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(54) **A method for making positive working printing plates from a lithographic base comprising a flexible support having a hardened hydrophilic substrate**

Verfahren zur Herstellung einer positiv arbeitenden Druckplatte, von einem lithographischen Träger mit einem vernetzten hydrophilen Substrat ausgehend

Procédé pour la fabrication d'une plaque d'impression positive à partir d'un support flexible recouvert d'une couche hydrophile durcie

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EP-A- 0 298 580

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• **"INK JET RECORDING FOR USE IN MAKING LITHOGRAPHIC PRINTING PLATES"**
RESEARCH DISCLOSURE, no. 289, May 1988,
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• **PATENT ABSTRACTS OF JAPAN** vol. 007, no.
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(DAINIPPON INSATSU KK), 31 May 1983,

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Description

FIELD OF THE INVENTION

[0001] This invention relates to lithographic printing, and is particularly related to a method for producing lithographic plates without a developing step using an ink jet printing apparatus.

BACKGROUND OF THE INVENTION.

[0002] In lithographic printing, a lithographic plate having a hydrophilic surface coated with a hydrophobic material forming an image is mounted on a lithographic press. Typically the plate is rotated beneath a water source to spread water across the plate, and then hydrophobic ink is applied to the plate. The hydrophobic ink does not stick on the uncoated surface of the plate because of the water extending over the uncoated surface. The hydrophobic image repels the water but attracts the ink, and thus ink is applied to the image. The inked image is then used to make lithographic copies.

[0003] Many techniques for producing lithographic plates have been developed. In one common method, plates having photosensitive coatings are exposed and developed to leave a hydrophobic image on the plate corresponding to the lithographic image to be printed. The unexposed portion of the plate remains hydrophilic. According to another technique, a transparent sheet having a special coating of graphite and a binder is placed over a plate and subjected to laser beam imaging. The laser beam causes the graphite and binder to transfer to the plate surface to create a hydrophobic image on the plate. Yet another technique includes making plates from a prepared original using master imager machines that resemble photocopiers. According to still another method, a liquid ink is sprayed onto a plate through a stencil and then the plate is heated to harden the ink.

[0004] Unfortunately, the prior methods have numerous disadvantages. Some methods require special chemicals, materials or coatings on the plate and a developing or heating step to affix the image to the plate. Other methods require expensive, single purpose equipment, expensive and often potentially harmful chemicals, or considerably operator time to make the lithographic plate. Still other methods require the operator to make an original or a stencil image first and then use the original or stencil to make the plate. However, the original or stencil must be made through other means, requiring time and additional materials. Methods requiring liquid ink restrict the possible plate materials because of absorption or diffusion of the ink into or over the plate. In many if not most cases, the plates are used once and discarded, thereby destroying the image. As a result, short runs are often economically impractical and many businesses cannot afford the expense associated with lithographic printing.

[0005] In **US-A- 4 833 486** there is claimed an ink jet

image transfer lithographic apparatus and method therefore which overcomes these and other disadvantages of the prior methods. The claimed ink jet printer is an ink jet printer suited for use of a hot melt ink. Said patent discloses printing on rigid and flexible imaging elements. The disadvantage of said method is that said printers are expensive.

[0006] In more recent times printers suitable for use with a hot melt ink have appeared on the market which are much cheaper. Those printers have however the disadvantage that they can not be used with a rigid (e.g. an aluminum foil) lithographic base. These printers are however perfectly suited for use with a flexible lithographic base. Paper is an excellent lithographic base for preparing printing plates with printers suitable for use with hot melt inks. However it has been found that lithographic printing plates with paper as support prepared with these cheap printers suitable for use with a hot melt ink yield copies where also the non-image areas accept ink.

OBJECTS OF THE INVENTION

[0007] It is an object of the invention to provide a method for making lithographic printing plates from a flexible lithographic base image-wise imaged with hot melt ink by a printer suitable for use with a hot melt ink which yields an excellent lithographic printing plate with a good ink acceptance in the image areas and no ink acceptance in the non-image.

[0008] It is further an object of the present invention to provide a method for making lithographic printing plates without development of the lithographic base in a rapid, economical and ecological way.

[0009] Further objects of the present invention will become clear from the description hereinafter.

