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(54) **Anti-counterfeiting element with flip images for an identification document and a method for its manufacture**

(57) The application relates to an anti-counterfeiting element for an identification document, said anti-counterfeiting element being able to reveal different sets of data and/or images when tilting the identification document, said data/images being viewed through a printed filter. The anti-counterfeiting element comprises more particularly two separate fragments (F1,F2), each of which comprising part of data/images to be revealed and part of the printed filter, each fragment (F1,F2) being provided on two overlapping areas of said document.

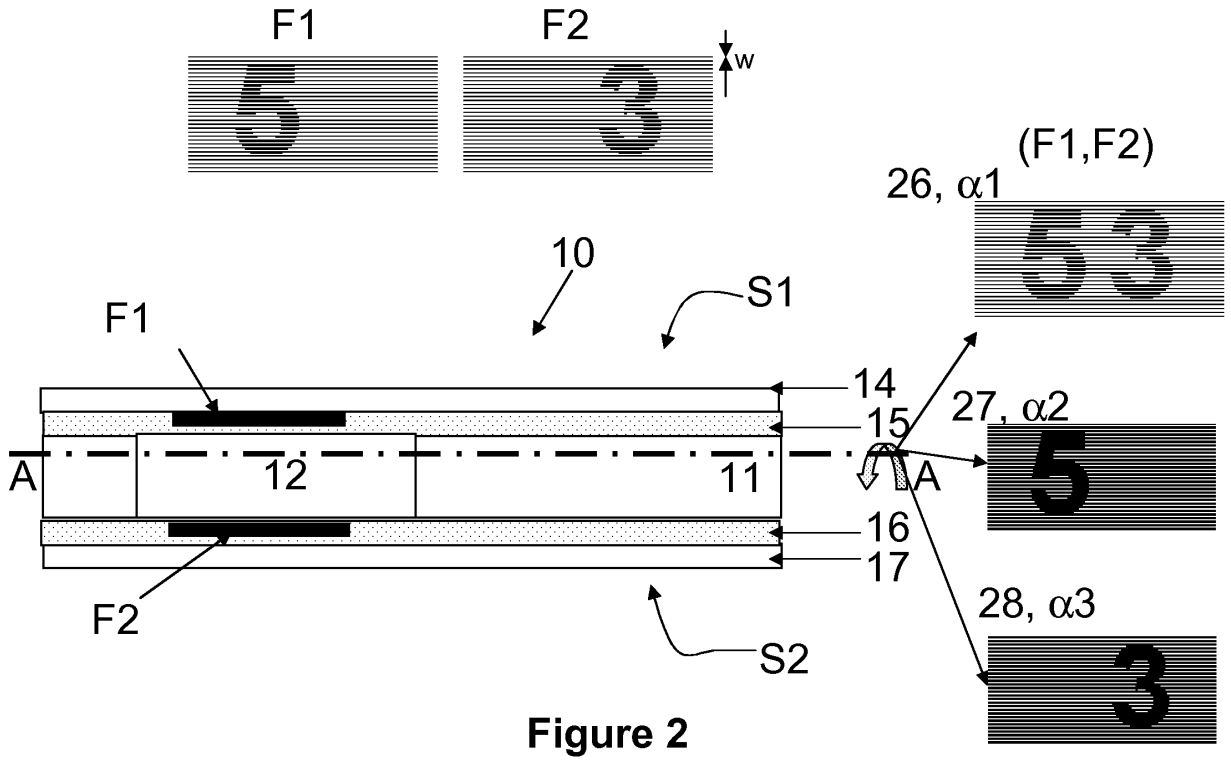

Figure 2

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Description

BACKGROUND

[0001] This invention relates generally to identification documents and a method for making such identification documents. More particularly, this invention relates to an anti-counterfeiting element for such identification document and to a secure identification document that allows detecting a fraudulent modification of the existing personalization or a completely falsified document. The invention also relates to a method for making such anti-counterfeiting element.

[0002] Identification documents are associated with secure applications, such as for example driving licenses, identity cards, membership cards, badges or passes, passports, discount cards, banking cards, money cards, multi-application cards, and other papers of value; and security documents such as bank notes. Such documents are widely used, they may comprise an electronic module or not. If they comprise an electronic module, they can function either with contact and/or without contacts depending on the application to which they are intended. They may take the shape of card or a booklet or something else. Such identification documents are graphically personalized. Personalized information is personal data of the card's owner, i.e for example his photo, his name, his birth date, his social security number, his biometric information such as his fingerprint for example, a validity date, an identification number allocated to him etc... This personalized information is printed onto the surface of the document, or into one or more constitution layers of the document. Because of the value and importance associated with each of these data carriers, they are often the subject of unauthorized copying and alterations, and forgeries.

