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(54) Lithographic plate finisher

Endbearbeitungslösung für lithographische Platten

Composition de finissage pour plaque lithographique

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- **PATENT ABSTRACTS OF JAPAN vol. 11, no. 274 (P-612)(2721) 05 September 1987, JP-A-62 73269 (KONISHIROKU PHOTO IND. CO. LTD.)**

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Description

The present invention relates to a process for preparing a lithographic plate.

Upon manufacturing a lithographic printing plate, a gumming up step is performed as the final process. In the gumming up step, a protecting agent, i.e., so-called desensitizing gum is applied onto the surface of the printing plate. This is applied to the plate for the purposes of preventing adhesion of contaminants on the plate after the plate is manufactured and till the plate is set on a printing press to thereby prevent occurrence of background contamination on printed matters and for preventing the formation of defects on the plate surface during storing the plates in the heaped up state or upon hitting them against a foreign substance. The most important purpose of the gumming up step is to prevent the lowering of the hydrophilic properties of non-image areas due to oxidization encountered when the plate surface is directly exposed to air and to enhance the hydrophilic properties thereof. For these reasons, the gumming up is a step indispensable for the plate making process.

As a gumming solution, there has been used, for a long time, a composition comprising an aqueous solution of gum arabic having a concentration ranging from about 15 to 30% by weight to which additives such as surfactants, pH-adjusting agents and preservatives are optionally added.

However, the desensitizing ability of gum arabic is so strong that the ink receptivity of image areas is often lowered. Therefore, it is sometimes observed that many unacceptale printed matters are formed till those having satisfactory ink concentration are surely obtained during printing operations.

There has been proposed an emulsion gum solution comprising an oil phase containing a lipophilic surfactant, such as an organic solvent soluble lipophilic surfactant, dissolved in a petroleum fraction and a water phase containing a water soluble organic high molecular compound dissolved therein. In such emulsion gum solution, gum arabic serves as not only a desensitizing agent but also a protective colloid to stabilize the emulsion.

However, gum arabic is a natural substance which is produced only in limited regions in the world and its amount of harvest is greatly influenced by various factors such as the climate at the regions. Thus the stable supply thereof is not always expected.

Under such circumstances, many attempts have been directed to the use of a variety of water-soluble polymeric compounds as desensitizing gum lithographic plate finishers instead of gum arabic.

For instance, Japanese Patent Un-examined Publication (hereunder referred to as "J.P. KOKAI") No. Sho 54-97102 (B.P. 2010298) discloses dextrin, sterabic, arabogalactan, alginic acid salts, polyacrylic acids, hydroxyethyl cellulose, polyvinyl pyrrolidone, polyacrylamide, methyl cellulose, hydroxypropyl cellulose, hydroxymethyl cellulose and salts of carboxyalkyl celluloses. Moreover, Japanese Patent Publication for Opposition Purpose (hereunder referred to as "J.P. KOKOKU") No. Sho 54-41921 discloses pullulan and pullulan derivatives; J.P. KOKAI No. Sho 58-197091 discloses polyvinyl pyrrolidone; and J.P. KOKAI No. Sho 56-133193 (U.S.P. 4,349,391) discloses polyvinyl alcohols. J.P.KOKAI No. Sho 59-57242 discloses modified starch derivatives which include roasted starch such as British gum, enzyme-modified dextrin such as enzyme dextrin and Schardinger dextrin, acid-treated starch such as solubilized starch, oxidized starch such as dialdehyde starch, gelatinized starch such as modified or non-modified gelatinized starch, esterified starch such as phosphoric acid starch, fatty acid starch, sulfuric acid starch, nitric acid starch, xanthogenic acid starch and carbamic acid starch, etherified starch such as carboxyalkylated starch, hydroxyalkylated starch, sulfoalkylated starch, cyanoethylated starch, allylated starch, benzylated starch, carbamylethylated starch and dialkylamino starch, crosslinked starch such as methylol crosslinked starch, hydroxyalkyl crosslinked starch, phosphoric acid crosslinked starch and dicarboxylic acid crosslinked starch, and starch graft copolymer such as starch polyacrylamide copolymer, starch polyacrylic acid copolymer, starch polyvinyl acetate copolymer, starch polyacrylnitrile copolymer, cationic starch polyacrylate copolymer, cationic starch polyvinyl compound copolymer, starch styrene maleic acid copolymer and starch polyethylene oxide copolymer.

However, all the plate finishers using water soluble organic polymeric compounds instead of gum arabic are inferior in the ability to desensitize non-image areas to that of gum arabic and therefore, if they are used as emulsion type gum solutions, the oil phase components often contaminate non-image areas.

Further, the water-soluble organic polymeric compounds are inferior in the property of protective colloid to gum arabic and therefore, emulsion type gum solutions using the polymeric compounds undergo phase separation into oil and aqueous phases in a few days.

Moreover, an expensive machine such as a homogenizer and labors are required to prepare an emulsion type gum solution.

To make up for these disadvantages, a non-emulsion type gum solution has been known. However, as explained earlier, the non-emulsion type gum solution using a large amount of gum arabic has disadvantages in that it is inferior in ink receptivity in image areas and that gum arabic is not stably supplied. On the other hand, a non-emulsion type gum solution containing a water-soluble organic polymeric compound instead of gum arabic is sufficient in the ability of preventing contamination in non-image areas because it does not contain a lipophilic component, but it is insufficient in ink receptivity in image areas so that many unacceptable printed matters are produced at the beginning of printing operation.

EPA-0 326 715 describes a process of preparing a lithographic plate which comprises the steps of in order imagewise exposing to light a presensitized plate comprising an aluminium support having a lithographically suitable light sensitive layer, developing the plates with a developer/finisher solution to remove areas of the light-sensitive layer thereby obtaining a lithographic plate having an image area and a non-image area. The developer/finisher contains: a) a mono-, di- or tri-sodium, potassium or lithium phosphate; and b) benzyl alcohol, phenoxyethanol and phenoxypropanol; and c) polyvinyl pyrrolidone, dextrin, poly (methyl vinyl ether/maleic acid) and gum arabic; and d) citric acid and benzoic acid; and e) sodium or potassium octyl sulfate; and f) sodium, potassium and lithium benzoate; and g) sodium, potassium and ammonium citrate; and h) sodium, potassium and ammonium sorbate; and i) water to give 100.0% by weight.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a lithographic plate finisher (hereunder referred to as "plate finisher") having good ability of desensitizing non-image areas but not reducing ink receptivity of image areas.

Another object of the present invention is to provide a plate finisher which is stable against phase separation even when the amount of gum arabic used is small.

