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(54) SECURITY PAPERS COMPRISING AN NON-REFLECTIVE COATING

SICHERHEITSPAPIER ENTHALTEND EINE NICHT REFLEKTIERENDE SCHICHT

PAPIERS DE SECURITE POURVUS D'UN REVETEMENT NON REFLECHISSANT

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Description

[0001] The present invention is concerned with improvements in security articles and papers such as bank notes, cheques, personal identification documents and the like.

[0002] It is known to partially embed in security articles and papers security elements, in particular threads, so that they are exposed at one or both sides of the security paper at intervals along the element, the regions of exposure being referred to as windows.

Whilst traditional security elements have been narrow and of constant widths, it is desirable to use wider elements or ones with varying widths, for aesthetic reasons or because more information/indicia can be applied to the element.

[0003] The process of embedding security elements of varying widths in paper has been described in EP-A-0070172. The narrow portions become wholly embedded and the wider portions remain exposed. One problem that has been identified using this method is that fibres get deposited around the wider regions in an uneven and unattractive manner. In particular, when embedding such security elements into security paper, an uneven deposition of paper fibres along the edges of the elements, where the thread touches the paper, can cause the windows to appear unsightly and not aesthetically pleasing. It may be possible to overcome this effect by using air or water jets to clean off excessive fibres but this is difficult and expensive. The current invention accepts that the fibres will be deposited and aims to mask their presence.

[0004] Although the unsightly effect of uneven fibre deposition can be limited to acceptable levels for security elements having a continuous width of less than about 2mm, it has been found that for element with a varying width, or for elements having widths greater than about 2mm, this problem can reach an unacceptable level. As a consequence designs printed onto the security paper over the wider windowed elements may appear inconsistent and irregular.

[0005] Furthermore, recent approaches to embedding security elements and wide polymeric bands into paper have suggested binding fibres in discrete regions on the element, as described in WO 00/39391. The binding is usually achieved by applying an adhesive onto the thread as a design or indicia. The approach outlined in WO 00/39391 is adequate, but the effectiveness of the feature may be reduced by poor paper fibre deposition.

[0006] The use of matt non-reflective coatings has been described previously in EP-A-988157. This disclosure describes a security element intended to be wholly non-visible in reflected light when embedded in windowed security paper.

[0007] However, the exposed part of the security thread described in this document does not form a visually striking feature of the appearance of the security article in reflected light.

[0008] A further problem is that there is a continued

need to provide ever more secure documents for an increasing variety of uses to prevent counterfeiting, as counterfeiters have greater access to more sophisticated reproduction equipment.

[0009] The current invention therefore provides a security substrate comprising a security element partially embedded therein, such that regions of the security element are exposed in windows in at least one surface of the substrate, in which a matt non-reflective coating is applied to at least a part of the security element, characterised in that the matt non-reflective coating is applied to at least parts of one or both edges of the element, the regions coated by the matt coating being substantially invisible to the unaided eye when the substrate is viewed in reflected light.

[0010] It has been found that the aforementioned problems may be overcome by selectively applying a matt coating to the wider extremities of the security element, which coating is substantially the same colour as the substrate onto or into which the element is to be applied or embedded, thereby masking any areas of uneven fibre deposition and providing further enhancements to the appearance of the security document.

[0011] The present invention enables an additional level of complexity and security to be built into the security element without compromising the appearance of the thread once it has been embedded into a security document or the like.

[0012] The matt coating may also have additional machine-detectable functionality such as luminescence or magnetic properties, though it is preferable to use covert properties, such as magnetics, as portions of the matt coating will be covered by fibres.

[0013] Although the matt regions themselves are potentially machine-readable, as stated above, the regions may also conceal other machine-readable materials such as magnetic materials.

[0014] Furthermore, the matt regions of a security element according to the present invention are substantially invisible to the unaided eye in reflected light when the security element is included into a substrate. The matt regions of the security element may also contain an adhesive to promote adhesion of paper or other fibres within the treated area. Typically the regions will be coated with a matt non-reflective coating substantially the same colour as the substrate into which the security element is to be included. The matt coating may also have additional machine readable or authenticable properties.