SUMMARY OF THE INVENTION

[0010] According to the present invention there is provided a method for making lithographic printing plates including the steps of dispensing hot melt hydrophobic ink from a printhead of a printer suited for use of hot melt inks onto a lithographic base in a predetermined pattern by melting the ink in the printhead and spraying droplets of the melted ink directly onto the lithographic base or transferring the ink by means of an intermediate drum onto the lithographic base into the predetermined pattern, wherein the ink solidifies essentially upon contact with the lithographic base, characterized in that the lithographic base comprises a flexible support having a cross-linked hydrophilic surface.

DETAILED DESCRIPTION OF THE INVENTION

[0011] According to the present invention, the lithographic base having a cross-linked hydrophilic surface comprises a flexible support, such as e.g. paper or plas-

tic film, provided with a cross-linked hydrophilic layer. A particularly suitable cross-linked hydrophilic layer may be obtained from a hydrophilic binder cross-linked with a cross-linking agent such as formaldehyde, glyoxal, polyisocyanate or a hydrolysed tetraalkyl orthosilicate. The latter is particularly preferred; most preferred is tetraethyl or tetramethyl orthosilicate.

[0012] As hydrophilic binder there may be used hydrophilic (co)polymers such as for example, homopolymers and copolymers of acrylamide, methylol acrylamide, methylol methacrylamide, acrylic acid, methacrylic acid, hydroxyethyl acrylate, hydroxyethyl methacrylate or maleic anhydride/vinylmethylether copolymers. The hydrophilicity of the (co)polymer or (co)polymer mixture used is preferably the same as or higher than the hydrophilicity of polyvinyl acetate hydrolyzed to at least an extent of 60 percent by weight, preferably 80 percent by weight. A preferred hydrophilic binder is polyvinylalcohol.

[0013] The amount of crosslinking agent, in particular of tetraalkyl orthosilicate, is preferably at least 0.2 parts by weight per part by weight of hydrophilic binder, more preferably between 0.5 and 5 parts by weight, most preferably between 1.0 parts by weight and 3 parts by weight.

[0014] A cross-linked hydrophilic layer in a lithographic base used in accordance with the present embodiment preferably also contains substances that increase the mechanical strength and the porosity of the layer. For this purpose colloidal silica may be used. The colloidal silica employed may be in the form of any commercially available water-dispersion of colloidal silica for example having an average particle size up to 40 nm, e.g. 20 nm. In addition inert particles of larger size than the colloidal silica can be added e.g. silica prepared according to Stöber as described in J. Colloid and Interface Sci., Vol. 26, 1968, pages 62 to 69 or alumina particles or particles having an average diameter of at least 100 nm which are particles of titanium dioxide or other heavy metal oxides. By incorporating these particles the surface of the cross-linked hydrophilic layer is given a uniform rough texture consisting of microscopic hills and valleys, which serve as storage places for water in background areas.

[0015] The thickness of a cross-linked hydrophilic layer in a lithographic base in accordance with this embodiment may vary in the range of 0.2 to 25 µm and is preferably 1 to 10 µm.

[0016] Particular examples of suitable cross-linked hydrophilic layers for use in accordance with the present invention are disclosed in **EP-A- 601 240, GB-P- 1 419 512, FR-P- 2 300 354, US-P- 3 971 660, US-P- 4 284 705 and EP-A- 514 490.**

[0017] As flexible support of a lithographic base in connection with the present embodiment it is particularly preferred to use a plastic film e.g. substrated polyethylene terephthalate film, cellulose acetate film, polystyrene film, polycarbonate film etc... The plastic film sup-

port may be opaque or transparent.

[0018] It is particularly preferred to use a polyester film support to which an adhesion improving layer has been provided. Particularly suitable adhesion improving layers for use in accordance with the present invention comprise a hydrophilic binder and colloidal silica as disclosed in **EP-A- 619 524, EP-A- 620 502 and EP-A- 619 525**. Preferably, the amount of silica in the adhesion improving layer is between 200 mg per m² and 750 mg per m². Further, the ratio of silica to hydrophilic binder is preferably more than 1 and the surface area of the colloidal silica is preferably at least 300 m² per gram, more preferably at least 500 m² per gram.

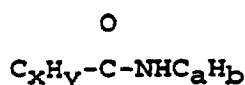
[0019] The hot melt ink used in the present invention is a solid hydrophobic ink that is melted in the ink jet printhead. A hot melt ink, also called a phase change ink consists of a hot melt ink carrier composition, and a dye. The phase change ink carrier may be a composition containing optionally a natural wax or a mixture of natural waxes or a mixture of (a) natural and (a) synthetic wax(es). The main requirement for the ink according to the invention is to be a meltable, jettable hydrophobic substance having appropriate physical characteristics, e.g. a phase change ink carrier. Thus, dyes and coloring agents are not required, but can help the operator to see the image on the plate.

