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(54) **Identification document comprising a see-through portion with anti-counterfeiting bubbles and a method for its manufacture**

(57) The application relates to secure identification documents and a method for securing such identification documents. The identification document comprises a body (20) and at least one overlay (21,22) covering at least one of its main surfaces, said main surface carrying official personalization data (26), said document further comprising at least one see-through portion (23) and

graphical anti-counterfeiting means (25) enabling to prove any attempt of fraudulent modification or personalization of said document. The graphical anti-counterfeiting means are remarkable in that they are created in three dimensions, in such a manner that they extend from one side of said document to the opposite side, through the thickness of said at least one see-through portion (23).

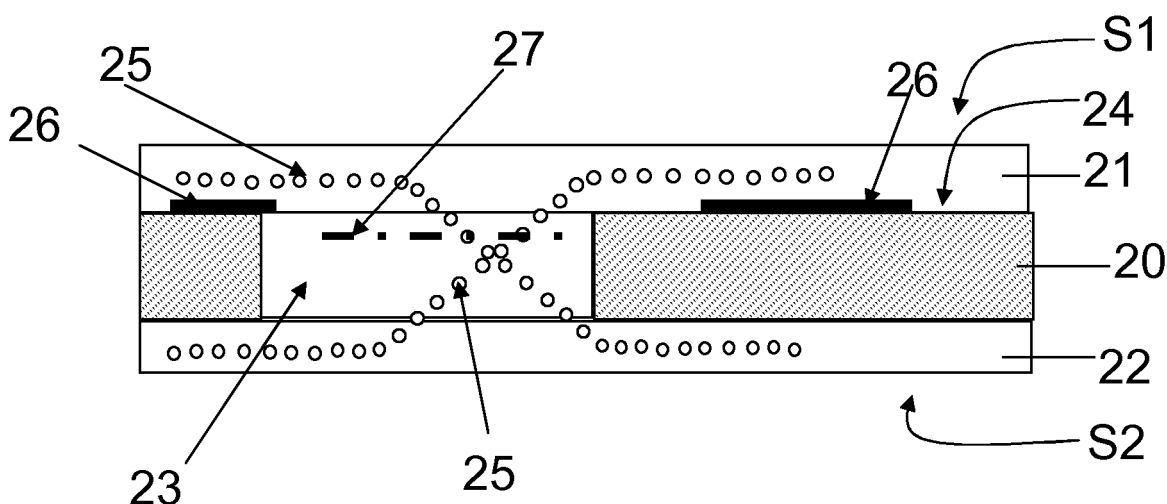


Figure 2

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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 official 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, onto the document, anti-counterfeiting means drawing a pattern and comprising wavy lines also called guilloche pattern. However, conventional guilloche patterns are all the same for each batch of documents to be manufactured, so that their pattern is predictable. Consequently, it is easy for an infringer to scan the guilloche pattern and to prepare a falsification, which avoids to print onto the existing guilloche pattern, or to prepare false documents by reproducing the scanned guilloche pattern onto the falsified personalization data.

[0004] Such a falsification is for example illustrated in figures 1A and 1B, which represent a card personalized and secured according to this known guilloche technology. On figure 1A, one can see a card 10 carrying personalization data 3 printed either onto or into it. These data enable to identify the card holder and are therefore personal to the true holder of such card. The card 10 thus personalized may have been realized from a card body

5 relatively thick, whose main surfaces are covered on each side by a cover film 7a and 7b, also called overlay. At least one of the overlays covering the personalization data may carry for example a guilloche pattern 2. In fact, guilloche pattern 2 is generally printed on the card body 5, but sometimes it can also be printed onto overlay 7a. Typically, the assembling of this three parts 5, 7a and 7b is made by hot lamination. Before this lamination step, the personalization data are marked onto at least one main surface of the card body 5, for example by depositing an ink or other appropriate pigment. Typically, the card body 5 may be made in PVC, or PC, or PET, and overlays 7a, 7b are transparent, soft, and made in plastic material such as PVC. The materials of the overlays and of the card body being different, a thermosensitive glue is conventionally used for fixedly attaching this elements together. After the hot lamination step, the personalized card 10 is obtained. Figure 1B then shows that a delamination of such a card is still possible: one can still remove one of the overlays, such as 7a in this example, so that an infringer has access to personalized data 3 of the card and guilloche pattern 2 if this later is printed on card body 5. Then, it becomes easy for the infringer to modify the personalized data 3, in order to obtain a falsified card body 5', and to place another overlay 70 onto which the scanned predictable guilloche pattern 2 may previously reproduced, in order to obtain a falsified card 10'. The scanned predictable guilloche pattern 2 may also be reproduced on falsified card body 5' before attaching a new overlay.