[0015] The current invention, seeks to improve and enhance the appearance of the security element in a windowed substrate in reflected light by masking defects that occur during the substrate making process. To this end, the matt coating is applied in discreet regions to enhance and improve visualisation of the element in non-coated areas.

[0016] Preferred embodiments of the present invention will now be described in more detail, by way of example only, with reference to the following Figures, in which:

Figure 1 shows a plan view of a first embodiment of a security element according to the present invention having a matt non-reflective coating;

Figure 2 shows a plan view of a second embodiment of a security element according to the present invention;

Figure 3 shows a plan view of a third embodiment of a security element according to the present invention;

Figure 4 shows a plan view of a fourth embodiment of a security element according to the present invention, which has a constant width with two matt non-reflective areas running along either edge;

Figure 5 shows a plan view of a fifth embodiment of a security element according to the present invention;

[0017] Figure 1 shows a security element 1 according to a first embodiment of the present invention for partially embedding into a fibrous substrate, such as a security paper or the like. The security element 1, which is preferably made from metallised PET, is of varying width and may be of any desired length. The security element 1 is substantially elongate in shape and has alternating wide portions 3 and narrow portions 4. The element 1 is preferably symmetrical about a centre axis 5. The extremities of the wide portions 3 are coated with a matt non-reflective coating 2 which is substantially the same colour as the substrate into which the element 1 is to be embedded. This leaves a constant strip which is uncoated along the centre of the element 1, which is the width of the narrow portions 4.

[0018] The security element 1 is partially embedded within the substrate, preferably using known papermaking or similar apparatus such as cylinder mould or Fourdrinier machines. The process used is selected to produce a windowed substrate in which portions of the elements are exposed in windows at one or both surfaces of the substrate. As a further alternative, a method may be selected which enables a continuous strip of the element 1 to be exposed on one surface of the substrate, and portions exposed in windows in the other surface.

[0019] The narrow portions 4 of the element are typically less than 2mm in width. Typically the wide portion 3 is at least 1mm wider than the narrow portion 4. When embedded in a windowed substrate such as a security paper, the security element 1 will appear to be of a constant width in the windows when viewed in reflection. When viewed in transmission, the viewer will be able to see the overall shape of the element 1 including the coated parts of the wider portions 3 of the element 1 due to their increased opacity in contrast to the surrounding substrate.

[0020] Figure 2 shows an alternative embodiment of a

security element 1 according to the present invention. In this embodiment, the security element 1 has been die cut such that the edges 6 are undulating. Security elements 1 with curved edges are harder to counterfeit and may also mirror a design applied to a security document or other article made from the substrate into which the security element 1 is embedded. Such a design may be created by demetallisation, diffractive effects or printed using inks.

[0021] When viewed in reflective light, the security element 1 will appear as a visible security element that has a width variation that is less than that of the whole element and may be designed so as to give the appearance of a security of constant width. In transmissive light, the whole element 1 will be seen.

[0022] Figure 3 shows a further embodiment of the present invention. In this embodiment, the edges 6 of the security element 1 are castellated. The wide portions 3 are only partially coated with the matt non-reflective coating 2 at their very extremities, leaving the majority of the wide portions 3 and all of the narrow portions 4 uncoated.

[0023] When viewed in reflective light, the security element 1 will appear to be of constant width. In transmissive light, the whole element 1 will be seen.

[0024] Figure 4 shows how the current invention may be employed in respect of an element having a constant width. It has been found that, when embedding elements of widths greater than 2mm, problems can occur with poor fibre deposition along the edges 6 of the element. Again this can be unsightly and is certainly not desirable. The matt non-reflective coating is therefore used to mask this problem and is applied to the edges 6 of the security element 1. Although some of the width of the element is "lost" under the coating 2, the area of the element under the coating 2 may be used for non-visual information such as magnetic coding as described in EP-A-0516790.

