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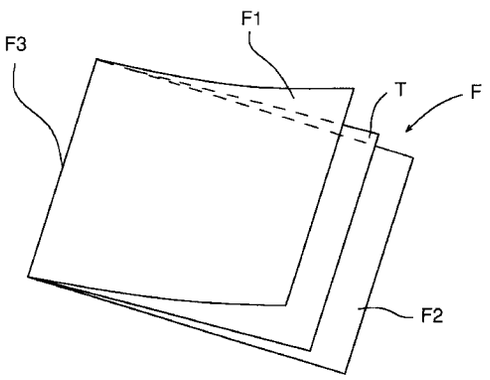
(54) Image recording apparatus capable of smoothing toner images.

(57) An apparatus for refixing a toner image on a recording sheet with a carrier member including a thin film member and a film supporting member which are so constructed to sandwich the sheet having the toner image therebetween. A control device for use in a copying machine controls a feeding device, a photoreceptor, a transferring device and a fixing device so that the carrier means is conveyed together with the sheet having the toner image from the feeding device to the fixing device through the transferring device and that the toner on the sheet is refixed by the fixing device.

FIG. 2



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BACKGROUND OF THE INVENTION

The present invention relates to an image recording apparatus wherein toner images are transferred onto a recording sheet and then fixed thereon through an electrophotographic method, and more particularly to an image recording apparatus capable of producing even glossy images.

With regard to an image recording apparatus wherein toner images are transferred onto a recording sheet and then fixed thereon through an electrophotographic method, image recording apparatuses capable of forming color images have spread in addition to those forming black and white images.

Even in a field of a recording sheet, formation of images on a transparent film has spread in addition to that on an ordinary paper. A transparent light transmission sheet on which images of graphics and graphs are formed by means of black or colored toners is used in an overhead projector (OHP) so that the images thereon are projected on a screen.

However, a light transmission sheet on which colored toner images are copied and fixed by means of an ordinary electrophotographic copying machine has failed, when projected by an OHP, to offer sharp projected color images. The reason why sharp projected color images can not be obtained is that there are fine irregularities on the surface of color toners deposited on a transparent film and the irregularities cause projected light to be subjected to diffusion or diffused reflection and thereby color toner portions are projected on a screen as a shade. A light transmission sheet that offers sharp projected color images can be obtained by smoothing the surface of color toners deposited on the sheet.

For the purpose of preparing a light transmission sheet that offers a sharp color image, a light transmission sheet ejected from a copying machine after being subjected to transferring and fixing of color toner images onto its transparent film in the copying machine has been fixed again in an image quality improving apparatus provided with a built-in heater and a pair of rollers for improving light transmitting property and glossiness prepared separately in a way that the light transmission sheet passes through the rollers while being sandwiched therebetween with a toner image surface facing a thin film.

Even when color toners are transferred onto an ordinary paper and fixed thereon, glossy color toner images can be obtained when the ordinary paper having thereon color toner images passes through the aforementioned image quality improving apparatus with toner images facing a thin film.

The aforementioned image quality improving apparatus prepared separately from a copying machine is of a structure similar to that of a fixing unit provided in the copying machine. It is therefore extremely desirable that a light transmitting property can be enhanced or a gloss can be increased by feeding a light transmission sheet or a color copy ejected from a copying machine again into the copying machine. However, it is impossible to realize this easily because it is necessary to feed the light transmission sheet or the color copy so that a thin film may be placed on the surface of the light transmission sheet or the color copy.

① When a light transmission sheet is caused to pass through a feeding-out member and a double-feed preventing member by using sheet feeding means of an image recording apparatus again, creases are caused on a thin film, resulting in unevenness of gloss and light transmitting property of the light transmission sheet.

② In the vicinity of a transfer unit in a conveyance path, there is positioned an image carrier (a photoreceptor drum), and residual electric charges remaining after image formation cause creases and dog-ears on a thin film, when it passes therethrough, resulting in jam troubles and unevenness of a gloss and a light transmitting property.

③ In order for the toner image surface and a thin film to be fed together while they face each other, fixed recording materials are fed again while they are sandwiched between the thin film applied by a film applying unit and a film support. However, depending upon a way of feeding, dog-ears or creases are generated, resulting in jam troubles or unevenness of a gloss and a light transmitting property.

④ When a toner image surface and a thin film pass through a fixing unit while they face and are in contact each other, a pair of rollers facing each other which lack elasticity neither give smoothness to toners nor improve glossiness and light transmitting property.

⑤ When a toner image surface and a thin film pass through a fixing unit while they face and are in contact each other, creases are generated and uniform gloss and light transmitting image screen can not be obtained if the relation of the hardness between an upper roller and a lower roller is not established pertinently.

⑥ When feeding again recording materials facing a thin film by using sheet feeding means of an image recording apparatus again, it is not possible to fix again due to troubles in conveyance caused when the thin film and recording materials pass through a transfer unit facing an image carrier.

⑦ When enhancing light transmitting property and glossiness by using again a fixing unit which has fixed toner images, the conveyance speed for recording materials in fixing which is too low fails to improve smoothness of an adhering toner surface.

⑧ In re-fixing whose purpose is to enhance a light transmitting property and glossiness, satis-

factory conditions for re-fixing need to be that a temperature on the surface of a roller facing a thin film is within a range of 100°C - 160°C and a rubber hardness of the roller is not more than 90° in surface hardness ASKER C. However, fixing conditions for forming matted images through an ordinary high speed copying do not satisfy the conditions mentioned above. Therefore, it is not possible to use, without taking any action, the fixing unit which has formed fixed toner images.