A further object of the present invention is to provide a plate finisher which can easily be prepared with an inexpensive machine.

The forgoing objects can be quite effectively attained by the present invention by providing a process of preparing a lithographic plate which comprises the steps of, in order, image wise exposing to light a presensitized plate comprising an aluminum support having a lithographically suitable light-sensitive layer, developing the plate with an aqueous alkaline solution to remove either light-exposed or light-unexposed area of the light-sensitive layer thereby obtaining a lithographic plate consisting of an oleophilic image area and a hydrophilic non-image area and applying to the plate a lithographic plate finisher having a pH of from 2 to 6 comprising, in uniform solution, at least one water soluble resin, an organic solvent whose solubility in water at 20°C is not more than 5% by weight, and water.

DETAILED EXPLANATION OF THE INVENTION

The present invention will be explained in detail.

SOLVENTS

The plate finisher used in the process of the present invention comprises a solvent whose solubility in water at 20°C is not more than 5% by weight. The addition of such solvent improves ink receptivity of image areas.

Examples of such solvent include benzyl alcohol, ethylene glycol dibutyl ether, ethylene glycol benzyl ether, ethylene glycol monophenyl ether, hexyl glycol, hexyl diglycol, propyl propylene diglycol, methyl phenyl carbitol, diethylene glycol dibutyl ether, n-amyl alcohol, metyl amyl alcohol, isophorone, methyl cyclohexanone and acetophenone. Among them, benzyl alcohol is most preferred because it is highly stable and inexpensive but does not give out strong odor.

In the invention, the solvent may be used alone or in combination. The amount of the solvent used is preferably 0.1 to 10 % and more preferably 0.5 to 5 % by weight based on the total weight of the plate finisher. If it is less than 0.1 % by weight, ink receptivity of image areas is reduced. On the other hand, if it exceeds 10 % by weight, the plate surface becomes sticky and the drying property is deteriorated. Solvents whose solubility in water is more than 5 % by weight have no or insufficient effect on the prevention of lowering of ink receptivity of image areas.

WATER-SOLUBLE RESINS

The plate finisher may contain a variety of water-soluble resins.

Examples of such resins include natural high molecular compounds such as starches derived from sweet potato, potato, tapioca, wheat, corn and waxy corn; those derived from sea weeds such as carrageenan, laminaran, sea weed mannan, funori (a glue plant), Irish moss, agar and sodium alginate; mucilage derived from plants such as tororo-aoi mucin, mannan, quince seed mucin, pectin, tragacanth gum, karaya gum, xanthine gum, guar bean gum, locust bean gum, gum arabic, carob gum and benzoiun gum; mucilage derived from microorganisms such as homopolysaccharides (e.g., dextran, glucan and levan) and heteropolysaccharides (e.g., succinoglucan and xanthane gum); proteins such as glue, gelatin, casein and collagen; semisynthetic sompounds such as propylene glycol alginate and cellulose derivatives such as viscose, methyl cellulose, ethyl cellulose, methyl ethyl cellulose, hydroxyethyl cellulose, carboxymethyl cellulose, hydroxypropyl cellulose, hydroxypropyl methyl cellulose and hydroxypropyl methyl cellulose phthalate; processed starches such as roasted dextrin (e.g., white dextrin, yellow dextrin and British gum), enzyme-modified dextrin such as enzyme dextrin and Schardinger dextrin, acid-treated starch such as solubilized starch, oxidized starch such as dialdehyde starch, gelatinized starch such as modified or non-modified gelatinized starch, esterified starch such as phosphoric acid starch, fatty acid starch, sulfuric acid starch, nitric acid starch, xanthogenic acid starch, carbamic acid starch and succinic acid starch, etherified starch such as carboxyalkylated starch, hydroxyalkylated starch, sulfoalkylated starch, cyanoethylated starch, allylated starch, benzylated starch, carbamylethylated starch and dialkylamino starch, crosslinked starch such as methylol crosslinked starch, hydroxyalkyl crosslinked starch, phosphoric acid crosslinked starch and dicarboxylic acid crosslinked starch, and starch graft copolymer such as starch polyacrylamide copolymer, starch polyacrylic acid copolymer, starch polyvinyl acetate copolymer, starch polyacrylnitrile copolymer, cationic starch polyacrylate copolymer, cationic starch polyvinyl compound copolymer, starch styrene maleic acid copolymer and starch polyethylene oxide copolymer; and synthetic compounds such as polyvinyl alcohol, modified polyvinyl alcohol such as partial acetal of polyvinyl alcohol, allyl modified polyvinyl alcohol, polyvinyl methyl ether, polyvinyl ethyl ether and polyvinyl isobutyl ether, poly(meth)acrylic acid derivatives such as sodium polyacrylate, partially saponified polyacrylate, partially saponified product of acrylate copolymer, salt of polymethacrylate and polyacrylamide, polyethylene glycol, polyethylene oxide, polyvinyl pyrrolidone, polyvinyl pyrrolidone-vinyl acetate copolymer, carboxy vinyl-polymer, styrene-maleic acid copolymer and styrene-crotonic acid copolymer.

These water-soluble resins may be used in the plate finisher alone or in combination in an amount of, preferably, 5 to 40 %, more preferably 10 to 30 % by weight based on the total weight of the plate finisher.

In the present invention, it is possible to significantly lower the amount of gum arabic to be used in the plate finisher. Although gum arabic may not be used at all in the finisher, it is preferable to use gum arabic in an amount of 1 to 20 % by weight based on the total weight of the water-soluble resin used in the finisher to give sufficient desensitizing ability to non-image areas.

pH ADJUSTING AGENTS

The plate finisher is used in the acid region, i.e., at pH ranging from 2 to 6. The pH value is generally adjusted by adding a mineral acid, an organic acid, an inorganic salt, an alkali agent or the like to the plate finisher. The amount thereof generally ranges from 0.01 to 3 % by weight.

Useful examples of the foregoing mineral acids are nitric acid, sulfuric acid and phosphoric acid and those of the organic acids are citric acid, acetic acid, oxalic acid, malonic acid, p-toluenesulfonic acid, tartaric acid, malic acid, lactic acid, levulinic acid, phytic acid, benzoic acid, butyric acid, maleic acid, picolinic acid and organophosphonic acids .

