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(54) Process for the treatment of a multi-layer covering for a blanket cylinder of a printing machine and so obtained covering

(57) The process for the treatment of a multi-layer covering-for a blanket cylinder of a printing machine, in which said covering comprises a caoutchouc layer and an elastomeric caoutchouc sublayer, consists in subjecting the surface of the elastomeric layer destined to the contact with the surface of the cylinder, to a surface finishing with the material having chemo-physical properties which confer to the elastomeric layer a friction coefficient in contact with the surface of the cylinder, such to attain a uniform adhesion even when said elastomeric layer is subjected to a tensioning effort.

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Description

[0001] The present invention reflates to a process for the treatment of a multi-layer covering for a blanket cylinder of a printing machine and to the so obtained covering.

[0002] The invention pertains to the field of the printing machines, particularly but not exclusively of the Web Offset or Sheet Feed type.

[0003] As known to the expert in the field, in these printing machines, on the metal printing cylinder pivotable around its own axis, a covering sheet is mounted based on a rubber fabric called "caoutchouc" in the field, or with an English name, "printing blanket" (in the following, the therm caoutchouc will be used), which covers the lateral surface of the cylinder. The caoutchouc is provided at its two opposite sides of a corresponding metal bar, normally aluminum or steel made, having a U-shaped cross-section in order to be introduced on the corresponding edge of the caoutchouc and then be fastened to it. The two metal bars serve to fix the caoutchouc to said cylinder. Traditionally, the caoutchouc comprises at least two layers one of which is a fabric and the other is rubber, even if caoutchoucs have been realized having a more complex structure, comprising also more than one fabric layer and more than one rubber layer. The fabric is for instance a cotton cloth or PET and also a metal (particularly aluminum and steel alloys), whilst rubber is for instance of the nitrilo/butilic type.

[0004] For each model of offset printing machine the producer indicates the total thickness of the covering which covers the blanket cylinder. The total thickness of this covering is obtained, in addition to the caoutchouc cited before (the real covering), also utilizing an underblanket (forming the so-called under-caoutchouc or, in English, "underblanket", in the following simply called "undercaoutchouc", constituted by a cardboard polyester sheet and/or always thicker. In the case of polyester, the face of the undercaoutchouc destined to come in contact with the surface of the printing cylinder is treated with an adhesive for which, once disposed on the lateral surface of the printing cylinder, it remains glued on the latter. On undercaoutchout the caoutchouc is then laid, which is blocked to the printing cylinder by the metal bars cited before and applied at the ends.

[0005] The thickness of the undercaoutchouc is so chosen that, added to that of the caoutchouc, it permits to obtain the covering thickness prescribed by the producer of the machine.

[0006] As one can easily understand, the operation described before is rather long and requires attention, all this affecting in a not negligible way the managing costs of the printing machine.

[0007] It is still known, from the international patent application No. PCT/EP2008/004244, the possibility or obviating such drawbacks by using a multi-layer covering comprising a caoutchouc layer complying with the printing machine and an elastomeric sublayer having such chemical-physical characteristics for which such elastomeric layer has self-leveling capacities and thickness which, together with the thickness of the caoutchouc, permits to obtain the desired global thickness; this permits to reduce remarkably the setting- times of the machine.

[0008] The elastomeric layer has a direct adhesion capacity without the interposing of further adhesives. Such high adhesive capacity can also, in certain cases, produce some difficulties for the assembly of such multi-layer covering. In the case of the traditional caoutchouc, the technique today in use provides that, after having assembled the under-caoutchouc, the caoutchouc can be anchored to the printing cylinder by means of aluminum or steel bars previously applied to two sides of the same caoutchouc, which by the insertion in appropriate tracks present on the cylinder, guarantee the fixing of the rubber fabric as a covering to the printing cylinder. The rubber fabric, after having been positioned on the cylinder by means of the bars cited before, is placed in tension through the tightening, with a torque wrench, of the screws which fasten the bar to the cylinder. This operation serves to guarantee the adhesion of the caoutchouc to the cylinder which it covers. If the assembly is not made perfectly, eventual lacks of adhesion are evidenced by the centrifugal force produced by the rotation of the cylinder in the printing phase. In this case, negative effects on the print quality can occur (for instance, doubling); therefore, it is a common practice to repeat once the operation of making in tension the rubber fabric after the printing of the first copies.

[0009] In the case of the multilayer covering, once having performed the fastening, the elastomeric layer could have such an adhesion to the cylinder, that the effects of the tension forces applied with the torque wrench are not uniform on the whole covering; in particular, an over-tensioning can occur at the outer regions of the covering close to the bars with an almost zero tension in the central region of the multilayer fabric.

[0010] This relevant difference of adhesion, evidenced by the centrifugal forces produced during the rotation of the cylinder in the printing phase, causes as said a reduction of the print quality. Unlike the traditional covering in order to obtain good assembly results it can be necessary to repeat the operation of making the tension also three/four times with consequent unacceptable production slowdowns.

[0011] The technical task of the present invention is to realize a treatment process of a multilayer covering for a blanket of a printing machine and a covering so obtained, which eliminate the drawbacks lamented in the known art.

