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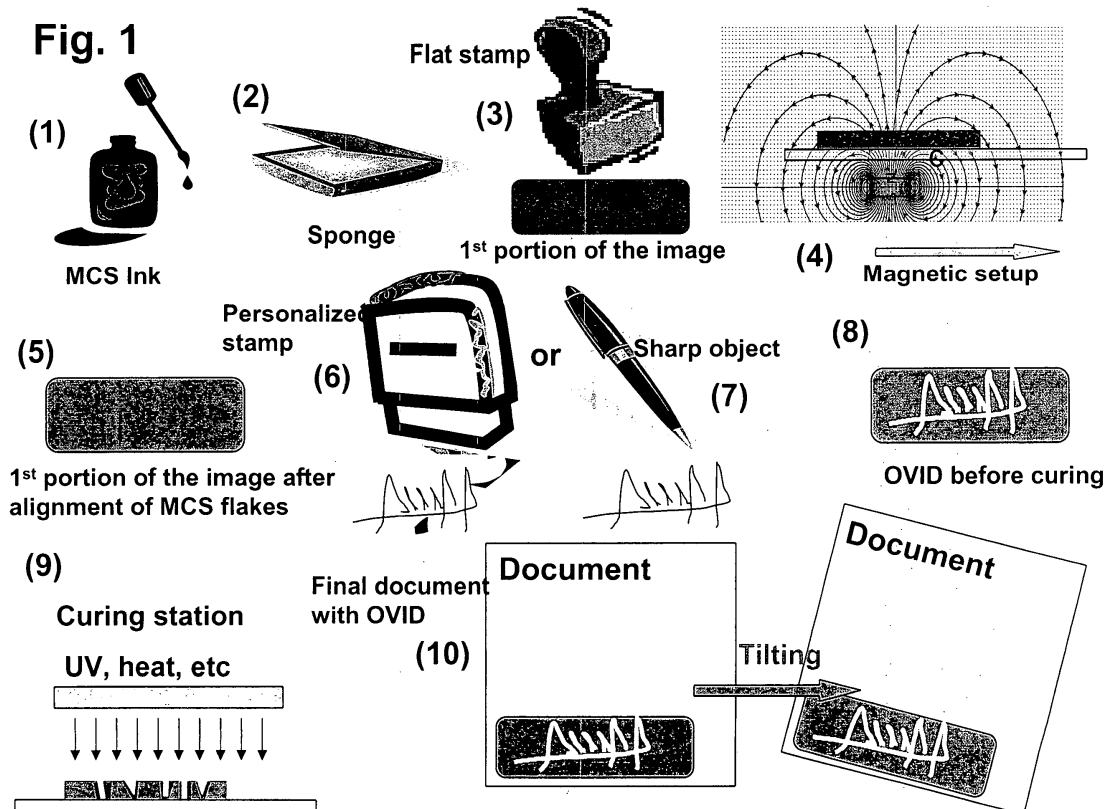
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(54) **A kit for providing an image on a substrate**

(57) A kit for producing optically variable images is disclosed wherein the kit includes a special effect pigment having particles that are magnetically alignable, a magnet for aligning the particles and a scribing tool for personalizing an image. Alternatively or in addition the

kit can include e-field responsive flakes in a carrier vehicle and an electric field source for aligning said flakes. A stylus may be included for moving or changing the alignment of a portion of the flakes that have been aligned in the magnetic or electric field.



## Description

### FIELD OF THIS INVENTION

[0001] This invention relates generally to a kit for producing optically variable images and in one aspect, more particularly to a kit that includes a special effect pigment having particles that are magnetically alignable, a magnet for aligning the particles and a scribing tool for personalizing an image.