SUMMARY OF THE INVENTION

An object of the invention is to solve the problems ① - ⑧ mentioned above and to provide an image recording apparatus wherein it is possible to improve a gloss and a light transmitting property by feeding thereinto again a light transmission sheet or a color copy which has been subjected to fixing.

The invention is to provide an image recording apparatus solving the aforementioned problems, and the first invention which has solved the problem described in the above-mentioned item ① is to provide an image recording apparatus comprising a sheet feeding means, an image forming means that transfers toner images formed on an image carrier onto a recording material fed by the sheet feeding means and a fixing means that fixes the recording material having thereon transferred toner images, wherein the recording material is fed again in a manner that a toner surface of fixed recording material is caused to face a thin film and is sandwiched between the thin film and a film support, and the film support is caused to face a feed-out member of the sheet feeding means and the thin film is caused to face the double-feed preventing means, so that the recording material may pass through the fixing means again for smoothing the toner images.

The second invention which has solved the problem described in the above-mentioned item ② is to provide an image recording apparatus comprising a sheet feeding means, an image forming means that transfers toner images formed on an image carrier onto a recording material fed by the sheet feeding means and a fixing means that fixes the recording material having thereon transferred toner images, wherein a toner surface of the aforementioned fixed recording material is sandwiched between a thin film and a film support in a way that the toner surface faces the thin film, and the aforesaid sheet feeding means is driven again with the film support facing the image carrier mentioned above so that the recording material may pass through the fixing means again for smoothing the toner images.

The third invention which has solved the problem described in the above-mentioned item ③ is to provide an image recording apparatus comprising a sheet feeding means, an image forming means that transfers toner images formed on an image carrier onto a recording material fed by the sheet feeding means and a fixing means that fixes the recording material having thereon transferred toner images, wherein a toner surface of the fixed recording material is sandwiched between a thin film applied by a film applying unit and a film support in a way that the toner surface faces the thin film and the above-mentioned sheet feeding means is driven again with the aforementioned film-applied portion taking the lead so that the recording material may pass through the fixing means again for smoothing the toner images.

The fourth invention which has solved the problem described in the above-mentioned item ④ is to provide an image recording apparatus comprising a sheet feeding means, an image forming means that transfers toner images formed on an image carrier onto a recording material fed by the sheet feeding means and a fixing means that fixes the recording material having thereon transferred toner images, wherein a toner surface of the aforementioned fixed recording material is sandwiched between a thin film and a film support in a way that the toner surface faces the thin film, and the above-mentioned sheet feeding means is driven again with the aforementioned thin film facing an elastic fixing member of the fixing means so that the recording material may pass through the fixing means again for smoothing the toner images.

The fifth invention which has solved the problem described in the above-mentioned item ⑤ is to provide an image recording apparatus comprising a sheet feeding means, an image forming means that transfers toner images formed on an image carrier onto a recording material fed by the sheet feeding means and a fixing means that fixes the recording material having thereon transferred toner images, wherein a toner surface of the aforementioned fixed recording material is sandwiched between a thin film and a film support in a way that the toner surface faces the thin film, and the above-mentioned sheet feeding means is driven again so that the recording material may pass through the aforementioned fixing means having upper and lower conveyance members which are different in hardness in a way that a conveyance member which comes in contact with the film support is harder to be not less than 90° in surface hardness ASKER C at the surface again, for smoothing the toner images.

The invention is to provide an image recording apparatus wherein the aforementioned problems have been solved and, the sixth invention which has solved the problem described in the above-mentioned item ⑥ is to provide an image recording apparatus comprising a sheet feeding means, an image forming means that transfers toner images formed on an image carrier onto a recording material

fed by the sheet feeding means and a fixing means that fixes the recording material having thereon transferred toner images, wherein the sheet feeding means and the fixing means are operated while the image forming means is kept to be out of operation, and a toner surface of the aforementioned fixed recording material is sandwiched between a thin film and a film support in a way that the toner surface faces the thin film, and the above-mentioned sheet feeding means is driven again so that the recording material may pass through the fixing means again for smoothing the toner images.

The seventh invention which has solved the problem described in the above-mentioned item ⑦ is to provide an image recording apparatus comprising a sheet feeding means, an image forming means that transfers toner images formed on an image carrier onto a recording material fed by the sheet feeding means and a fixing means that fixes the recording material having thereon transferred toner images, wherein the sheet feeding means and the fixing means are operated in a way that each of a conveyance speed of the sheet feeding means and a conveyance speed of the fixing means is lower than that in image forming, and a toner surface of the aforementioned fixed recording material is sandwiched between a thin film and a film support in a way that the toner surface faces the thin film, and the aforesaid sheet feeding means is driven again so that the recording material may pass through the fixing means again for smoothing the toner images.