[0012] Within this technical task, an aim of the present invention is to provide a treatment process of a multilayer covering for a blanket cylinder of a printing machine, which permits to the covering, even when subjected to a tensioning effort, to adhere uniformly and with the correct tension to the blanket cylinder, in order to determine a print with the

desired qualitative specifications.

[0013] Another aim of the present invention is to provide a treatment process of a multilayer covering for a blanket cylinder of a printing machine, allowing a simple and rapid application of the multilayer covering to the blanket cylinder, in order to improve the productivity of the printing machine.

[0014] This and other aims are reached with a treatment process of a. multilayer covering for a blanket cylinder of a printing machine according to claim 1.

[0015] Other features of the present invention are described in the dependent claims.

[0016] The process according to the present invention permits to maintain significantly unchanged the self-leveling features of the elastomeric layer.

[0017] The multilayer covering for a blanket cylinder of a printing machine comprises a caoutchouc layer and an elastomeric caoutchouc sublayer.

[0018] The process of treatment consists in subjecting the surface of the elastomeric layer arranged to contact the surface of the cylinder, to a surface finishing with a material having chemo-physical properties which confer to the elastomeric layer such a friction coefficient at the point of contact with the surface of the cylinder, to attain a uniform adhesion even when the elastomeric layer is subjected to a tensioning effort.

[0019] Preferably the material for the surface finishing is a drying UV paint, for instance comprising a pre-polymer of the family of the epoxy-acrylates.

[0020] The paint also contains preferably a sliding agent, particularly in a proportion variable between 3% and 30%.

[0021] Similar results can be obtained using other kinds of UV paint, for instance based on acrylic or urethanic pre-polymers, or polyesters or poly-ethers or modified acrylics, etc.

[0022] The paint uses for the finishing can have for instance the following general formulation:

70-80%	mixtures of modified acrylic esthers and acrylic monomers
2-5%	acrylated amines
5-10%	photo-initiators
0.5-3%	additives and stabilizers
5-20%	polyethilenic and polyolephinic waxes

[0023] As an alternativer the material for the surface finishing can be oil- and/or wax- and/or fat-based among which for instance silicones, minerals and fluorides.

[0024] The finishing can be realized by means of the creation of a protective layer directly on the surface of the elastomeric layer destined to be in contact with the cylinder. In such a case, the protective layer is created by means of a spreading with a Meyer bar, reverse roll, flexo, rotogravure, spraying, glazing, or others. It has been verified that a finishing material thickness comprised between 5 and 40 μm is convenient.

[0025] The finishing can also be realized by means of a production of a film of a protective layer and with a subsequent or contemporary application of the protective layer on the surface of the elastomeric layer destined to the contact with the cylinder. In such a case the protective layer can be preferably polyester- or fluoride-based. The coupling can be of a physical and/or chemical kind or even by the aid of an adhesive, and can occur for instance by an extrusion process, calendering, or others. Also in this case the thicknesses of the film are comprised between 5 and 40 μm.

[0026] In the multilayer covering according to the present invention no adhesive is provided between the elastomeric layer and the lateral surface of the blanket cylinder, so that the drawback (present, as said, with the known coverings of such type) of the adhesive residues on the surface of the blanket cylinder is eliminated.

[0027] In a convenient way, the elastomeric layer forming the undercaoutchouc is poliurethan-based (PU and/or TPU). In such a case, as an example, the compounds corresponding to the mark Estane and distinguished by the numbers 54660, 58437, 58070 and ETE 55DS3, produced by Lubrizol Corporation, can be used.

[0028] It was possible to verify that, with thicknesses of said elastomer comprised between 0,05 and 1,50 mm, it is practically possible to cover all the demands of the market.

[0029] Preferably for the covering according to the present invention, the elastomeric layer, after the treatment of surface finishing, has the following chemo-physucal properties, according to the norm AST D 1894:

- Static friction coefficient $\mu s < 0,9$
- Dynamic friction coefficient $\mu k < 0,9$

[0030] Such properties refer naturally to the surface destined to the contact with a steel printing cylinder.

EXAMPLE OF A SURFACE FINISHING PROCESS

[0031] In the specific case referred in the following, the following specific formulation for the finishing paint is used:

75%	mixtures of modified acrylic esters and acrylic monomers
5%	acrylated amines
8%	photo-initiators
2%	additives and stabilizers
	10% modified silicone-based additive

[0032] The paint is laid with a thickness of 40 μm. The total thickness of the multi-layer covering comprising the finishing treatment will be conforming to the type of printing machine. In particular, for a Lithoman 48pgg machine, using a 1,70 mm Vulcan Alto caoutchouc model and a 0,20 mm undercovering, the multi-layer covering has a total thickness of 1,90 mm including the surface treatment layer with a total thickness tolerance of +/- 0,02 mm.

[0033] The spreading operation occurs at ambient temperature by means of a Reverse Steinemann painting machine. The paint is subsequently polymerized under a UV lamp with a 160 watt/cm power.