[0003] To prevent such activities from being carried out on these data carriers, different types of visual and touchable security features have been added to data carriers. One of these security features consists in providing, into the document, an optically variable security element, which comprises at least two security markings. Said markings are decomposed and interleaved, to create a complex image that is printed into the document. Then, a filter is placed over this complex image, said filter being arranged so that it enables to visualize each marking at a respective particular angle by tilting the document. Such filter can be made either with micro-lens or with printed pattern, which in the simplest case can comprise just parallel lines.

[0004] Figure 1 shows an example of such existing printed filter over a complex image in a cross-sectional view. The filter 22 comprises parallel lines 24 that are printed onto an upper layer 20 at least translucent. In fact, the filter comprises a set of substantially opaque lines 24 that are parallel and clear gaps 25 between opaque lines 24. The period P of the filter is defined by the sum of the line width L and the gap width G. The gap width G essentially defines the resolution requirements for the markings to be revealed. A complex image 11 is printed onto a layer underneath, for example a core layer 10. The complex image, or security pattern, comprises in this example two markings A and B decomposed into bands that are interleaved. The printing of the complex image and the filter can be made either by laser engraving or by conventional printing process such as inkjet or offset or silk screen etc... Each security markings A and B is decomposed into bands that are spaced from a distance P from each other, and each band A of one security marking is interleaved with two bands of the other security marking B, and reciprocally. The distance P between each band of each security marking must be substantially the same as the period P of the filter layer 22. Then, when tilting the document, such that only one marking A or B is seen through the clear gaps 25 of the filter layer 22, this marking is seen clearly. In the figure 1, one can see that marking A can be viewed when tilting the document at viewing angle VA, while marking B can be viewed when tilting the document at viewing angle VB.

[0005] However, even if these kinds of optically variable security elements are difficult to copy because impossible to scan, they may still be falsified. Indeed, an infringer can arrive to change the variable data viewed through the filter, or to remove the part of the document comprising the optically variable security feature and to replace it by another part comprising another falsified optically variable element.

[0006] Considering the above, a problem intended to be solved by the invention, is to propose an anti-counterfeiting element for an identification document, said anti-counterfeiting element being able to reveal different sets of data or images when tilting the document, said anti-counterfeiting element being made with a more complex security so that infringement becomes impossible, while keeping a simple manufacturing process.

SUMMARY

[0007] The solution of the invention to this problem relates to the fact that said anti-counterfeiting element comprises two separate fragments, each of which comprising part of data/images to be revealed and part of the printed filter, each fragment being provided on two overlapping areas into said document.

[0008] Thus, data or images to be revealed and filter are mixed together and then divided in two fragments, each fragment facing each other through the thickness of a constitution material. Said constitution material is preferably at least translucent, or semi-opaque and enlighten by means of a backlight. With such a structure of the anti-counterfeiting element, it appears much more complex for an infringer to modify a data onto a first area of the document, because such modification affects immediately the other data onto the other area of the document and generates wrong information inside the different items showed when tilting the document.

[0009] Then, it becomes impossible to modify such anti-counterfeiting element. Moreover, because the sets of data or images, which are revealed when tilting the document, can be linked to the identity of the owner of the document, it becomes also impossible to remove the anti-counterfeiting element and to replace it by another falsified element.

[0010] According to another aspect, the invention relates also to a secure identification document comprising such an anti-counterfeiting element.

[0011] According to another aspect, the invention relates also to a method for manufacturing such an anti-counterfeiting element for an identification document. The method comprises the following steps :

- creating two fragments, each of which comprising at least one image or set of data and part of printed filter,
- printing each fragment respectively on different areas of the identification document, in such a manner that they face each other through the thickness of a constitution material, so that said part of filter of first fragment serves as filter for the other image/set of data of the second fragment and said image/set of data of first fragment can be revealed through the other part of filter of the second fragment depending on the tilt angle of the document.

BRIEF DESCRIPTION OF DRAWINGS

[0012] Other particularities and advantages of the invention will be better understood with the help of the description below, which has been provided as an illustrative and non limitative example by reference to the enclosed figures that represent:

Figure 1, already described, is a cross-sectional view of an existing printed filter over a complex image able to reveal different set of data or images when tilting the document and viewed through the printed filter,

Figure 2 is a cross sectional view of a document comprising an anti-counterfeiting element according to a first embodiment of the invention,

Figure 3 is a cross-sectional view of a document comprising an anti-counterfeiting element according to a second embodiment of the invention,

Figure 4 is an example of two fragments of an anti-counterfeiting element according to a first embodiment of the invention, each fragment comprising a part of the printed filter and data to be revealed, and it illustrates also data that can be viewed when viewing these two fragments of the anti-counterfeiting element at different tilting angles of the document,

Figure 5 is another example of two fragments of an anti-counterfeiting element according to a second embodiment of the invention, and data that can be revealed when viewing these two fragments overlapping each other at different tilting angles of the document,

Figure 6 is another example of two fragments of an anti-counterfeiting element according to a third embodiment of the invention, and data that can be revealed when viewing these two fragments overlapping each other at different tilting angles of the document.

