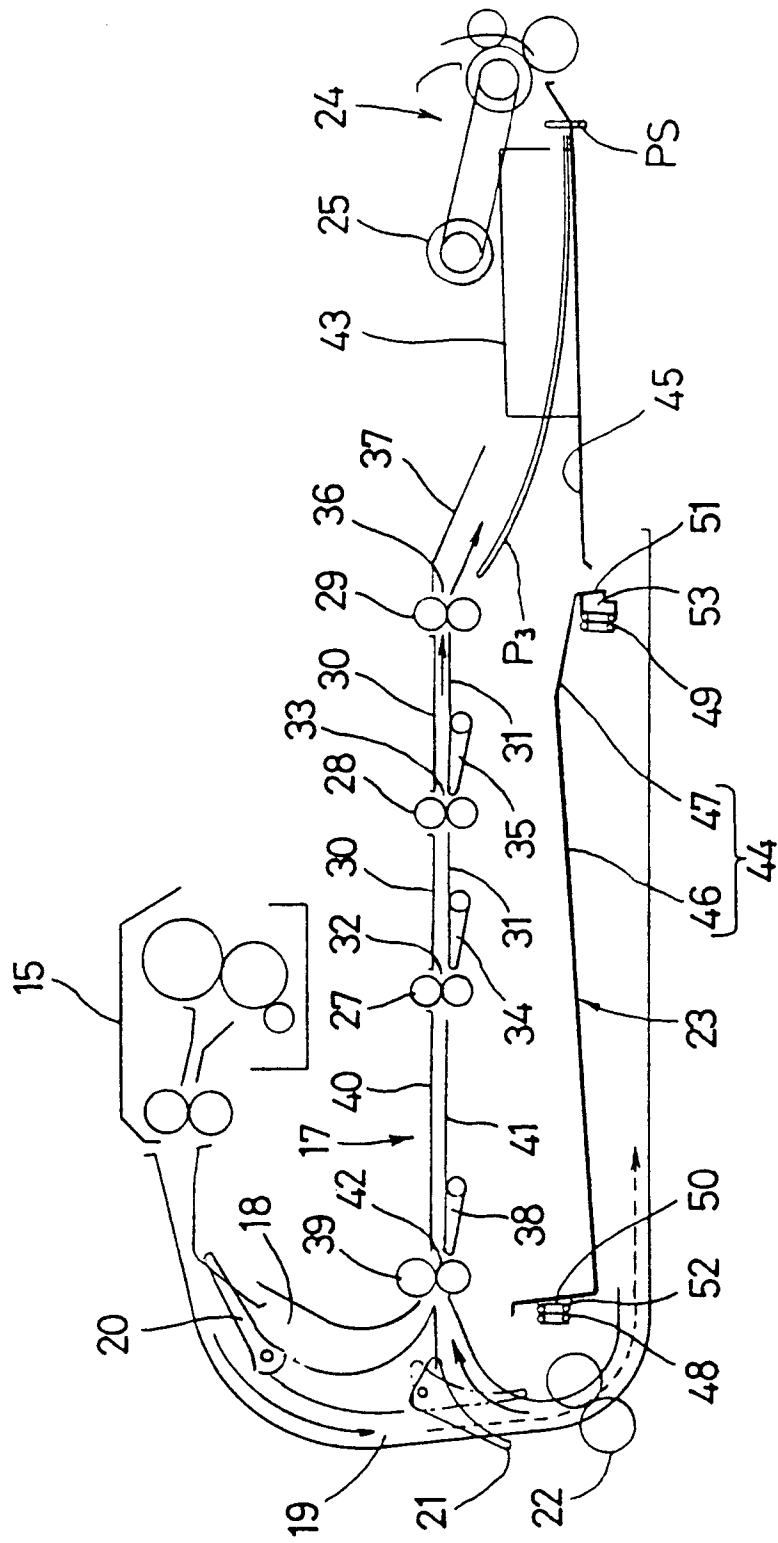


Fig.7