### BACKGROUND OF THE INVENTION

[0002] Printing kits of various types are well known and have proven to be useful in assisting and motivating adults and children to become interested in the printing arts. By way of example, United States Patent 5,435,240 in the name of Fromm describes an educational device in the form of a children's pad printing kit includes a smooth, preferably transparent, transfer sheet upon which images may be drawn or traced, one or more water based felt tip ink pens, and a deformable rubber-like transfer pad which is capable of lifting off an image from the surface of the transfer sheet when the rubber-like transfer pad is placed into contact with the ink image on the surface. United States Patent 5,902,111 issued May 11, 1999 in the name of Lindsey discloses a part printing kit for use at children's parties or other special occasions. The kit includes a T-shirt or similar article of clothing with pre-printed indicia, indicating the nature of the occasion or displaying a company's logo or other identifying phrases. The pre-printed indicia may also include directions for using the kit as described following. The kit includes a variety of fabric paints, a backing material to prevent the paints from bleeding through the fabric, brushes, markers and the like suitable for use on fabrics, and instructions. The purpose of the kit is to allow the participants at the special occasion to decorate the shirt with their handprints.

[0003] Within the last several years, optically variable pigments for use in inks and paints have become nearly ubiquitous being used on currencies, labels and other devices requiring built-in security features that are difficult to copy with digital copiers. Heretofore, these pigments have required expensive industrial equipment for their application in coating substrates and the like. Optically variable pigment having a color change with change in viewing angle has been described in numerous patents in the name of Roger Phillips of Flex Products Inc. and JDS Uniphase Corp, for example U.S. patent 4,838,648 5,059,245 5,171,363 5,383,995 5,569,535 6,114,018. In addition to color-shifting pigments, diffractive pigments are used as security coatings in various applications requiring anti-counterfeiting features. US Patent 6,841,238 in the name of Argoitia et al. discloses chromatic diffractive pigments also useful in this invention. Groove orientable diffractive pigment flakes are also known. Another form of flake that is less expensive to produce and that

is applicable to this invention is a reflecting flake. Reflecting flakes are disclosed by Phillips et al. in US patent 6,387,498. These aforementioned pigments have been used to coat automobiles, clothing, children's toys currencies and other highly valuable documents. As of late, several patent applications have been filed that relate to magnetic alignment of these pigments to produce desired optical effects; however, what has been missing is an inexpensive kit that would allow children and adults alike to use these special effect pigments to design their own graphics or personalized graphics.

[0004] It is an object of this invention, to provide a kit for printing field alignable pigments upon a substrate including means for creating special effects or personalizing of the printed graphics.

[0005] It is an object of this invention to provide a kit for printing with magnetically alignable paint or ink, having therein magnetically alignable flakes, wherein the flakes can first be aligned with a magnet producing a magnetic field and later scribed with a scribing tool within the kit to create personalized graphics, thereby changing the alignment of some of the magnetically aligned pigment flakes.

### SUMMARY OF THE INVENTION

[0006] According the invention, these objects are achieved by a kit for printing as defined in claim 1 and a kit for providing an image on a substrate as defined in claim 18 or 22 and a method of printing as defined in claim 19. The dependent claims define preferred and advantageous embodiments of the invention.

[0007] In accordance with an aspect of this invention there is provided, a kit for printing comprising a printing ink including a carrier vehicle and field alignable flakes;

means of generating a magnetic or electric field, for aligning the field alignable flakes in dependence upon the magnetic or electric field;  
a stylus for moving or changing the alignment of a portion of the flakes that have been aligned in the magnetic or electric field.

[0008] In accordance with the invention there is further provided, a kit for printing comprising:

a printing ink including a carrier vehicle and field alignable flakes;  
means of generating a magnetic or electric field, for aligning the field alignable flakes in dependence upon the magnetic or electric field;  
a printing stamp for moving or changing the alignment of a portion of the flakes that have been aligned in the magnetic or electric field.

[0009] In accordance with the invention a kit for providing an image on a substrate includes:

a stylus or scribe;  
 a container of ink comprising optically variable magnetically alignable flakes;  
 a magnet for aligning some of the flakes, and  
 means for curing the ink.