DETAILED DESCRIPTION

[0013] Hereafter, an embodiment of the present invention will be described in the context of identity (ID) card and a method for producing it. However, it is to be understood that the invention is usable with any data carrier that includes, but is not limited to, a driving license, a badge or pass, a passport, a discount card, a membership card, a banking card, a credit card, a money card, a multi-application card, and other security documents and papers of value that are to be provided with information or data in such a way that they cannot be easily imitated by common means. Such identification documents may take indifferently the shape of card, or booklet, or something else.

[0014] Figure 2 shows a schematic cross-sectional view of an identification document 10 comprising an anti-counterfeiting element F1, F2 according to a first embodiment of the invention. This document may be made either by molding in one-piece, or by lamination or other conventional process for attaching several layers together. In the illustrated example, the document comprises several layers 11, 12, 14, 15, 16, 17 attached together. In a preferred embodiment, the layers can be made with polycarbonate. This material is very interesting because, when they are laminated, the layers are fused together and form only one piece instead of collated layers that could be delaminated. However, invention is not limited to this preferred embodiment, and layers made in other plastic material, such as PVC, ABS, PET etc...can also be used. The layers can also be attached by other means such as glue for example.

[0015] In the illustrated example, upper layers 14 and 17, also called external layers or overlay layers, are preferably transparent, in order to let information printed onto the body or lower layers to be seen from the outside. Layers 15 and 16 can be at least translucent and laser-sensitive or not. Layer 11, which is the core of the body in the illustrated example, can be either opaque, or semi-opaque or at least translucent. In the illustrated example of figure 2, if the core is completely opaque, it is then necessary to provide a part 12 in said core, which has to be either semi-opaque or at least translucent. This part 12 is intended to be used for the anti-counterfeiting element. This part 12, when at least translucent, can constitute a see-through portion of the document. However, if the layer 11 is semi-opaque or at least translucent, this part 12 is not necessary, but a portion of the layer 11 will be used for the anti-counterfeiting element. In the case where the layer 11 or the portion 12 is semi-opaque, the anti-counterfeiting element can only reveal different sets

of data or image, depending on the tilt angle of the document, only when using a backlight.

[0016] In fact, the anti-counterfeiting element is divided in two fragments F1, F2, each of which being provided on one side, respectively S1, S2 of the document, and more particularly on each side S1, S2 of the portion 12. The two fragments overlap each other. Thus, when viewing the document, one can see the two fragments F1, F2 together, overlapping each other, and displaying different sets of data or images depending on the tilt angle of the document.

[0017] In the example illustrated in figure 2, each fragment F1, F2 comprises one figure and a part of a printed filter. Thus, fragment F1 comprises for example figure "5" and a part of a printed filter, while fragment F2 comprises for example figure "3" and part of the printed filter. Each figure is shifted compare to each other, so that part of filter of fragment F2 is used as filter for figure "5" of first fragment F1, and part of filter of first fragment F1 is used as filter for figure "3" of second fragment F2. Then, when the document is tilted along the axis A-A represented in dashed lines, the two fragments, as illustrated by the references 26 to 28, display different data. Thus, in a first angle $\alpha 1$ for example, the first displayed data 26 is the number "53". In a second angle $\alpha 2$ for example, the second displayed data 27 is the figure "5", while in a third angle $\alpha 3$ for example, the third displayed data 28 is the figure "3". Thanks to this embodiment, there is no more need to use complex software to create a complex image. Indeed, there is no complex image, different image and/or data to be revealed being applied on both sides of the portion.

[0018] Figure 3 shows a schematic cross-sectional view of an identification document 10 comprising an anti-counterfeiting element F1, F2 according to a second embodiment of the invention. The same references as in figure 2 are used to design the same elements. As in the first embodiment, this document may be made either by molding in one-piece, or by lamination or other conventional process for attaching several layers 11, 14, 15, 16, 17 together. In this example, core 11 of the body has no see-through portion 12 as in first embodiment. This core 11 layer can be either opaque, or semi-opaque or at least translucent. The anti-counterfeiting element is also divided into two fragments F1, F2, each of which is applied on the same side of the document, compare to the core 11 layer. These two fragments are in fact applied either on two different layers or, as illustrated in figure 3, on each side of one layer 15. However, whatever their location into the different layers of the document, these two fragments have to overlap each other, with a minimum thickness in between of an at least translucent material.

[0019] In case the core 11 layer is completely opaque, typically white for instance, the division of the markings and filter in two fragments that are applied on two overlapping areas into the constitution layers, produces also a visible result because of the opaque core, which offers in this case a background to the displayed data. Thus, when viewing the document, one can see the two fragments F1, F2 together, overlapping each other, and displaying different sets of data or images depending on the tilting angle of the document.

[0020] The thickness of the material in-between the two overlapping areas onto which are applied the two fragments F1, F2, has to be adapted to the resolution of the lines of the fragments F1, F2 in order to have good result. That is why the thickness is at least equal to the width w of a line of the printed filter, and is preferably three times this width w..