[0005] Guilloche patterns have thus been improved in order to increase the security of identification documents. A first improvement consists in varying the contrast and luminosity of the constitutive pixels of each wavy line, the contrast and luminosity depending on the neighborhood pixels. A second improvement consists in creating a guilloche pattern, whose shape is unique for each document and depends on the personalization data of the holder of the document. However, such improvements do not still prevent some kind of infringement consisting in delaminating the overlay layers and in reproducing the guilloche pattern either on a falsified card body or on a new overlay, after having modified the photography for example, as already explained in regards to figures 1A and 1B.

[0006] Considering the above, a problem intended to be solved by the invention, is to propose an identification document comprising a body and at least one overlay covering at least one of its main surfaces, said main surface carrying official personalization data, said document further comprising at least one see-through portion and graphical anti-counterfeiting means provided for proving any attempt of fraudulent modification or personalization of said document, said anti-counterfeiting means being able to protect the personalization data against infringement, by the fact that it is impossible to remove them for accessing the official personalization data, without destroying the material.

SUMMARY

[0007] The solution of the invention to this problem relates to the fact that said anti-counterfeiting means are created in three-dimensions, in such a manner that they extend from one side of the document to the opposite side, through the thickness of said at least one see-through portion.

[0008] Thus, in case of attempt to delaminate an overlay for accessing the official personalization in order to modify it, it becomes impossible for the infringer to recreate the graphical anti-counterfeiting means with a good continuity so that the wavy lines of the overlays match with the lines passing through the thickness of the see-through portion.

[0009] According to a further aspect of the invention, the three-dimensional anti-counterfeiting means comprise bubbles that are created to form continuous wavy lines inside the thickness of a first overlay, through said at least one see-through portion, and inside the thickness of a second overlay.

[0010] Thus, if at least one overlay is removed, in order to access the official personalization for modifying it or replacing it, this overlay is destroyed because weakened by the presence of bubbles, so that it is impossible to reposition the same overlay. It becomes also impossible to replace the overlay by another, because it is impossible to recreate the bubbles with the same precision, in such a manner that the lines of bubbles match with the lines of bubbles that are deep in the thickness of the see-through portion, with a good and accurate continuity.

[0011] According to another aspect, the shape of the three-dimensional pattern, comprising an assembly of bubbles lines, is linked to at least one personal information of the legitimate holder of the document.

[0012] According to another aspect, the invention relates also to a method for manufacturing an identification document comprising a body carrying, on at least one of its main surface, personalization data, said method being **characterized in that** it comprises a step of creation of graphical anti-counterfeiting means in three dimensions, extending in a continuous manner from one side to the opposite side, through the thickness of an at least translucent portion of the document.

[0013] Advantageously, said graphical anti-counterfeiting means are made by creation of bubbles more or less spaced from each other.

[0014] According to a further embodiment, each bubble is positioned at a predetermined location, so that the pattern formed by the assembly of bubbles is linked to at least one personal information of the legitimate holder of the document.

[0015] Advantageously, the bubbles are created by means of at least one laser beam with short focal distance.

BRIEF DESCRIPTION OF DRAWINGS

[0016] 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:

Figures 1A and 1B, already described, are schematic perspective views of cards personalized and secure according to prior art technology and that can be easily falsified,

Figure 2, a schematic cross-sectional view of an identification document according to the invention, Figure 3, a schematic front view of another identification document according to the invention,

Figure 4, a schematic cross-sectional view of an identification document during the step of creation of anti-counterfeiting means.

DETAILED DESCRIPTION

[0017] 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.

[0018] Figure 2 shows a schematic cross-sectional view of an identification document. This document comprises for example a body 20 onto which are fixedly attached two transparent overlays 21 and 22. The body may be made either in only one piece, or with several layers attached together by means of conventional process of lamination or gluing or the like. The body further comprises at least one portion 23 at least translucent, and at the most transparent. This portion may define either a so-called "clear window" or all the entire body.