**[0010]** In accordance with the invention a kit for providing an image on a substrate includes:

a stylus or scribe;  
 a container of ink comprising alignable flakes;  
 a means spreading and for aligning some of the flakes, and  
 means for curing the ink.

**[0011]** In accordance with another aspect of the invention a method of printing an image is provided comprising the steps of:

applying a printing ink comprising field alignable flakes to a substrate;  
 applying a magnetic or electric field to the applied printing ink so that the field alignable flakes align along field lines; and,  
 using a stylus to re-align some of the aligned flakes.

**[0012]** In accordance with another aspect of the invention a method of printing an image is provided comprising the steps of:

applying a printing ink comprising field alignable flakes to a substrate;  
 applying a magnetic or electric field to the applied printing ink so that the field alignable flakes align along field lines; and,  
 using a printing stamp to re-align some of the aligned flakes.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0013]** Exemplary embodiments of the invention will now be described in conjunction with the drawings, in which:

Fig. 1 is a pictorial flow chart illustrating an ordered sequence of steps, pictorially in the creation of an optically variable image device (OVID).

Fig. 2 is a pictorial flow chart illustrating an ordered sequence of steps in the creation of an OVID.

Fig. 3 is a cross sectional view of an apparatus for aligning flakes in a presence of an electric field.

## DETAILED DESCRIPTION

**[0014]** This invention describes a kit and methods of using the kit to produce optically variable image devices (OVIDs).

**[0015]** The resulting image is preferably an image hav-

ing personalized graphics thereon. The ink or paint used to create the image has flakes therein that can be aligned by way of applying the flakes with a squeegee or applicator or stamp, or can be aligned by exposing the flakes in a magnetic or electric field. Preferably magnetically alignable flakes are used, and a magnet is provided to align the flakes in the magnetic field. The flakes may be colored, reflective, optically variable, and/or diffractive. In a preferred embodiment images are formed by selectively moving at least partially aligned flakes with a scribing tool to create paths or channels within a fluid, uncured, coated inked or painted surface wherein the paths or channels where flakes have been moved or removed define images, signatures or logos that can be preserved after the coating has cured.

**[0016]** The scribing tool mentioned hereafter, preferably has a pointed end or chiseled end, yet is not so sharp as to score or cut the substrate. The scribing tool preferably has an end that will allow the ink or paint to be pushed aside, while leaving some ink or paint in the path. A scribing tool could also be provided that has an end or edge that is sufficiently chiseled as a scraping tool to remove essentially all of the ink or paint in the path, where it is desired to do so. The end may also be a roller ball or similar structure so as to create an effect of a ball point pen signature.

**[0017]** Referring now to Fig. 1, a series of steps are shown pictorially as stations or steps, from step (1) through step (10) in the creation of an OVID. More specifically, in step (1) magnetic color-shifting ink (MCSI) is applied with an applicator to a stamp pad shown in (2). In step (3) a stamp is inked with the ink and is then applied to a substrate thereby coating a portion of the substrate. Of course optionally, an inked roller could be used, or any means suitable for applying ink or paint substantially evenly to a substrate. Alternatively ink can be applied through a silk screen or any suitable stencil so as to cover desired regions of the substrate. Subsequently in (4) the substrate is held over a magnet so that the magnetic field propagates through the inked substrate thereby aligning the flakes subjected to the magnetic field. The magnetically aligned flakes are shown in step (5) and the image appears dark as most of the flakes are substantially upstanding as most of the field lines in 4 are orthogonal, substantially orthogonal, or at least somewhat upstanding on their edges to the plane of the substrate. Optionally in steps (6) or (7) either a personalized stamp or a sharp object is used to push down upstanding flakes in a pattern forming a signature. Of course any number of patterns or any form of graphic can be realized. By using the scribe in step (7) any form can be created by the sharp object and any personalized indicia can be scribed into the aligned flakes thereby changing their alignment or simply removing flakes along a path. In step (6) a stamp rearranges the flakes in its path as its form of a signature is stamped upon the upstanding flakes. In step (7) when the scribe is used, flakes are actually sequentially moved from an aligned position to a different position as the

