# Patent alert January 2025

**Coating and finishing technologies**

**This month's selection in brief**

This month's selection focuses on highlights inventions related to printing and lamination as example of coating and finishing technologies. The selection also includes pre-treatment methods to enhance adhesion between the ink and the substrate or reduce water-use in water-based coating processes.

## Contents


Ink for printing and dyeing synthetic fibres....2

Process for pretreating a textile with a jettable primer coating prior to printing....3

Heat press suitable for applying a water-based ink print on a stack of fabric layers of different sizes....4

A method for manufacturing a paper or paperboard based packaging laminate....5

Laminated card comprising a thermochromic pattern and method for manufacturing such a card....6

Methods and systems of a printed circuit on a substrate for stretchable electronics....7

Treatment sheets and articles and method for using treatment sheets and articles....8

Continuous self-disinfecting and pathogen eradicating coating with spore germination agent, article of manufacture with the coating and method of application....9

# Ink for printing and dyeing synthetic fibres

Patent number: EP4332180

Publication date: 2024-03-06

Applicant(s): PROMETHO GMBH

Inventor(s): HOFFMANN RUTH; HOFFMANN JENS-CHRISTOPH

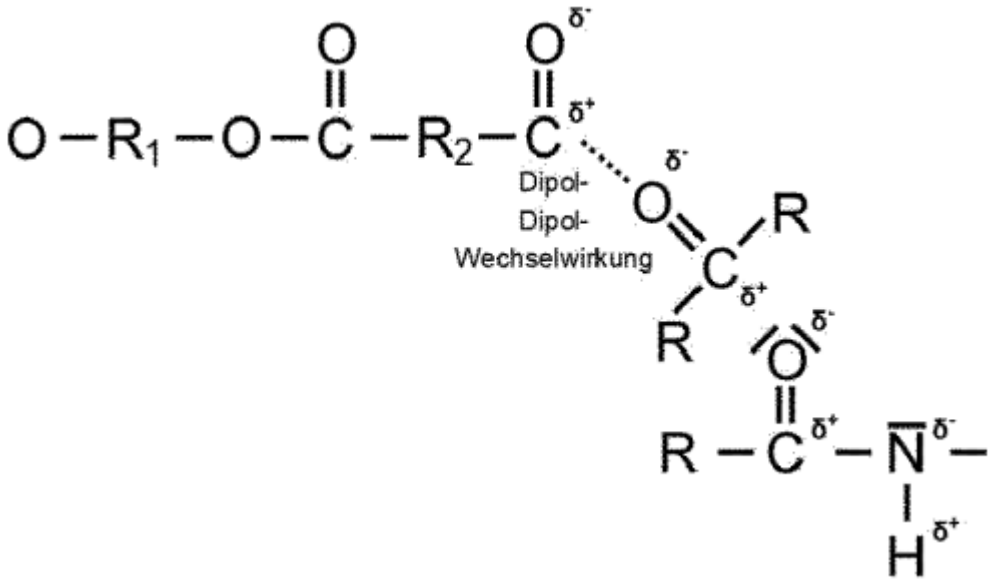
**Summary**

The invention relates to a pigment dispersion, to an ink for printing and coloring non-polar substrates, to a method for printing and coloring non-polar substrates, to the use of the pigment dispersion for printing and coloring non-polar substrates, and to a textile dyed or printed with said ink.

Color pigments are color-imparting substances which, in contrast to dyes, are completely insoluble in water. Particle size and particle size distribution, for example, are decisive for the properties of the pigments. The latter determine the specific surface area, which in turn is responsible for the scattering and reflection of the light and thus constitute the color. Pigments have no attraction whatsoever to the fiber and therefore, in contrast to the dyes, have no possibility of bonding to the fiber.

The dyes used in textile printing differ depending on the substrate to be printed. Reactive dyes, vat dyes, sulfur dyes or direct dyes have hitherto been used for the classical printing of cellulose fibers. Acid dyes are usually suitable for wool and silk. Polyamide is usually dyed with acid or metal complex dyes, but also with direct dyes or reactive dyes. Polyester is usually printed with disperse dyes. After printing, the goods are normally dried and steamed, and the excess dye and the thickener are washed out.