[0025] In reflective light, only the uncoated portion of the security element 1 will be visible, whereas the whole element will be visible in transmission.

[0026] Figure 5 shows another embodiment of the present invention in which a security element 1 has a constant width. In this embodiment, a matt non-reflective coating 2 is applied in a manner such that the uncoated section of the element 1 has undulating edges. When such a security element 1 is embedded in a windowed substrate it will appear to have a varying width when viewed in reflection. However, in transmission, the entire shape of the security element 1 will be visible. This effect is both aesthetically pleasing and results in a security element 1 that is harder to counterfeit than standard elements, particularly if elaborate patterns are used along either edge 6. The coating 2 can be applied in patterns which contrast or complement demetallised, holographic or printed features on the security document or article or to provide visual continuity.

[0027] The matt non-reflective coatings may be combined in register with demetallised regions 7, thus producing a visually striking effect and also an enhancement

in the security of the final document, due to the added complexity of the security element.

[0028] It would also be appreciated by a person skilled in the art that a matt non-reflective coating 2 may be applied in accordance with the present invention on one side of the security element only and the other side of the security element may remain uncoated or may be provided with a full coating or, alternatively, a partial coating may be applied on both sides of the security element to prevent thread turnover from being apparent to the user. Similarly, the security element 1 need not be symmetrical about the centre axis 5.

[0029] Furthermore, the security element to which the present invention refers may be in the form of a security thread or equally may be a planchette.

[0030] The security element can be embedded in a security substrate used to make any security document, such as a banknote, Passport, voucher, passport, bond, certificate and the like.

[0031] Although several specific embodiments of the present invention have been described above, the features described may be used in any combination.

Claims

1. A security substrate comprising a security element (1) partially embedded therein, such that regions of the security element (1) are exposed in windows in at least one surface of the substrate, said security element (1) having at least a coated portion in which a matt non-reflective coating (2) is applied to at least a part of the security element (1) and an uncoated portion, **characterised in that** the matt non-reflective coating (2) is applied to one or both edges of the element (1), wherein only the uncoated portion of the element (1) is visible when the substrate is viewed in reflected light, and when the substrate is viewed in transmitted light the overall shape of the security element (1) is visible.
2. A security substrate as claimed in claim 1 wherein the security element (1) is an elongate element.
3. A security substrate as claimed in claim 1 or claim 2 wherein the security element (1) is of constant width.
4. A security substrate as claimed in any one of claims 1 or 2 wherein the security element (1) is of varying width and has alternating narrow portions (4) and wide portions (3).
5. A security substrate as claimed in claim 4 wherein the width of the narrow portions (4) of the security element (1) is no greater than 2mm.
6. A security substrate as claimed in claim 4 or claim 5 wherein the width of the wide portions (3) of the se-

curity element (1) is at least 1mm wider than the width of the narrow portions (4).

7. A security substrate as claimed in any one of claims 4 to 6 wherein the narrow portions (4) are uncoated and the matt non-reflective coating (2) is applied to parts of the edges of the wide portions (3).

