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(54) A WRAPAROUND COVERING FOR A PRINTING OR VARNISHING PLATE CYLINDER FOR THE SURFACE FINISHING OF A PRINTED SUBSTRATE

UMHÜLLUNGSVERPACKUNG FÜR EINEN DRUCK- ODER LACKIERPLATTENZYLINDER ZUR OBERFLÄCHENBEARBEITUNG EINES BEDRUCKTEN SUBSTRATS

UNE COUVERTURE ENVELOPPANTE POUR UN CYLINDRE PORTE-PLAQUE D'IMPRESSION OU À VERNIR POUR LE FINISSAGE DE LA SURFACE D'UN SUBSTRAT IMPRIMÉ

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(74) Representative: **Rapisardi, Mariacristina**
Ufficio Brevetti Rapisardi S.r.l.
Via Serbelloni, 12
20122 Milano (IT)

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(73) Proprietor: **Printgraph Waterless S.p.A.**
20019 Settimo Milanese MI (IT)

(72) Inventor: **LEVI ACOBAS, Roberto**
I-20145 Milano (IT)

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Description

[0001] The present invention relates to a wraparound covering for a printing or varnishing plate cylinder for the surface finishing of a printed substrate.

[0002] There are various existing surface finishing processes for a printed substrate, the latter generally consisting of paper or cardboard, or plastic or metal material, and among such processes one consists in the application of an overprint varnish to the printed substrate.

[0003] Overprint varnishes are typically water-borne or UV curable acrylics.

[0004] With reference to an offset, flexographic, letterpress or digital printing press, the overprint varnishes are usually applied by using one or more varnishing units, which can also be positioned as final elements of the printing press and followed, if necessary, by ovens or lamps for drying or cross-linking the varnishes.

[0005] Transfer of the varnish to the substrate takes place using a blanket or a varnishing plate, which serve the function of receiving the varnish and transferring it to the substrate.

[0006] One of the drawbacks that can be reported concerning some of these known products consists in the fact that the capacity to transfer the varnish is not always complete.

[0007] In particular, to ensure effective transfer of the overprint varnishes, it may be necessary to use special surface treatments, as described for example in patent application EP 1591268.

[0008] In addition, in the case where it is necessary to preserve some areas of the substrate from the varnish, it is common practice to cut and remove specific areas from the upper layer of the blanket or of the varnishing plate so that the difference in thickness makes it possible to prevent the transfer of the varnish.

[0009] Those areas having lower thickness, which are cut in the blanket or in the varnishing plate, are called "non-image areas".

[0010] The creation of the stripped areas, however, brings about a structural weakening of the blanket or of the varnishing plate, and as a result they are not always able to guarantee the dimensional stability required for prolonged reutilisation over time.

[0011] An additional drawback of some of these known products consists in the fact that, owing to the exerted pressure, long jobs or relatively high thicknesses of the printed substrate leave an impression of the format of the substrate on the blanket or on the plate; for this reason, reuse of such products is not possible in the case of different formats because these marks would be reproduced on the printed product.

[0012] Furthermore, these known products generally have a rough surface and therefore they need to be washed often, as they tend to accumulate the overprint varnish.

[0013] Another finishing process consists in the appli-

cation of a decorative metal foil to the printed substrate.

[0014] For such applications there are special machines called cold foil laminators.

[0015] First of all the process is based on the reproduction, using offset technology, of the image with a proper glue on the printed substrate to be decorated, then on the application of the metallised foil, by the action of the blanket cylinder: the parts of the printed substrate on which the glue has been applied retain the metallised foil, which on the other hand is easily removed and retrieved in the other areas in such a manner that the decoration remains in the desired forms on the substrate.

[0016] A blanket is mounted on the blanket cylinder and the surface thereof is generally constituted by a film made of PVF - polyvinyl fluoride (Tedlar[®]) - or of PVDF - polyvinylidene fluoride - for the purpose of giving the blanket a smooth, non-stick surface so as not to interfere with the metallised foil with which it comes into contact.