In digital textile printing and especially in the area of DTG (Direct to Garment) and DTF (Direct to Fabric), dye-based inks are frequently used, but pigmented inks are also increasingly being offered. The pigmented inks have hitherto been used predominantly on cotton or other natural fibers. For this purpose, the substrate is usually pretreated with a usually cationic primer and printed with a usually anionic ink.



# Process for pretreating a textile with a jettable primer coating prior to printing

Patent number: WO2024/186689

Publication date: 2024-09-12

Applicant(s): POLYMERIC US, INC.

Inventor(s): ABEYDEERA PRAMUDI; SARMA DEVERAKONDA

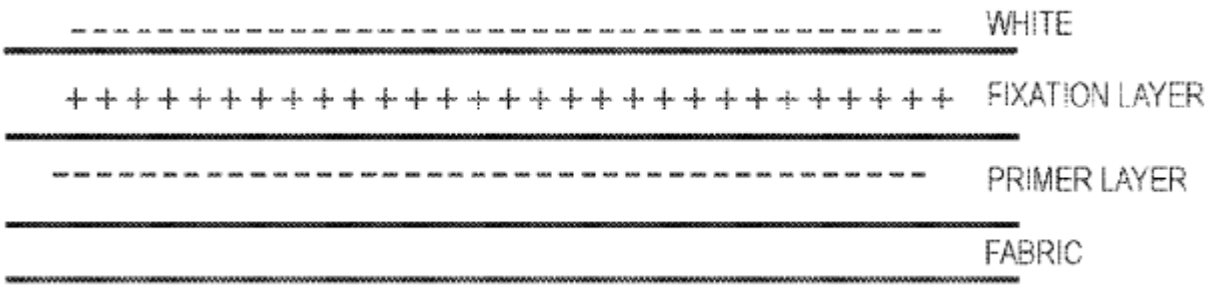
**Summary**

Provided herein are methods for printing a graphical image on a substrate. The methods may comprise one or more of the following steps: (1) applying a primer coating composition to a portion of a substrate; (2) applying a fixation composition to a portion of the substrate; (3) applying one or more white or colored ink layers to form a graphical image on the substrate; and (4) curing the printed substrate. Also provided herein are primer coating compositions and fixation compositions useful in such methods.

Inkjet printing is a digital printing process wherein ink is ejected directly onto a substrate from a jet device driven by an electronic signal. As a non-contact material deposition technology, inkjet printing utilizes electronic signals to control the droplets or stream of ink to be deposited on surface of the media.

Printing graphical images on textiles is often challenging due to the variable porosity- and/or non-uniform surfaces of many textile substrates. If ink droplets are deposited onto the surface of a highly porous textile (e.g., fleece), they may be rapidly absorbed by the fabric, resulting in a blurry- and low quality- image. On the other hand, if ink droplets are deposited onto the surface of a non-porous textile (e.g., poly ester), the ink droplets may spread laterally and overlap with neighboring droplets, resulting in color bleed and a blurry, undesirable image.

There is therefore a need in the industry for an improved method of printing a graphical image on a textile substrate using an inkjet printer. In particular, there is a need for a printing process that can accommodate a wide range of textiles (e.g., porous and non-porous textiles), can accommodate application of both white and colored ink layers, which minimizes or eliminates migration or absorption of the ink applied to the substrate, and w hich does not exhibit visible staining or discoloration due to application of the pretreatment composition. Additionally, printed textiles should exhibit commercially acceptable (or even excellent) wash-fastness and durability.