Useful examples of the foregoing inorganic salts are water soluble alkali metal salts and ammonium salts of nitric acid, phosphoric acid, sulfuric acid, molybdenic acid, acetic acid, polyphosphoric acid and boric acid, such as sodium nitrate, potassium nitrate, ammonium nitrate, monosodium phosphate, disodium phosphate, monopotassium phosphate, dipotassium phosphate, monoammonium phosphate, diammonium phosphate, sodium sulfate, potassium sulfate, ammonium sulfate, sodium molybdate, potassium molybdate, ammonium molybdate, sodium acetate, potassium acetate, ammonium acetate, sodium tripolyphosphate, sodium hexametaphosphate, sodium pyrophosphate, soium borate and ammonium borate and those of the foregoing alkali agents are alkali metal hydroxides such as sodium hydroxide, potassium hydroxide and lithium hydroxide, and amines such as ammonia, monoethanol amine, diethanol amine and triethanol amine.

The foregoing mineral acids, organic acids, inorganic salts or alkali agents may be used alone or in combination.

SURFACTANTS

A surfactant can be added to the plate finisher to improve the surface conditions or the like of the resulting coated film and to stably solubilize the solvent whose solubility in water at 20 °C is not more than 5 % by weight. Examples of the surfactants usable herein include anionic, nonionic, amphoteric and cationic surfactants.

Examples of such anionic surfactants include fatty acid salts, alkylbenzene sulfonic acid salts, straight chain alkylbenzene sulfonic acid salts, alkyl sulfonic acid salts, α-olefin sulfonic acid salts, alkyl phosphoric acid ester salts, dialkyl sulfo succinic acid ester salts, polyoxyethylene alkyl ether sulfonic acid salts, polyoxyethylene alkyl ether phophoric acid salts, alkylnaphthalene sulfonic acid salts, N-lauroyl sarcosine salts, sulfonic acid salts of condensates of naphthalene and formaldehyde, and diphenylether disulfonic acid salts.

Examples of the nonionic surfactants are polyoxyethylene alkyl ethers, polyoxyethylene alkyl phenol ethers, polyoxyethylene-polyoxypropylene brock copolymers, polyoxyethylene sorbitan fatty acid esters, polyoxyethylene glycerin fatty acid esters, polyethylene glycol fatty acid esters, polyoxyethylene fatty acid amines, fatty acid monoglycerides, sorbitan fatty acid esters, pentaerythritol fatty acid esters, sucrose fatty acid esters and amine oxides.

Examples of the amphoteric surfactants are alkylcarboxy betaines, alkylamino carboxylic acids and alkylimidazolines.

Examples of the cationic surfactants are tetraalkyl ammonium salts, trialkyl benzyl ammonium salts and alkyl imidazolinium salts. In addition, there may be mentioned fluorine atom containing surfactants and silicon atom containing surfactants.

Among them, the anionic and/or nonionic surfactants are more effective.

The surfactants may be used alone or in combination. The amount thereof used is not limited to a specific range, but preferably it ranges from 0.01 to 10% by weight on the basis of the total weight of the plate finisher.

WETTING AGENTS, PRESERVATIVES AND OTHER ADDITIVES

In addition to the foregoing components, the plate finisher may further comprise a lower alcohol such as glycerin, ethylene glycol and triethylene glycol as a wetting agent. The amount of the wetting agent preferably ranges from 0.1 to 5.0 % by weight, more preferably 0.5 to 3.0 % by weight based on the total weight of the plate finisher. Moreover, the plate finisher may comprise other additives such as preservatives. Examples thereof are benzoic acid and derivatives thereof, phenol, formalin, sodium dehydroacetate and 3-isothiazolones. These compounds may be used in an amount ranging from 0.005 to 2.0 % by weight of the plate finisher. Further, the plate finisher may contain other additives which are used in conventional plate finishers, for example, anti-foaming agents, chelating agents and coloring agents.

METHOD OF THE PREPARATION OF THE PLATE FINISHER

The plate finisher can be prepared by dissolving with agitation the solvent, a water soluble resin, a surfactant, a pH adjusting agent, a wetting agent and a preservative in water or if necessary in hot water. Since the plate finisher is a non-emulsion type gum solution, it is unnecessary to prepare a water phase and an oil phase and subsequently to emulsify the mixture with a homogenizer unlike an emulsion type gum solution. Thus, the plate finisher can be prepared easily with an inexpensive equipment.

PRESENSITIZED PLATE

The plate finisher may be applied to various kinds of lithographic printing plates, in particular the plate finisher can suitably be applied to those obtained by imagewise exposing a presensitized plate (called "PS plate") comprising an aluminum substrate provided thereon with a light-sensitive layer and then developing the same. Examples of preferred such PS plates include those comprising an aluminum substrate provided thereon with a light-sensitive layer composed of a mixture of a diazo resin (a salt of a condensate of p-diazodiphenylamine and paraformaldehyde) and shellac as disclosed in British Patent No. 1,350,521; negative working PS plates such as those comprising an aluminum substrate provided thereon with a light-sensitive layer composed of a mixture of a diazo resin and a polymer mainly composed of repeating units derived from hydroxyethyl methyacrylate or hydroxyethyl acrylate as disclosed in British Patent Nos. 1,460,978 and 1,505,739; and positive working PS plates such as those comprising an aluminum substrate provided thereon with a light-sensitive layer composed of a mixture of o-quinonediazide light-sensitive substance and a novolak type phenol resin as disclosed in J.P. KOKAI No. Sho 50-125806. Preferred examples of such PS plates further include PS plates comprising an aluminum substrate provided thereon with a light-sensitive layer composed of a photocross-linkable photopolymer specifically described in U.S. Patent No. 3,860,426; PS plates comprising an aluminum plate provided thereon with a light-sensitive layer composed of a photopolymerizable photopolymer composition as disclosed in U.S. Patent Nos. 4,072,528 and 4,072,527; and PS plates comprising an aluminum plate provided thereon with a light-sensitive layer composed of a mixture of an azide and a water-soluble polymer as disclosed in British Patent Nos. 1,235,281 and 1,495,861.

APPLICATION OF THE PLATE FINISHER

A method in accordance with the present invention using the plate finisher will hereunder be explained specifically with reference to an example in which a PS plate is used.

First of all, a PS plate is imagewise exposed to light and then developed to give a lithographic printing plate.

A developer usable in the foregoing development is an alkaline solution whose principal solvent is water. The developer optionally comprises additives such as organic solvents, anionic surfactants and inorganic salts in addition to an alkaline agent.

Specific examples of the alkaline agents include inorganic alkaline agents such as sodium silicate, potassium silicate, potassium hydroxide, sodium hydroxide, lithium hydroxide, sodium tertiary phosphate, sodium bicarbonate, sodium carbonate, potassium carbonate and ammonium carbonate; and organic alkaline agents such as mono-, di- or tri-ethanolamine and propanolamine. The amount thereof used in the developer preferably ranges from 0.05 to 4 % by weight and more preferably 0.1 to 2 % by weight.