[0019] On at least one of the main surfaces 24 of the body, are provided official personalization data 26, i.e. data that are linked to the legitimate holder of the identification document. These data can be, but are not limited to, a name and/or birth date and/or photography and/or fingerprint, and/or validity date etc.... These data can be printed either onto the surface 24 of the body, or into said body 20, by any conventional process such as laser engraving, ink jet printing process, offset printing process, D2T2 (acronym for Dye Diffusion Thermal Transfer), photo process or the like...

[0020] The at least translucent portion 23 may also comprise security markings 27, such as an identification

number for example, or also personalized data linked to the legitimate holder.

[0021] The identification document further comprises graphical anti-counterfeiting means 25 that are provided for proving any attempt of fraudulent modification or personalization. Those means are advantageously created in three-dimensions, in such a manner that they draw a pattern, which passes from one side S1 of the document to the opposite side S2 through at least said one at least translucent portion 23. More particularly, such security pattern is created inside a first top overlay 21, then passes through at least one transparent portion 23 and further inside the second bottom overlay 22. This pattern can be arranged to draw wavy lines such as guilloches. The fact to have such three-dimensional anti-counterfeiting means enables to increase the security of the document. Indeed in case an infringer tries to remove at least one overlay 21 for the purpose to modify the personalization data 26, it will be much more difficult for him to reproduce the pattern on another overlay so that it matches, with an accurate continuity, with the remaining part of pattern remained in the thickness of the transparent portion 23.

[0022] Moreover, the anti-counterfeiting means are made by creating bubbles into the constitution material of the document. These bubbles are advantageously created by means of at least one laser beam with a short focal distance. Such laser beam can be a YAG laser for example. The short focal distance, which is typically of few centimeters, enables to create the bubbles with a great precise location. YAG laser used can have short pulse duration, typically 10ps, its pulse energy can vary from 0 up to 200 μ J at a repetition rate of 50KHz for standard picosecond YAG laser, i.e. at wavelength of 1064nm, with a maximum power of 10W, while pulse energy can be around 100 μ J at a repetition rate of 50KHz for YAG laser that function at wavelength of 532nm for example, with maximum power of 5W. However, this example is not limitative and other laser can be used, such as nanosecond laser, which is less expensive than picosecond laser.

[0023] The thus created bubbles that are trapped inside the thickness of the document may be of different nature. They can be for example filled with a gas resulting from the combustion of the constitution material. Thus, they can be filled for example by a carbonic gas, which forms due to the presence of carbon particles in the constituting material, or by a chlorine gas for example, due to the presence of PVC in the constituting material. Moreover, such bubbles are not limited to spherical shape, but can be of any three-dimensional shape, which is representative of a change of the visual appearance of the constitution material. In a further example, such three-dimensional shape can be not filled by a gas, but can offer an optical distortion, such that it appears with a different coloration into the at least translucent material.

[0024] Those bubbles 25 present some advantages. First, they prevent any attempt of delamination of the overlays because in case of such an attempt, the bubbles

let traces that can not be removed at the interface between the overlays and the body. Those traces make therefore more difficult a counterfeiting attempt by the fact that the reactivity of the two materials, constituting respectively the overlay and the body, even if there is a new overlay, will never be the same as with the first official personalization. Second, if an attempt is made by an infringer to modify the personalization data 26 and/or security markings 27, by means of a laser beam through the overlay 21 for example, then the bubbles will interfere onto the laser beam which will be diffracted, so that additional fraudulent personalization will appear to be different than the original official personalization and falsification will appear immediately to naked eyes.

[0025] Furthermore, the overlays 21, 22 are preferably made with the same material as the material used for the at least translucent portion (s) 23, or at least with a material chemically compliant, so that they can be fused together at a common fusion temperature. The intimate bond between the two pieces respectively 21, 23 and 22, 23 does not necessitate the use of an additional material, thus reducing to none the risks of delamination of the overlays after their assembling.