[0017] A blanket such as this is in itself very costly and the process of adhesion of the PVF or PVDF film is complicated and expensive.

[0018] Moreover, a blanket such as this does not always guarantee the necessary resistance to high levels of pressure.

[0019] Lastly, a blanket such as this can prove to be unwieldy and vulnerable to the point that during transport and assembly, surface folds can easily form, making it unusable, as it would replicate these folds on the metal foil, thereby spoiling the decoration.

[0020] DE4142508, US5484684, US4767694, disclose a wraparound covering suitable for a printing cylinder and having a completion being a layer of photosensitive material.

[0021] US1938301 discloses a wraparound covering suitable for a printing cylinder and having a completion comprising a plurality of layers of oxidative varnish.

[0022] EP2388139 and US2006/0230965 disclose a wraparound covering only temporary receiving a varnish.

[0023] The technical task of the present invention is to realize a wraparound covering for a printing or varnishing plate cylinder for the surface finishing of a printed substrate that makes it possible to overcome the drawbacks of the previous art.

[0024] Within the scope of this technical task, an aim of the invention is to provide a covering of the type stated above that offers a wide flexibility of use for various processes for the surface finishing of a printed substrate, that also has improved resistance to abrasion and is less subjectable to keep the impression of the printing format, thereby ensuring a longer duration of use and a reduction in the time required for maintenance.

[0025] Another aim of the invention is to provide a coating of the type stated hereinabove, which, in the field of overprint varnishing of a printed substrate, has an improved ability for the transfer of the varnish, together with improved dimensional stability suitable for making it reusable over time without any loss in precision.

[0026] An additional aim of the invention is to provide

a covering of the type stated above, which in the field of overprint varnishing of a printed substrate, offers easier washing thereof and thus a reduction in the time required for maintenance.

[0027] A further aim of the invention is to provide a covering of the type stated above, which in the field of overprint varnishing of a printed substrate, has a printing surface with improved properties of chemical resistance to products used for washing.

[0028] A further aim of the invention is to provide a coating of the type stated above, which in the field of application of a decorative metal foil to a printed substrate, proves to be simple in construction, as well as economical, easy to assemble, easy to handle, resistant and provided with properties characterising the surface consisting of smoothness and a non-stick quality that are optimal for the application.

[0029] The technical task, as well as these and other aims of the invention, are achieved by a wraparound covering for a printing or varnishing plate cylinder for the surface finishing of a printed substrate, characterized in that a film of varnish is present in at least one zone of the surface thereof intended for contact with the printed substrate.

[0030] The invention also provides a procedure for transferring an overprint varnish to a printed substrate, characterized in that there is applied to a varnishing cylinder a coating on which at least one zone is selected for transferring the varnish by application of a varnish film on said zone.

[0031] This coating can be advantageously used in a printing press as the blanket or varnishing plate for the printing or plate cylinder of the varnishing unit, and in a cold foil laminator as the blanket for the printing cylinder suitable for applying a decorative metal foil to the printed substrate.

[0032] Other characteristics of the present invention are also specified in the dependent claims.

[0033] Further characteristics and advantages of the invention will emerge more clearly in the following description of preferred, but not exclusive, embodiments of the covering according to the invention.

[0034] The wraparound covering for a printing or varnishing plate cylinder for the surface finishing of a printed substrate, has a film of varnish in at least one zone of the surface thereof intended for contact with the printed substrate.

[0035] This film preferably has a thickness no greater than 400 μm .

[0036] We shall now refer to a first preferred embodiment of the invention, in which the varnish is of the cross-linkable type having at least a wavelength in the ultraviolet range or in the range comprised between the ultraviolet and the visible region or in the visible range.