scribing tool pushes the flakes down flat or moves the flakes out of its path. Therefore the region showing a scribed signature may have flattened pressed down flakes or may be substantially absent of flakes as the flakes are pushed aside by the scribing tool. This depends upon how sharp the end of the scribe is, and how much pressure is applied to the end. In Fig. 1 step (8) shows the signed or stamped signature in the magnetically oriented ink. As was mentioned heretofore, the ink or paint can be any ink or paint having magnetically orientable flakes, for example flakes of the composition absorber/dielectric/magnetically alignable layer/reflector/dielectric absorber can be used to magnetically alignable magenta to green color shifting pigment. Alternatively a flake of the composition dielectric/reflector/magnetically alignable layer/reflector/ dielectric on an embossed substrate can provide a magnetically alignable reflective diffractive non color shifting pigment. Notwithstanding, any combination of flat, diffractive color shifting or non-color shifting flake with or without the addition of a dye in the ink vehicle can be utilized in accordance with this invention. After the image is created it is preferably passed to a curing station shown in step (9) wherein an ultra-violet (UV) or heat source is used to cure the ink so that the image remains fixed and can be handled. In step (10) the image is then affixed to a document for providing security to that document or personalizing of the document to which it is attached.

**[0018]** When optically variable flakes are used, the document bearing the signature will change color as the document is tilted. Both the background flakes and flakes in and about the signature will change color however contrast is seen so that the signature is visible. When the scribing tool is used, and flakes within the path of the tool are moved aside, a trough with ridges is formed and the resulting image, graphic or signature has raised and lower portions that can be discerned by touch, resulting in visual and tactile effects.

**[0019]** Referring now to Fig. 2, an alternate series of steps are shown as steps (1) through (9) which pictorially illustrate the process of forming an image in accordance with an embodiment of this invention. Steps (1) through (3) are the same as in Fig. 1, however the ink or paint need not be formed of magnetically alignable pigment. Any special effect flakes can be used including optically variable flakes, diffractive flakes or reflective flakes. What is required is that the flakes provide a visual difference with a change in viewing angle. After the substrate is stamped, with the special effect coating, the flakes like substantially flat to the substrate, as they have been pressed down with the flat stamp in step (3). In steps (5) or (6) of Fig 2 a signature stamp or scribing tool, respectively is used to create a signature within the flat lying flakes shown in step (7). The image is then fixed at a curing station in step (8) where the heat or UV is applied, depending upon the ink or paint vehicle. The image is affixed to a document as is shown in step (9). If optically variable flakes are used, tilting the document will show

a change of color with tilt angle. If reflecting flakes were used, having no color shift, tilting the document will show a change in brightness.

**[0020]** In the preferred embodiment shown in Fig. 1 a permanent magnet is used in step (4) to align the magnetically alignable flakes. Alternatively, an electro-magnet can be used to achieve a similar result. Rubber "fridge" magnets are also ideal for realizing a field that will allow the flakes to either stand up on edge or alternatively lie flat, depending on the orientation of the magnetic material. In another embodiment means for generating an electric field can be provided and dielectric or semiconductor flakes such as dielectric diffractive or flat flakes including alternating layers of high index and low index dielectric materials can be provided as described in United States patent 6,815,065 and United States patent application publication number 2005/0132929. These flakes can be a lined in an electric field. Other special effect pigments such as pearlescent mica based pigments alignable in an electrical field can also be used.