Examples of useful organic solvents are alcohols such as n-propyl alcohol and benzyl alcohol; and glycol ethers such as phenyl cellosolve. The organic solvents are added to the developer preferably in an amount ranging from 0.5 to 15 % by weight and more preferably 1 to 5 % by weight.

Examples of anionic surfactants include alkylsulfuric acid ester salts such as sodium laurylsulfate; alkylarylsulfonic acid salts such as sodium dodecylbenzenesulfonate; sulfonic acid salts of dibasic fatty acid esters such as sodium di-(2-ethylhexyl)sulfosuccinate; alkylnaphthalenesulfonic acid salts such as sodium n-butylnaphthalene-sulfonate; and polyoxyethylene alkyl(phenol) ether sulfates and in particular alkylnaphthalenesulfonic acid salts such as n-butylnaphthalenesulfonic acid salt are suitably used. The amount of the anionic surfactants in the developer preferably ranges from 0.1 to 5 % by weight and more preferably 0.5 to 1.5 % by weight.

Examples of inorganic salts are water-soluble alkali metal or alkaline earth metal salts of inorganic acids such as phosphoric acid, silicic acid, carbonic acid and sulfurous acid and, particularly preferred are alkali and alkaline earth metal salts of sulfurous acid. The amount of these inorganic salts in the developer in general ranges from 0.05 to 5 % by weight and preferably 0.1 to 1 % by weight.

It is also advantageous that the developer further comprises other additives such as antifoaming agents and wetting agents, if necessary.

The imagewise exposed PS plate can be developed with the foregoing developer in various known manners. Specific examples of methods for developing the imagewise exposed PS plate include a method comprising dipping the PS plate in a developer; a method comprising spraying a developer on the light-sensitive layer of the PS plate through a plurality of nozzles; a method comprising rubbing the light-sensitive layer of the PS plate with a sponge containing a developer; and a method comprising applying a developer to the surface of the light-sensitive layer of the PS plate with a roller.

The resulting lithographic printing plate thus developed is washed with water, the water is squeezed from the surface of the PS plate, then a proper amount of the plate finisher of the present invention is poured onto the plate surface. Then, the plate surface is rubbed with a sponge so that the plate finisher is uniformly distributed throughout the plate surface. As a result, non-image areas of the plate surface can be protected and hence the lithographic printing plate can stably stored.

The plate finisher can be applied to the plate surface in various manner, for example, by applying the plate finisher to the resulting lithographic printing plate after the development and water washing by use of an automatic gumming-up machine; supplying it to the printing plate immediately after the development without water washing; or applying it to the printing plate after water washing with a small amount of water or after rinsing with a rinse solution containing a surfactant by use of an automatic gumming-up machine.

The lithographic printing plate is in general washed with water, prior to the printing operation to remove the gum on the plate surface (so-called degumming step) and then printing is performed in a conventional manner. However, the plate finisher makes it possible to directly perform the printing operation without carrying out such a degumming step. Moreover, the process of the present invention provides acceptable clear printed matters immediately after the initiation of the printing operation without providing a great number of unacceptable printed matters as usually observed when conventional gumming solution is used. Non-image areas treated by the plate finisher are kept highly hydrophilic. Thus, the plate finisher can provide good printed matters free of background contamination.

EXAMPLES

The present invention will hereunder be explained in more detail with reference to the following non-limitative working Examples and the effect practically achieved by the present invention will also be discussd in detail in comparison with Comparative Examples.

In the following Examples and Comparative Examples, the term "%" means "% by weight" unless otherwise specified.

Example 1

(a) Lithographic printing plate

An aluminum plate having a thickness of 0.24 mm was degreased by immersing it in 7% aqueous solution of tertiary sodium phosphate maintained at 60°C , washed with water and rubbed with a nylon brush with pouring an aqueous suspension of pumice stone to carry out graining. After washing with water, it was immersed in 5% aqueous solution of potassium silicate (molar ratio of SiO_2/K_2O = 2.0) maintained at 70 °C for 30 to 60 seconds. After sufficiently washing with water, the aluminum plate was dried.

The aluminum substrate thus treated was coated with a solution of a light-sensitive composition (hereunder referred to as "light-sensitive solution") comprising 2.0 parts by weight of 2-hydroxyethyl methacrylate copolymer (synthesized according to the method disclosed in Example 1 of British Patent No. 1,505,739), 0.12 part by weight of 2-

methoxy-4-hydroxy-5-benzoylbenzenesulfonic acid salt of a condensate of p-diazodiphenylamine and paraformaldehyde, 0.03 part by weight of Oil Blue #603 (available from ORIENT CHEMICAL INDUSTRIES CO., LTD.), 15 parts by weight of 2-methoxyethanol, 10 parts by weight of methanol and 5.0 parts by weight of ethylene chloride to obtain a PS plate having a coated amount of the light-sensitive layer of 1.8 g/m^2 (weighed after drying).

(b) Plate finisher

Gum solution I

Component	Amount (part by weight)
Pure water	750
Gum arabic	20
Enzyme modified potato starch (viscosity (20%): 10 cps at 20°C)	200
Enzyme modified corn starch (viscosity (20%): 5 cps at 20 °C)	40
Phosphated waxy starch (viscosity (20%): 40 cps at 20°C) (phosphorus bonded per unit: 1.0)	20
Sodium dilauryl sulfosuccinate	10
Ammonium phosphate	3
Phosphoric acid (85 %)	4
EDTA-4Na	3
Ethylene glycol	20
Benzyl alcohol	25
Sodium dehydroacetate	0.5
Emulsion type silicon atom containing antifoaming agent	0.2

After the starches were dissolved in hot water at 80°C and cooled, the other components were added and dissolved with stirring to prepare a plate finisher.

Gum solution II

The same as Gum solution I except that benzyl alcohol was not added.

Gum solution III

Aqueous solution A	
Component	Amount (part by weight)
Pure water	750
Gum arabic	150
Enzyme modified potato starch (viscosity (20%): 10 cps at 20°C)	130
Ammonium phosphate	3
Phosphoric acid (85 %)	4
EDTA-4Na	3
Ethylene glycol	20
Sodium dehydroacetate	0.5
Emulsion type silicon atom containing antifoaming agent	0.2
Solution B	
Sodium dilauryl sulfosuccinate	10
Polyoxyethylene nonyl phenyl ether (HLB = 7.8)	3
Rosin ester (manufactured by ARAKAWA CHEMICAL INC.)	5
Dioctyl sebacate	15

In the same manner as in the preparation of Gum solution I, Solution A was prepared. Solution B was gradually added to Solution A with vigorous agitation to obtain an emulsion which was further emulsified with a homogenizer to prepare a plate finisher.