[0021] This lower limit of the thickness is much more important when the material in-between the two overlapping areas is semi-opaque, because the two fragments have to be seen together, overlapping each other, in order to reveal the different sets of data or images without using huge angle of viewing. Typically, the preferred maximum angle for viewing last information is 30°.

[0022] The two fragments F1, F2 are applied on layers of the document either by means of a conventional color or monochrome printing process, or by laser engraving if layers used are laser-sensitive. They can be applied either on/into layers 15, 16, 11 or portion 12.

[0023] Figure 4 shows another example of two fragments F1, F2 of such anti-counterfeiting element. In this example, fragment F1 comprises a part of the printed filter and figure "3", while fragment F2 comprises another part of the printed filter and figure "5". The two fragments F1, F2 are applied on both sides of an at least translucent layer 15, or portion 12, so that each figure is facing each other through the thickness of the layer 15 or portion 12, i.e the two fragments are applied either on same side S1 of the document compare to the core 11 layer, or on both sides S1, S2. Then, when viewing these two fragments overlapping each other at different tilt angles of the document, different data are displayed. For example, at first angle $\alpha 1$, the two figures "3" and "5" appear to be superimposed and display a complex image , while at a second angle $\alpha 2$, only the figure "3" is displayed, and at a third angle $\alpha 3$ only the other figure "5" is displayed.

[0024] Figure 5 shows another example of two fragments F1, F2 that can be used to create the anti-counterfeiting element. In this example, first fragment F1 is divided in two parts 41, 42. A first part 41 comprises for example the figure "3" printed with parallel lines that are identical to the parallel lines of the second part 42, which comprises a part of the printed filter. In the same manner, the second fragment F2 is divided in two parts 43, 44, the first part 43 comprising a part of the printed filter and the second part 44 comprising another figure "5" printed with parallel lines that are identical to the parallel lines of the printed filter of the first part 43. Then, the two fragments F1, F2 are applied either on both sides S1, S2 of the document, or on the same side S1 of the document compare to the core layer, in such a manner that the first part 41 of the first fragment F1 is located over the first part 43 of the second fragment F2. Then, when viewing these two fragments overlapping each other through the

at least translucent portion, at different tilt angles of the document, different data are displayed. In the example of figure 4, at first angle $\alpha 1$, figure "3" appears , while at a second angle $\alpha 2$, the number "35" is displayed, and at a third angle $\alpha 3$ only the figure "5" is displayed.

[0025] The examples that have just been described relates to fragments, each of which comprises only one figure. Of course, the fragments can comprise everything such as numbers, words, images, logos etc...

[0026] Figure 6 shows another example according to which each fragment comprises a part of the printed filter mixed with a number of three figures. First fragment F1 comprises for example number "567" together with the printed filter, while second fragment F2 comprises number "382" together with the printed filter. Then, when viewing these two fragments overlapping each other through the at least translucent material in-between, at different tilt angles of the document, one can see for example number "387" at a first angle $\alpha 1$, a second number "562" at a second angle $\alpha 2$, and a complex image revealing the two preceding numbers as being superimposed at a third angle $\alpha 3$.

[0027] All the examples that have been described relate to anti-counterfeiting element comprising figure or number. However, the anti-counterfeiting element can incorporate all type of information such as numeric data, text, pictures, logos etc, depending on the size of the element and the resolution of the personalization equipment. In a further embodiment, it appears to be advantageous to incorporate in such anti-counterfeiting element at least one information or image linked to the identity of the owner of the identification document. For example, this information can be his name and/or his birth date and/or his fingerprint and/or his photography etc... Moreover this information incorporated in the anti-counterfeiting element can be the same as at least one information that is printed onto the remaining body of the document, so that it is very easy to authenticate the document and to verify that the anti-counterfeiting element has not been replaced by another false element. In this case, it appears much more difficult to counterfeit an identification document, because the infringer needs to be able to counterfeit both sets of data, which are in each fragment on different areas of the document, and a modification of a first data on one area affects automatically the other fragment on the other area. Thus, it becomes impossible to modify such element or to replace it by another falsified element.

[0028] In both embodiments, each fragment can be applied by means of different techniques. In a first example, the two fragments can be printed by laser engraving into laser sensitive layers located either on one side of the document compare to the core layer, or on both sides. In a second example, one of the fragments is printed by laser engraving into one laser sensitive layer deep inside the document, either in core 11 layer, or in see-through portion 12, or in another layer 15, while the other fragment is printed using a conventional color printing process onto the external surface of the document, i.e. on the layer just under the overlay layer 14 or 17"located either on the same side or on the other side of the first fragment compare to the core 11 layer.

[0029] In a further example, the two fragments are printed by means of a conventional color printing process on both sides of the external surface of the document in an area located just above and under the see-through portion, in case of first embodiment with a see-through portion.