[0020] A subject phase change ink carrier composition typically comprises a fatty amide-containing material. The fatty amide-containing material of the phase change ink carrier composition preferably comprises a tetra-amide compound. The preferred tetra-amide compounds for producing the phase change ink carrier composition are Dimer acid-based tetra-amides which preferably include the reaction product of a fatty acid, a diamine (ethylene diamine) and a Dimer acid. Fatty acids having from 10 to 22 carbon atoms are preferably employed in the formation of the Dimer acid-based tetra-amide. These Dimer acid-based tetra-amides are produced by Union Camp and comprise the reaction product of ethylene diamine, Dimer acid, and the following fatty acids: decanoic acid (Union Camp X3202 -23), myristic acid (Union Camp X3202-56), stearic acid (Union Camp X3138-43, X3164 -23, X3202-44, X3202-46, X3222-65, X3261-37, X3261-53, and X3290-72), docasanic acid (Union Camp X3202-36). For purposes of this invention, the most preferred Dimer acid-based tetra-amide is the reaction product of Dimer acid, ethylene diamine and stearic acid in a stoichiometric ratio of 1:2:2. Stearic acid is the preferred fatty acid reactant because its adduct with Dimer acid and ethylene diamine has the lowest viscosity of the dimer acid-based tetra-amides. Its ingredients also are the most readily available and therefore lowest in cost.

[0021] The fatty amide-containing material can also comprise a mono-amide. In fact, in the preferred case, the phase change ink carrier composition comprises both a tetra-amide compound and a mono-amide compound. The mono-amide compound typically comprises

either a primary or secondary mono-amide, but is preferably a secondary mono-amide. Of the primary mono-amides, stearamide, such as Kemamide S manufactured by Witco Chemical Company, can be employed herein. As for the secondary mono-amides, behenyl behenamide (Kemamide EX-666), and stearyl stearamide (Kemamide S-180 and Kemamide EX-672), all manufactured by Witco Chemical Company, are extremely useful mono-amides. However, stearyl stearamide is the mono-amide of choice in producing the phase change ink carrier composition of the present invention.

[0022] Another way of describing the preferred secondary mono-amide compound of this invention is by structural formula. More especially, the secondary mono-amide compound comprises as a composition which is represented by the structural formula :



wherein :

x is an integer from 5 to 21

y is an integer from 11 to 43

a is an integer from 6 to 22

b is an integer from 13 to 45.

[0023] The preferred fatty amide-containing compounds of this invention comprise a plurality of fatty amide materials which are physically compatible with each other. Typically, even when a plurality of fatty amide-containing compounds are employed to produce the phase change ink carrier composition, the carrier composition has a substantially single melting point transition. The melting point of the phase change ink carrier composition is preferably at least about 70 °C, more preferably at least about 80 °C, and most preferably at least about 85 °C.

[0024] The preferred phase change ink carrier composition comprises a tetra-amide and a mono-amide. The weight ratio of the tetra-amide to the mono-amide in the preferred instance is from about 2:1 to 1:10 and more preferably, from about 1:1 to 1:3.

[0025] In order to add more flexibility and adhesion to the phase change ink carrier composition, a tackifier can be employed. The preferred tackifiers are those which are compatible with fatty amide-containing materials. These include, for example, Foral 85, a glycerol ester of hydrogenated abietic (rosin) acid, and Foral 105, a pentaerythritol ester of hydroabietic (rosin) acid, both manufactured by Hercules Chemical Company; Nevtag 100 and Nevtag 80, synthetic polyterpene resins manufactured by Neville Chemical Company; and Wingtack 86, a modified synthetic polyterpene resin manufactured by Goodyear Chemical Company. However, Foral 105 is the tackifier of choice in producing the phase change ink

carrier composition of the present invention.

[0026] Another compound which can be added in forming the subject change ink carrier composition is a plasticizer which is incorporated into the carrier composition to increase its flexibility and lower its melt viscosity. Plasticizers which have been found to be particularly advantageous in the composition of the subject invention preferably include dioctyl phthalate, diundecyl phthalate, alkylbenzyl phthalate (Santicizer 278) and triphenyl phosphate, all manufactured by Monsanto Chemical Company; tributoxyethyl phosphate (KP-140) manufactured by FMC Corporation; dicyclohexyl phthalate (Morflex 150) manufactured by Morflex Chemical Company Inc.; and trioctyl trimellitate, manufactured by Kodak. However, Santicizer 278 is the plasticizer of choice in producing the phase change ink carrier composition of the present invention.

