

SECURITY LABEL STOCK AND SYSTEM FOR MANUFACTURING THEREOF

FIELD OF THE INVENTION

The present invention relates to a smart and secure label stock. More particularly, the present invention relates to a label stock produced from a substrate utilizing adhesive and liner materials and having a plurality of security features on the rear side of the substrate made using specialized inks and various authentication features for different applications.

10 **BACKGROUND OF THE INVENTION**

A label stock is a carrier commonly coated on one side with adhesive and usually printed on the other side. It can be a wide variety of papers, films, fabric, foils, etc. There are many types of label stocks namely puffy labels, litho, latex, foil, thermal. Puffy labels are made of water, gel, foam or air. Litho are one of the most common label stocks. Latex is flexible and better than the most standard litho labels. Foil has the shiny properties of a metal foil. Thermal label stock changes color (usually black) when heated. A heating element in the shape of letters or images can be used to create an image on the label. The stock type affects the type of ink that prints well on them.

The label stock is used for printing labels which may not have or have security features integrated in the label. The security labels are printed on the front side of the label stock and for authentication these labels can be read with machine code readers or visible through naked eye. Generally, on the rear side of the label stock there is a pressure sensitive or heat sensitive or moisture sensitive adhesive using which it is affixed on any product. There are some labels which are tamper evident which upon any attempt of counterfeiting get tampered in a way that determines counterfeiting at some extent. However, there are some labels which are not tamper evident and, in that case, for counterfeiting it just needs to be peeled off from a product and pasted on other. Further, with the help of high-resolution printers the labels on front side of the label stock are susceptible of being copied. In this scenario, generally a user authenticates a product from the label on the front side and may buy a counterfeit product. Further, adding security features to labels printed on the front of label stock adds more and more cost to

the label to make it secure printed label. In printing such labels, a huge amount of cost is spent in printing the label and certain amount is spent on purchasing suitable label stock. All the product manufactures in the market cannot bear the cost of such expensive labels.

EP1102702 describes a method, module and apparatus useful in the application of
5 linerless labels to surfaces of elements so that conventional liner label applicators can be used with linerless labels. The module for adapting apparatus which strips liners from a label and applies labels to a substrate, the module enabling the apparatus to apply linerless labels, the module comprising: a source of linerless label sheet, a source of liner sheet, a roll for guiding the linerless label sheet after removal from the source of linerless
10 label, a die cutter and an anvil roller defining an area through which linerless label sheet may move between said die cutter and anvil roller, a laminator roller adjacent to the anvil roller defining an area between the anvil roller and the laminator roller through which both liner sheet and cut-out linerless labels from the linerless label sheet may move between the anvil roller and the laminator roller to form a temporary support of
15 the liner for said cut-out linerless label. The main drawback of the invention is that the label formed from this method and apparatus is very expensive.

EP579423 discloses a linerless label stock produced from a single substrate utilizing a coating machine by moving the substrate through the coating machine and applying a tie coating to the substrate first face, a release coating to the substrate second face, and a
20 pressure sensitive adhesive to the tie coating. The tie coating comprises a dispersion of a pigment, such as silica, with a binder, such as polyvinyl alcohol. The substrate is cut to form individual labels, and is rolled up into a roll with the release coated second face on the outside of the roll. Printing may be applied to the substrate prior to coating, or to the release coating. The main drawback of the invention is that the process used to prepare
25 the label stock is very complex. Hence, there had been attempts to make the label stock secure adding security features on both its sides, but has resulted into making the label stocks costly and complex in manufacture.

Therefore there is a need of producing cost effective provisions to add security features in the labels. Therefore, there is a need of incorporating security features in the label stocks
30 that help in providing additional security to the product against counterfeiting.

OBJECT OF THE INVENTION

The main object of the present invention is to provide a smart and secure label stock produced from a substrate utilizing plurality of specialized inks, various authentication features, adhesive, and liner materials for different/wide range of applications.

Another object of the present invention is to provide a smart and secure label stock with security features utilizing hidden images, taggants and specialized inks for coating the substrate.

Another object of the present invention is to provide a smart and secure label stock temper evident layer which masks the coating material on rear side of the substrate made using specialized inks and various authentication features for different applications.

Yet another object of the present invention is to provide a smart and secure label stock with tamper evident metalized holographic effects.

Still another object of the present invention is to provide an assembly for providing the smart and secure label stock having various security features.