Patentansprüche

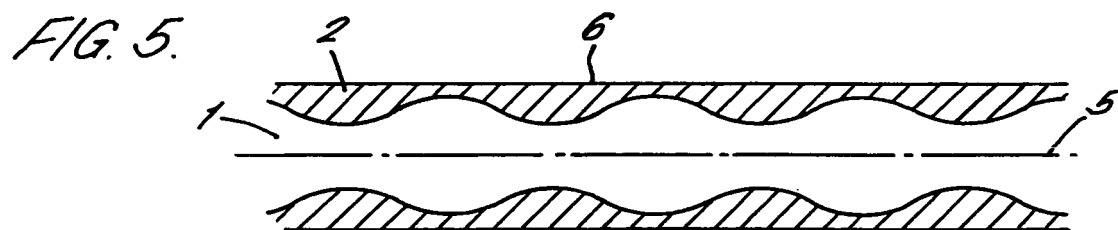
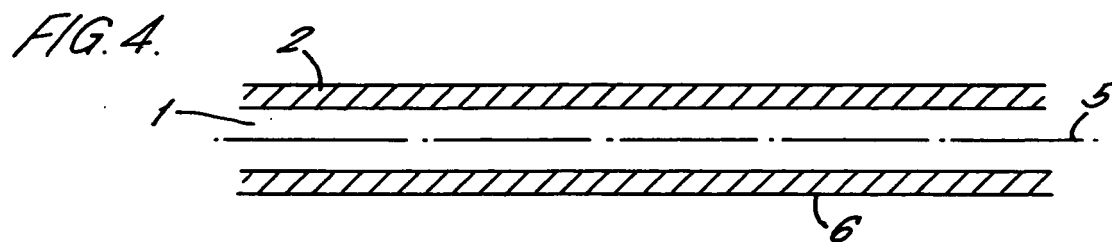
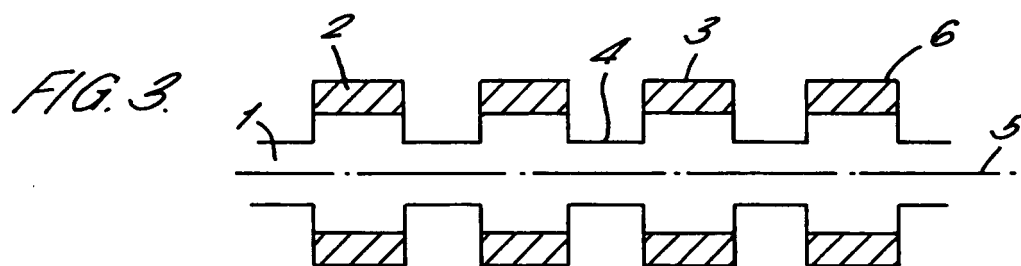
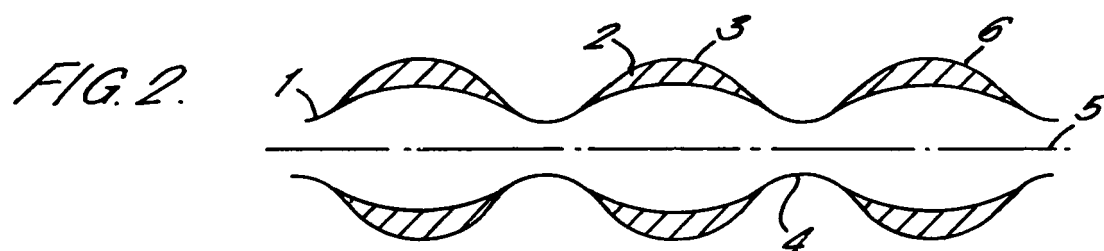
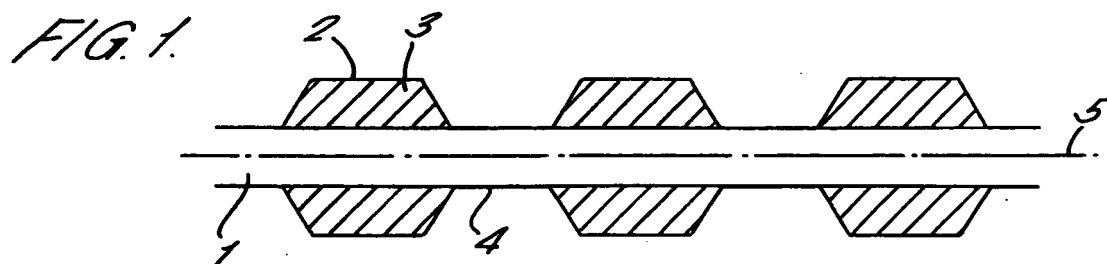
1. Sicherheitssubstrat, das ein zum Teil darin eingebettetes Sicherheitselement (1) aufweist, sodass Bereiche des Sicherheitselements (1) in Fenstern in zumindest einer Oberfläche des Substrats freiliegen, wobei das Sicherheitselement (1) zumindest einen beschichteten Abschnitt, in dem eine matte, nicht reflektierende Beschichtung (2) auf zumindest einen Teil des Sicherheitselements (1) aufgebracht ist, und einen nicht beschichteten Abschnitt aufweist, **dadurch gekennzeichnet, dass** die matte, nicht reflektierende Beschichtung (2) auf eine oder beide Kanten des Elements (1) aufgetragen wurde, wobei nur der nicht beschichtete Abschnitt des Elements (1) sichtbar ist, wenn das Substrat im Auflicht betrachtet wird, und die gesamte Form des Sicherheitselements (1) sichtbar ist, wenn das Substrat im Durchlicht betrachtet wird.
2. Sicherheitssubstrat nach Anspruch 1, wobei das Sicherheitselement (1) ein längliches Element ist.
3. Sicherheitssubstrat nach Anspruch 1 oder Anspruch 2, wobei das Sicherheitselement (1) eine konstante Breite aufweist.
4. Sicherheitssubstrat nach Anspruch 1 oder Anspruch 2, wobei die Breite des Sicherheitselements (1) variiert und das Sicherheitselement (1) abwechselnd schmale Abschnitte (4) und breite Abschnitte (3) aufweist.
5. Sicherheitssubstrat nach Anspruch 4, wobei die Breite der schmalen Abschnitte (4) des Sicherheitselements (1) nicht größer als 2 mm ist.
6. Sicherheitssubstrat nach Anspruch 4 oder Anspruch 5, wobei die Breite der breiten Abschnitte (3) des Sicherheitselements (1) zumindest 1 mm größer ist als die Breite der schmalen Abschnitte (4).
7. Sicherheitssubstrat nach einem der Ansprüche 4 bis 6, wobei die schmalen Abschnitte (4) nicht beschichtet sind und die matte, nicht reflektierende Beschichtung (2) auf Teile der Kanten der breiten Abschnitte (3) aufgebracht wurde.