# Heat press suitable for applying a water-based ink print on a stack of fabric layers of different sizes

Patent number: US20240239095

Publication date: 2024-07-18

Applicant(s): Solomon Eric

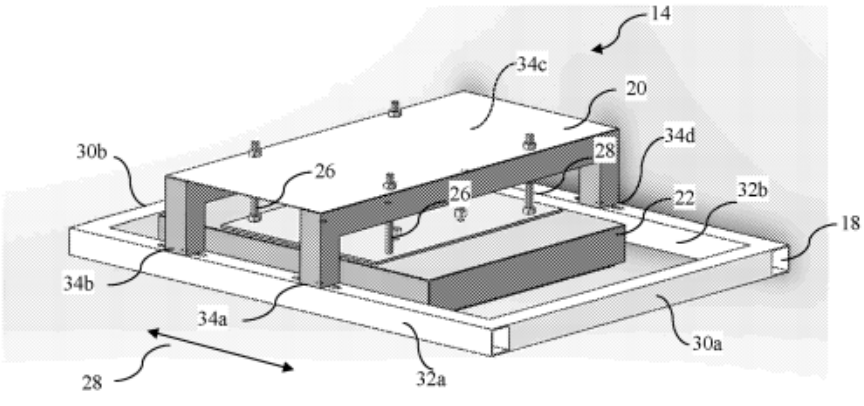
Inventor(s): Solomon Eric

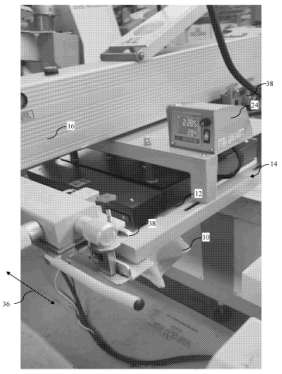
**Summary**

The disclosure relates generally to a heat press suitable for applying a water-based ink print on a substrate, such as a stack of fabric layers of different sizes. This disclosure relates more specifically to a stamp unit configured to be attached to a screen-printing head of an inline heat press in which the stamp unit allows the adjustment of the horizontal position of a floating spring-biased platen relative to the horizontal position of a pallet of the screen-printing head.

In the garment industry, heat presses are commonly used to imprint a design on a garment, such as on a t-shirt or a sweatshirt. A heat press is used to remove moisture from the garment and the print. For example, after a high-solid acrylic ink foundation is imprinted on the garment, the foundation can be fixed by heat pressing before top colors are applied.

However, when the thickness variations are caused by a small extra layer of fabric used, for example, for providing a pocket to the garment, the floating spring-biased platen may become less effective than a fixed platen. Indeed, unless the extra layer of fabric is well centered relative to the spring of the floating spring biased platen, some of the springs of the floating spring biased platen will compress significantly more than others, allowing the platen to tilt and causing a pressure relief from a central portion of the extra layer of fabric and a concentration of pressure on a side portion of the extra layer of fabric. Instead, a fixed platen would not tilt and could apply a more uniform pressure and temperature on the extra layer of fabric only. Thus, a fixed platen design could be used to imprint a design on the extra layer of fabric only, provided the extra layer of fabric has a sufficiently uniform thickness. When the extra layer of fabric does not have a sufficiently uniform thickness, such as in the presence of seams, it may become difficult to generate a uniform pressure and temperature suitable for fixing the water-based ink print. Therefore, there is a need in the art for an improved heat press suitable for applying a print on a substrate, such as a stack of fabric layers of different sizes.



# A method for manufacturing a paper or paperboard based packaging laminate

Patent number: WO2024/165914

Publication date: 2024-08-15

Applicant(s): STORA ENSO OYJ

Inventor(s): NYLÉN OTTO; KARPPINEN ANNI; BACKFOLK KAJ

**Summary**

The present invention relates to a method for manufacturing a paper or paperboard based packaging laminate, said method comprising: a) providing a paper or paperboard substrate, b) providing a microfibrillated cellulose (MFC) film comprising at least 50 wt% of MFC based on the dry weight of the MFC film, and c) laminating a surface of the paper or paperboard substrate to a surface of the MFC film by a melt adhesive process using a melt adhesive comprising at least 50 wt% of a water soluble thermoplastic polymer based on the dry weight of the melt adhesive, wherein the melt adhesive is applied to the surface of the paper or paperboard substrate and/or to the surface of the MFC film in a low solvent or solvent free form.