**[0021]** Referring now to Fig. 3, a device is shown for aligning e-field alignable pigment, which is used in place of the magnetic alignment step in Figs. 1 and 2. In Fig. 3 a substrate 30 is shown having an electrically conductive layer 31 deposited thereon. The layer 31 is electrically coupled to the ground terminal of a DC or AC voltage source. A layer 32 of e-field alignable pigment flakes in a curable carrier is applied within between the conductive layer and an upper electrode 33 upon the conductive layer. The conductive layer serves as a ground electrode.

**[0022]** The kit in accordance with this invention preferably includes ink or paint, or an ink or paint vehicle, and a supply of pigment flakes that can selectively added to the ink in a plurality of concentrations. A typical concentration of flakes within the binder or carrier is approximately 10% by weight of pigment and 90% of carrier vehicle. If the concentration is too dilute, the effect will be negligible. The kit also preferably includes an applicator in the form of a flat stamp or squeegee to spread the flakes upon a substrate. The provision of a magnet and scribing tool is also required in a preferred embodiment.

**[0023]** The substrate upon which the image may be formed can be paper, plastic, metal, and a variety of other support materials. For example, the ink or paint can even be applied to one's nails, or a sheet of glass.

A surprising effect of this invention is that the ink or paint about where the scribing tool has scribed has a rolling bar effect if looked at closely. Although bar is very thin, the effect is striking.

**[0024]** Of course, numerous other embodiments may be envisaged, without departing from the spirit and scope of the invention.

## Claims

1. A kit for printing comprising:

- a printing ink including a carrier vehicle and field alignable flakes;  
 means (31, 32) for generating a magnetic or electric field and for aligning the field alignable flakes in dependence upon the magnetic or electric field;  
 a stylus or printing stamp for moving or changing the alignment of a portion of the flakes that have been aligned in the magnetic or electric field.
2. A kit as defined in claim 1, wherein the means for generating the magnetic field is a permanent magnet or an electro-magnet.
  3. A kit as defined in claim 1 or 2, wherein the carrier vehicle and the field alignable flakes are in separate containers so that they can be intermixed in a desired ratio.
  4. A kit as defined in claim 1 or 2, wherein the carrier vehicle and the field alignable flakes are premixed and within a same container.
  5. A kit as defined in any one of claims 1-4, wherein the stylus is for use after the ink has been applied to a substrate (30) and after the ink has been exposed to the field.
  6. A kit as defined in any one of claims 1-4, wherein the stylus is for use after the ink has been applied to a substrate (30) and before the ink is exposed to the field.
  7. A kit as defined in any one of claims 1-6, further comprising a stamp pad.
  8. A kit as defined in any one of claims 1-7, wherein the printing stamp is a personalized stamp.
  9. A kit as defined in claim 8, wherein the personalized stamp includes indicia thereon relating to some aspect of the user.
  10. A kit as defined in any one of claims 1-9, further comprising a UV or heat source for curing the printing ink.
  11. A kit as defined in any one of claims 1-10, wherein the flakes are at least one of optically variable flakes, reflective flakes and diffractive flakes, or wherein the flakes have optically variable and diffractive properties.
  12. A kit as defined in any one of claims 1-11, further comprising instructions related to a sequence of steps required for printing.
  13. A kit as defined in claim 12, wherein the sequence of ordered steps includes applying the printing ink to a substrate (30), then exposing some of the printing ink applied to the substrate (30) to a magnetic field so as to align some of the flakes in dependence upon the field, and using a stylus or printing stamp to rearrange the orientation of at least some of the aligned flakes.
  14. A kit as defined in any one of claims 1-13, wherein the printing ink is in a container having an applicator for applying the ink.
  15. A kit as defined in any one of claims 1-14, further comprising a stencil having openings through which the printing ink can be applied.
  16. A kit as defined in any one of claims 1-15, further comprising a stencil having at least a channel along which the stylus can be guided.
  17. A kit as defined in any one of claims 1-16, wherein instructions are included for creating a visible signature in the magnetically aligned ink, wherein the signature is contrasted with the magnetically aligned flakes.
  18. A kit for providing an image on a substrate comprising:
    - a stylus or scribe;
    - a container of ink comprising optically variable magnetically alignable flakes;
    - a magnet for aligning some of the flakes, and
    - means for curing the ink.
  19. A method of printing an image comprising the steps of:
    - applying a printing ink comprising field alignable flakes to a substrate.
    - applying a magnetic or electric field to the applied printing ink so that the field alignable flakes align along field lines; and,
    - using a stylus or printing stamp to re-align some of the aligned flakes.
  20. A method of printing as defined in claim 18, wherein the stylus is used to flatten flakes in the path of the moving stylus.
  21. A method of printing as defined in claim 18 or 19, wherein the stylus is used to move some of the aligned flakes to the side of the stylus and out of a path of the stylus as it is guided along the substrate through the printing ink.
  22. A kit for providing an image on a substrate (30) comprising:

a stylus or scribe;  
a container of ink comprising optically variable  
magnetically alignable flakes;  
a magnet for aligning some of the flakes, and  
means for curing the ink.

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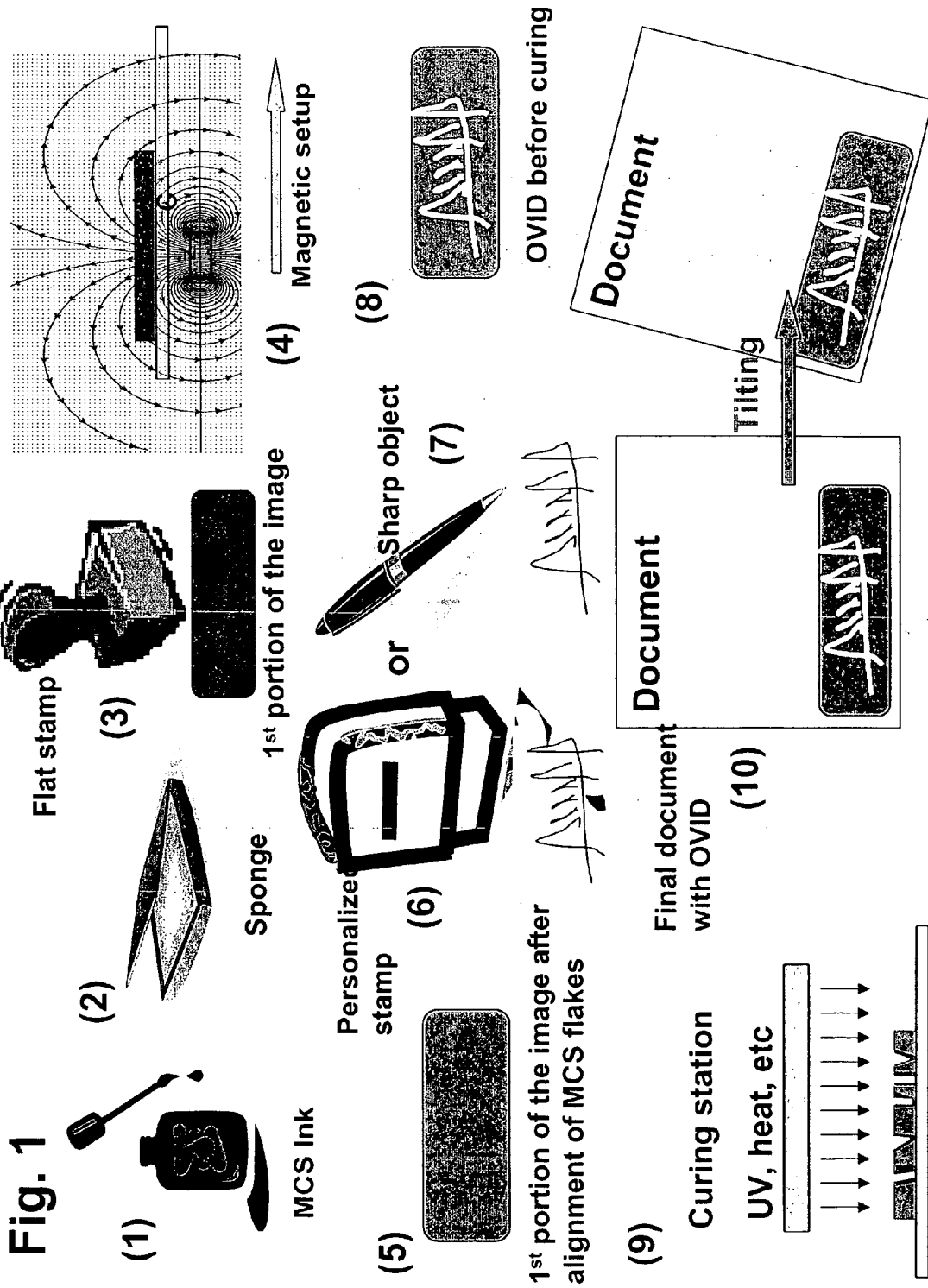
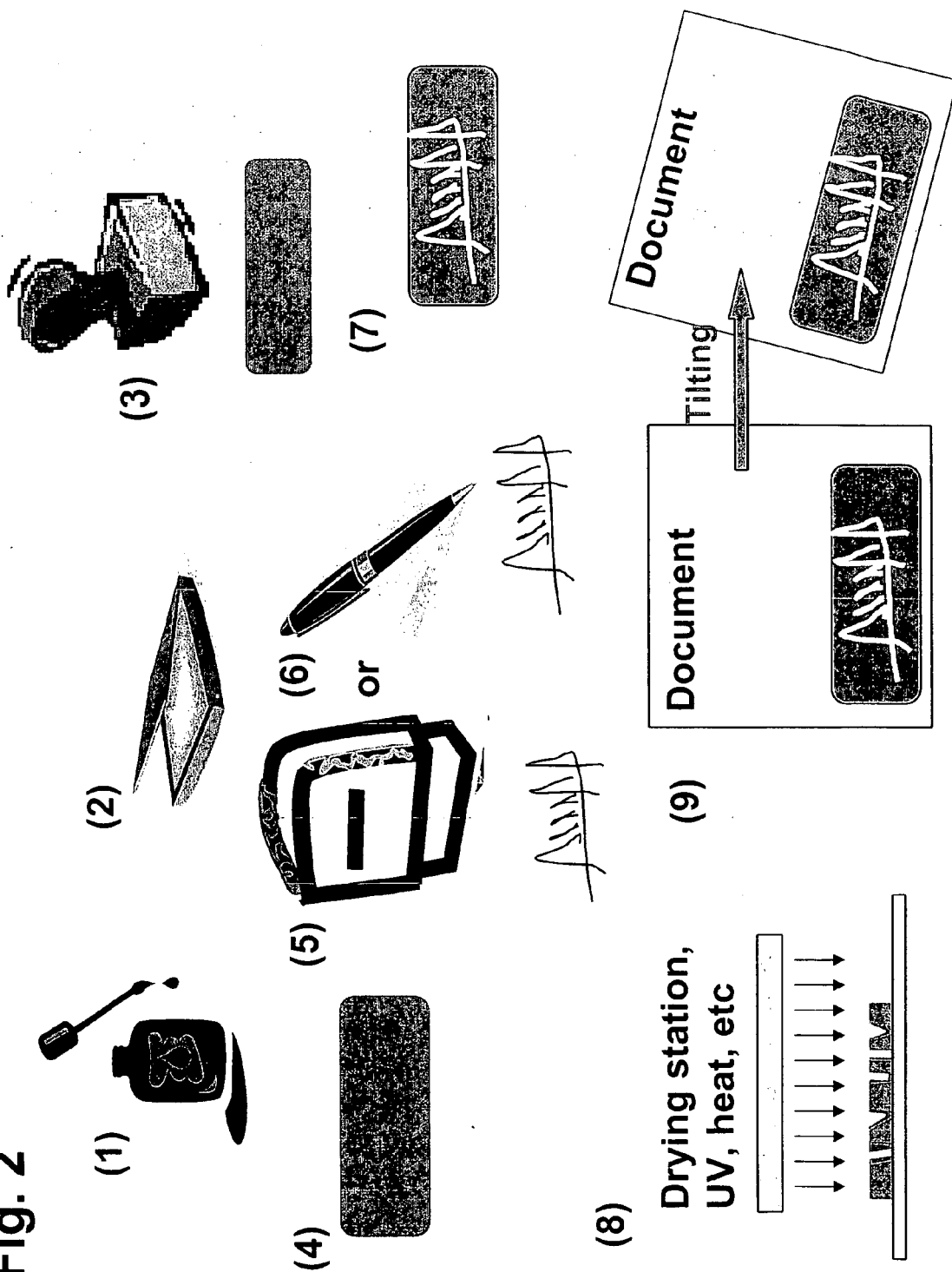