In the eighth invention which has solved the problem described in the above-mentioned item ⑧, the surface of a thin film is caused to face a roller with rubber hardness of not more than 90° in surface hardness ASKER C whose fixing temperature is within a range of 100°C - 160°C by sandwiching a toner image surface in fixing upside down for re-fixing considering the features of a thin film surface. The invention provides an image recording apparatus comprising a sheet feeding means, an image forming means that transfers toner images formed on an image carrier onto a recording material fed by the sheet feeding means and a fixing means that fixes the transferred toner images on the recording material, wherein the sheet feeding means and the fixing means are operated, and then the sheet feeding means is driven again with fixing roller conditions (roller materials, load, nips etc.) of the fixing means set identical to those in image forming and with a toner surface of the fixed recording material being sandwiched between a thin film applied by a film applying unit and a film support in a way that the toner surface faces the thin film, so that the recording material may pass through the fixing means for re-fixing.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a structural diagram showing an example of an image recording apparatus of the invention. Fig. 2 is an illustration showing how a recording material to be fed again is caused to face a thin film, Fig. 3 is an illustration showing re-feeding conditions at a manual sheet-insertion section, Fig. 4 is an illustration showing re-feeding conditions at a transfer section and Fig. 5 is an illustration showing re-feeding conditions at a fixing section. Fig. 6 is an illustration showing conditions before re-feeding (a) and those after re-feeding (b) for a light transmission film (a transparency). Fig. 7 is a block diagram showing the control system.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

An image recording apparatus of the invention which will be explained as follows referring to examples is a color image recording apparatus having a function in which transparency and glossiness of toner images are improved when a recording material ejected after being fixed is fed again from a manual sheet-insertion section with a toner image surface on the recording material facing a thin film prepared separately, keeping step with function of the image recording apparatus for recording color images.

Construction of a color image recording apparatus of the invention and how color images are formed will be explained as follows, referring to Fig. 1.

In the figure, the numeral 30 is an image carrier in a drum shape that is to say a photoreceptor drum having OPC photoreceptor coated on a drum and being ground and rotated clockwise. The numeral 35 is a scorotron charging unit that gives electric charges to the photoreceptor on the surface of the photoreceptor drum 30, the numeral 40 is an area for imagewise exposure where a laser beam is projected so that it is focused on the surface of the photoreceptor drum 30 by means of an optical system for exposure.

A laser writing unit, for example, may be used for the optical system for exposure. After color signals outputted from an image-reading unit are inputted in the laser writing unit, a laser beam emitted from an unillustrated semiconductor laser is subjected to rotational scanning by means of polygon mirror 41 in the laser writing unit, and then is deflected by reflection mirror 43 through fθ lens to be projected on the surface of the photoreceptor drum 30 charged uniformly by the charging unit 35 mentioned above.

When scanning is started, on the other hand, the laser beam is detected by an index sensor, modulation of the laser beam by means of the first color signals is started, and modulated laser beam starts scanning the surface of the photoreceptor drum 30. Therefore, both the primary scanning by means of

the laser beam and the sub-scanning by means of a rotation of the photoreceptor drum 30 start forming a latent image for the first color on an image area on the photoreceptor drum 30. The latent image is then subjected to reversal development under non-contact conditions in developing means 36 (Y) containing, for example, yellow (Y) toners as the first color, thus, a yellow toner image is formed on the surface of the photoreceptor drum 30. The toner image obtained on the image area, while it is held on the surface of the photoreceptor drum 30, passes under transferring means 37 and cleaning means 39 both of which are staying away from the surface of the photoreceptor drum 30. After that, the next copy cycle is started.

Namely, the photoreceptor drum 30 is charged again by the charging unit 35, then, the second color signals outputted from a signal processing unit are inputted in the writing unit mentioned above and writing on the surface of the photoreceptor drum 30 by means of the second color signals is conducted in the same manner as in the case of the first color signals mentioned above, thus, a latent image is formed. This latent image is subjected to reversal development under non-contact conditions in developing means 36 (M) containing, for example, magenta (M) toners as the second color, thus, a magenta toner image is formed. This magenta toner image is formed to be superposed on the yellow toner image which has been formed already.

The toner image thus obtained on the image area, while it is held on the surface of the photoreceptor drum 30, passes under transferring means 37 and cleaning means 39 both of which are staying away from the surface of the photoreceptor drum 30. After that, the next copy cycle is started.

In the same manner as in the foregoing, writing by means of the third color is conducted and a latent image is formed. This latent image is subjected to reversal development under non-contact conditions in developing means 36 (C) containing, for example, cyan (C) toners as the third color.

The cyan toner image is formed to be superposed on the yellow toner image and the magenta toner image so that a color image may be obtained. Developing means 36 (BK) containing black toners is further provided, and when a black toner image is further formed to be superposed in the same manner as in the foregoing, a color image with high image quality can be obtained.

As described above, charging by means of charging unit 35 provided around photoreceptor drum 30 and itself, exposure by means of a laser writing unit for each color and development processing by means of developing means 36 (Y), (M), (C) and (BK) are conducted for each color, namely four times in total for forming a color toner image which is obtained by superposing each color image on the image area on the surface of the photoreceptor drum 30.

The numerals 61 and 62 represent conveyance paths through which a recording material is conveyed one sheet by one sheet. With regard to recording materials loaded in sheet feeding cassette 50, leading edges thereof are lifted by an unillustrated sheet lifting plate, the uppermost sheet is fed out by feed-out roller 51 and then is conveyed, after being separated by double-feed-preventing rollers 52a and 52b, through conveyance paths 61 and 62 to the point of registration rollers 53a and 53b where the recording material stops provisionally.

The registration rollers 53a and 53b feed out the recording material synchronizing with a toner image on the photoreceptor drum 30 so that the toner image may be transferred onto the recording material at the transferring means 37.