[0037] The varnish may therefore be of a polymerizable type with light emitted by low-pressure fluorescent lamps or high-pressure mercury lamps, either pure or with Fe, Pb, As, Ga, In halides or other metals.

[0038] As an alternative, the varnish may be of a polymerizable type with LED sources that emit at different wavelengths in a range of 200 to 450 nm.

[0039] The varnish is preferably based on one or more base components selected from among aromatic and aliphatic epoxy acrylates and methacrylates, epoxidized soybean oil acrylates, acrylated polyesters, chlorinated acrylated polyesters, aromatic acrylated urethanes, aliphatic acrylated and methacrylated urethanes, acrylacrylates, polyether acrylates, amine-modified acrylated polyesters and methacrylated polybutadiene.

[0040] In this case, the base components of the varnish are present in pure form or in an aqueous solution or aqueous dispersion, or in a mixture with one or more secondary components selected from among linear and cyclic alcohol monomers, lactones, glycols, bisphenols, pentaerythrols, mono-, di-, tri-, tetra-, penta- and hexafunctional acrylated and methacrylated isocyanurates, silicones and acrylated melamines.

[0041] A varnish such as this is polymerizable owing to photoinitiators with a radical mechanism of the type such as alpha-hydroxy ketones, phenylglyoxylates, acylphosphine oxides, alpha amino ketones, benzophenone and derivatives thereof, benzyl dimethyl ketal, titanocene derivatives and oxime esters, camphorquinones or with a mixed system with resins with isocyanate functional groups.

[0042] As an alternative, the varnish may be based on one or more base components selected from among cyclic ethers, cycloaliphatic diepoxies, alcohols, and vinyl ethers.

[0043] A varnish such as this is polymerizable with photoinitiators with a cationic mechanism of the type such as hexafluorophosphate salts of iodonium or sulfonium, pentafluorophenyl boranuides, sulfanyl phenyl sulfones and sulfonyl metides or generators of photoacids like sulfonated oximes. This category includes the systems that react with mixed radical and cationic systems together.

[0044] The polymerizable varnish may also make use of silicone and non-silicone additives, fatty acids, polyurethanes, and polyacrylics.

[0045] We shall now refer to a second preferred embodiment of the invention, in which the varnish is water- or solvent-based, monocomponent or bicomponent, thermosetting or catalyzed.

[0046] In this case, the varnish may be based on one or more base components selected from among acrolein resins, acrylamide resins, cyanoacrylic esters, haloacrylic esters, epoxy-acrylic urethane resins, acetal resins, alkyleneimine resins, allene resins, allyl resins, allyl-triazine resins, allyl ethers, allyl esters, alkyl resins, acryl-modified alkyl resins, amine resins, polyester-based resins, epoxy resins, fluorocarbon resins, phenolic resins and polyurethane resins.

[0047] The above-mentioned varnish may make use of silicone and non-silicone additives, fatty acids and mineral fillers.

[0048] We shall now refer to the use of the covering in

a printing press, as the blanket or varnishing plate for the printing or plate cylinder of a varnishing unit for transferring an overprint varnish to the printed substrate. The basic structure of the blanket or the varnishing plate is common to currently known structures, and can thus provide an upper layer made of nitrile rubber, or polyurethane, or silicone or another material, a lower layer of polyester and a possible middle layer that is compressible, and in turn, possibly provided with a fabric for supporting the interface with the upper and/or lower layer.

[0049] The basic structure of the blanket or of the varnishing plate is advantageously completed with the above-described film of varnish applied to the surface of the upper layer.

[0050] The chemical/physical properties of the above-described film of varnish are such as to optimize the transfer of varnish to the printed substrate.

[0051] In this manner, significant simplification of the production process is also achieved.

[0052] The application of the film can take place in sheets or in reels according to all the known techniques, for example coating, spraying, flexo, rotogravure, curtain coating, reverse roll, silk screen printing or other techniques, including digital printing techniques.

[0053] In particular, the reverse roll technique has proven to be the most economical and fastest technique.