15 SUMMARY OF THE INVENTION

The present invention relates to a smart and secure label stock with security features. More particularly, the present invention relates to a label stock produced from a substrate utilizing adhesive and liner materials with a plurality of specialized inks intended for different applications.

In an embodiment, the present invention provides a smart and secure label stock with security features comprising a substrate, a plurality of coating material, a sensitive adhesive, a release coat chemical, a metalized tamper evident holographic layer and a release paper wherein the security features are added on the rear side of the substrate. The substrate is preferably a paper substrate including but not limited to chrome, art and maplitho paper. The coating material is coated on a specific area of the substrate forming a plurality of separate security features on separate portions using a plurality of specialized inks. The coating material includes specialized inks and a release coating chemical, wherein the specialized inks include but are not limited to thermo-chromic ink, UV fluorescent ink, bio-chromic ink, a color ink, and a taggant coat.

In yet another embodiment, the present invention provides an assembly for manufacturing the label stock includes a plurality of ink and chemical coating stations spaced from each other, a metal coating station and a release lining station. The plurality of ink and chemical coating stations comprises of: a material tray, a plurality of rollers and a drying chamber. The ink and chemical coating station is used for coating the substrate with a plurality of specialized inks and a release coating chemical and drying the substrate. The plurality of rollers include but are not limited to material lifting roller, ink transfer roller, die/printing plate mounting roller and an impression roller. The specialized inks include but are not limited to thermo-chromic ink, bio-chromic ink, UV fluorescent ink, color ink and a taggant coat. The metal coating station is also having a plurality of rollers, and an unwind and wind shaft carrying a metalized sheet roll for giving a registered tamper evident metalized holographic effect on the substrate. A release lining station having a plurality of unwinding shafts carrying a release paper roll and a coated substrate roll, an adhesive header and at least two sandwich rollers for lining the release paper with adhesive and sandwiching the adhesive coated release paper with the substrate forming the label stock and a rewind shaft for collecting the smart and secure label stock.

In yet another embodiment, the smart and secure label stock ensures the authenticity of the product due to the security features made using specialized inks and registered tamper evident layer which has masking effect on the rear side of the substrate. The specific masking effect on the rear side of the substrate provides an extra edge to the label stock where the identification of security features cannot be revealed and thereby obviate the counterfeit of the product. The registered tamper evident metalized holographic effect on the rear side of the substrate ensures the authentication of the product because as soon as smart and secure label stock is peeled off from the product, the pattern made using metalized fumes is tampered on the product cannot be reused again. Due to this tampering the smart and secure label stock becomes unusable and prevents counterfeiting. Further the security features made using specialized inks such as any text, art work or raster image become readable on the back side of the substrate and some security features can be read through special readers or film. Raster images are images stored in varying formats which are technically characterized by the width and height of image in pixels and by number of bits per pixel (or color depth, which determines the

number of colors it represents). Raster images are non line art images and include subtle chromatic gradations, undefined lines and shapes and complex composition.

BRIEF DESCRIPTION OF THE DRAWING

- 5 Some embodiments of the present invention are illustrated as an example and are not limited by the figures of the accompanying drawings, in which like references may indicate similar elements and in which:

Figure 1 depicts the ink and chemical coating station in accordance with an embodiment to the present invention.

- 10 **Figure 2** depicts the metal coating station in accordance with an embodiment to the present invention.

Figure 3 depicts the release lining station in accordance with an embodiment to the present invention.

- 15 **Figure 4** shows the smart and secure label stock in accordance with an embodiment to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

- The present invention will now be described hereinafter in which a preferred embodiment of the invention is shown. This invention may, however, be embodied in
20 many different forms and should not be construed as being limited to the embodiment set forth herein. Rather, the embodiment is provided so that this disclosure will be thorough, and will fully convey the scope of the invention to those skilled in the art.

- The present invention relates to a smart and secure label stock with security features. More particularly, the present invention relates to the label stock produced from a
25 substrate utilizing adhesive and liner materials with specialized inks for different applications.

In a preferred embodiment, the present invention provides a smart and secure label stock with security features comprising a substrate, a coating material, a pressure or heat or

moisture sensitive adhesive, a release coat chemical, a metalized tamper evident holographic layer and a release paper wherein the security features are added on the rear side of the substrate. The substrate is preferably a paper substrate including but not limited to chrome, art and map litho paper. The coating material is coated on a specific area of the substrate forming a plurality of separate security features on separate portions using a plurality of specialized inks. The coating material includes specialized inks and a release coating chemical, wherein the specialized inks including but not limited to thermo-chromic ink, UV fluorescent ink, bio-chromic ink, a color ink, and a taggant coat. The specialized inks are used to create a plurality of security features such as a text, an artwork, a raster image etc. The bio-chromic ink coated on the substrate is a two color UV ink and is visible in two UV lights out of which one is high wavelength UV light and other is low wavelength UV light.