[0030] In another example, first fragment can be printed by laser engraving deep in the document, provided that the material is laser-sensitive, while second fragment can be printed also by laser engraving onto external surface located either on the same side or on the other side, compare to the core layer. In this case, the focus and depth of the laser have to be accurately controlled. In a last example, both fragments can be printed by conventional color printing process, onto both external surfaces of the document.

[0031] Finally, it is also possible to print, by offset process for example, a first fragment F1, which may contain not personalized data, such as a country specific emblem for example, together with part of the filter, and the second fragment F2 can be printed either by means of laser engraving or other personalization technique and contain personal data together with part of the filter, such that, when tilting the document, personal data can be seen from a first direction, and the emblem can be seen from another viewing angle.

[0032] Moreover, in an additional variant, it is possible to print each fragment F1, F2 respectively in at least one predetermined color, in such a manner that when the two fragments overlap each other, they display additional information with a third color according to subtractive or additive synthesis.

Claims

1. An anti-counterfeiting element for an identification document, said anti-counterfeiting element comprising different sets of data/images, to be revealed when tilting said identification document, said data/images being viewed through a printed filter, **characterized in that** said anti-counterfeiting element comprises two separate fragments (F1, F2), each of which comprising part of data/images to be revealed and part of the printed filter, each fragment (F1, F2) being provided on two overlapping areas into said document.

2. An anti-counterfeiting element according to claim 1, wherein said overlapping areas are provided on two sides of one layer (15, 12, 11) of the document.

3. An anti-counterfeiting element according to claim 2, wherein said layer (12) is an at least translucent por-

tion provided in the core (11) layer of the document.

4. An anti-counterfeiting element according to claim 1, wherein said two overlapping areas are provided on two different layers of the document.

5. An anti-counterfeiting element according to anyone of preceding claims, wherein the constitution material in-between the two overlapping areas is at least translucent.

6. An anti-counterfeiting element according to anyone of claims 1 to 4, wherein the constitution material in-between the two overlapping areas is semi-opaque and different sets of data/images are viewed, depending on the tilt angle of the document, by using a backlight.

7. An anti-counterfeiting element according to anyone of preceding claims, wherein the thickness of the material in-between the two overlapping fragments (F1, F2) is at least equal to the width (w) of a line of the printed filter.

8. An anti-counterfeiting element according to anyone of preceding claims, wherein the fragments (F1, F2) are printed either by laser engraving and/or or by conventional color printing process such as inkjet, offset, silk screen.

9. A secure identification document comprising an anti-counterfeiting element according to anyone of preceding claims 1 to 8.

10. Method for manufacturing an anti-counterfeiting element for an identification document, said anti-counterfeiting element comprising different sets of data/images, to be revealed when tilting said identification document, said data/images being viewed through a printed filter, **characterized in that** said method comprises the following steps :

- creating two fragments (F1, F2), each of which comprising at least one image or set of data and part of printed filter,
- printing each fragment respectively on different areas of the identification document, in such a manner that they face each other through the thickness of a constitution material, so that said part of filter of first fragment (F1) serves as filter for the other image/set of data of the second fragment (F2) and said image/set of data of first fragment (F1) can be revealed through the other part of filter of the second fragment (F2) depending on the tilt angle of the document.

11. Method according to claim 10, wherein at least one fragment (F1, F2) is printed by means of a laser beam.

12. Method according to claim 10 or 11, wherein at least one fragment (F1, F2) is printed in color by means of a conventional printing process.

13. Method according to claim 10, wherein each fragment (F1, F2) is printed respectively in at least one predetermined color, in such a manner that when the two fragments overlap each other, they display additional information with a third color according to subtractive or additive synthesis.

14. Method according to anyone of preceding claims 10 to 13, wherein the sets of data/images intended to be revealed when tilting the document, are linked to the identity of the owner of the document.