[0026] Figure 3 shows a schematic front view of a card comprising such graphical anti-counterfeiting means made with bubbles through the thickness of the card. In the illustrated example, the card comprises official personalized data 26, such as the name of the legitimate holder, his photography and for example an identification number, "1234" in the illustrated example. The card further comprises two at least translucent portions 23A, 23B defining so-called see-through portions or windows. When there is only one see-through portion, as in first embodiment illustrated in figure 2, this portion is not necessary located in the middle of the document and can be on the lateral side of the card for example. However, in this later case, two see-through portions, as in this second embodiment of figure 3, are preferred for protecting the document with more efficiency. At least one of these see-through portions 23A may comprise a security marking, such as the same identification number "1234" as the one applied onto the card in the example. Graphical anti-counterfeiting means 25 are provided into the card. Such means draw wavy lines, forming a guilloche pattern. For simplification purpose, only three guilloches lines are schematized in figure 3, but in reality, many of such lines can be created. Such lines comprise bubbles created by means of at least one laser beam. Each line pass from one first side of the card to the opposite second side through a first see-through portion 23A and/or 23B, and then pass again from the second side to the first side through a second see-through portion 23B and/or 23A.

[0027] In order to increase the securing of the document, the shape of the graphical pattern can be linked to the identity of the legitimate holder, so that the shape of the anti-counterfeiting means is unique for each document to secure. Moreover, the space between each consecutive bubble is not necessarily constant and can vary;

the variation may depend on the identification data relating to the legitimate holder of the document. In this case, it is therefore possible to create unique graphical anti-counterfeiting pattern for each card. For that, a specific software program is used in order to define the position of each bubble of the pattern, by taking into account one or more data linked to the legitimate holder. For example spaces between two consecutives bubbles that are equal to two times the diameter of the bubbles can be linked to a code "0", and spaces that are equal to four times the diameter of the bubbles can be linked to code "1". Thus, it is possible to create a binary code corresponding to the personal data of the legitimate holder, or to other items such as a country and so on. In a similar example, it is also possible to modify the size of the bubbles, small size corresponding to code "0" and bigger one corresponding to code "1". In a further example, a bubble can be placed in a position relative to a wavy line, and bubble just bellow can correspond to code "0", while bubble just above corresponds to code "1". Of course, all the information can also be coded by a key provided by one guilloche amongst all of them, which can reveal the key code.

[0028] Figure 4 shows a schematic cross-sectional view of an identification document during the step of creation of anti-counterfeiting means. The same references are used for designing the same elements as in figure 2. Bubbles are created by means of at least one YAG laser beam L1 with short focal distance. This short focal distance can be, but is not limited to, less than 50mm for example for picosecond YAG laser functioning at 1064 nm

[0029] Such laser beam with short focal distance enables to create the bubbles with a great precision inside the document, and particularly to create each bubble with a very accurate location. Moreover, the creation of each bubble at a predetermined depth through the thickness of the body is made by controlling the energy of the laser beam. For picosecond YAG laser functioning at 1064nm, this energy varies typically from 0 up to 200μJ at a repetition rate of 50KHz, while for picosencond YAG laser that functions at wavelength of 532nm this energy is typically around 100μJ at a repetition rate of 50KHz, for example.

In a preferred embodiment, two identical laser beams L1, L2 with short focal distance are used, each laser beam L1, L2 being used for creating a set of bubbles Set1, respectively Set2. In fact, it is important to create a continuity with good registration of the guilloche lines, which pass through the transparent portion 23. If only one laser beam is used, the document has to be returned and mechanically positioned, in order to create the second set of bubbles set2 on the face S2 opposite to the first S1. However, the second set, set2, has to be created with good registration in view of the first, to create a continuity of the line defined by the two sets Set1 and Set2. Such a good registration is difficult to obtain with good accuracy because the document has to be very accurately positioned and an error in the mechanical positioning may

occur. Therefore, it is much easier to use two laser beams L1, L2, each being placed in front of each side S1, S2 of the document to secure. Thus, a first laser beam L1 makes all the bubbles of the guilloche lines on the top overlay 21 of the card up to the middle of the at least one see-through portion 23, said bubbles defining a first set of bubbles Set1. For that the laser L1 is moved towards the direction indicated by the arrow F1. The second laser beam L2 makes on the same time the other set of bubbles Set 2, defining the guilloche lines on the bottom overlay 22 up to the middle of the at least one see-through portion 23. For that, the second laser beam L2 is moved towards the direction indicated by the arrow F2, in a reversed sense compare to the direction F1 of movement of the first laser. In this case, the document is fixedly positioned during the creation of the anti-counterfeiting means, so that the lines are created with a perfect continuity without any registration step difficult to implement.