[0054] However, the silkscreen printing technique may be preferred, in that it makes it possible to apply a film of varnish of a large thickness and, if necessary, only in some selected parts of the printed substrate.

[0055] At this point, the creation of "non image areas" can take place no longer by stripping the blanket or varnishing plate, but by selecting, thanks to serigraphic printing, the zones thereof that are suitable for transferring the varnish and that are selectively coated with the film of varnish.

[0056] In short, the production process for a blanket and for a varnishing plate is simplified enormously. In fact, for the creation of the non-image areas, the latter no longer have to be stripped, thereby preserving the dimensional stability thereof.

[0057] We shall now refer to the use of the covering, in a cold foil laminator, as the blanket for the printing cylinder of assembly unit for applying a decorative metallised foil.

[0058] In this case as well, a basic structure common to currently known structures can be used for the blanket and completed by coating the upper surface with the film of varnish described hereinabove.

[0059] The film of varnish gives the specific surface properties consisting of smoothness and non-stick quality to the blanket.

[0060] In this case as well, the application of the film of polymerizable varnish may take place in sheets or in reels according to all the known techniques cited hereinabove, for example coating, spraying, flexo, rotogravure, curtain coating, reverse roll, silkscreen printing or other techniques, including digital printing techniques.

[0061] In this manner, one achieves a reduction in production costs, simplification of the production process, a reduction in the consumption of raw materials, improved resistance of the blanket in the transport and assembly stages and during use.

[0062] An example of a covering structure realized according to the invention is provided herein below.

EXAMPLE 1

[0063] On a blanket of the Vulcan ECO™ type, a thickness of 30 μm of UV curable varnish, type UV RAD JET STREAM™ reduced by GRAFCO™, is applied on the upper layer using the full solid flexographic method.

[0064] The wraparound covering for a printing cylinder for the surface finishing of a printed substrate is susceptible to various modifications and variants falling within the scope of the most general inventive concept claimed.

Claims

1. A wraparound covering for a printing or varnishing plate cylinder for the surface finishing of a printed substrate, **characterized in that** it consists of a basic structure and a completion of said basic structure having a contacting surface with said printed substrate, said basic structure comprising an upper layer, a compressible middle layer and a lower layer made of polyester, and said completion consisting of one film of smoothness and non-stick conferring properties varnish, said varnish being cross-linkable by means of radiation having at least a wavelength in the ultraviolet range or in the range comprised between the ultraviolet and visible region or in the visible range.
2. The wraparound covering for a blanket or varnishing plate cylinder for the surface finishing of a printed substrate according to the preceding claim, **characterized in that** said film has a thickness no greater than 400 μm.
3. The wraparound covering for a printing or varnishing plate cylinder for the surface finishing of a printed substrate according to claim 1, **characterized in that** said varnish is cross-linkable with radiation emitted by low-pressure fluorescent lamps or high-pressure mercury lamps, either pure or with Fe, Pb, As, Ga, In, halides or other metals added to them.
4. The wraparound covering for a printing or varnishing plate cylinder for the surface finishing of a printed substrate according to claim 1, **characterized in that** said varnish is cross-linkable with LED sources that emit at different wavelengths in a range of 200 to 450 nm.

5. The wraparound covering for a printing or varnishing plate cylinder for the surface finishing of a printed substrate according to claim 1, **characterized in that** said varnish is based on one or more base components selected from among aromatic and aliphatic epoxy acrylates and methacrylates, epoxidized soybean oil acrylates, acrylated polyesters, chlorinated acrylated polyesters, aromatic acrylated urethanes, aliphatic acrylated and methacrylated urethanes, acrylacrylates, polyether acrylates, amine modified acrylated polyesters and methacrylated polybutadiene.
6. The wraparound covering for a printing or varnishing plate cylinder for the surface finishing of a printed substrate according to claim 1, **characterized in that** said varnish is based on one or more base components selected from among cyclic ethers, cycloaliphatic diepoxies, alcohols, and vinyl ethers.
7. A printing press **characterized in that** it has, as the blanket or varnishing plate for the varnishing cylinder of one or more units for applying an overprint varnish to the printed substrate, a covering in accordance with any of claims 1 to 6.
8. A cold foil laminator **characterized in that** it has, as the blanket for the printing cylinder of an unit for applying a decorative metallised foil to the printed substrate, a covering in accordance with any of claims 1 to 6.

