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(54) **Method of elevating quality of printed matter by post-treatment including gloss and non-gloss treatment on digital printed matter**

(57) Provided is a method of elevating a quality of a printed matter by performing a post-treatment including a gloss and non-gloss treatment on a digital printed matter and to a method which performs a post-treatment in-

cluding a gloss or a non-gloss, and a gloss and non-gloss treatment on an entire printed surface of the digital printed matter or on a partial specific printed surface to elevate a quality of a printed matter.

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Description

TECHNICAL FIELD

[0001] The present invention relates to a method of elevating a quality of a printed matter by performing post-treatments including gloss and non-gloss treatments on a digital printed matter, and more particularly, to a method which performs post-treatments including a gloss treatment or a non-gloss treatment, and a gloss and non-gloss treatment on an entire surface to be printed of a digital printed matter or on a partial specific surface to be printed to elevate a quality of a printed matter.

[0002] All printed matters may be first obtained from a simple paper and the simple paper is printed to be a book or a photograph, which may elevate a value of the printed matter. In other words, various post-treatments are performed on the most printed matter to add a value by a separate post-treatment after forming the printed matter in accordance with the application so as to improve a quality of the printed matter to elevate the quality of the printed matter.

[0003] Currently, most of machines and consumables for a printing post-treatment have been developed so as to be suitable for an offset printed matter which has been used for a long time.

[0004] Further, in the case of the offset printing, it is understood that a paper having a size of 1020 X 720 is used as a basic size so that sizes of consumables required for all post-treatments have been already determined to be the same as the basic size.

[0005] However, a digital printer generally uses a paper having a size of 450 X 320 as a basic size so that it is difficult or very inconvenient to use post-treatment equipment for offset printing or a cost for the post-treatment is significantly increased.

[0006] An object of the present invention is to develop a post-treatment method which is suitable for a small quantity and multi item digital printed matter whose market is expanding in recent years and to try to improve a quality of a digital printed matter to elevate the quality of the printed matter.

[0007] The post-treatment method for the digital printed matter is a method of elevating a quality of a digital printed matter by a post-treatment including a processing which may understand a characteristic of a digital printed matter, specifically, a characteristic of a thermoplastic resin based toner or ink to pressurize a matt-treated film or a film having a highly smoothened surface on the digital printed surface using a lamination thermal roller to transfer a shape (a film mold) of the film into an ink surface to be changed into a gloss or non-gloss image shape.

BACKGROUND ART

[0008] In the related art, there are various post-treatment methods for a screen printed matter or an offset printed matter. The most basic post-treatment method

includes a post-treatment method which coats a thermoplastic resin melting solution with a thin film or laminates a resin film in order to preserve or protect the screen printed matter or the offset printed matter or a post-treatment method which partially and splendidly decorates a surface of the printed matter by thermally welding various color thin films such as a gold foil or a silver foil to try to elevate a quality of the printed matter.

[0009] Further, in Korean Patent No. 704462, which is a specific related art which tries to elevate a quality of a printed matter using a printing post-treatment method, a partial heating embossing method which uses a thermal laminate film on a printed surface is disclosed.

[0010] According to the related art, the post-treatment is performed on a printed surface with a thermal laminate film in which a surface layer which is a biaxial oriented polypropylene film and an adhesive layer which is an ethylene vinyl acetate (EVA) resin which is a hot melt thermoplastic resin are laminated and various embossing shapes are partially formed on a printed surface on which the embossing treatment is performed to add an aesthetic characteristic or a strong image to the printed pattern which may elevate a quality of a printed matter.

[0011] As another related art, Korean Patent Application Unexamined Publication No. 10-2004-32470 discloses a laminate film which three-dimensionally shows and enlarges letters or figures on a printed surface by laminating the printed surface using a post-treatment.

[0012] As described above, the post-treatment of the related art, such as a laminating treatment on the printed layer, a partial thermal welding treatment of a printed surface with a gold or silver foil, a partial formation of various shapes of embossing, a treatment of enlarging or three-dimensionally showing a printed matter necessarily uses directly or indirectly a film which may cause the corresponding function in order to provide the corresponding function and operation.