The transferring means 37 in the present example is composed of endless belt 373 spread over rotating rollers 371 and 272 and charging means 374 for image-transferring provided at the position that is behind the belt 373 and faces the transferring area. When transferring images, the transferring means presses the recording material that moves while keeping in contact with the belt 373 onto the photoreceptor drum 30 and the charging means 374 positioned behind transfers toner images onto the recording material. The recording material on which image-transferring has been finished is separated from the belt 373 by roller 372, conveyed to fixing means 70 through conveyance belt 63 and ejected from the apparatus after being fixed.

On the other hand, blade 39A of the cleaning means 39 keeps in contact with the surface of the photoreceptor drum 30 from which the recording material has been separated, and removes toners staying thereon. After completion of removal of residual toners, the blade is moved away from the surface of the drum again for the following process of color image forming.

The transferring means 37 which has finished transferring is moved away from the photoreceptor drum 30 to the position shown with dotted lines.

When improving light transmitting property and glossiness of an image on the recording material ejected after the above-mentioned process, the recording material is conveyed again as follows.

Fig. 2 shows a means for causing a recording material to be conveyed again to face a thin film, and the means is prepared separately as sandwiching means F wherein thin film F1 such as, for example, a polyester film or a polyimide film having a thickness of not more than 50 μm and heat resisting property causing less toner deposition and film support F2 such as a sheet of paper or a resin sheet having a thickness greater than that of F1 and heat resisting property are included and an edge of the thin film F1 and that of the film support F2 are pasted together at joining portion F3. Recording material T to be conveyed again is

sandwiched in the sandwiching means F with a toner image surface facing the thin film F1.

For conveying again in an image recording apparatus in the present example, when a re-feeding selection button provided on an operation panel of the image recording apparatus is pressed, an image forming mode (copy mode) explained previously may be changed to a re-feeding mode.

In the re-feeding mode, operations such as charging, imagewise exposure and developing are not performed but feeding operation by means of a sheet feeding means from a manual-insertion portion and fixing operation by means of a fixing means only are performed.

Fig. 3 shows how a recording material is fed again in a manual sheet insertion portion, wherein recording material T sandwiched in sandwiching means F is inserted into a manual sheet insertion portion with joining portion F3 as a leading edge, namely in a way that the joining portion F3 hits a sheet feeding means, and with film support F2 touching feed-out roller 64.

When a copy start button is pressed under the condition that sandwiching means F is detected by sensor S1 provided on the manual sheet insertion portion, a sheet feeding means starts operating and re-feeding is conducted by the rotation of feed-out roller 64. Since the re-feeding is conducted with joining portion F3 as a leading edge, it is avoided that an edge of thin film F1 is dog-eared or folded to create creases.

Since the turning force of the feed-out roller 64 is transferred only to the film support F2 which is in contact with the feed-out roller and thereby sandwiching means F is moved along the conveyance path, no load is applied on the thin film F1 and thereby no crease is created thereon.

The sandwiching means F fed out by the feed-out roller 64 is transported to double-feed-preventing rollers 65a and 65b and further to registration rollers 53a and 53b in succession to be transported. Even in this case, film support F2 is in contact with roller 65a which is a driving roller in double-feed-preventing rollers 65a and 65b and thin film F2 is in contact with stationary roller 65b which is connected to a torque limiter and prevents double feeding. Therefore, no crease is created on the thin film F1 though the force for pulling the thin film is applied on it.

In a re-feeding mode, registration rollers 53a and 53b have only the function for feeding and film support F2 is in contact with driving roller 53a among registration rollers 53a and 53b, while thin film F1 is in contact with driven roller 53b. Therefore, the thin film F1, when it passes through the area of the registration roller 53a, is neither be creased nor be dog-eared.

Fig. 4 is an illustration showing the state of re-feeding at the transferring portion.

In a re-feeding mode, transferring belt 373 is positioned at the point (shown with dotted lines in Fig. 1) that is away from the photoreceptor drum 30 and rotates. Sandwiching means F is transported while keeping in contact with the transferring belt 373 and passes through the transferring section to move to adjoining conveyance belt 63. When the sandwiching means F passes through the transferring section, film support F2 faces the photoreceptor drum 30. If the sandwiching means F passes through the transferring section with thin film F1 facing the photoreceptor drum 30, the thin film F1 is attracted on an electrostatic manner to the charged photoreceptor drum 30, causing creases or, in the worst case, conveyance troubles caused by the attraction of the thin film.

When the sandwiching means F sandwiching and holding recording material T passes through the transferring section with its film support F2 facing the photoreceptor drum 30 as in the invention, it is free from the troubles mentioned above and can be transported normally.

Fig. 5 is a key portion diagram showing how a toner image is smoothed while sandwiching means F holding recording material T is being pinched and transported by rotating fixing rollers 70a and 70b in the fixing means 70.

Upper roller 70a of the fixing means in the present example is an aluminum tube with a thin wall having therein an infrared lamp as a heat source at the center thereof, whose external surface is covered with a PFA tube, and surface temperature of the upper roller is controlled to be at about 195°C by means of a sensor.

On the other hand, lower roller 70b is a roller having a superficial layer made of rubber material such as silicone rubber having a thickness of about 5 mm, and the surface of the lower roller is coated with Teflon. The lower roller rotates while being in pressure-contact, through its rubber hardness of not more than surface hardness ASKER C 90°, with the upper roller 70a. Heat is conducted from the upper roller 70a to the lower roller 70b whose surface temperature is thereby kept at about 130°C.