Coating of paper and paperboard with plastics is often employed to combine the mechanical properties of the paper or paperboard with the barrier and sealing properties of a plastic film or layer. Paper or paperboard provided with even a relatively small amount of a suitable plastic material can provide the properties needed to make the paper or paperboard suitable for many demanding applications, for example as liquid or food packaging. In liquid or food packaging board, polyolefin coatings are frequently used as liquid barrier layers, heat sealing layers and adhesives. However, the recycling of such polymer coated board is difficult since it is difficult to separate the polymers from the fibers.

The paper or paperboard-based packaging laminate may further be provided with polymeric sealing layer(s) on one side or on both sides thereof. The polymeric sealing layer(s) preferably serve as the outermost layers of the packaging laminate. The polymeric sealing layer(s) preferably provide liquid barrier properties and mechanical protection for the paper or paperboard-based packaging laminate surface. At least one of the polymeric sealing layer(s) is preferably also heat- sealable.

# Laminated card comprising a thermochromic pattern and method for manufacturing such a card

Patent number: WO2024/047285

Publication date: 2024-03-07

Applicant(s): IDEMIA FRANCE

Inventor(s): DEBRIFFE JUSTINE; DAUDE INES; WEISSKOPP CAROLINE

**Summary**

The invention relates to a laminated card and a method for manufacturing such a card. The card comprises, in order: a thermoplastics backing layer (100); an adhesive layer (101); a primer layer (102); a thermochromic pattern (103) which is printed using a thermochromic ink; and a plastics protective layer (104). The primer layer is suitable for the thermochromic ink, enabling good adhesion of the thermochromic pattern to the lower layers, i.e. to the backing layer via the adhesive layer. The adhesive layer (101) and the primer layer (102) are both water-based or both polymerized under UV radiation. The thermochromic ink comprises a liquid crystal compound.

A common problem with this type of card intended to contain information, and in particular personal information, is to ensure a high level of security. In this context, document EP 3045321 discloses a card and its manufacturing method. The card comprises a plurality of laminated layers. At least one thermochromic pattern is printed on one of the layers, the thermochromic pattern having a thermochromic ink composition comprising leuco dye. Such a thermochromic ink has a first color when its temperature is within a given temperature range and becomes transparent when its temperature is outside said given temperature range. The thermochromic ink used is preferably aqueous-based, the solvent-based inks being liable to damage the microcapsules.

The assembly of the front 10 or of the back 11 of the payment card 1 is carried out in the following manner:

- A first step of the method consists in providing one of the support layers 100
- The adhesive layer 101 is deposited on the support layer 100.
- A first drying step is then carried out in which the adhesive layer 101 is dried.
- The adhesive layer 102 is deposited on the dry adhesive layer 101.
- A second drying step is then carried out in which the attachment layer 102 is dried.
- The thermochromic pattern 103 is then printed on the dry bonding layer 102.

# Methods and systems of a printed circuit on a substrate for stretchable electronics

Patent number: WO2024/167943

Publication date: 2024-08-15

Applicant(s): APPLIED CAVITATION, INC.

Inventor(s): TIBBETTS MARSHALL CAMPION; BAMBACH ANDREW JOHN; MASTROPIETRO MICHAEL ALAN

**Summary**

Disclosed herein include methods and systems for fabricating a flexible or stretchable printed circuit. For example, and without limitation, a substrate for receiving the printed circuit can be provided and pre-shrunk to minimize degradation of the fiducial alignment (registration) as each layer is printed. In some embodiments, the method of fabricating a flexible or stretchable circuit (e.g., a heater) on a flexible or stretchable layer (e.g., fabric) includes pre-shrinking the substrate, printing the circuit onto the substrate, removing excess substrate, transferring the remainder of the substrate with the flexible or stretchable printed circuits (e.g., stretchable resistive heating element) to an adhesive element, and/or applying the resulting pattern to the flexible or stretchable layer (e.g., fabric).