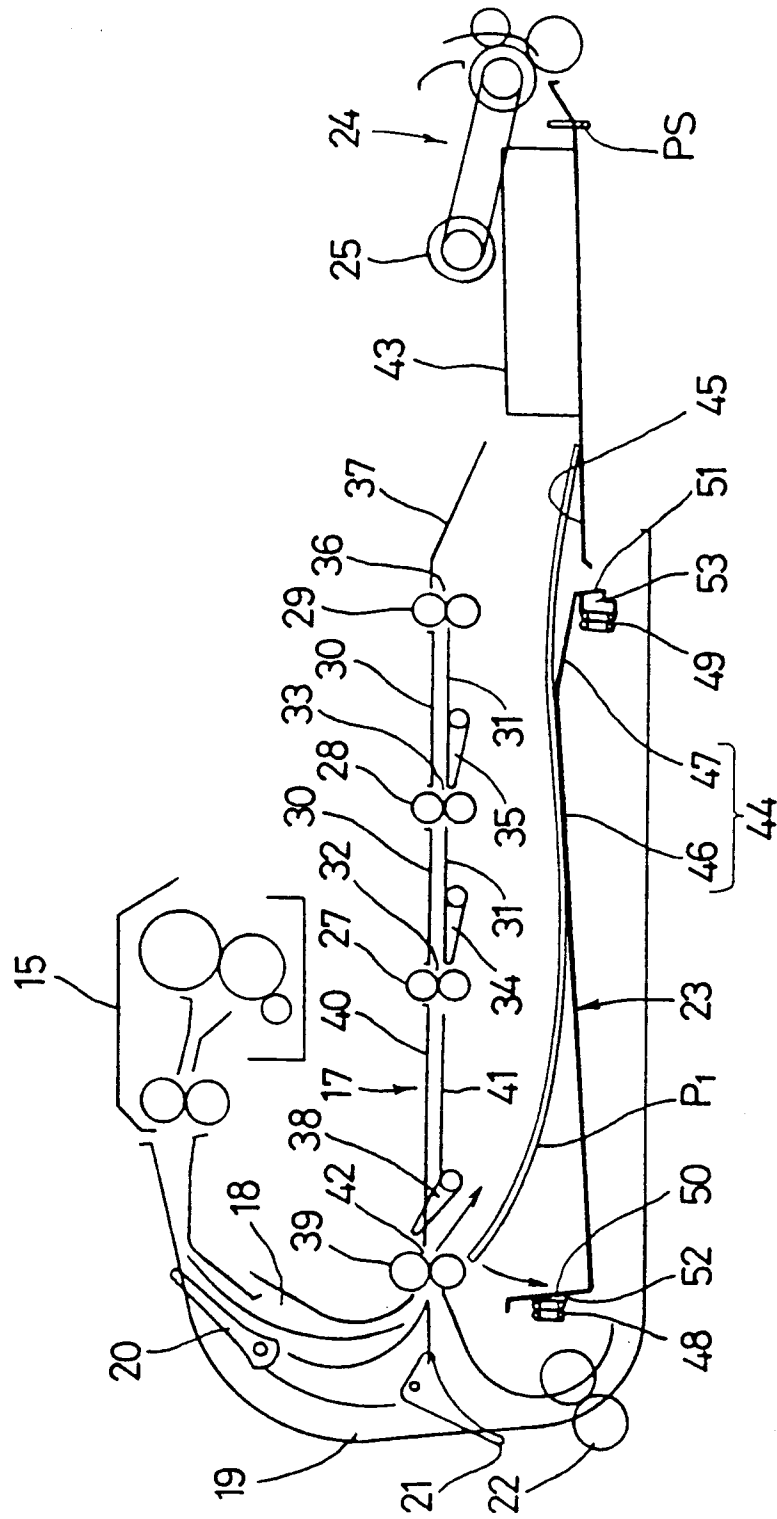


Fig.8