When the sandwiching means F is sandwiched and re-fixed in the fixing means 70 as described above, it was observed that the smoothness on the surface of a toner image portion was changed for the better and thereby light transmitting property and glossiness were improved.

Fig. 6 shows that the smoothness of the toner surface is improved after (b) re-feeding compared with (a) before re-feeding, and thereby, when illuminated, light is transmitted through toners and sharp color images are projected on a screen.

The inventors of the invention made tests changing conditions variously about the upper and lower rollers of a fixing means in which the sandwiching means F is subjected to re-fixing while being sand-

wiched. As a result, it was observed that the surface hardness of the roller facing the film support F2 needs to be harder than that of the roller facing the thin film F1, and the desirable condition for the hardness of the roller facing the thin film F1 is 90° or less in surface hardness ASKER C. The sandwiching means F, after being subjected to re-fixing, is ejected and then cooled, and recording material T therein becomes available after being separated from the thin film F1.

Another example of the invention will be explained next as follows.

In an image forming apparatus in the present example, an operation mode is changed from an image forming mode (copy mode) explained previously to a re-fixing mode when a re-fixing selection button provided on an operation panel of the apparatus is pressed.

A block diagram shown in FIg. 7 indicates a control circuit for the foregoing wherein, when the re-fixing selection button is pressed, image forming means such as charging, exposure, developing, transferring and cleaning means are caused to be out of operation, while only feeding operation through a manual insertion portion performed by a sheet feeding means and fixing operation of a fixing means are conducted. Programming is established so that sheet feeding speed and fixing speed in the re-fixing mode may be lower than those in the copy mode with regard to the sheet conveyance speed.

In the sheet feeding portion where F3 hits a sheet feeding means, sandwiching means F fed out by feed-out roller 64 is conveyed along conveyance path 62 through double-feed-preventing rollers 65a and 65b as well as registration rollers 53a and 53b. In this case, the registration rollers 53a and 53b have only the function of feeding in the re-fixing mode, and these feeding rollers rotate at a low speed to convey the sandwiching means F to a transferring means.

In a re-fixing mode, transferring belt 373 is positioned at the point that is away from the photoreceptor drum 30 and rotates. Sandwiching means F is transported while keeping in contact with the transferring belt 373 and passes through the transferring section to move to adjoining conveyance belt 63. In the re-fixing mode, image forming means are out of operation and photoreceptor drum 30 is suspended to be on a non-charged state. Further, charging means 374 for transferring is also out of operation. Therefore, the sandwiching means F is not contaminated by toners and others.

The thin film F1 is attracted in an electrostatic manner to the charging means, causing creases or, in the worst case, conveyance troubles caused by the attraction of the thin film. However, since image forming means are out of operation as in the invention, the sandwiching means F in which recording material T is sandwiched and held can be conveyed normally without causing the problems mentioned above.

In the fixing means 70 in a copy mode, rollers rotate at the linear speed of about 140 mm/sec and a toner image is conveyed thereby with its surface facing upper roller 70a for satisfactory fixing.

In the re-fixing mode, on the other hand, a toner image faces a fixing means in a manner contrary to that in a copy mode, and a linear speed of rollers is switched to the low speed of about 20 mm/sec. Therefore, when thin film F1 passes through the elastic lower roller 70b while touching it in the occasion that sandwiching means F is ejected after being subjected to re-fixing, it was observed that the smoothness on the toner surface of a toner image was changed for the better and light transmitting property and glossiness were improved.

Further, speed of revolution of the motor was varied in many ways for the tests.

As a result, it was observed to be necessary to use, in a re-fixing mode, the linear speed of a roller which is lower than that in a copy mode.

The examples mentioned above were conducted based on the results of the tests mentioned above wherein excellent fixing was carried out at a high speed in a copy mode, while uniform gloss was obtained in a re-fixing mode by turning the toner image surface upside down and by changing the fixing speed.

Owing to the invention, it has become possible to enhance light transmitting property and glossiness of an image fixed on a recording material by feeding the recording material again in the image recording apparatus of the invention and by peeling off a thin film of a sandwiching means from the recording material, consequently, an apparatus prepared separately for enhancing light transmitting property and glossiness has fallen into disuse.

Claims

1. An apparatus for refixing a toner image on a recording sheet, comprising

means for feeding a recording sheet;

image carrying means having an imaging surface on which a toner image is formed;

transferring means for receiving the sheet from the feeding means and for transferring the toner image from the image carrying means onto the sheet;

fixing means for receiving the sheet from the transferring means and for fixing the toner image on the sheet;

a carrier member including a thin film member and a film supporting member which are so constructed to sandwich the sheet having the toner image therebetween; and

means for controlling the feeding means,

the image carrying means, the transferring means and the fixing means so that the carrier means is conveyed together with the sheet having the toner image from the feeding means to the fixing means through the transferring means and that the toner on the sheet is refixed by the fixing means.

2. The apparatus of claim 1, wherein the sheet is inserted between the thin film member and the film supporting member so that the toner image on the sheet faces the thin film member.

3. The apparatus of claim 2, wherein the film member and the film supporting member are jointed at their one side, and the carrier member is so conveyed that the jointed side become a leading edge.

4. The apparatus of claim 3, wherein the feeding means comprises a double feed prevention means including a rotating roller and stop roller which are arranged in contact with each other, and the carrier means is conveyed between the rotating roller and the stop roller so that the thin film member faces the stop roller and the film supporting member faces the rotating roller.