Gum solution IV

The same as Gum solution III except that Gum solution I was substituted for Solution A.

(c) Test

The PS plate prepared in step (a) was exposed to light through a negative transparency having halftone dot image. The exposed plate was processed in an automatic processor (Model 600 EII manufactured by FUJI PHOTO FILM CO., LTD.) having a developing zone provided with an aqueous developer comprising 3.0 parts by weight of sodium sulfite, 30.0 parts by weight of benzyl alcohol, 20.0 parts by weight of triethanolamine, 5.0 parts by weight of monoethanolamine, 10.0 parts by weight of sodium t-butylnaphthalenesulfonate and 1000 parts by weight of pure water, to develop the exposed plates, and a finishing zone provided with one part by volume of Gum solution I, II, III or IV prepared in step (b) and one part by volume of tap water, to apply each of the plate finishers to the developed plates immediately after the development without washing with water. Lithographic printing plates were thus prepared.

These printing plates were previously allowed to stand for 3 days in a thermo-humidistat at a temperature of 45 °C and a relative humidity (RH) of 85% or for 10 days at a room temperature. Each of the plates was set on a printing press Heidelberg SOR-M and printing operation was conducted without removing the gum in an usual manner using dampening water containing 10 % isopropyl alcohol. The number of spoiled printed matters before acceptable clear printed matters were obtained, background contamination and stability of the gum solutions were determined. The stability of the gum solutions was evaluated by storing the solutions under ambient conditions and observing the phase separation of the solutions. The results are shown in Table 1.

Table 1

	Example 1	Comparative Example		
		a	b	c
Gum solution	I	II	III	IV
The number of spoiled sheets				
(45 °C, 85%, 3 days)	15	> 100	20	9
(10 days,room temp)	12	80	15	8
Background contamination	A	A	A	B
Stability of gum solution	stable	stable	separated in 1 year	separated in a few days
A: No or little background contamination B: Background contamination (non-image areas)				

Comparative Example b used a conventional emulsion type gum solution III wherein a large amount of gum arabic was used. Comparative Example c used Gum solution IV wherein the amount of gum arabic was reduced and a large amount of a conventional water-soluble resin was used. Comparing with Comparative Example b, Comparative Example c was small in the number of spoiled printed matters but produced contamination in non-image areas during printing and was so unstable that the solution was separated into a water phase and an oil phase in a few days. Comparative Example a wherein the oil phase was removed was low in background contamination during printing and high in solution stability but produced many spoiled printed matters.

In contrast, Example 1 of the present invention wherein benzyl alcohol was added was smaller in the number of spoiled printed matters than the conventional emulsion type gum solution (Comparative Example b) and was low in background contamination during printing and high in solution stability. Further, the gum solution of Example 1 was prepared more easily using more inexpensive equipment than the emulsion type gum solutions of Comparative Examples b and c.

Example 2

(d) Lithographic printing plate

A light-sensitive solution was prepared by dissolving, in 40 parts by weight of methyl cellosolve, 1 part by weight of naphthoquinone-1,2-diazide-5-sulfonic acid ester of polyhydroxyphenyl obtained by polycondensing acetone and pyrogallol as disclosed in J.P. KOKOKU No. Sho 43-28403 and 2 parts by weight of novolak type cresol-formaldehyde resin.

A grained aluminum plate having a thickness of 0.2 mm was sufficiently washed and then dried. The foregoing light-sensitive solution was applied to the surface of the aluminum plate with a whirler and then dried to thus obtain a positive working PS plate having a light-sensitive layer in an amount of about 0.2 g/m^2.

(e) Test

The PS plate prepared in step (d) was exposed to light through a positive transparency having halftone dot iamage, developed with 3% aqueous solution of sodium silicate, washed with water and dried.

The exposed plate was processed in an automatic processor (Model 800 EB manufactured by FUJI PHOTO FILM CO., LTD.) having a developing zone provided with 3 % aqueous sodium silicate solution, to develop the exposed plates, and a finishing zone provided with one part by volume of Gum solution I, II, III or IV prepared in step (b) and one part by volume of tap water, to apply each of the plate finishers to the developed plates immediately after the development without washing with water. Lithographic printing plates were thus prepared.

These printing plates were previously allowed to stand for 3 days in a thermo-humidistat at a temperature of 45 °C and a relative humidity (RH) of 85% or for 10 days at a room temperature. Each of the plates was set on a printing press Heidelberg SOR-M and printing operation was conducted without removing the gum in an usual manner using dampening water containing 10 % isopropyl alcohol. The results are shown in Table 2.

Table 2

	Example 2	Comparative Example		
		d	e	f
Gum solution	I	II	III	IV
The number of spoiled sheets				
(45 °C, 85%, 3 days)	13	90	18	8
(10 days,room temp)	10	50	12	8
Background contamination	A	A	A	B
Stability of gum solution	stable	stable	separated in 1 year	separated in a few days
A: No or little background contamination B: Background contamination (non-image areas)				

Table 2 shows that Example 2 gave good results like Example 1.

Example 3, 4 and 5

The same procedures as in Examples 1 and 2 were repeated except that benzyl alcohol in Gum solution I was replaced by ethylene glycol monophenyl ether, propylpropylene diglycol or n-amyl alcohol. The results are shown in Table 3.

Table 3

		Example		
		3	4	5
Solvent		S-1	S-2	S-3
Amount (parts by weight)		25	35	20
Same procedures as in Example 1	spoiled sheets			
	45 °C, 85%, 3 days	20	22	30
	room temp., 10 days	18	20	25
	Background contamination	A	A	A
Same procedures as in Example 2	spoiled sheets			
	45 °C, 85%, 3 days	18	20	23
	room temp., 10 days	15	15	18
	Background contamination	A	A	A
Stability		good	good	good
S-1: Ethylene glycol monophenyl ether S-2: Propylpropylene diglycol S-3: n-Amyl alcohol				

In all Examples, the number of spoiled printed matters was much smaller than Comparative Examples a and d and no background contamination was observed during printing.

The plate finisher is excellent in the desensitizing ability and does not deteriorate the ink receptivity of image areas. Therefore, the lithographic printing plate prepared by the process of this invention has good ink receptivity from the beginning of the printing operation. Moreover, the plate finisher is excellent in stability over time and can be prepared easily with an inexpensive equipment.

