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(54) Paper machine fabric with release coating

(57) A paper machine fabric INCLUDES A fabric having a roll side and a paper side and a surface matrix on the paper side; and a chrome complex treatment in the surface matrix. The chrome complex treatment chemically reacts with the surface matrix and orients hydrophobic organic chains away from the surface of the fabric and thereby provides enhanced release property.

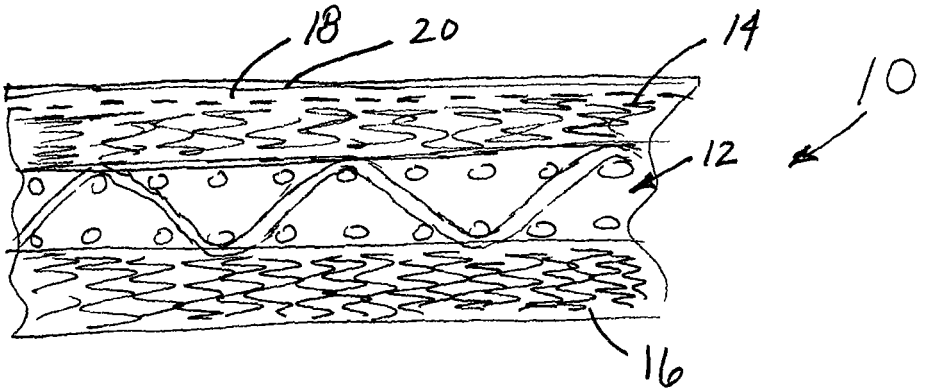

FIG. 1

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Description

CROSS REFERENCE TO PROVISONAL APPLICATION

[0001] This application claims the benefit of the filing date of provisional patent application 60/759,650 filed January 17, 2007.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to paper machine fabrics. Paper machine fabrics are conventionally used in the manufacture of paper towels, facial tissue, bathroom tissue, table napkins and the like.

[0003] U.S. Pat. Nos. 6,017,417 and 6,331,230 and Publication WO 01/44568 describe the manufacture of tissue and the like using through-air drying. Typically, in such processes, a slurry of cellulosic fibers is fed onto a forming fabric or between two forming fabrics, where the paper web is formed and partially dewatered before the web is transferred, often via a transfer fabric, to a through-air drying (TAD) fabric for further water removal by way of one or multiple TAD units. The web is then fed by way of the TAD fabric to a presser roll where a nip is formed between the TAD fabric and a Yankee cylinder. Here the paper web transfers to the Yankee cylinder where further drying and creping takes place. In one variation of this process, the Yankee cylinder is removed, thus eliminating the pressing nip. In this case, the web is transferred from the TAD fabric to a further fabric.

[0004] It is conventional to spray a chemical release agent, e.g. silicone oil onto the paper machine fabrics in order to provide good sheet release, whether it be to aid the transfer of the sheet on to another fabric or on to the Yankee cylinder, after exiting the presser roll nip. There are a number of potential problems associated with using a chemical release agent in the TAD process, two of these being that they are messy to utilize and very expensive.

[0005] A significant problem with the use of a chemical release agent is the fact that the agent remains in the recycled white water system. Most modern paper machines tend to have closed water systems, and so the water that is removed from the cellulosic stock during the papermaking process and the reclaimed fabric shower water is collected, recycled and then reused as shower water and also to dilute the new cellulosic stock. In the interim period, the water is stored in holding tanks. In these tanks, minute beads of chemical release agent coalesce into larger globules. It is extremely difficult to separate the chemical release agent from the water and the globules end up coating these tanks, which finally make their way back into the system. When the globules find their way into the cellulosic stock, there are potentially a number of problems, all of which result in a reduction of paper quality and machine operating efficiency.

[0006] Another approach to improve release is to coat the fabric, and typical coatings include thermoset polyurethane (TPU), hydrophobic materials and the like.

[0007] It is clear that the need remains for an environmentally friendly system which can be applied to paper making machine fabric and other belts or rolls to improve release behavior without adversely impacting other performance attributes.

SUMMARY OF THE INVENTION

[0008] According to the invention, the foregoing need has been met.

[0009] According to the invention, a paper machine fabric is provided which comprises a fabric having a roll side and a paper side and a surface matrix on the paper side; and a chrome complex treatment on the surface matrix. The chrome complex treatment serves to enhance release properties of the fabric without requiring sanding of the fabric and without using materials which interfere with the complex paper system and/or the paper making machine itself. Further, the treatment is applied in a water based system, and chemically reacts with the surface of the fabric.

[0010] According to the invention, the chrome complex treatment can preferably be an organic metal complex, preferably a fatty acid metal complex.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A detailed description of preferred embodiments of the present invention follows, with reference to the attached drawings, wherein:

[0012] Figure 1 schematically illustrates a fabric having a coating according to the invention.

DETAILED DESCRIPTION

[0013] The invention relates to fabric for papermaking machines and, more particularly, to a treatment for such fabric which improves the release properties of the fabric.

[0014] The treatment according to the invention is applied to the paper side of a fabric, preferably a fabric 10 having a base 12 and batt layers 14, 16 attached at each side of base 12. A surface matrix 18 can be attached to or otherwise defined on a surface of batt layer 14, and the treatment 20 according to the invention is preferably applied at least to surface matrix 18.