5. The apparatus of claim 3, wherein, when the carrier member is conveyed together with the sheet, the control means controls the transferring means and the image carrying means so that between the transferring means and the image carrying means is provided a space to allow the sheet to pass therethrough.

6. The apparatus of claim 5, wherein the carrier means is so conveyed between the transferring means and the image carrying means that the film supporting member faces the image carrying means.

7. The apparatus of claim 3, wherein the fixing means comprises a fixing roller having a rigid cylindrical surface and an elastic roller having an elastic surface made of rubber which are arranged in contact with each other, and the carrier means is conveyed between the fixing roller and the elastic roller so that the thin film member faces the elastic roller.

8. The apparatus of claim 3, wherein the rotation speed of the fixing roller in the timer of refixing is made slower than that in the time of ordinarily fixing to fix a toner image at the first time.

FIG. 1

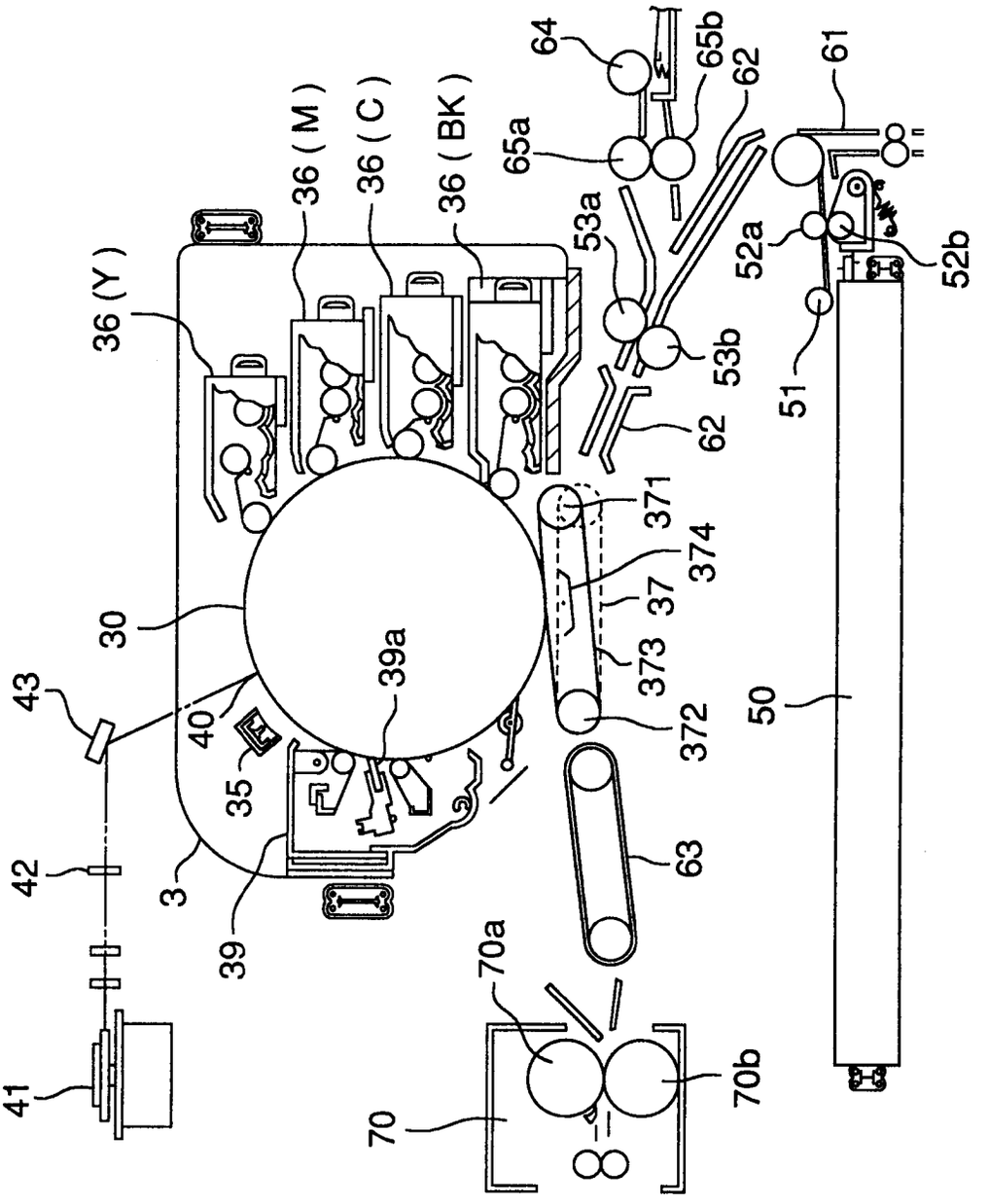
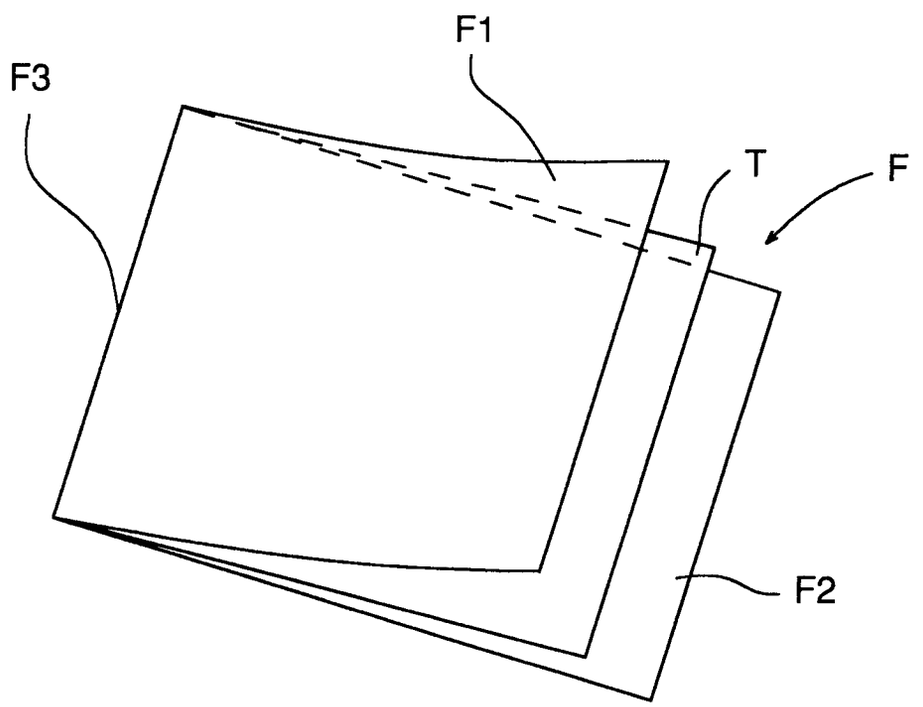