[0027] Other materials may be added to the phase change ink carrier composition. In a typical phase change ink chemical composition antioxidants are added for preventing discoloration of the carrier composition. The preferred antioxidant materials can include Irganox 1010 manufactured by Ciba Geigy; and Naugard 76, Naugard 512, and Naugard 524 manufactured by Uniroyal Chemical Company; the most preferred antioxidant being Naugard 524.

[0028] In a preferred case, the phase change ink carrier composition comprises a tetra-amide and a mono-amide compound, a tackifier, a plasticizer, and a viscosity modifying agent. The preferred compositional ranges of this phase change ink carrier composition are as follows : from about 10 to 50 weight percent of a tetra-amide compound, from about 30 to 80 weight percent of a mono-amide compound, from about 0 to 25 weight percent of a tackifier, from about 0 to 25 weight percent of a plasticizer, and from about 0 to 10 weight percent of a viscosity modifying agent.

[0029] As previously indicated, the subject phase change ink formed from the phase change ink carrier composition exhibits excellent physical properties. More details are given in **EP-A 353 979**.

[0030] Other preferred phase change ink carriers and phase change inks are disclosed in **EP-A- 519 138**, **EP-A- 604 023**, **EP-A- 739 958**, **US-A- 5 592 204**, **WO-96/015201**, **US-A- 5 531 819**, **US-A- 5 560 765**, **WO 90/005893**, **WO- 91/010711**, **WO- 91/010710** and **EP-A- 723 999**.

[0031] Printers suitable for use of hot melt inks are piezo-drop-on-demand printers which are well known to those skilled in the art. Such printers are described in e. g. **WO- 90/005893** and **EP-A- 623 472**. The image forming requires the following steps. The solid hydrophobic ink is melted in the ink jet printhead and held in a reservoir. On demand, microdots of ink are sprayed onto the lithographic base in a predetermined pattern as the plate passes through the printer.. According to one embodiment of the invention, the microdots have a diameter of about 50µm. Upon contact with the lithographic base the

ink solidifies and leaves an upraised, hydrophobic pattern on the lithographic base, forming the lithographic printing plate. No developing or drying step is required.

[0032] In another embodiment there is used an indirect method including applying the ink on an intermediate drum and contacting said drum with the lithographic base. Said process is disclosed in **EP-A- 604 023**.

[0033] In another embodiment of the invention an ink jet printer suitable for using a hot melt ink is placed adjacent to the plate cylinder of an offset printing machine and directed to spray hot melt ink onto a lithographic base held on the plate cylinder. A computer or other information source supplies graphics and textual information to the printhead via a lead.

[0034] The printing plate of the present invention can also be used in the printing process as a seamless sleeve printing plate. This cylindrical printing plate which has as diameter the diameter of the print cylinder is slid on the print cylinder instead of applying in a classical way a classically formed printing plate. More details on sleeves are given in "Grafisch Nieuws" ed. Keesing, 15, 1995, page 4 to 6.

[0035] The following example illustrates the present invention without limiting it thereto. All parts and percentages are by weight unless otherwise specified.

EXAMPLE 1

Preparation of the solution for the subbing layer.

[0036] To a solution of 11.4 g of gelatine (viscosity : 19-21 mPas) in 940 ml of water was added 31.7 ml (11.4 g solid product) KIESELSOL 300 F (tradename for 30 % aqueous dispersion of colloidal silica - surface area of 300 m² per g). Anionic wetting agents (0.6 g) and biocides (1 g) were added.

Preparation of the hydrophilic layer.

[0037] To 440 g of a dispersion containing 21.5 % TiO₂ (average particle size 0.3 to 0.5 um) and 2.5 % polyvinyl alcohol in deionized water were subsequently added, while stirring, 250 g of a 5 % polyvinyl alcohol solution in water, 105 g of a hydrolyzed 22 % tetramethyl orthosilicate emulsion in water and 22 g of a 10 % solution of a wetting agent. To this mixture was then added 183g of deionized water and the pH was adjusted to pH=4.

Preparation of the lithographic base.