[0013] Further, as a related art for a non-gloss or gloss treatment which is used for the post-treatment of a digital printed matter according to the present invention, a post-treatment technique which performs a non-gloss and gloss treatment on a printed surface is known. In the related art, in the case of the non-gloss treatment, a matt treatment is performed on one surface of a thermoplastic resin having a relatively high melting point using a chemical method or a laminating film on which an adhesive layer is formed is laminated on the other surface of a film which is quenched by a quenching material or a non-glossy film on which an embossing treatment is performed, using a thermal roller to allow the surface layer to be a non-gloss treated surface to give a non-gloss effect to the printed matter. As another non-gloss treatment method which is a related art prior to the above-mentioned method, according to a printing post-treatment method, a printed matter on which a thermoplastic resin film having a low melting point, which is relatively easily thermally deformed, is laminated, is bonded to a thermoplastic resin film, which is hardly thermally de-

formed, having a relatively high melting point which is non-gloss treated and an image of the non-gloss treated surface is transferred onto the laminated film surface while the printed matter passes through a thermal roller so that a non-gloss effect of the printed surface may be achieved.

[0014] Further, a gloss treatment of the related art is a post-treatment in which a printed surface is directly laminated with an acrylic resin film or a polyethylene film which has an excellent glossy property or a film having a high melting point and a high smoothing property is bonded to a surface which is laminated with a thermoplastic film having a relatively low melting point on the printed surface in advance and the printed matter is pressurized by a roller to achieve a gloss effect on the printed surface.

[0015] As described above, in order to achieve the gloss and non-gloss effect as a printing post-treatment method of the related art, the gloss and non-gloss treated film is directly on the printed matter or the printed surface is laminated by a thermally deformed film and then transition is performed by heating and pressurizing a non-gloss treated film or a highly smoothened film surface to obtain the non-gloss or gloss effect. Therefore, according to the related art, in order to achieve the gloss or non-gloss effect, the laminate film needs to be necessarily used on the printed surface. However, according to the present invention, a post-treatment method including a gloss or non-gloss treatment which may give a non-gloss or gloss effect on the digital printed surface without using a laminate film may be provided.

SUMMARY OF THE INVENTION

[0016] The present invention has been made in an effort to provide a method which elevates a quality of a printed matter using a post-treatment including a gloss and non-gloss treatment which gives a gloss and non-gloss effect without using a separate laminate film on a printed layer in order to add a gloss and non-gloss effect on the printed layer using a thermosetting property of a digital printed layer in consideration of a characteristic of a digital printed matter, specifically, the usage of a resin based toner or ink.

[0017] A first exemplary embodiment of the present invention provides a method of elevating a quality of a printed matter, using a printing post-treatment which laminates a glossy film on a digital printed surface to pass the printed matter through a thermally pressurizing roller and separates the glossy film to perform a gloss treatment only on the printed layer, a post-treatment which primarily prints a surface by digital printing, laminates the printed surface with a non-glossy media film, secondarily prints the printed matter thereon by digital printing and then bonds a glossy film on the printed surface to pass the printed matter through a thermally pressurizing roller to separate the glossy film to perform a gloss treatment on a secondary digital printed layer, a printing post-treat-

ment which bonds a non-glossy film to a digital printed surface to pass the printed matter through the thermally pressurizing roller and separates and removes the non-glossy film to perform the non-gloss treatment on the printed surface, and a post-treatment which laminates a glossy media film on a digital printed surface, secondarily performs digital printing thereon, laminates a glossy or non-glossy film on the printed surface to pass the printed matter through the thermally pressurizing roller to perform a gloss or non-gloss treatment on a secondary printed layer.

[0018] According to a method of elevating a quality of a printed matter using a post-treatment including a gloss and non-gloss treatment of the present invention, a large amount of films may be saved and a post-treatment is easily performed on an image on a printed matter to be emphasized or symbolically attract an attention and various and splendid patterns may be reflected on the printed surface so that a quality of a digital printed matter is improved to obtain a high quality printed matter.