64
65b
62
61
36 (M)
36 (C)
36 (BK)
65a
53a
52a
52b
36 (Y)
53b
51
62
371
374
30
37
373
39a
43
40
372
50
35
42
3
63
39
70a
41
70
70b

FIG. 2



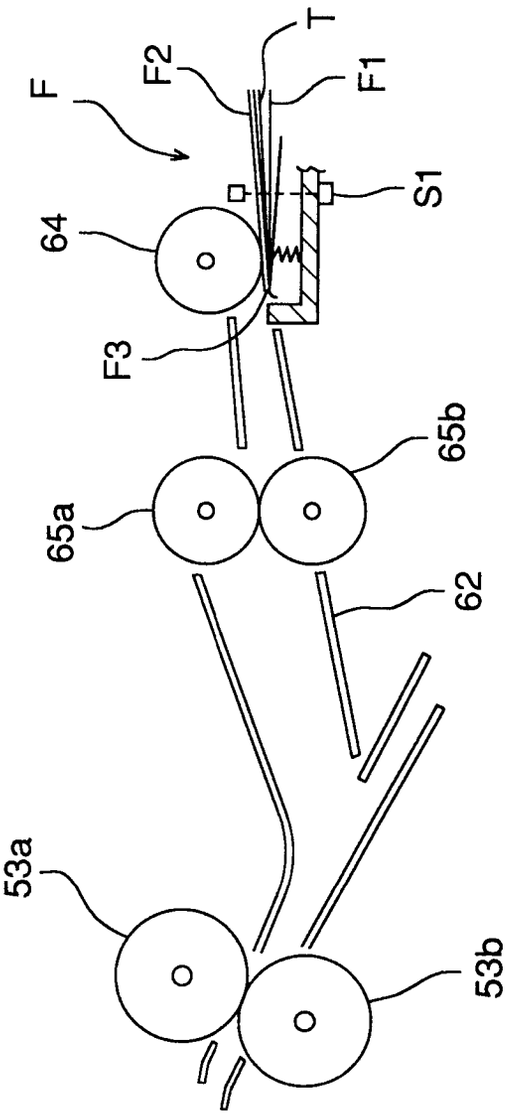


FIG. 3

FIG. 4

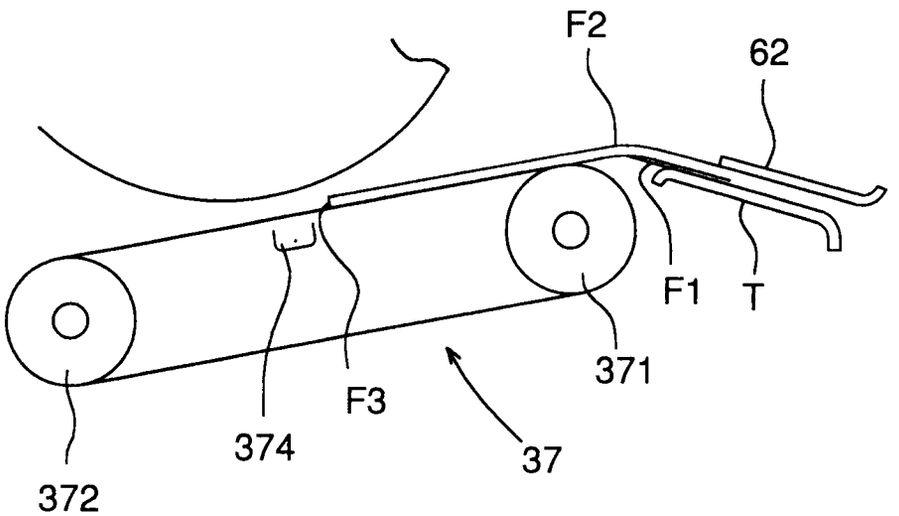


FIG. 5

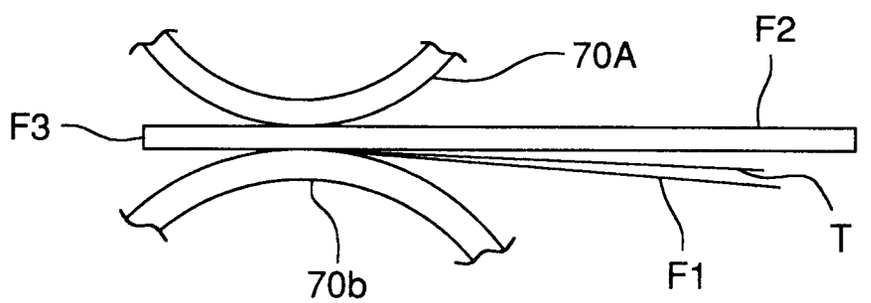


FIG. 6