Fig. 2





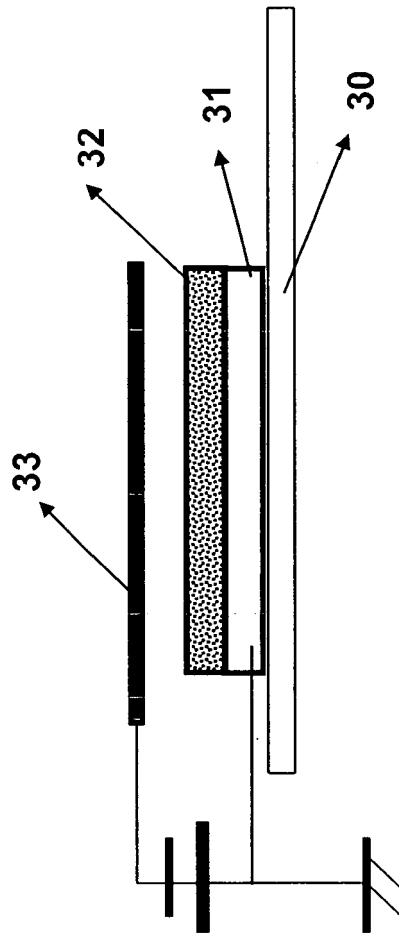


Fig. 3



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 07 01 8184

| DOCUMENTS CONSIDERED TO BE RELEVANT   |   |  |  |
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| Category  | Citation of document with indication, where appropriate, of relevant passages   | Relevant to claim  | CLASSIFICATION OF THE APPLICATION (IPC)                          |
| X   | EP 1 700 640 A (JDS UNIPHASE CORP [US])<br>13 September 2006 (2006-09-13)<br>* paragraph [0035] - paragraph [0036] *<br>* paragraphs [0039], [0048], [0049] *<br>* page 3, line 33 *<br>* examples 1-5 *<br>* figures 4a-4d *<br>* figures 8,9 *<br>----- | 1-22   | INV.<br>B05D3/12<br>B05D5/06<br>B41K1/00<br><br>ADD.<br>B05D3/14 |
|   |   |  | TECHNICAL FIELDS<br>SEARCHED (IPC)                               |
|   |   |  | B05D<br>B41K<br>B42D<br>B41M<br>B44D                             |
| The present search report has been drawn up for all claims  |   |  |  |
| Place of search<br><b>The Hague</b>   |   | Date of completion of the search<br><b>23 January 2008</b> | Examiner<br><b>Dardel, Blaise</b>                                |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br><br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |   |  |  |

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**REFERENCES CITED IN THE DESCRIPTION**

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