In yet another embodiment, the present invention provides an assembly for manufacturing the label stock includes a plurality of ink and chemical coating stations spaced from each other, a metal coating station and a release lining station. The plurality of ink and chemical coating stations comprises of: a material tray, a plurality of rollers and a drying chamber. The ink and chemical coating station is used for coating the substrate with a plurality of specialized inks and a release coating chemical and drying the substrate. The plurality of rollers include but are not limited to material lifting roller, ink transfer roller, die/printing plate mounting roller and an impression roller. The specialized inks include but are not limited to thermo-chromic ink, bio-chromic ink, UV fluorescent ink, color ink and a taggant coat. The metal coating station is also having a plurality of rollers and an unwind and wind shaft carrying a metalized sheet roll for giving a registered tamper evident metalized holographic effect on the substrate and a release lining station having a plurality of unwinding shafts carrying a release paper roll and a coated substrate roll, an adhesive header and at least two sandwich rollers for lining the release paper with adhesive and sandwiching the adhesive coated release paper with the substrate forming the smart and secure label stock and a rewind shaft for collecting the smart and secure label stock.

In the ink and chemical coating station, the material lifting roller (conveyer sheet) is used to lift the ink from the material tray and transfers the lifted ink to the corresponding ink transfer roller. The ink transfer roller transfers the ink to the pattern on the corresponding

die/printing plate mounting roller and the printed pattern is printed or coated on the rear side of the paper substrate by using the impression roller. After coating with specialized inks, the substrate is passed to the drying chamber where the substrate is dried properly. The substrate after passing through a plurality of ink and chemical coating stations gets
5 winded to the rewind shaft.

The rewind shaft gets unwound into the metal coating station having a plurality of rollers and an unwind and wind shaft carrying a metalized sheet roll for giving a registered tamper metalized holographic effect on the substrate. The substrate is passed through the plurality of rollers to transfer an adhesive on the substrate in a pattern. A metalized sheet
10 roll from an unwind shaft then comes into contact with the substrate applied with the adhesive. The metal fumes from the metalized sheet roll then stick to the substrate and thereafter the metalized substrate is dried and cured in the drying chamber.

The metal fumes give the substrate a registered tamper evident metalized holographic effect and hence the metalized substrate is wound back to a rewind shaft. On the other
15 hand, the used up metalized sheet roll is wound on the corresponding rewind shaft. The rewind shaft with metalized substrate gets unwound into the release lining station where it is sandwiched with an adhesive coated release paper through chilled sandwich rollers and finally forms the smart and secure label stock. Plurality of unwinding shafts carries a release paper roll and a coated substrate roll. The release paper is coated with adhesive
20 using the adhesive header in the release lining station.

The smart and secure label stock ensures the authenticity of the product due to the security features made using specialized inks and registered tamper evident layer which has masking effect on the rear side of the substrate. The specific masking effect on the rear side of the substrate provides an extra edge to the label stock where the identification
25 of security features cannot be revealed and thereby obviate the counterfeit of the product. The registered tamper evident layer have various effects which include metalized holographic effect or plain paper effect or mono or multicolour effect or any printing effect on the rear side of the substrate ensures the authentication of the product because as soon as smart and secure label stock is peeled off from the product, the pattern made
30 using metalized fumes or any other form is tampered on the product cannot be reused again. Due to this tampering the smart and secure label stock becomes unusable and prevents counterfeiting. Further the security features made using specialized inks such as

any text, art work or raster image become readable on the back side of the substrate and some security features can be read through special readers or film. Raster images are images stored in varying formats which are technically characterized by the width and height of image in pixels and by number of bits per pixel (or color depth, which
5 determines the number of colors it represents). Raster images are non line art images and include subtle chromatic gradations, undefined lines and shapes and complex composition.