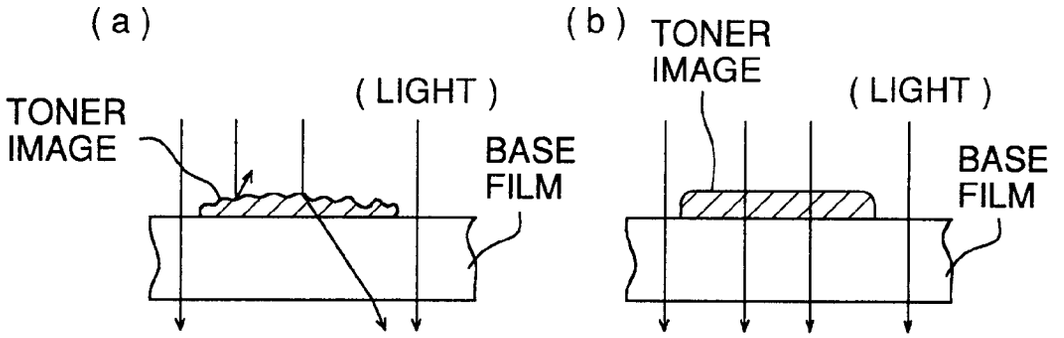
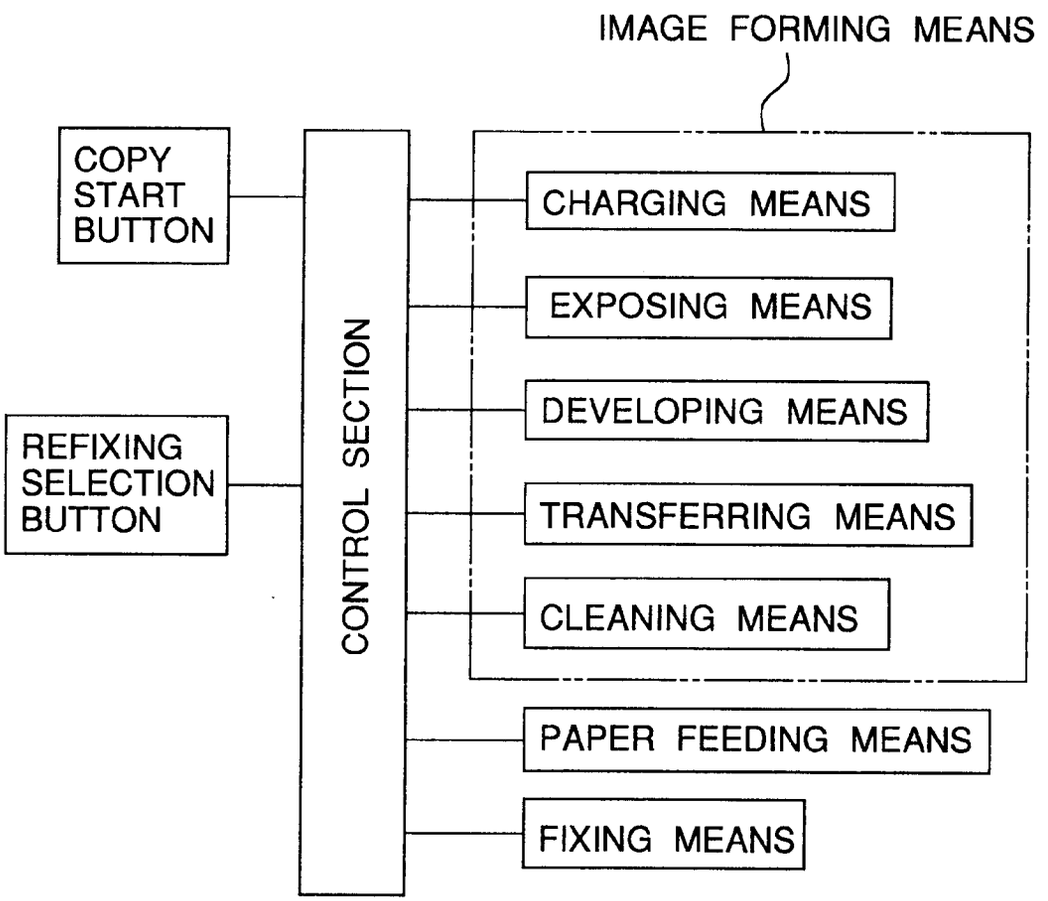

(a)
TONER IMAGE
(LIGHT)
BASE FILM
(b)
TONER IMAGE
(LIGHT)
BASE FILM

FIG. 7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DEVELOPING MEANS
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CLEANING MEANS
PAPER FEEDING MEANS
FIXING MEANS