The printed circuit described herein can be utilized in various settings. For example, they can be used in outerwear, base layers, gloves, socks, and/or chairs for outdoor activities. Military applications of the smart textiles described herein include outerwear, gloves, seats, and/or other gear. Therapeutic applications include braces, wraps, pads, bedding, and/or fabric(s) for pain management. Automotive applications include seat warming, steering wheel warming, defrosting applications, and/or warming of interior panels.

FIG. 6 illustrates an embodiment of an electrical structure 36 (or the flexible or stretchable substrate) providing a resistive heater. In some embodiments, the resistive heater that can be, for example, fixed and/or stretch-tolerant. As shown in FIG. 6, and in brief overview, the electrical structure 36 can include a plurality of layers. For example, the electrical structure 36 can include a base thermoplastic polyurethane (TPU) film 84 that can be disposed on, for example, an adhesive layer 79 that is spread over a fabric 76. A fixed resistance stretchable heater ink 88 (or heating element) is disposed on the TPU layer 84 and a stretchable printed silver conductor 90 is disposed at least partially over the heater ink 88. In some embodiments, the heating element 88 is covered using a stretchable insulator ink 93.

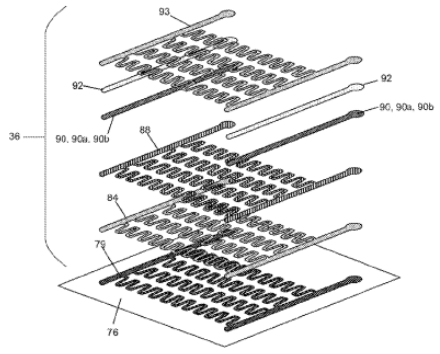



FIG. 6

# Treatment sheets and articles and method for using treatment sheets and articles

Patent number: WO2024/218614

Publication date: 2024-10-24

Applicant(s): ALADDIN MANUFACTURING CORPORATION

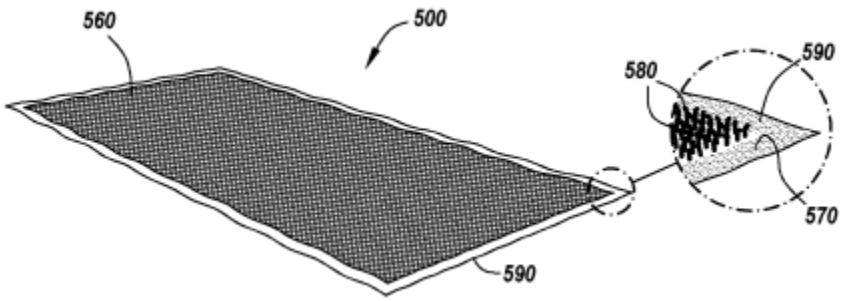
Inventor(s): NORTH MELISSA; BRINDLE MACK; HOOKER CHRISTINA MARIA; OZUNA DENNES; CASCIO ANTHONY; LONVICK CHRISTOPHER M

**Summary**

The present inventions disclosed and taught herein are directed to treating unfinished soft surfaces and other textile products in the manufacturing process to reduce the amount of water used and the time taken for processing by applying treatment chemicals in the wet phase of the process without having to add any treatment chemicals in a second water bath. The present inventions are also directed towards reducing the amounts of water that must be treated from the transfer of treatment chemicals to textile products and improving the transfer and retention of treatment chemicals in soft surfaces and other fabrics.

Commonly, many people prefer rugs and mats that have a softer feel. In many cases producing this softness is done by adding conditioners in the manufacturing process of making the articles. The common practice has been to add a softener and other treatment chemicals to a batch of unfinished rugs or mats in the latter stages of the wet phase of processing. The wet phase of processing comprises the steps of dyeing and preparing the rugs and mats before drying them. Most commonly, a softener has been added after the rugs and mats have already been dyed and rinsed. The dry phase of processing comprises drying and further preparing the finished soft surfaces for shipping and delivery.