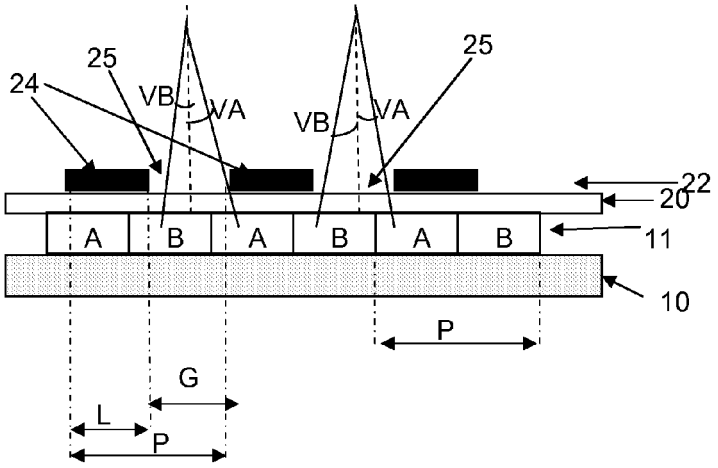

Figure 1

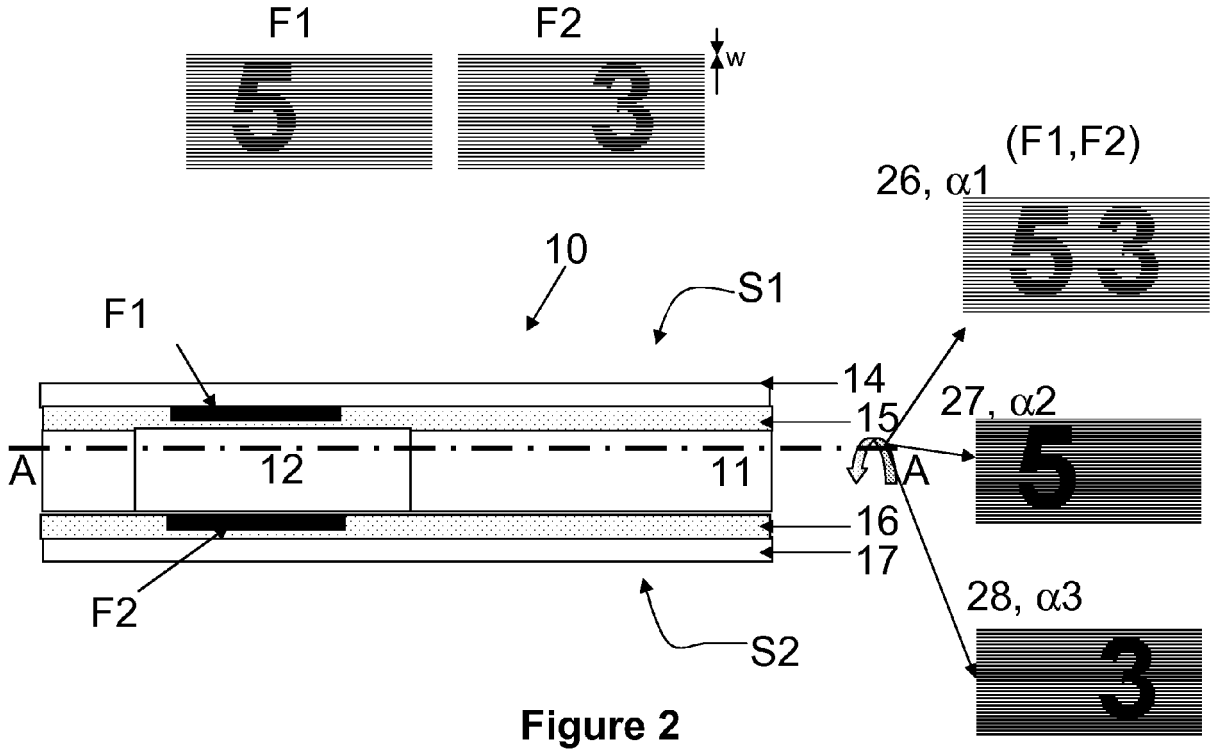

Figure 2

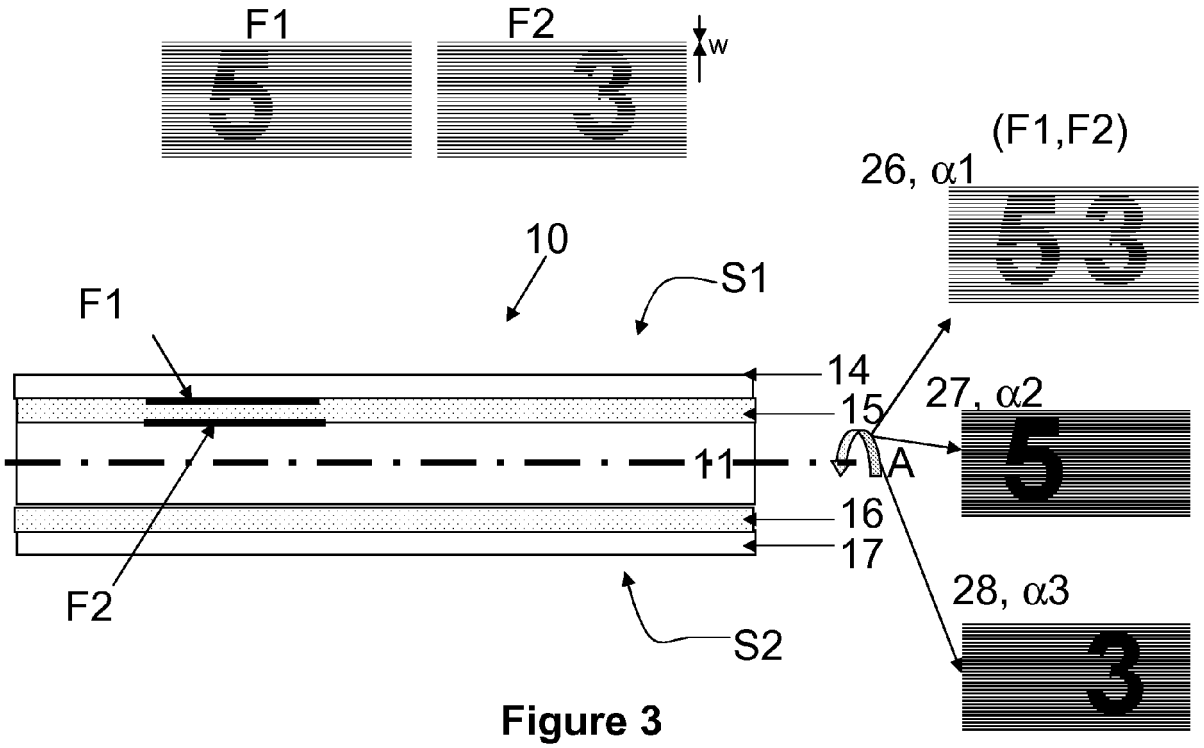

Figure 3

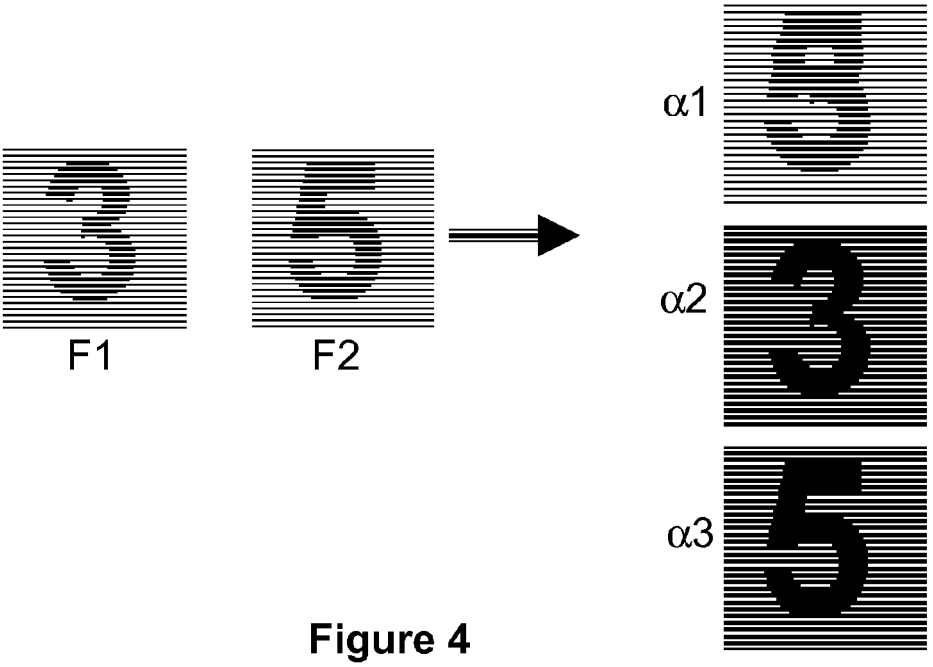

Figure 4

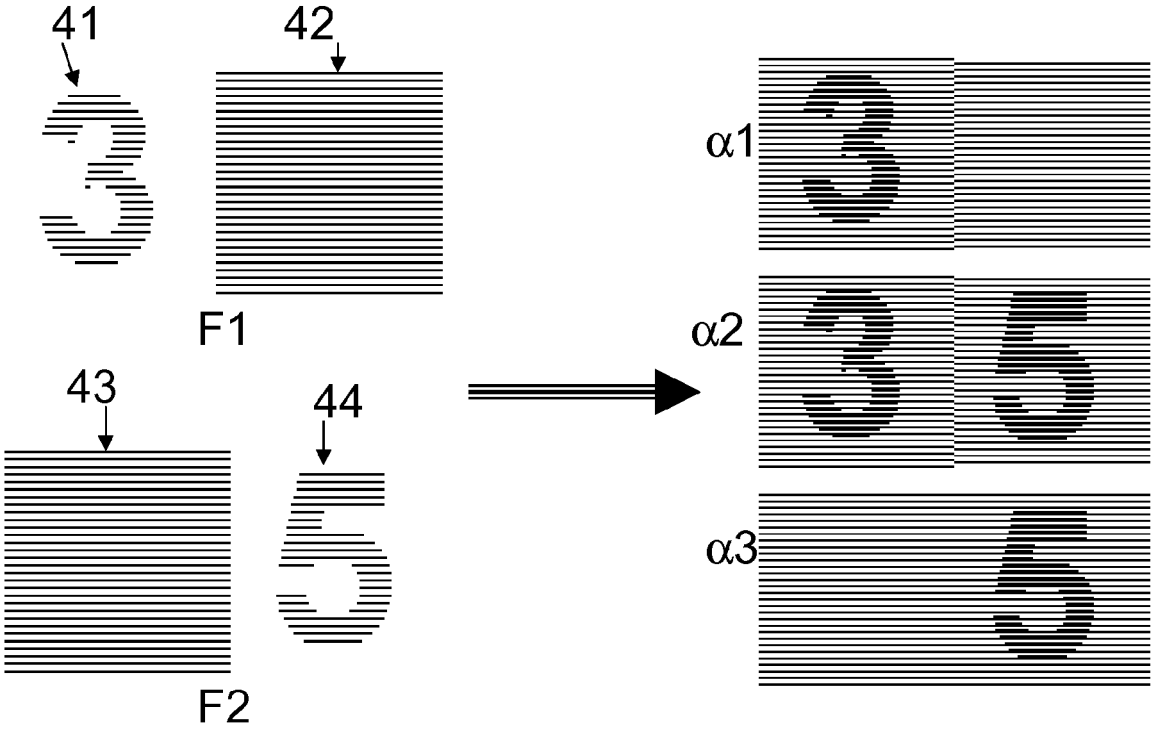

Figure 5

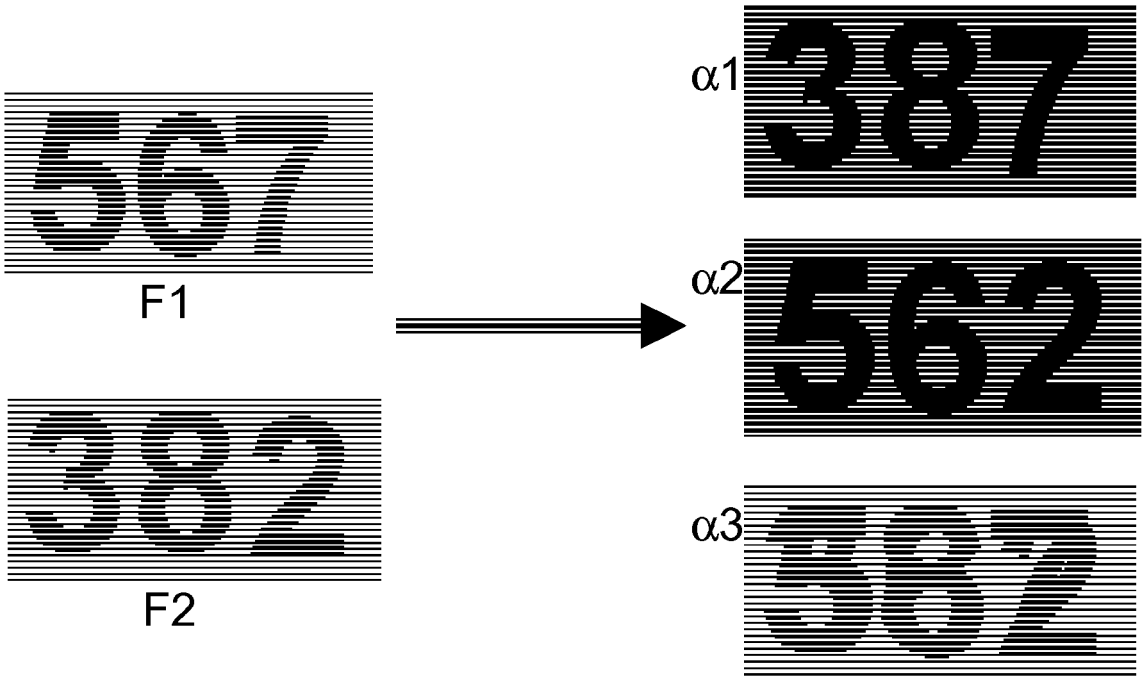

Figure 6

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EUROPEAN SEARCH REPORT

Application Number
EP 09 30 5288

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 827 283 B2 (KAPPE FRANK [DE] ET AL KAPPE FRANK [DE] ET AL) 7 December 2004 (2004-12-07) * column 1, line 47 - line 49 * * column 3, line 62 - line 67 * * column 5, line 5 - line 12 * * column 5, line 62 - column 6, line 61 * * column 7, line 49 - column 8, line 6 * * column 9, line 14 - line 56; figures 1,6 * -----	1-5,8-14	INV. B41M3/14 B42D15/10
X	GB 2 350 319 A (RUE DE INT LTD [GB]) 29 November 2000 (2000-11-29) * page 1, line 3 - line 9 * * page 3, line 13 - line 17 * * page 4, line 4 - line 14 * * page 5, line 19 - line 30 * * page 7, line 27 - line 32 * * page 8, line 13 - line 15 * * page 9, line 20 - page 10, line 14; figures 2,3 * -----	1-3,5, 8-10, 12-14	TECHNICAL FIELDS SEARCHED (IPC) B42D B41M
X	EP 0 219 011 A (GAO GES AUTOMATION ORG [DE]) 22 April 1987 (1987-04-22) * column 1, line 1 - line 7 * * column 7, line 30 - line 56 * * column 8, line 13 - line 34 * * column 9, line 46 - line 56; figures 2,4 * -----	1,4-11, 14	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 November 2009	Sigurd, Karin

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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O : non-written disclosure
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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EPO FORM 1503 03.82 (P04C01)

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 30 5288

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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