Now referring to **Figure 1**, the ink and chemical coating station is shown. The ink and chemical coating station **(28)** has a material tray **(8)** in which a specialized ink is filled including but not limited to thermo-chromic ink, UV fluorescent ink, bio-chromic ink,
10 taggant coat, and an ink for making a hidden raster image and other security features. The material lifting roller **(1)** lifts the specialized ink from the material tray **(8)** and transfers the lifted ink into the ink transfer roller **(2)** from where the ink is transferred to pattern on the die/printing plate mounting roller **(3)** and the printed pattern is transferred
15 to the substrate **(9)** by using an impression roller **(4)**. Finally, the paper substrate **(9)** with ink coated on it is sent to the drying chamber **(10)** where it is dried properly. The substrate **(9)** after passing through the ink and chemical coating station winds back to the rewind shaft or continuous with the material tray **(8)**. The substrate **(9)** is coated with a plurality of coating material **(16, 17, 18, 19, 20, 21)** by using a plurality of ink and
20 chemical coating stations having separate inks filled in the material tray **(8)**.

The thermo-chromic ink is a type of ink that turns transparent when heat is applied. The UV fluorescent ink is an invisible ink with fluorescent properties and can be read under ultraviolet radiations. The bio-chromic ink is a two color ink UV ink and seen under two special UV lights namely short wavelength UV light and long wavelength UV light. The
25 taggant coat is an invisible ink that does not have any color and reacts with specially designed camera, light and scanner. The ink is also in the form of a hidden raster image with specifically digitized photographs, artworks, undefined lines and shapes, complex composition, subtle chromatic gradations and graphics. The inks are coated on the substrate on a specified area for security purpose.

30 Now referring to **Figure 2**, the metal coating station is shown. The metal coating station **(26)** allows the substrate **(9)** to be coated with a sensitive adhesive **(22)** present in material tray **(8)** using the material lifting roller **(1)**, ink transfer roller **(2)**, die printing

mounting roller (3), impression roller (4) and the substrate (9) is layered with the metalized sheet roll and dried using drying chamber (10) to form the metalized substrate (9a). The metalized substrate (9a) passes through the rewind shaft (7) to stick the metal fumes to the substrate (9) giving the metalized substrate (9a) the registered tamper
5 evident metalized holographic effect. The metalized sheet roll is unwound from an unwind shaft (5) and after metallization, the used up metalized sheet roll is wound again to rewind shaft (6).

Now referring to **Figure 3**, the release lining station (27) is shown having the adhesive header (12) and chilled sandwich rollers (13). The release paper (25) unwinds from the
10 release paper unwind shaft (11) and passed through the adhesive header (12) from where the release paper (25) is coated with a pressure sensitive adhesive. The unwind shaft (14) on the other hand, unwinds the metalized substrate (9a) and both the adhesive coated release paper and the metalized substrate (9a) is passed through the chilled sandwich rollers (13) where they are sandwiched together to form the smart and secure label stock
15 (9b) and winds into the rewind shaft (15).

Now referring to **Figure 4**, the smart and secure label stock is shown. The label stock comprises of a substrate (9) with coating material, release coat (21), release coat agent (24), tamper evident layer (23), a sensitive adhesive (22) and a release paper (25). The coating material is coated on a specific area of the substrate (9) forming a plurality of
20 separate security features on separate portions using a plurality of specialized inks. The specialized inks include but not limited to thermo chromic ink (16), taggant coat (17), UV fluorescent ink (18), special ink (19) for raster image and bio chromic ink (20) to be coated on a specified area on the substrate (9) forming the separate security features from the separate ink. The release coat (21) is formed by coating the substrate (9) by release
25 coated chemical or release agent. The release coat agent (24) is coated on the substrate (9) and tamper evident holographic effect is given to the substrate (9) forming the temper evident layer (23) and finally the release paper (25) is attached on the substrate using a sensitive adhesive (22) forming the smart and secure label stock (9b).

The substrate (9) on its rear side is coated with the coating material (16, 17, 18, 19, 20
30 and 21) on a specified area in the ink and chemical coating station. The release coat agent (24) and tampered evident layer (23) is formed on the rear side of the substrate (9) making it a metalized substrate in the metal coating station and finally a sensitive

adhesive **(22)** coated release paper **(25)** is attached on the rear side of the metallized substrate to form the ready to use smart and secure label stock **(9b)** in the adhesive coating station. The smart and secure label stock is usable as a blank label after die-cutting to be affixed on any product over which anything can be written by hand or as a
5 label stock over which a company label having its own security features are printed.

Therefore, the present invention provides a smart and secure label stock having a plurality of security features made on different portions in its rear side using a plurality of specialized inks and various authentication technologies. The present invention provides an added security feature for authentication of any product.

10 Many modifications and other embodiments of the invention set forth herein will readily occur to one skilled in the art to which the invention pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included
15 within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.