[0034] The covering for printing machines so conceived is subject to many modifications and changes, all being within the inventive concept; furthermore, al details can be substituted with technically equivalent elements. In practice, the used materials, and also their dimensions, can be of any kind according to the needs and the state of the art.

Claims

1. A process for the treatment of a multi-layer covering for a blanket cylinder of a printing machine, in which said covering comprises a caoutchouc layer and an elastomeric caoutchouc sublayer, **characterized in that** the surface of said elastomeric layer arranged to contact the surface of said cylinder is subjected to a surface finishing using a non-adhesive material having chemo-physical properties which confer to said elastomeric layer a friction coefficient at the point of contact with said surface of said cylinder, to attain a uniform adhesion even when said elastomeric layer is subjected to a force of tension.

2. The process for the treatment of a covering for the blanket cylinder of a printing machine according to claim 1, **characterized in that** said material for said surface finishing is applied as a protective layer of said surface of said elastomeric layer arranged to contact the surface of said cylinder.

3. The process for the treatment of a covering for the blanket cylinder of a printing machine according to the preceding claim, **characterized in that** the thickness of said protective layer is between 5 and 40 μm.

4. The process for the treatment of a covering for the blanket cylinder of a printing machine according to one or more preceding claims, **characterized in that** said elastomeric layer, after said surface finishing, has following chemo-physical properties, according to ASTM norm D 1894:

   - ○ Static friction coefficient μs < 0.9
   - ○ Dynamic friction coefficient μk< 0.9

   said chemo-physical properties referring to said surface arranged to contact said printing cylinder particularly of steel.

5. The process for the treatment of a covering for the blanket cylinder of a printing machine according to one or more preceding claims, **characterized in that** said material for said finishing is a drying UV paint.

6. The process for the treatment of a covering for the blanket cylinder of a printing machine according to the preceding claim, **characterized in that** said paint comprises at least a pre-polymer of the family of the epoxy-acrylates.

7. The process for the treatment of a covering for the blanket cylinder of a printing machine according to any preceding claim, **characterized in that** said paint contains a sliding agent.

8. The process for the treatment of a covering for the blanket cylinder of a printing machine according to the preceding claim, **characterized in that** said sliding agent is present in a proportion of from 3% to 30%.

9. The process for the treatment of a covering for the blanket cylinder of a printing machine according to any of preceding claims 7 or 8, **characterized in that** said sliding agent is a poly-ethylenic wax and/or modified polyolephinic wax and/or modified silicone additive.

10. The process for the treatment of a covering for the blanket cylinder of a printing machine according to one or more preceding claims, **characterized in that** said protective layer is created directly on said surface of said elastomeric layer.

11. The process for the treatment of a covering for the blanket cylinder of a printing machine according to the preceding claim, **characterized in that** said protective layer is created by spreading.

12. The process for the treatment of a covering for the blanket cylinder of a printing machine according to claim 10, **characterized in that** said protective layer is created by spraying.

13. The process for the treatment of a covering for the blanket cylinder of a printing machine according to one or more claims from 1. to 9, **characterized in that** said protective layer is made by producing a film and subsequent or contemporary application of said film on said surface of said elastomeric layer.

14. The process for the treatment of a covering for the blanket cylinder of a printing machine according to the preceding claim, **characterized in that** said protective layer is polyester- or fluoride-based.

15. The process for the treatment of a covering for the blanket cylinder of a printing machine according to one or more preceding claims, **characterized in that** said material for the surface finishing is oil- and/or fat- and/or wax-based.

16. The process for the treatment of a covering for the blanket cylinder of a printing machine according to the preceding claim, **characterized in that** said oil and/or fat and/or wax is of a kind of silicons and/or mineral and/or fluoride.

17. A covering for the blanket cylinder of a printing machine, **characterized in that** it is made by a process according to one or more preceding claims.

18. A cylinder for a printing machine, **characterized in that** it comprises a covering according to the preceding claim.

19. A printing machine, **characterized in that** it comprises a printing cylinder according to the preceding claim.

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EUROPEAN SEARCH REPORT

Application Number
EP 10 16 5414

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 215 045 A (HUBER & SUHNER AG [CH] HANNECARD GMBH [BE]) 19 June 2002 (2002-06-19) * abstract; figure 1 * * paragraphs [0019], [0020], [0033], [0036], [0043], [0044] *	1-19	INV. B41N10/02 B41N10/04 B41N10/06
X	US 2005/252397 A1 (BYERS JOSEPH L [US] ET AL BYERS JOSEPH L [US] ET AL) 17 November 2005 (2005-11-17) * claims 48,54-57 * * paragraphs [0032], [0033] *	1-19	
X	US 2002/134264 A1 (OKUBO HIROMASA [JP] ET AL) 26 September 2002 (2002-09-26) * paragraphs [0053] - [0055], [0072] - [0093] *	1-19	
X	US 4 537 129 A (HEINEMANN FREDERICK F [US] ET AL) 27 August 1985 (1985-08-27) * the whole document *	1-19	

TECHNICAL FIELDS SEARCHED (IPC)

B41N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 September 2010	Vogel, Thomas

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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17-09-2010

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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