Revendications

1. Substrat de sécurité comprenant un élément de sécurité (1) partiellement enrobé dans celui-ci, de telle sorte que les régions de l'élément de sécurité (1) sont exposées dans des fenêtres dans au moins une surface du substrat, ledit élément de sécurité (1) ayant au moins une partie revêtue dans laquelle un revêtement mat non réfléchissant (2) est appliqué sur au moins une partie de l'élément de sécurité (1) et une partie non revêtue, **caractérisé en ce que** le revêtement mat non réfléchissant (2) est appliqué sur un ou les deux bords de l'élément de sécurité (1), dans lequel seule la partie non revêtue de l'élément de sécurité (1) est visible lorsque le substrat est vu dans une lumière réfléchie, et lorsque le substrat est vu dans une lumière transmise, la forme globale de l'élément de sécurité (1) est visible. 5
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2. Substrat de sécurité selon la revendication 1, dans lequel l'élément de sécurité (1) est un élément allongé. 15
3. Substrat de sécurité selon la revendication 1 ou 2, dans lequel l'élément de sécurité (1) a une largeur constante. 20
4. Substrat de sécurité selon l'une quelconque des revendications 1 ou 2, dans lequel l'élément de sécurité (1) est de largeur variable et a une alternance de parties étroites (4) et de parties larges (3). 25
5. Substrat de sécurité selon la revendication 4, dans lequel la largeur des parties étroites (4) de l'élément de sécurité (1) ne dépasse pas 2 mm. 30
6. Substrat de sécurité selon la revendication 4 ou 5, dans lequel la largeur des parties larges (3) de l'élément de sécurité (1) est d'au moins 1 mm plus large que la largeur des parties étroites (4). 35
7. Substrat de sécurité selon l'une quelconque des revendications 4 à 6, dans lequel les parties étroites (4) sont non revêtues et le revêtement mat non réfléchissant (2) est appliqué sur des parties des bords des parties larges (3). 40
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REFERENCES CITED IN THE DESCRIPTION

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