[0015] According to the invention, the surface treatment comprises a water based system containing a chrome complex. One example of particularly suitable chrome complexes is a family of products marketed by Dupont under the trademark Quillon®, certain examples of which include chromium pentahydroxy(tetradecanoato)di-; tetradecanoato chromic chloride hydroxide; octadecanoato chromic chloride hydroxide and others.

[0016] The treatment composition can be applied in relatively low concentrations, for example at concentrations of less than 10% volume, preferably at concentra-

tions of less than 2% volume. The composition can be applied using known techniques such as spray or kiss roll application. After application to the fabric, the composition is preferably dried and cured, preferably at a temperature of about 100°C plus or minus about 50°C. This leads to chemical reaction of the composition with the fabric which leads to desirable release properties of the fabric. It is believed that the composition reacts with the polar groups of the fabric, and when cured the complex forms an insoluble layer of a polymerized chromium network chemically bonded to the substrate. Hydrophobic fatty acid chains of the composition are left oriented away from the surface of the substrate, giving rise to a unique and unexpected release property.

[0017] The treatment according to the present invention can advantageously be applied to various papermaking machine clothing or fabric and other industrial fabrics, for example including forming fabrics, press fabrics, impermeable press belts, dryer fabrics, TAD and other industrial fabrics, and can be applied to rolls and sleeves.

[0018] The composition of the present invention can also be engineered with other aqueous polymer systems such as poly vinyl alcohol (PVA) or poly vinyl acetate (PVAc) to provide control over surface energy, wetting behavior and the like.

[0019] A particular advantage of the present invention is that the fabric does not need to be sanded or ground or otherwise treated in a potentially harmful way in order to apply the composition.

[0020] The water based system which is preferably used to apply the composition is environmentally friendly, and does not contaminate the white water of the process or the wet cellulosic material.

EXAMPLE

[0021] An impermeable press belt having a 1.0 mm thick surface matrix consisting of TPU and embedded nylon fibers is treated using Quilon S and/or Quilon L solution. The solution is applied by spray and/or kiss roll application at concentrations of 0-10% by volume, and then dried and cured at 100°C. Following this treatment, the treated fabrics were tested and surface energy dropped by approximately 20% as compared to the normal TPU. Thus, the treated fabric has a marked improvement in release properties.

[0022] It is to be understood that the invention is not limited to the illustrations described and shown herein, which are deemed to be merely illustrative of the best modes of carrying out the invention, and which are susceptible of modification of form, size, arrangement of parts and details of operation. The invention rather is intended to encompass all such modifications which are within its spirit and scope as defined by the claims.

Claims

1. A paper machine fabric, comprising:

   a fabric having a roll side and a paper side and a surface matrix on the paper side; and
   a chrome complex treatment in the surface matrix.

2. The fabric of claim 1, wherein the fabric comprises a fabric base, a roll side batt layer on the roll side of the fabric base, and a paper side batt layer on the paper side of the fabric base, wherein the surface matrix is attached to the paper side batt layer.

3. The fabric of claim 1, wherein the chrome complex treatment is chemically bonded with the surface matrix.

4. The fabric of claim 1, wherein the chrome complex comprises a polymerized chromium network chemically bonded with the surface matrix.

5. The fabric of claim 1, wherein the fabric is at least one of a forming fabric, a press fabric, a dryer fabric, an impermeable press belt and a through-air dryer fabric.

6. A method for providing release properties to a papermaking machine fabric, comprising the steps of:

   applying a solution of chemically reactive chrome complex to a surface of a papermaking machine fabric; and
   drying and curing the fabric so that the complex reacts with the surface and produces a polymerized chromium network chemically bonded to the fabric.

7. The method of claim 6, wherein the drying and curing step orients hydrophobic fatty chains from the complex so that the chains are oriented away from the fabric.

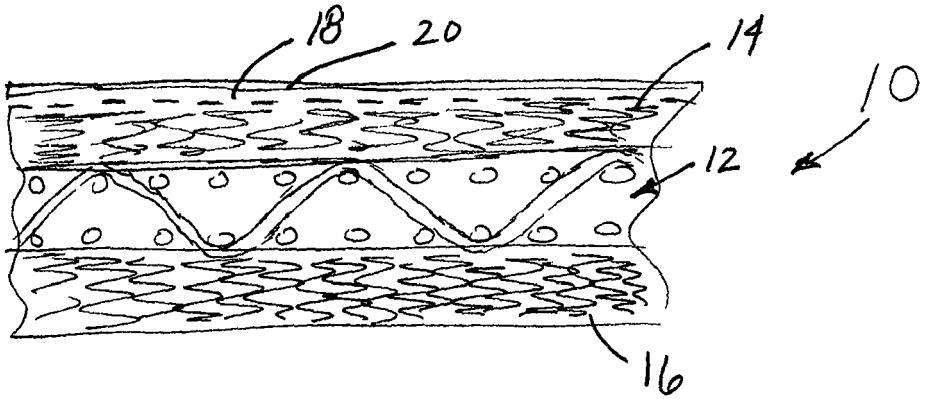

FIG. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 07 10 0593

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	*example* * figures * -----	2,4,6,7	D21F7/08
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TECHNICAL FIELDS SEARCHED (IPC)

D21F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 May 2007	Pregetter, Mario

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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