[0038] To a polyethylene terephthalate support, coated with a primer containing 170 mg/m² of a latex of copoly(vinylidenechloride/ methyl methacrylate/ icatonic acid) and 40 mg/m² of silica with a surface area of 100 m²/g was applied the above described solution for the subbing layer at a solids coverage of 750 mg/m². On top of the subbing layer was coated the above mentioned hydrophilic layer to a wet coating thickness of 50 g/m²,

dried at 30°C and subsequently hardened by subjecting it to a temperature of 60°C for 1 week.

Printing

[0039] With a printer suitable for use of hot melt inks Tektronix phaser 340 (marketed by Tektronix USA) and as hot melt ink Black Colorstix ink for Phaser 340/350 an image was applied on the lithographic base. Said imaged lithographic base was used as a lithographic printing plate on an ABDick printing machine . The Van Son Rubberbase ink and as fountain solution 2% Tame was used. The printing copies were excellent from the fifth copie, showing a good ink acceptance in the image areas and no ink acceptance in the non-image areas.

[0040] When a white copying paper Agfa 701 (81 g/ m²; Bekk porosity 25 ml/s) was used in the same printing procedure the hundredth copie still showed a strong ink acceptance in the non-image areas.

Claims

1. A method for making lithographic printing plates including the steps of dispensing hot melt hydrophobic ink from a printhead of a printer suited for use of hot melt inks onto a lithographic base in a predetermined pattern by melting the ink in the printhead and spraying droplets of the melted ink directly onto the lithographic base or transferring the ink by means of an intermediate drum onto the lithographic base into the predetermined pattern, wherein the ink solidifies essentially upon contact with the lithographic base, **characterized in that** the lithographic base comprises a flexible support having a cross-linked hydrophilic surface.
2. A method for making lithographic printing plates according to claim 1 wherein said cross-linked hydrophilic surface comprises a hydrophilic binder
3. A method for making lithographic printing plates according to claim 2 wherein said hydrophilic binder has a hydrophilicity which is the same as or higher than the hydrophilicity of polyvinyl acetate hydrolyzed to at least an extent of 60 percent by weight.
4. A method for making lithographic printing plates according to claim 3 wherein said hydrophilic binder is polyvinylalcohol.
5. A method for making lithographic printing plates according to claim 1 wherein said cross-linked hydrophilic surface comprises a cross-linking agent.
6. A method for making lithographic printing plates according to claim 5 wherein said cross-linking agent is a hydrolyzed tetraalkyl orthosilicate.

7. A method for making lithographic printing plates according to claim 6 wherein said hydrolyzed tetraalkyl orthosilicate is tetramethyl or tetraethyl orthosilicate.
8. A method for making lithographic printing plates according to claim 1 wherein the hydrophilic surface contains a hydrophilic binder and a cross-linking agent and wherein the amount of cross-linking agent is at least 1 part by weight per part by weight of hydrophilic binder.
9. A method for making lithographic printing plates according to any of claims 1 to 8 wherein the hydrophobic support is an organic resin support or a polyolefine coated paper base.
10. A method for making lithographic printing plates according to any of claims 1 to 9 wherein the hot melt ink comprises a fatty amide-containing material.

Patentansprüche

1. Ein durch die nachstehenden Schritte **gekennzeichnetes** Verfahren zur Herstellung lithografischer Druckplatten :

die Zufuhr von hydrophober Heißschmelztinte von einem Druckkopf eines für Verwendung mit Heißschmelztinten geeigneten Druckers auf einen lithografischen Träger entsprechend einem vorgegebenen Muster, indem die Druckfarbe im Druckkopf geschmolzen wird und Tropfen der geschmolzenen Farbe direkt auf den lithografischen Träger gespritzt werden oder die Druckfarbe über eine zwischengeschaltete Trommel entsprechend dem vorgegebenen Muster auf den lithografischen Träger übertragen wird, wobei die Druckfarbe im wesentlichen bei Kontakterhaltung mit dem lithografischen Träger erstarrt, **dadurch gekennzeichnet, daß** der lithografische Träger einen biegsamen Träger mit einer vernetzten hydrophilen Oberfläche enthält.

2. Verfahren zur Herstellung lithografischer Druckplatten nach Anspruch 1, **dadurch gekennzeichnet, daß** die vernetzte hydrophile Oberfläche ein hydrophiles Bindemittel enthält.
3. Verfahren zur Herstellung lithografischer Druckplatten nach Anspruch 2, **dadurch gekennzeichnet, daß** das hydrophile Bindemittel eine Hydrophilie aufweist, die höher oder gleich der Hydrophilie von zu wenigstens 60 Gew.-% hydrolysiertem Polyvinylacetat ist.