Claims

1. A process of preparing a lithographic plate which comprises the steps of, in order, image wise exposing to light a presensitized plate comprising an aluminium support having a lithographically suitable light-sensitive layer, developing the plate with an aqueous alkaline solution to remove either light-exposed or light-unexposed area of the light-sensitive layer thereby obtaining a lithographic plate consisting of an oleophilic image area and a hydrophilic non-image area and applying to the plate a lithographic plate finisher having a pH of from 2 to 6 comprising, in uniform solution, at least one water soluble resin, an organic solvent whose solubility in water at 20°C is not more than 5% by weight, and water.

2. The process of claim 1 wherein the solvent whose solubility in water at 20°C is not more than 5 % by weight is selected from the group consisting of benzyl alcohol, ethylene glycol dibutyl ether, ethylene glycol benzyl ether, ethylene glycol monophenyl ether, hexyl glycol, hexyl diglycol, propyl propylene diglycol, methyl phenyl carbitol, diethylene glycol dibutyl ether, n-amyl alcohol, methyl amyl alcohol, isophorone, methyl cyclohexanone and acetophenone.

3. The process of claim 1 wherein the solvent is benzyl alcohol.

4. The process of claim 1 wherein the amount of the solvent used is 0.1 to 10 % by weight based on the total weight of the plate finisher.

5. The process of claim 1 wherein the amount of the solvent used is 0.5 to 5 % by weight based on the total weight of the plate finisher.

6. The process of claim 1 wherein said water-soluble resin is selected from the group consisting of starches derived from sweet potato, tapioca, wheat, corn and waxy corn; those derived from carrageenan, laminaran, sea weed mannan, funori (a glue plant), Irish moss, agar and sodium alginate; mucilage derived from tororo-aoi mucin, mannan, quince seed mucin, pectin, tragacanth gum, karaya gum, xanthine gum, guar bean gum, locust bean gum, gum arabic, carob gum and benzoiun gum; dextran, glucan, levan, succinoglucan and xanthane gum; glue, gelatin, casein and collage; propylene glycol alginate, viscose, methyl cellulose, ethyl cellulose, methyl ethyl cellulose, hydroxyethyl cellulose, carboxymethyl cellulose, hydroxypropyl cellulose, hydroxypropyl methyl cellulose and hydroxypropyl methyl cellulose phthalate; processed starches, enzyme-modified dextrin, acid-treated starch, oxidized, gelatinized starch, esterified, fatty acid starch, sulfuric acid starch, nitric acid starch, xanthogenic acid starch, carbamic acid starch and succinic acid starch, etherified starch, crosslinked, and starch graft copolymer; polyvinyl alcohol, modified polyvinyl alcohol, poly(meth)acrylic acid derivatives; polyethylene glycol, polyethylene oxide, polyvinyl pyrrolidone, polyvinyl pyrrolidone-vinyl acetate copolymer, carboxy vinylpolymer, styrene-maleic acid copolymer and styrene-crotonic acid copolymer and is contained in an amount of 5 to 40 % based on the total weight of the plate finisher.

7. The process of claim 1 wherein said water-soluble resin comprises gum arabic in an amount of 1 to 20 % by weight based on the total weight of the water-soluble resin.

8. The process of claim 1 wherein the plate finisher further comprises at least one wetting agent selected from the group consisting of glycerin, ethylene glycol and triethylene glycol in an amount ranging from 0.1 to 5.0 % by weight based on the total weight of the plate finisher.

9. The process of claim 1 wherein the plate finisher further comprises at least one surfactant selected from the group consisting of fatty acid salts, alkylbenzene sulfonic acid salts, straight chain alkylbenzene sulfonic acid salts, alkyl sulfonic acid salts, a - olefin sulfonic acid salts, alkyl phosphoric acid ester salts, dialkyl sulfo succinic acid ester salts, polyoxyethylene alkyl ether sulfonic acid slats, polyoxyethylene alkyl ether phophoric acid salts, alkylnaphthalene sulfonic acid salts, N-lauroyl sarcosine salts, sulfonic acid salts of condensates of naphthalene and formaldehyde, diphenylether disulfonic acid salts; polyoxyethylene alkyl ethers, polyoxyethylene alkyl phenol ethers, polyoxyethylene-polyoxyproplene block copolymers, polyoxyethylene sorbitan fatty acid esters, polyoxyethylene glycerin fatty acid ester, polyethylene glycol fatty acid esters, polyoxyethylene fatty acid amines, fatty acid monoglycerides, sorbitan fatty acid ester, pentaerythritol fatty acid esters, sucrose fatty acid esters, amine oxides; alkylocarboxyl betaines, alkylamino carboxylic acids, alkylimidazolines; tetraalkyl ammonium salts, trialkyl benzyl ammonium salts, alkyl imidazolinium salts; fluorine atom containing surfactants and silicon atom containing surfactants in an amount of 0.01 to 10% by weight based on th total weight of the plate finisher.

10. The process of claim 1 wherein the plate finisher further comprises at least one pH adjusting agent.

11. The process of claim 1 wherein the plate finisher further comprises at least one preservative selected from the group consisting of benzoic acid, derivatives thereof, phenol, formalin, sodium dehydroacetate and 3-isothiazolones in an amount ranging from 0.005 to 2.0 % by weight of the plate finisher.

12. The process of claim 1 wherein the plate finisher further comprises at least one selected from the group consisting of anti-foaming agents, chelating agents and colouring agents.

13. The process of claim 1 wherein said light-sensitive layer comprises a light-sensitive diazo rein and a polymeric binder.

Patentansprüche

1. Verfahren zur Herstellung einer lithographischen Platte, das in der genannten Reihenfolge die folgenden Stufen umfaßt:

   bildmäßiges Belichten einer vorsensibilisierten Platte mit einem Aluminium-Träger und einer darauf aufgebrachten lithographisch geeigneten lichtempfindlichen Schicht mit Licht,
   Entwickeln der Platte mit einer wäßrigen alkalischen Lösung zur Entfernung entweder des belichteten Bereichs oder des nicht-belichteten Bereichs der lichtempfindlichen Schicht unter Bildung einer lithographische Platte, die besteht aus einem oleophilen Bildbereich und einem hydrophilen Nicht-Bildbereich, und
   Aufbringen eines lithographischen Platten-Finishers, der einen pH-Wert von 2 bis 6 aufweist, auf die Platte, der in Form einer einheitlichen Lösung enthält mindestens ein wasserlösliches Harz, ein organisches Lösungsmittel, dessen Löslichkeit in Wasser bei 20°C nicht mehr als 5 Gew.-% beträgt, und Wasser.