Claims

1. Identification document comprising a body (20) and at least one overlay (21, 22) covering at least one of its main surfaces, said main surface carrying official personalization data (26), said document further comprising at least one see-through portion (23; 23A, 23B) and graphical anti-counterfeiting means (25) enabling to prove any attempt of fraudulent modification or personalization of said document, **characterized in that** said anti-counterfeiting means (25) are created in three dimensions, in such a manner that they extend from one side of said document to the opposite side, through the thickness of said at least one see-through portion (23; 23A, 23B).
2. Identification document according to claim 1, wherein said three-dimensional anti-counterfeiting means comprise bubbles that are created to form continuous wavy lines inside the thickness of a first overlay (21), through said at least one see-through portion (23; 23A, 23B) and inside the thickness of a second overlay (22).
3. Identification document according to claim 1 or 2, wherein the shape of the three-dimensional pattern, comprising an assembly of bubbles lines, is linked to at least one personal information of the legitimate holder of the document.
4. Identification document according to anyone of preceding claims, wherein the space between two consecutive bubbles varies and depends on at least one personal information of the legitimate holder of the document.
5. Identification document according to anyone of preceding, wherein the size of the bubbles varies and

depends on at least one personal information of the legitimate holder of the document.

6. Identification document according to anyone of preceding claims, wherein at least the overlay (21) covering the personalization data (26) is made of the same material as the material used for the at least one see-through portion (23; 23A, 23B). 5

7. Method for manufacturing an identification document comprising a body (20) carrying, on at least one of its main surface, personalization data (26), said method being **characterized in that** it comprises a step of creation of graphical anti-counterfeiting means (25) in three dimensions, extending in a continuous manner from one side to the opposite side, through the thickness of an at least translucent portion (23; 23A, 23B) of the document. 10
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8. Method according to claim 7, wherein said three-dimensional graphical anti-counterfeiting means are made by creation of bubbles more or less spaced from each other. 20

9. Method according to claim 8, wherein each bubble is positioned at a predetermined location, so that the pattern formed by the assembly of bubbles is linked to at least one personal information of the legitimate holder of the document. 25
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10. Method according to claim 8, wherein the bubbles are created by means of at least one laser beam with short focal distance. 35

11. Method according to claim 8, wherein the bubbles are created by means of two laser beams with short focal distance, each laser facing each main surface of the document, so that each laser beam creates a set of bubbles (Set1, Set2) through each surface, each set of bubbles joining each other in a continuous manner through the thickness of said at least one see-through portion (23; 23A, 23B). 40
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12. Use of at least one laser beam with short focal distance for creating an assembly of bubbles through the thickness of an identification document, said assembly defining a three-dimensional pattern extending from one side to the opposite side of the document, through the thickness of at least one see-through portion, said pattern forming graphical anti-counterfeiting means for proving any attempt of falsification or modification of a secure identification document. 50
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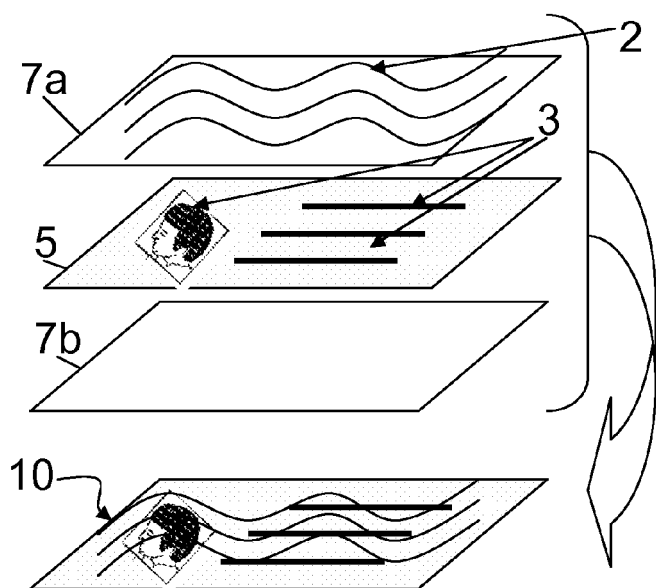