Patentansprüche

1. Rundumbelag für einen Druck- oder Lackierplattenzylinder zur Oberflächenbearbeitung eines bedruckten Substrats, **dadurch gekennzeichnet, dass** er aus einer Basisstruktur und einem Abschluss der Basisstruktur, aufweisend eine Oberfläche des Kontakts mit dem bedruckten Substrat, besteht, wobei die Basisstruktur eine obere Schicht, eine kompressible mittlere Schicht und eine untere Schicht aus Polyester umfasst, und wobei der Abschluss aus einem glatten Film und einem Antihafteigenschaften verleihenden Lack besteht, wobei der Lack mithilfe von Strahlung, aufweisend mindestens eine Wellenlänge im ultravioletten Bereich oder im Bereich, der zwischen der ultravioletten und sichtbaren Region oder im sichtbaren Bereich umfasst ist, vernetzbar ist.
2. Rundumbelag für einen Tuch- oder Lackierplattenzylinder zur Oberflächenbearbeitung eines bedruckten Substrats nach dem vorangehenden Anspruch, **dadurch gekennzeichnet, dass** der Film eine Dicke von nicht mehr als 400 µm aufweist.

3. Rundumbelag für einen Druck- oder Lackierplattenzylinder zur Oberflächenbearbeitung eines bedruckten Substrats nach Anspruch 1, **dadurch gekennzeichnet, dass** der Lack mit Strahlung, die durch Unterdruck-Leuchtstofflampen oder Hochdruck-Quecksilberlampen emittiert wird, entweder pur oder mit Fe, Pb, As, Ga, In, Halogeniden oder anderen zu diesen hinzugefügten Metallen vernetzbar ist.
4. Rundumbelag für einen Druck- oder Lackierplattenzylinder zur Oberflächenbearbeitung eines bedruckten Substrats nach Anspruch 1, **dadurch gekennzeichnet, dass** der Lack mit LED-Quellen, die bei unterschiedlichen Wellenlängen in einem Bereich von 200 bis 450 nm emittieren, vernetzbar ist.
5. Rundumbelag für einen Druck- oder Lackierplattenzylinder zur Oberflächenbearbeitung eines bedruckten Substrats nach Anspruch 1, **dadurch gekennzeichnet, dass** der Lack auf einer oder mehreren Basiskomponenten basiert, ausgewählt aus Folgendem: aromatische und aliphatische Epoxyacrylate und -methacrylate, epoxidierte Sojaöl-Acrylate, acrylierte Polyester, chlorierte acrylierte Polyester, aromatische acrylierte Urethane, aliphatische acrylierte und methacrylierte Urethane, Acrylacrylate, Polyetheracrylate, aminmodifizierte acrylierte Polyester und methacryliertes Polybutadien.
6. Rundumbelag für einen Druck- oder Lackierplattenzylinder zur Oberflächenbearbeitung eines bedruckten Substrats nach Anspruch 1, **dadurch gekennzeichnet, dass** der Lack auf einer oder mehreren Basiskomponenten basiert, ausgewählt aus Folgendem: cyclische Ether, cycloaliphatische Diepoxide, Alkohole und Vinylether.
7. Druckpresse, **dadurch gekennzeichnet, dass** sie als die Tuch- oder Lackierplatte für den Lackierzylinder einer oder mehrerer Einheiten zum Auftragen eines Überdrucklacks auf das bedruckte Substrat einen Belag nach einem der Ansprüche 1 bis 6 aufweist.
8. Kaltfolienlaminator, **dadurch gekennzeichnet, dass** er als das Tuch für den Druckzylinder einer Einheit zum Auftragen einer dekorativen, metallisierten Folie auf das bedruckte Substrat einen Belag nach einem der Ansprüche 1 bis 6 aufweist.