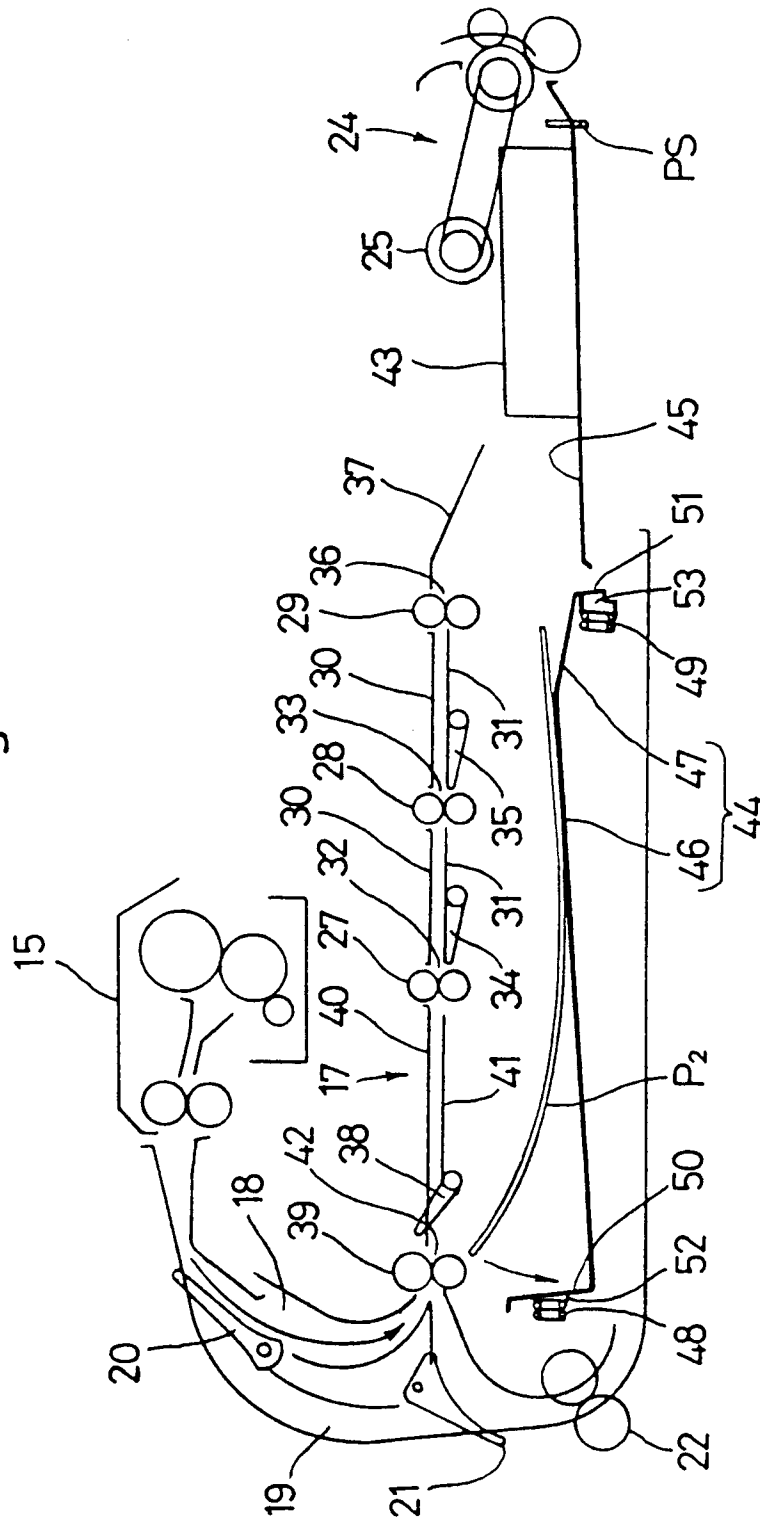


Fig. 9