In one embodiment, a treatment carpet tile or mat 500 may be made as any other carpet tile or mat is made and may or may not have a backing. In one embodiment, the treatment carpet tile or mat 500 may not need a backing if the yarn is bound to the primary backing 570. This may be accomplished by heat-binding the yam to the backing 570 such as by melting a portion of the backstitch of the tufted yam 580 to the primary backing 570. This may be done with a yarn 580 and a primary backing made of polyester such as, but not limited to, polyethylene terephthalate (PET) or a mixture of PET and coPET as may be known to those skilled in the art such that the heat may partially melt some of the yam 580 with some of the primary backing 570. In this way, the yarn 580 will not pull out of the primary backing 570 to shed on the articles to be treated. Additionally, the edges 590 of the treatment carpet tile or mat 500 may be stitched or otherwise processed so that the primary backing 570 does not fray when the treatment carpet tile or mat 500 is tumbled in the dryer with the fabric articles.



# Continuous self-disinfecting and pathogen eradicating coating with spore germination agent, article of manufacture with the coating and method of application

Patent number: WO2024/044256

Publication date: 2024-02-29

Applicant(s): KISMET TECHNOLOGIES LLC

Inventor(s): DRAKE CHRISTINA; HOOS SCOTT; COUGHLIN CHRISTOPHER

**Summary**

The embodiments relate to a continuous self-disinfecting and pathogen eradicating coatings using a water-based polymer coating composition with metal-modified nanoparticles and a spore germination agent and method of disinfecting a surface. The embodiments relate to an article of manufacture that includes a continuous self-disinfecting and pathogen eradicating coating on an article during manufacture of the article or after the article is installed in an environment. The coating composition may comprise a mixture of a water-based coating polymer; an aqueous solution having silver-modified ceria nanoparticles (AgCNPs), and a spore germination agent wherein the AgCNPs ingredient having a weight percent loading less than about 3% weight/volume and the spore germination agents having a 0.01-3% weight/volume and the mixture configured for coating surfaces.

The embodiments related to an article of manufacture includes a continuous self-disinfecting and pathogen eradicating coating on a surface of the article. The surface may be hard or soft. In an aspect, an article of manufacture is provided that comprises an object having a surface; and a coating composition is cured and bonded to the surface. The composition has AgCNPs and spore germination agents.

A method of disinfecting a surface comprises coating the surface with a coating composition with silver-modified ceria nanoparticles (AgCNPs) and a spore germination agent, and curing the coating composition to form a self-disinfecting coating on the surface which eradicates bacteria biofilms at least by 99.9%.The coating composition may be cured with a UV light or harden by drying.

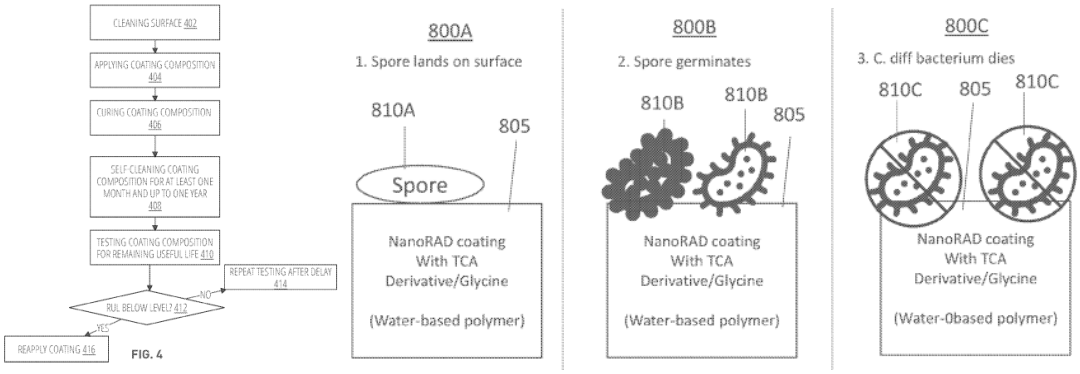


FIG. 4