Revendications

1. Couverture enveloppante pour un cylindre porte-plaque d'impression ou à vernir pour le finissage de la surface d'un substrat imprimé, **caractérisée en ce qu'elle** consiste en une structure de base et une réalisation de ladite structure de base ayant une surface

- de contact avec ledit substrat imprimé, ladite structure de base comprenant une couche supérieure, une couche intermédiaire compressible et une couche inférieure en polyester, et ladite réalisation consistant en un film lisse et antiadhésif conférant des propriétés sur vernis, ledit vernis étant réticulable au moyen d'un rayonnement ayant au moins une longueur d'onde dans le domaine du rayonnement ultraviolet ou dans le domaine compris entre le domaine de l'ultraviolet et visible ou dans le domaine visible.
2. Couverture enveloppante pour un blanchet ou un cylindre porte-plaque à vernir pour le finissage de la surface d'un substrat imprimé selon la revendication précédente, **caractérisée en ce que** ledit film possède une épaisseur non supérieure à 400 μm .
3. Couverture enveloppante pour un cylindre porte-plaque d'impression ou à vernir pour le finissage de la surface d'un substrat imprimé selon la revendication 1, **caractérisée en ce que** ledit vernis est réticulable avec le rayonnement émis par des lampes fluorescentes basse pression ou des lampes à vapeur de mercure haute pression, soit pur ou avec des halogénures de Fe, Pb, As, Ga, In, ou d'autres métaux ajoutés à ceux-ci.
4. Couverture enveloppante pour un cylindre porte-plaque d'impression ou à vernir pour le finissage de la surface d'un substrat imprimé selon la revendication 1, **caractérisée en ce que** ledit vernis est réticulable avec des sources DEL émettant à différentes longueurs d'onde dans une fourchette comprise entre 200 et 450 nm.
5. Couverture enveloppante pour un cylindre porte-plaque d'impression ou à vernir pour le finissage de la surface d'un substrat imprimé selon la revendication 1, **caractérisée en ce que** ledit vernis est basé sur un ou plusieurs composants de base sélectionnés parmi des acrylates et méthacrylates époxy aromatiques et aliphatiques, des acrylates d'huile de soja époxyde, des polyesters acrylés, des polyesters acrylés chlorés, des uréthanes acrylés aromatiques, des uréthanes acrylés et méthacrylés aliphatiques, des acrylacrylates, des acrylates polyéthers, des polyesters acrylés modifiés par des amines et du polybutadiène méthacrylé.
6. Couverture enveloppante pour un cylindre porte-plaque d'impression ou à vernir pour le finissage de la surface d'un substrat imprimé selon la revendication 1, **caractérisée en ce que** ledit vernis est basé sur un ou plusieurs des composants de base sélectionnés parmi des éthers cycliques, des diépoxy cycloaliphatiques, des alcools et des éthers vinyliques.
7. Presse à imprimer **caractérisée en ce qu'elle** possède, comme blanchet ou porte-plaque à vernir pour le cylindre à vernir d'une ou plusieurs unités pour appliquer un vernis de surimpression au substrat imprimé, une couverture selon l'une quelconque des revendications de 1 à 6.
8. Pelliculeuse à froid **caractérisée en ce qu'elle** possède, comme blanchet pour le cylindre d'impression d'une unité pour appliquer une pellicule métallisée décorative au substrat imprimé, une couverture selon l'une quelconque des revendications de 1 à 6.

REFERENCES CITED IN THE DESCRIPTION

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