A security hologram is disclosed including holographic material with a holographic image formed thereon and a shape (letters, numismatics or a guilloche pattern) printed on the holographic material using at least one fluorescent ink. Also disclosed is a security printed material formed from a substrate (sheet material) with a security hologram of this type attached thereto.
SECURITY HOLOGRAM AND SECURITY PRINTED MATERIAL

The present invention relates to a security hologram and relates particularly, but not exclusively, to a hologram for use on security printed material.

The purpose of security printing is to make the counterfeit copying of a document impossible, or at least extremely difficult, to achieve. Various techniques are employed by security printers to achieve this including the use of holograms, printing in micro text, numismatics (where a series of parallel lines are slightly altered in order to create a complex shape), micro numismatics (as set out in our earlier patent GB2411862), and printing using UV fluorescent inks, IR transparent inks and magnetic inks.

The addition of each of these security printing techniques, although making it harder for a potential forger, also makes the printing of an original document more complex and as a result more expensive. It is typically the case that a security printing machine has a large number of print heads each printing a different colour. However, given a finite number of print heads as further new techniques and ink types are added it is either necessary to run paper through the printer more than once (creating potential print alignment difficulties) or to use a new machine with more print heads.

One of the disadvantages of using UV fluorescent inks, that is inks that are invisible in standard visible
light but which fluoresce under a UV light source, is that in order for them to be effectively seen the paper they are printed on must be what is referred to as UV dull. This is paper that itself does not fluoresce under UV light. Most standard paper does fluoresce when exposed to UV light making the UV fluorescent ink difficult to see and where fine line security printing techniques are used with the UV fluorescent ink the detail of the fine line printing technique becomes impossible to authenticate. As a result it is necessary to use UV dull paper or alternatively a UV dull ink can be printed onto the standard paper prior to the UV fluorescent ink being printed. This UV dull ink prevents the fluorescence of the paper allowing fine line security printing techniques to be observed in the UV fluorescent ink but the UV dull ink requires its own ink head on the printer thereby either increasing the cost or reducing the number of other techniques and inks that can be used. As a result the use of UV fluorescent ink either increases the cost of printing by making a requirement for UV dull paper or reduces the security by taking up a print head with UV dull ink which also increases the cost.

Preferred embodiments of the present invention seek to overcome the above disadvantages of the prior art.

According to an aspect of the present invention there is provided a security hologram comprising:

at least one holographic material having at least one holographic image formed thereon; and

at least one shape printed at least partially on said holographic material using at least one fluorescent ink.
By printing a shape in UV fluorescent ink on a hologram, the advantage is provided that the hologram does not fluoresce under the UV light making the UV fluorescent ink visible in order that it can be checked to authenticate the security printing on the document. As a result, the hologram can be placed on any substrate that is printed on including low cost papers that are not UV dull. Neither is it necessary to print a UV dulling ink onto the paper prior to printing the UV fluorescent ink thereby saving the cost of the UV dull ink and not taking up a print head which could be used for another security ink or security printing technique. The present invention therefore allows the use of UV fluorescent inks in a larger variety of security printing scenarios without increasing cost or compromising on security printing techniques.

In a preferred embodiment a plurality of shapes are printed using a plurality of fluorescent ink colours.

In another preferred embodiment at least one shape comprises one or more if the following: -

(a) at least one letter shape;
(b) a series of letters forming at least one word;
(c) at least one guilloche pattern; and
(d) at least one numismatic image.

According to another aspect of the present invention there is provided a security printed material comprising: -

at least one substrate having at least one printable surface thereon; and
at least one security hologram as set out above attached to said printable surface.

In a preferred embodiment the fluorescent ink is at least partially printed on said substrate and on said hologram by attaching said hologram to said substrate before said ink is printed.

By partially printing on the hologram and partially printing on the substrate once the hologram has been added to the substrate, this provides the advantage that the order in which the security techniques were used is apparent. Even if a non-UV dull paper is used the fluorescent ink will be at least partially visible and it is easy to validate that the UV inks extend continuously over the hologram onto the substrate even if the fluorescing of the paper prevents the detailed shape from being checked as part of the authentication.

According to a further aspect of the present invention there is provided a method of security printing comprising the steps of:-

printing at least one shape using at least one fluorescent ink at least partially on a security hologram.

The method may further comprise attaching said hologram to a substrate and printing at least one said fluorescent ink at least partially on said hologram and at least partially on said substrate.

The method may also further comprise printing a plurality of coloured fluorescent inks.
In a preferred embodiment at least one said shape is printed using a printing technique for printing one or more of the following:

(a) at least one letter shape;
(b) a series of letters forming at least one word;
(c) at least one guilloche pattern; and
(d) at least one numismatic image.

Preferred embodiments of the present invention will now be described, by way of example only, and not in any limitative sense, with reference to figure 1 which shows a security printed material of the present invention including a security hologram also of the present invention.

Referring to figure 1 a security printed material in the form of a name badge 10 has a printable substrate 12 and a security holographic material in the form of a hologram 14 that has a holographic image formed thereon. The formation of holographic images does not form part of this invention and is well known to persons skilled in that art. The substrate 12 typically has well known security printing techniques applied thereon and can be formed from any suitable material for printing on including standard paper, UV dull paper, plastic and other materials.