2. Verfahren nach Anspruch 1, worin das Lösungsmittel, dessen Löslichkeit in Wasser bei 20°C nicht mehr als 5 Gew.-% beträgt, ausgewählt wird aus der Gruppe, die besteht aus Benzylalkohol, Ethylenglycoldibutyläther, Ethylenglycolbenzyläther, Ethylenglycolmonophenyläther, Hexylglycol, Hexyldiglycol, Propylpropylendiglycol, Methylphenylcarbitol, Diethylenglycoldibutyläther, n-Amylalkohol, Methylamylalkohol, Isophoron, Methylcyclohexanon und Acetophenon.

3. Verfahren nach Anspruch 1, worin das Lösungsmittel Benzylalkohol ist.

4. Verfahren nach Anspruch 1, worin die verwendete Menge des Lösungsmittels 0,1 bis 10 Gew.-%, bezogen auf das Gesamtgewicht des Platten-Finisher, beträgt.

5. Verfahren nach Anspruch 1, worin die verwendete Menge des Lösungsmittels 0,5 bis 5 Gew.-%, bezogen auf das Gesamtgewicht des Platten-Finishers, beträgt.

6. Verfahren nach Anspruch 1, worin das wasserlösliche Harz ausgewählt wird aus der Gruppe, die besteht aus Stärken, die stammen aus süßer Kartoffel, Tapioka, Weizen, Mais und wachsartiger Stärke; solchen, die stammen aus Carrageenan, Laminaran, Seegrasmannan, Funori (einer Leim-Pflanze), Irisch Moos, Agar und Natriumalginat; Muzilago, das stammt aus Tororo-aoi-Mucin, Mannan, Quittensamen-Mucin, Pectin, Traganthgummi, Karaya-Gummi, Xanthingummi, Guarbohnengummi, Johannisbrotgummi, Gummiarabicum, Carobagummi und Benzoiungummi; Dextran, Glucan, Levan, Succinoglucan und Xanthangummi); Leim, Gelatine, Casein und Collagen; Propylenglycolalginat, Viscose, Methylcellulose, Ethylcellulose, Methylethylcellulose, Hydroxyethylcellulose, Carboxymethylcellulose, Hydroxypropylcellulose, Hydroxypropylmethylcellulose und Hydroxypropylmethylcellulosephthalat; behandelten Stärken, Enzym-modifiziertem Dextrin, säurebehandelter Stärke, oxidierte, gelatinierte Stärke, veresterte Fettsäure-Stärke, Schwefelsäure-Stärke, Salpetersäure-Stärke, Xanthogensäure-Stärke, Carbamidsäure-Stärke und Bernsteinsäure-Stärke, verätherte Stärke, vernetzte Stärke und Stärke-Pfropf-Copolymere; Polyvinylalkohol, modifizierter Polyvinylalkohol, Poly(meth)acrylsäurederivate; Polyethylenglycol, Polyethylenoxid, Polyvinylpyrrolidon, Polyvinylpyrrolidon-Vinylacetat-Copolymer, Carboxyvinylpolymer, Styrol-Maleinsäure-Copolymer und Styrol-Crotonsäure-Copolymer, und in einer Menge von 5 bis 40 Gew.-%, bezogen auf das Gesamtgewicht des Platten-Finishers, darin enthalten ist.

7. Verfahren nach Anspruch 1, worin das wasserlösliche Harz Gummiarabicum in einer Menge von 1 bis 20 Gew.-%, bezogen auf das Gesamtgewicht des wasserlöslichen Harzes, enthält.

8. Verfahren nach Anspruch 1, worin der Platten-Finisher außerdem mindestens ein Netzmittel, ausgewählt aus der Gruppe, die besteht aus Glycerin, Ethylenglycol und Triethylenglycol, in einer Menge in dem Bereich von 0,1 bis 5,0 Gew.-%, bezogen auf das Gesamtgewicht des Platten-Finishers, enthält.

9. Verfahren nach Anspruch 1, worin der Platten-Finisher außerdem mindestens ein oberflächenaktives Agens, ausgewählt aus der Gruppe, die besteht aus Fettsäuresalzen, Alkylbenzolsulfonsäuresalzen, geradkettigen Alkylbenzolsulfonsäuresalzen, Alkylsulfonsäuresalzen, α-Olefinsulfonsäuresalzen, Alkylphosphorsäureestersalzen, Dialkylsulfobernsteinsäureestersalzen, Polyoxyethylenalkyläthersulfonsäuresalzen, Polyoxyethylenalkylätherphosphorsäuresalzen, Alkylnaphthalinsulfonsäuresalzen, N-Lauroylsarcosinsalzen, Sulfonsäuresalzen von Kondensaten von Naphthalin und Formaldehyd, Diphenylätherdisulfonsäuresalzen; Polyoxyethylenalkyläthern, Polyoxyethylenalkylphenoläthern, Polyoxyethylen-Polyoxypropylen-Block-Copolymeren, Polyoxyethylensorbitanfettsäureestern, Polyoxyethylenglycerinfettsäureestern, Polyethylenglycolfettsäureestern, Polyoxyethylenfettsäureaminen, Fettsäuremonoglyceriden, Sorbitanfettsäureestern, Pentaerythritfettsäureestern, Saccharosefettsäureester, Aminoxiden; Alkylcarboxylbetainen, Alkylaminocarbonsäuren, Alkylimidazolinen; Tetraalkylammoniumsalzen, Trialkylbenzylammoniumsalzen, Alkylimidazoliniumsalzen; ein Fluoratom enthaltenden oberflächenaktiven Agentien und ein Siliciumatom enthaltenden oberflächenaktiven Agentien, in einer Menge von 0,01 bis 10 Gew.-%, bezogen auf das Gesamtgewicht des Platten-Finisher, enthält.

10. Verfahren nach Anspruch 1, worin der Platten-Finisher außerdem mindestens ein pH-Wert-Einstellungsmittel enthält.

11. Verfahren nach Anspruch 1, worin der Platten-Finisher außerdem mindestens ein Konservierungsmittel, ausgewählt aus der Gruppe, die besteht aus Benzoesäure, Derivaten davon, Phenol, Formalin, Natriumdehydroacetat und 3-Isothiazolonen, in einer Menge in dem Bereich von 0,005 bis 2,0 Gew.-% des Platten-Finishers, enthält.

12. Verfahren nach Anspruch 1, worin der Platten-Finisher außerdem mindestens einen Vertreter aus der Gruppe der Antischaumbildner, der Chelatbildner und der Färbemittel enthält.

13. Verfahren nach Anspruch 1, worin die lichtempfindliche Schicht ein lichtempfindliches Diazoharz und ein polymeres Bindemittel enthält.