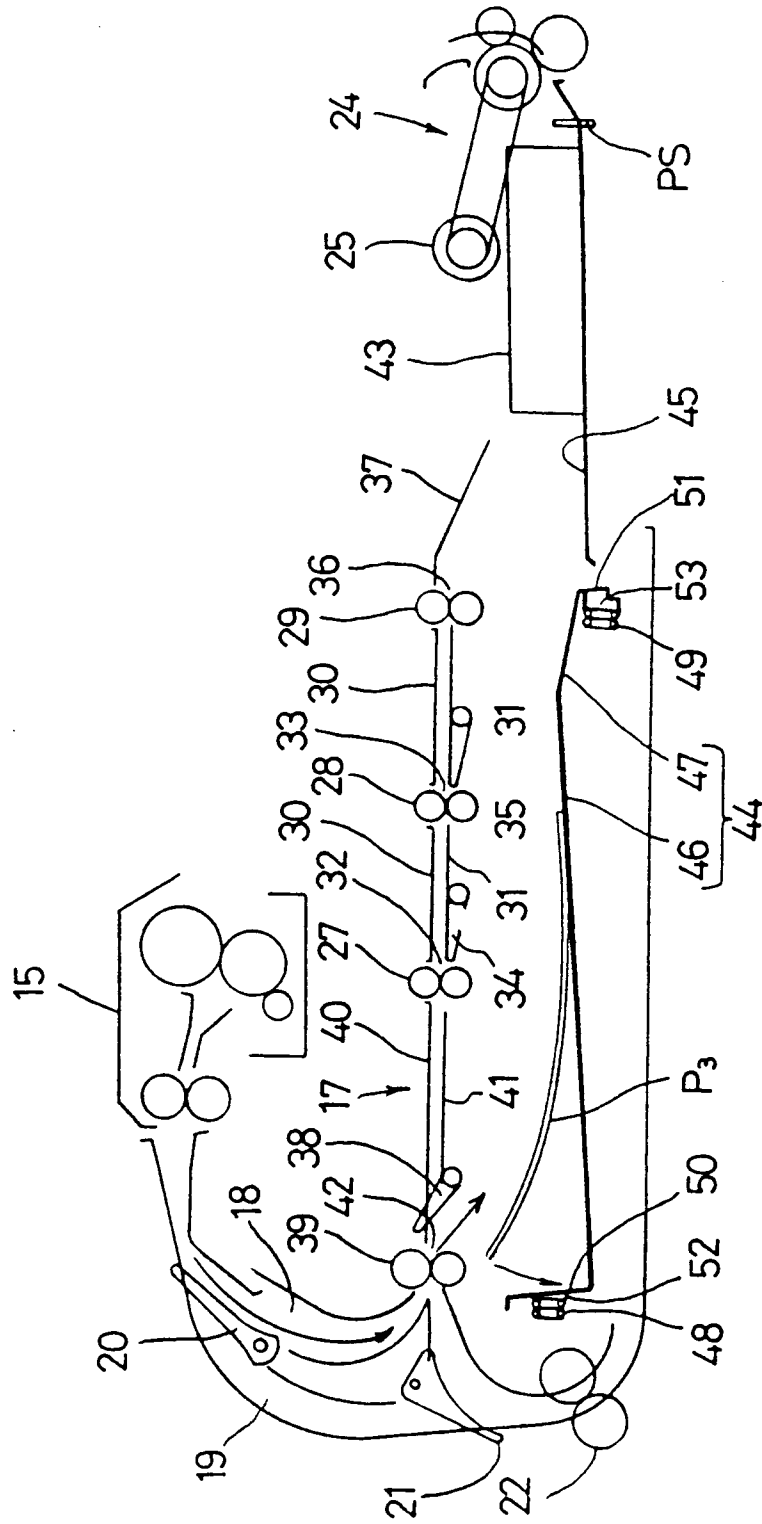


Fig.10