In order to enhance the security printing on the substrate the hologram and the substrate have UV fluorescent inks (of the type familiar to persons skilled in the art) printed thereon. Under standard lighting conditions the fluorescent inks are invisible but become visible to the naked eye when exposed to UV light. The
shaped printing using the UV fluorescent ink can include lettering as indicated and magnified at 16 and guilloche patents as indicated and magnified at 18. As can be seen at 20, under further magnification, the guilloche patent (and any other security printing technique used) can utilise different UV fluorescent inks that fluoresce to produce different colours.

The UV fluorescent ink can be printed solely on the hologram or can in addition be printed partially on the substrate. Even if the substrate is not a UV dulled material the UV fluorescent ink will be sufficiently visible to ensure there is correct continuation of the UV ink from the hologram onto the substrate, thereby ensuring that a hologram has not been lifted from another location and attached to the substrate. The part of the shape that is over the hologram can be checked in detail under magnification to ensure that the security printing pattern or wording is correct.

In this instance the hologram is first stuck to the substrate and then the printing takes place over both the substrate and the hologram. However, it is also possible to print the UV fluorescent ink onto the hologram before it is stuck onto the substrate. In order to ensure that the UV fluorescent inks cannot be easily wiped off the hologram curable inks must be used and the inks cured as part of the printing process.

It will be appreciated by persons skilled in the art that the above embodiment has been described by way of example only, and not in any limitative sense, and that various alterations and modifications are possible.
without departure from the scope of the invention as defined by the appended claims.
CLAIMS

1. A security hologram comprising:
   - at least one holographic material having at least one holographic image formed thereon; and
   - at least one shape printed at least partially on said holographic material using at least one fluorescent ink.

2. A security hologram according to claim 1, wherein a plurality of shapes are printed using a plurality of fluorescent ink colours.

3. A security hologram according to claim 1 or 2, wherein at least one shape comprises one or more of the following:
   - (a) at least one letter shape;
   - (b) a series of letters forming at least one word;
   - (c) at least one guilloche pattern; and
   - (d) at least one numismatic image.

4. A security hologram substantially as hereinbefore described with reference to the accompanying drawings.

5. A security printed material comprising:
   - at least one substrate having at least one printable surface thereon; and
   - at least one security hologram according to any one of the preceding claims attached to said printable surface.

6. A security printed material according to claim 5, wherein said fluorescent ink is at least partially printed on said substrate and on said hologram by
attaching said hologram to said substrate before said ink is printed.

7. A security printed material substantially as hereinbefore described with reference to the accompanying drawings.

8. A method of security printing comprising the steps of:
   - printing at least one shape using at least one fluorescent ink at least partially on a security hologram.

9. A method according to claim 8 further comprising attaching said hologram to a substrate and printing at least one said fluorescent ink at least partially on said hologram and at least partially on said substrate.

10. A method according to claim 8 or 9 further comprising printing a plurality of coloured fluorescent inks.

11. A method according to any one of claims 8 to 10, wherein at least one said shape is printed using a printing technique for printing one or more of the following:
   (a) at least one letter shape;
   (b) a series of letters forming at least one word;
   (c) at least one guilloche pattern; and
   (d) at least one numismatic image.

12. A method of security printing substantially as hereinbefore described with reference to the accompanying drawings.
**INTERNATIONAL SEARCH REPORT**

International application No

PCT/GB2010/050475

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. B42D15/00 B42D15/10

According to International Patent Classification (IPC) or to both national classification and IPC.

**B. DOCUMENTS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

B42D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched.

Electronic data base consulted during the international search (name of data base and where practical, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<tr>
<td>A</td>
<td>WO 2006/056089 A2 (ORELL FUESSLI SICHERHEITSDRUCK [CH]; EICHENBERGER MARTIN [CH]) 1 June 2006 (2006-06-01) the whole document</td>
<td>1,8</td>
</tr>
<tr>
<td>A</td>
<td>WO 2008/111016 A2 (BUNDESDRUCKEREI GMBH [DE]; LEOPOLD ANDRE [DE]; FISCHER JOERG [DE]; SPR) 18 September 2008 (2008-09-18) the whole document</td>
<td>1,8</td>
</tr>
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**D.**

Further documents are listed in the continuation of Box C

*See patent family annex*

Special categories of cited documents

- 'A' document defining the general state of the art which is not considered to be of particular relevance
- 'E' earlier document but published on or after the international filing date
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Date of the actual completion of the international search

31 May 2010

Date of mailing of the international search report

10/06/2010

Name and mailing address of the ISA/

European Patent Office, P B 5818 Patentlaan 2 NL - 2280 HV Rijswijk

Tlf (+31-70) 340-2040, Fax (+31-70) 340-3016

Authorized officer

Dewaele, Karl
<table>
<thead>
<tr>
<th>Patent document cited in search report</th>
<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
</tr>
</thead>
<tbody>
<tr>
<td>WO 2006056089 A2</td>
<td>01-06-2006</td>
<td>AT 432173 T</td>
<td>15-06-2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AU 2005309224 A1</td>
<td>01-06-2006</td>
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<tr>
<td></td>
<td></td>
<td>CA 2588186 A1</td>
<td>01-06-2006</td>
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<tr>
<td></td>
<td></td>
<td>CN 101119857 A</td>
<td>06-02-2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1827866 A2</td>
<td>05-09-2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 2008520458 T</td>
<td>19-06-2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KR 20070086572 A</td>
<td>27-08-2007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US 2008169639 A1</td>
<td>17-07-2008</td>
</tr>
<tr>
<td>WO 2008110163 A2</td>
<td>18-09-2008</td>
<td>CN 101678696 A</td>
<td>24-03-2010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 102007012696 A1</td>
<td>18-09-2008</td>
</tr>
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