Revendications

1. Procédé de préparation de plaque lithographique comportant les phases dans l'ordre, d'exposition à la lumière en image d'une plaque présensibilisée comportant un support en aluminium ayant un revêtement lithographique approprié sensible à la lumière, le développement de la plaque en solution alcaline aqueuse pour éliminer les zones de revêtement sensible à la lumière soit exposées soit non-exposées à la lumière obtenant ainsi une plaque lithographique qui consiste d'une zone oléophile d'image et d'une zone hydrophile sans image et l'application à la plaque d'un produit finisseur de plaque lithographique ayant un pH entre 2 et 6, comportant une solution uniforme d'un mininum d'une résine soluble à l'eau, d'un solvant organique dont la solubilité aqueuse à 20°C est de 5% par poids au maximum, et d'eau.

2. Procédé selon la revendication 1 dont le solvant soluble dans l'eau à 20°C est de 5% par poids au maximum est sélectionné à partir du groupe comportant l'alcool benzyle, l'éther dibutyle glycol éthylène, l'éther benzyle glycol éthylène, l'éther monophényle glycol éthylène, le glycol hexyle, le diglycol hexyle, le diglycol propylène propyle, le carbitol phényle méthyle, l'éther dibutyle glycol diethylène, l'alcool n-amyle, l'alcool amyle méthyle, l'isophorone, le cyclohexanone méthyle et l'acétophénone.

3. Le procédé selon la revendication 1 dont le solvant est l'alcool benzyle.

4. Le procédé selon la revendication 1 dont le volume de solvant utilisé est de 0,1 à 10% par poids basé sur le poids global du finisseur de plaque.

5. Le procédé selon la revendication 1 dont le volume de solvant utilisé est de 0,5 à 5% par poids basé sur le poids global du finisseur de plaque.

6. Le procédé selon la revendication 1 suivant laquelle la résine soluble à l'eau est sélectionnée à partir du groupe consistant d'amidons tels que les dérivés de patate douce, tapioca, blé, maïs et maïs farineux; les dérivés tels que

de carraeegenan, laminaran, mannan d'algue marine, funori (plante à colle forte), mousse perlée, d'agar et d'alginate de sodium; les mucilages tels que dérivés de tororo-aoi mucine, mannan, mucine de graine de coing, pectine, gommes tragacanthe, karaya, xanthine, de fève de guar, de caroube, arabique, et benzoïne; gommes dextrane, glucane, levane, succinoglucane et xanthane; glu, gélatine, caséine et collage; alginate propylène glycol, viscose, méthyle cellulose, éthyle cellulose, méthyle éthyle cellulose, hydroxyéthyle cellulose, carboxyméthyle cellulose, hydroxypropyle cellulose, hydroxypropyle méthyle cellulose et hydroxypropyle méthyle phthalate cellulose; amidons traités, dextrine d'enzyme modifié, amidon: traité à l'acide, oxydisé, gélatinisé, estérifié, amidon d'acide gras, d'acide sulfurique, d'acide nitrique, d'acide xanthogénique, d'acide carbamique et d'acide succinique, d'amidon estérifié, réticulé, et l'amidon greffé copolymère; l'alcool polyvinyle, l'alcool polyvinyle modifié, les dérivés d'acides poly(méth)acryliques; le glycol polyéthylène, l'oxyde polyéthylène, le pyrrolidone polyvinyle, le copolymère d'acétate de polyvinyle pyrrolidone vinyle, le polymère vinyle carboxyle, le copolymère d'acide maléique styrène et le copolymère d'acide crotonique styrène à raison de 4 à 40% par rapport au poids de finisseur de plaque.

7. Le procédé selon la revendication 1 suivant laquelle la résine soluble à l'eau comporte la gomme arabique à raison de 1 à 20% par poids selon le poids global de résine soluble à l'eau.

8. Le procédé selon la revendication 1 suivant laquelle le finisseur de plaque comporte au minimum un agent mouillant sélectionné à partir du groupe comportant la glycérine, le glycol éthylène et le glycol triéthylène à raison de 0,1 à 5,0% par poids basé sur le poids total de finisseur de plaque.

9. Le procédé selon la revendication 1 suivant laquelle le finisseur de plaque comporte au minimum un agent tensioactif sélectionné à partir du groupe de sels d'acide gras, sels d'acide sulfonique alcoyle benzène, sel d'acide sulfonique alcoyle benzène en chaîne rectiligne, sels d'acide sulfonique alcoyle, sels d'acide sulfonique a-oléfine, sels ester d'acide phosphorique alcoyle, sels ester d'acide succinique sulfo dialcoyle, sels d'acide sulfonique éther polyoxyéthylène alcoyle, sels d'acide phosphorique éther polyoxyéthylène alcoyle, sels d'acide sulfonique napththaline alcoyle, sels de sarcosine N-lauroyle, sels d'acide sulfonique de condensats de napththaline et formal, sels d'acides sulfoniques diphényle éther; éthers polyoxyéthylène alcoyle, éthers polyoxyéthylène phénol alcoyle, copolymères blocs polyoxyéthylène-polyoxypropylène esters d'acide gras sorbitane polyoxyéthylène esters d'acide gras glycérine polyoxyéthylène, esters d'acide gras glycol polyéthylène, amines d'acide gras polyoxyéthylène, monoglycérides d'acide gras, ester d'acide gras sorbitane, esters d'acide gras pentaerythritol, esters d'acide gras de sucrose, oxydes d'amine; bétaïnes carboxyle alcoyle, acides carboxyliques amino alcoyle, imidazolines alcoyle; sels d'ammonium tétra-alcoyle, sels d'ammonium benzyle tri-alcoyle, sels imidazolinium alcoyle; atome de fluorure contenant tensio-actifs et atome de silicium contenant des tensio-actifs à raison de 0,01 à 10% par poids basé sur le poids global du finisseur de plaque.

10. Le procédé selon la revendication 1 suivant laquelle le finisseur de plaque comporte en outre au minimum un agent d'ajustage de pH.

11. Le procédé selon la revendication 1 suivant laquelle le finisseur de plaque comporte au minimum un agent préservateur sélectionné à partir du groupe formé d'acide benzoïque, ses dérivés, phénol, formaline, dehydroacétate de sodium et des 3-isothiazolones à raison de 0,005 à 2,0% par poids de finisseur de plaque.

12. Le procédé selon la revendication 1 suivant laquelle le finisseur de plaque comporte au minimum un poste sélectionné à partir du groupe formé d'anti-moussants, d'agents chélatants et d'agents colorants.

13. Le procédé selon la revendication 1 suivant laquelle le revêtement sensible à la lumière comporte un contrôle diazo sensible à la lumière et un agglomérant polymérique.