DETAILED DESCRIPTION

[0019] The present invention relates to a method of elevating a quality of a printed matter by a post-treatment including a gloss and non-gloss treatment using a digital printed surface without using a laminate film for a printing post-treatment which is directly or indirectly used for a post-treatment using a characteristic of a digital printing ink such as a resin based toner and ink which is not permeated onto a surface of a paper differently from offset printing ink of the related art. According to a basic embodiment of the present invention, a printing post-treatment in which a glossy film is laminated on a printed surface of a paper which is digitally printed using a digital printer and a printed matter is passed through an engagement pressurizing roller which is maintained in a temperature range of 100 to 150°C so that a high gloss-treatment is partially performed only on a printed layer on the printed surface is performed to elevate a quality of a printed matter.

[0020] The embodiment of the present invention is a most basic method which performs a post-treatment in order to elevate a quality of a digital printed matter by showing only a portion in which a printed layer is formed such as a digitally printed letter or figure on a surface of a paper with a high glossy.

[0021] The glossy film which is used in the above-mentioned method is a PET film which is treated such that one surface thereof has a very high smoothing property and a melting point of the glossy film is much higher than that of a digitally printed thermoplastic resin ink. Further, the glossy film is hardly thermally deformed at a roller passing temperature. In a specific configuration of the glossy film, a release surface of a film where one surface having a thickness of several tens of micron is applied and laminated on a gloss-treated surface of a PET film having a highly gloss treated surface at an amount of 5

to 10 g per m² and a digitally printed surface are laminated to be passed through the thermally pressurizing roller. Here, the film having a very high smoothing property may be a film which is processed so as to have a smoothness of RZ 0.0001 or less.

[0022] According to a second embodiment, a printed surface on which digital printing is primarily performed is laminated by a non-glossy media film and digital printing is secondarily performed thereon. A glossy film is laminated on the printed surface to be passed through an engagement pressurizing roller which is maintained in the range of 100 to 150°C to perform a post treatment which performs a gloss treatment only on a secondarily printed digital printed layer to elevate a quality of a printed matter.

[0023] The media film which is laminated on a primarily digitally printed surface has an unique essential function of a laminate film which prevents a deformation of the primarily digital printed surface due to oxidation, contamination or moisture, a function of maintaining the digital printed layer to have its original status at the time of a gloss treatment of the digital printing which is subsequently performed, and an excellent adhering function with a secondarily printed digital printed layer.

[0024] The media film has a configuration in which a coating layer formed of a water based urethane having a thickness of several micron is formed on a surface layer of a biaxial oriented PP film having a thickness of several tens of micron and an ethylene vinyl acetate adhesive layer with a thickness of several tens of micron is formed on a lower layer thereof and thus the media film is hardly affected by heat and pressure which are applied to perform a glossy and non-glossy treatment on the printed layer.

[0025] When a glossy film is used to perform the gloss treatment on a digitally printed surface on a media film on which a laminating treatment is performed using a media film, only a printed layer which is digitally printed by letters or figures shows a high glossy so that based on a digital printing which shows a printed original form, only a secondarily printed digital printed layer shows a high glossy so as to elevate a quality of a printed matter.

[0026] A third embodiment is a method of elevating a quality of a printed matter by improving a quality of a printed matter using a printing post-treatment in which a non-glossy film is laminated on a digital printed surface to pass the printed matter through a thermally pressurizing roller which is maintained at a temperature of 100 to 150°C and the non-glossy film is separated and removed to perform a non-glossy treatment on a digital printed layer.

[0027] A fourth embodiment may be a post-treatment in which, in the non-glossy film treatment of the second embodiment, the non-glossy film treatment is continuous but a procedure of a non-glossy film treatment in the glossy film treatment is switched.

[0028] The non-glossy films which are used in the third and fourth embodiments are same and the glossy films

which are used in the first and second embodiments are same.