4. Verfahren zur Herstellung lithografischer Druckplatten nach Anspruch 3, **dadurch gekennzeichnet, daß** das hydrophile Bindemittel Polyvinylalkohol ist.
5. Verfahren zur Herstellung lithografischer Druckplatten nach Anspruch 1, **dadurch gekennzeichnet, daß** die vernetzte hydrophile Oberfläche ein Vernetzungsmittel enthält.
6. Verfahren zur Herstellung lithografischer Druckplatten nach Anspruch 5, **dadurch gekennzeichnet, daß** das Vernetzungsmittel ein hydrolysiertes Tetraalkylorthosilikat ist.
7. Verfahren zur Herstellung lithografischer Druckplatten nach Anspruch 6, **dadurch gekennzeichnet, daß** das hydrolysierte Tetraalkylorthosilikat Tetramethylorthosilikat oder Tetraethylorthosilikat ist.
8. Verfahren zur Herstellung lithografischer Druckplatten nach Anspruch 1, **dadurch gekennzeichnet, daß** die hydrophile Oberfläche ein hydrophiles Bindemittel und ein Vernetzungsmittel enthält und die Menge Vernetzungsmittel zumindest 1 Gewichtsteil je Gewichtsteil hydrophiles Bindemittel beträgt.
9. Verfahren zur Herstellung lithografischer Druckplatten nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, daß** der hydrophobe Träger ein Träger aus organischem Harz oder ein polyolefinbeschichteter Papierträger ist.
10. Verfahren zur Herstellung lithografischer Druckplatten nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, daß** die Heißschmelztinte ein Fettsäureamid enthaltendes Material enthält.

Revendications

1. Procédé pour fabriquer des clichés d'impression lithographique englobant les étapes consistant à distribuer une encre hydrophobe thermofusible à partir d'une tête d'impression d'une imprimante appropriée pour utiliser des encres thermofusibles sur une base lithographique dans un modèle prédéterminé en portant l'encre à fusion dans la tête d'impression et en pulvérisant des gouttelettes de l'encre portée à fusion directement sur la base lithographique ou en transférant l'encre à l'aide d'un tambour intermédiaire sur la base lithographique dans le modèle prédéterminé, dans lequel l'encre se solidifie essentiellement lors de sa mise en contact avec la base lithographique, **caractérisé en ce que** la base lithographique comprend un support flexible possédant une surface hydrophile réticulée.
2. Procédé pour fabriquer des clichés d'impression li-

thographique selon la revendication 1, dans lequel ladite surface hydrophile réticulée comprend un liant hydrophile.

3. Procédé pour fabriquer des clichés d'impression lithographique selon la revendication 2, dans lequel ledit liant hydrophile possède un caractère hydrophile qui est identique ou supérieur au caractère hydrophile d'un acétate de polyvinyle soumis à une hydrolyse à concurrence d'au moins 60 % en poids. 5
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4. Procédé pour fabriquer des clichés d'impression lithographique selon la revendication 3, dans lequel ledit liant hydrophile est l'alcool polyvinylique. 15
5. Procédé pour fabriquer des clichés d'impression lithographique selon la revendication 1, dans lequel ladite surface hydrophile réticulée comprend un agent de réticulation. 20
6. Procédé pour fabriquer des clichés d'impression lithographique selon la revendication 5, dans lequel ledit agent de réticulation est de l'orthosilicate de tétraalkyle hydrolysé. 25
7. Procédé pour fabriquer des clichés d'impression lithographique selon la revendication 6, dans lequel ledit orthosilicate de tétraalkyle hydrolysé est de l'orthosilicate de tétraméthyle ou de tétraéthyle. 30
8. Procédé pour fabriquer des clichés d'impression lithographique selon la revendication 1, dans lequel ladite surface hydrophile contient un liant hydrophile et un agent de réticulation et dans lequel la quantité de l'agent de réticulation s'élève à au moins 1 partie en poids par partie en poids du liant hydrophile. 35
9. Procédé pour fabriquer des clichés d'impression lithographique selon l'une quelconque des revendications 1 à 8, dans lequel le support hydrophobe est un support en résine organique ou une base de papier couché avec de la polyoléfine. 40
10. Procédé pour fabriquer des clichés d'impression lithographique selon l'une quelconque des revendications 1 à 9, dans lequel l'encre thermofusible comprend une matière contenant un amide gras. 45

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