[0029] According to a fifth embodiment, a portion which is desired to be partially glossy is digitally printed first and then a glossy film is laminated on the partial glossy portion to pass through a thermally pressurizing roller which is maintained at a temperature of 100 to 150°C and then the glossy film is separated so that the printed surface is gloss treated and a background portion is secondarily digitally printed to elevate a quality of a printed matter using a partial gloss treatment. Further, the quality of the printed matter may be elevated using a combination of other components.

[0030] The non-glossy film which is used in the third and fourth embodiments is a non-glossy film on which a silicon release layer is formed on one matt treated surface of a PET film which has a high melting point and is hardly thermally deformed. According to a specific configuration of the non-glossy film, a matt layer having a thickness of several microns is formed on one surface of a PET film having a thickness of several tens of microns and a silicon release layer on which a release agent of 5 to 10 g/m² is applied is formed on the matt layer.

[0031] According to the present invention, in order to obtain gloss or non-gloss effect of the related art, the gloss or non-gloss effect is obtained not by laminating a gloss or non-gloss treated film on a screen or offset printed surface or laminating a thermally deformed film on a printed surface and transiting the gloss or non-gloss treated film surface onto a film surface using thermal deformation, but by a common post-treatment in which using a characteristic of digital printing, specifically, using a characteristic of digital printing ink, a gloss or non-gloss treated film surface shape, that is, a kind of a film mold is directly transferred onto a digital printed layer by a thermally pressurizing means.

[0032] The post-treatment in which a gloss or non-gloss effect is achieved may be applied only to a printed layer which is printed using a digital printing method but not applied to a screen or offset printed surface and no effect may be obtained.

[0033] Further, according to the related art, in order to achieve the gloss and non-gloss effect, the laminate film is necessarily used. However, in the present invention, a media film having a multi-purpose function may or may not be used for the gloss and non-gloss treatment, which may advantageously save the film. Further, when the media film is used, the media film has a high melting point so that the media film is used to perform a unique function of the laminate film for protecting a printed matter, a blocking function between printed layers in order to prevent a color deformation due to the mixture of color between the primarily printed layer and a secondarily printed layer or a function of improving the adhesive property of the printed layer but the media film is not used to transit a gloss or non-gloss film image.

[0034] Features of the printing post-treatment method including the glossy and non-gloss treatment of the

present invention are as follows. First, the gloss and non-gloss post-treatment method of the present invention is applied to a digital printed matter so that the same effect is obtained and the quality of the printed matter is improved to elevate the printed matter.

[0035] Second, the post-treatment which may achieve the non-gloss and gloss effect is directly performed on the digital printed surface so that no separate film which may give a gloss and non-gloss effect is used, which may save a raw material.

[0036] Third, the gloss and non-gloss effect is selectively achieved only on a printed layer of the digital printed matter so that an image which may be emphasized or symbolically represented on the printed matter is easily post-treated.

[0037] Fourth, various and splendid patterns may be achieved on a printed surface using a post-treatment including a gloss or a non-gloss, a gloss and non-gloss multiple printing, and a blocking process of a printed layer of a media film so that a quality of a digital printed matter is elevated to obtain a high quality printed matter.

Claims

1. A method of elevating a printed matter using a printing post-treatment, comprising:

laminating a glossy film on a digital printed surface;
allowing a printed matter to pass through a thermally pressurizing roller which is maintained at a temperature of 100 to 150°C; and
separating the glossy film to perform a gloss treatment only on a printed layer.

2. The method of claim 1, wherein the glossy film is a PET film which is treated so as to have a smoothing property of RZ 0.0001 or higher and has a melting point higher than a digitally printed thermoplastic resin ink and is not thermally deformed at a temperature of 100 to 150°C at which the thermal roller is maintained.

3. A method of elevating a printed matter using a printing post-treatment, comprising:

laminating a printed surface on which primary digital printing is performed with a media film;
secondarily performing digital printing thereon;
bonding a glossy film onto the printed surface;
allowing a printed matter to pass through a thermally pressurizing roller which is maintained at a temperature of 100 to 150°C; and
separating the glossy film to perform gloss treatment on a secondarily printed digital printed layer.

4. The method of claim 3, wherein the media film is a film on which a water based urethane coating layer having a thickness of several micron is formed on a surface layer of a biaxial oriented polypropylene film having a thickness of several tens of micron and an ethylene vinyl acetate (EVA) resin adhesive layer having a thickness of several tens of micron is formed on a release layer.

5. A method of elevating a quality of a printed matter using a printing post-treatment, comprising:

digitally printing a portion to be partially glossy;
laminating a glossy film;
allowing a printed matter to pass through a thermally pressurizing roller which is maintained at a temperature of 100 to 150°C;
separating the glossy film to perform gloss treatment on a printed surface; and
performing again a partial gloss treatment by secondarily performing digital printing on a background portion.

6. A method of elevating a quality of a printed matter using a printing post-treatment, comprising
laminating a non-glossy film on a digital printed surface;
allowing a printed matter to pass through a thermally pressurizing roller which is maintained at a temperature of 100 to 150°C; and
separating the non-glossy film to perform non-gloss treatment on a digital printed layer.

7. The method of claim 6, wherein the non-glossy film is a non-glossy film on which a silicon release layer is formed on one surface of a PET film on which a matt treatment is performed.



EUROPEAN SEARCH REPORT

Application Number
EP 13 18 1305

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2005/181150 A1 (AONO TOSHIKI [JP]) 18 August 2005 (2005-08-18) * paragraphs [0314], [0322] - [0325], [0352] *	1,2	INV. B41M7/00
X	EP 0 648 613 A1 (KONISHIROKU PHOTO IND [JP]) 19 April 1995 (1995-04-19) * page 12, line 5 - line 16 *	1,2	
			TECHNICAL FIELDS SEARCHED (IPC)
			B41M
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		16 January 2014	Pulver, Michael
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)



Application Number

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1, 2

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



LACK OF UNITY OF INVENTION **SHEET B**

Application Number

EP 13 18 1305

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1, 2

A method of elevating a printed matter using a printing post-treatment as defined in claim 1.
The features defined in claim 1 in combination solve the objective technical problem of providing a method of forming a printed matter comprising gloss treatment only on a digital printed layer.

2. claims: 3, 4

A method as defined in claim 3 comprising laminating a printed surface on which primary digital printing is performed with a media film and secondarily performing digital printing thereon.
These special technical features solve the objective technical problem of providing a method of forming a printed matter comprising BOTH a laminated (primary) digital printed layer obtained by "laminating a printed surface on which primary digital printing is performed with a media film" AND a second digital printed layer being gloss treated.

3. claim: 5

A method as defined in claim 5 comprising performing a partial gloss treatment by secondarily performing digital printing on a background portion after performing gloss treatment on a printed surface obtained by digitally printing a portion of a printed matter to be partially glossy.
These special technical features solve the objective technical problem of providing a method of forming a printed matter comprising BOTH a (first) digital printed portion being partially glossy AND a second digital printed portion on a background portion obtained by "performing again a partial gloss treatment".

4. claims: 6, 7

A method as defined in claim 6 comprising laminating a non-glossy film on a digital printed surface and separating the non-glossy film to perform non-gloss treatment on a digital printed layer.
These special technical features solve the objective technical problem of providing a method of forming a printed matter comprising imparting NON-gloss to a digital printed layer, i.e. taking away or reducing gloss.



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 13 18 1305

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 18 1305

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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16-01-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005181150	A1	18-08-2005	NONE
EP 0648613	A1	19-04-1995	DE 69402656 D1 22-05-1997
			DE 69402656 T2 14-08-1997
			EP 0648613 A1 19-04-1995
			JP H07108772 A 25-04-1995
			US 5489567 A 06-02-1996

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 704462 [0009]
- KR 10200432470 [0011]