Figure 1A

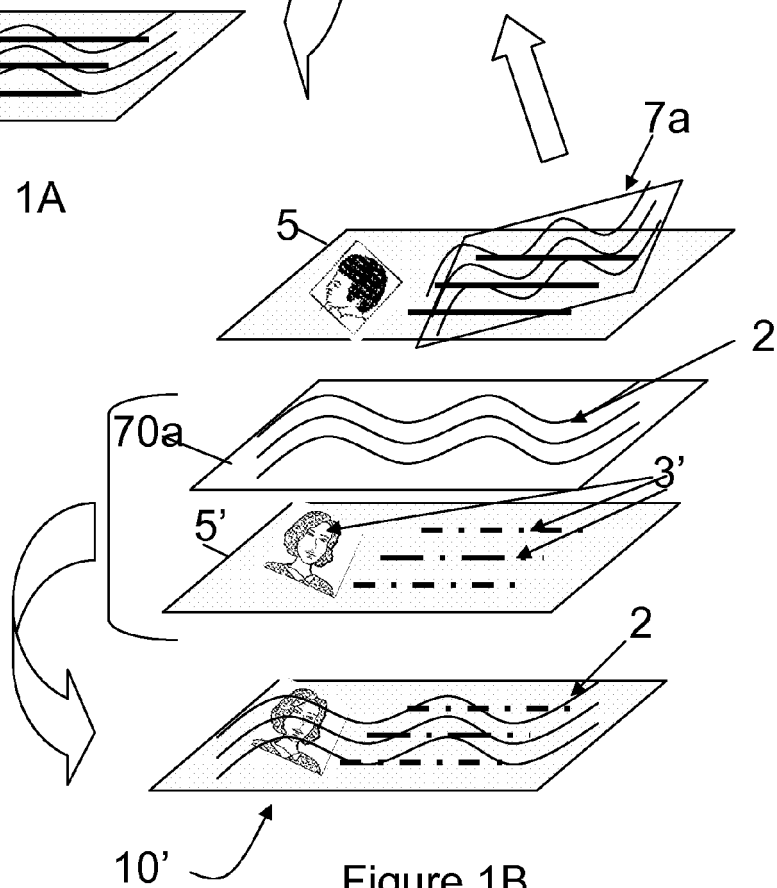


Figure 1B

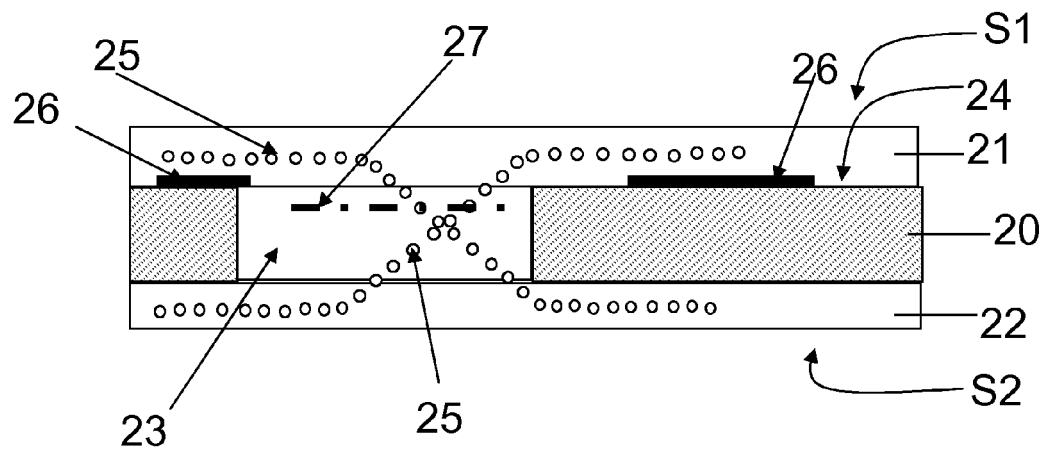


Figure 2

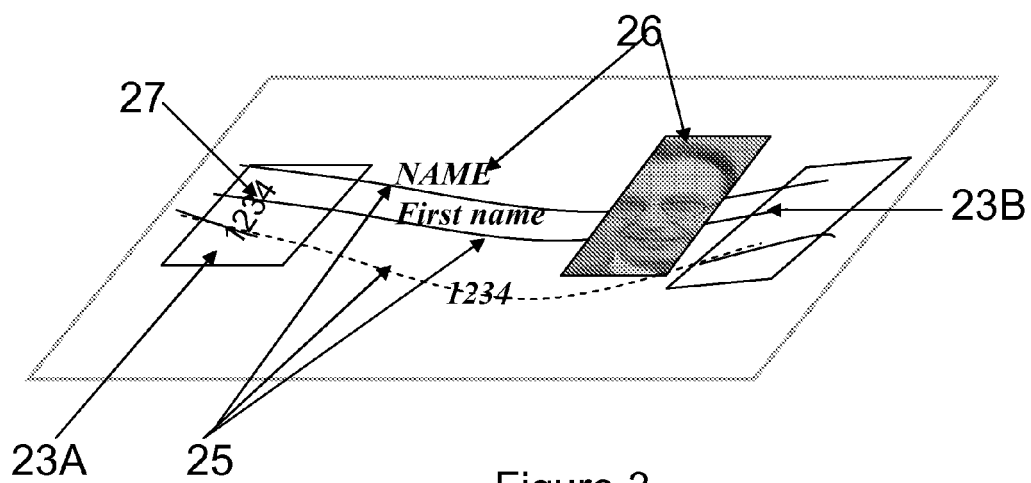


Figure 3

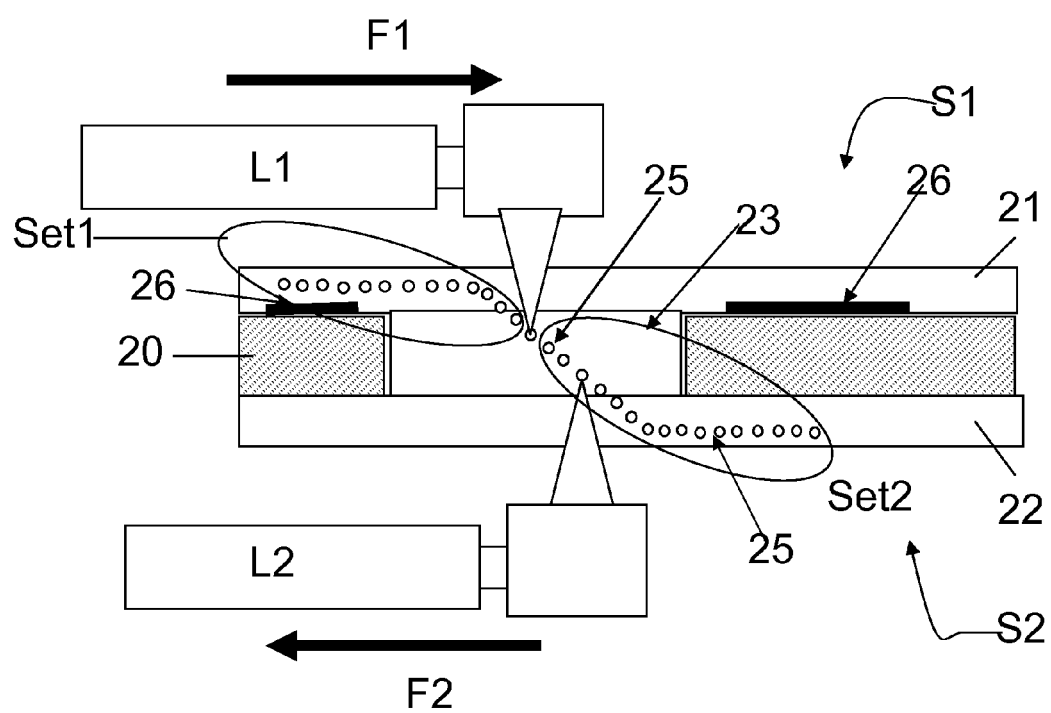


Figure 4



EUROPEAN SEARCH REPORT

Application Number
EP 09 30 5273

DOCUMENTS CONSIDERED TO BE RELEVANT			
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A	US 6 372 394 B1 (ZIENTEK PAUL [AU]) 16 April 2002 (2002-04-16) * column 1, line 52 - line 58 * * column 2, line 45 - line 56 *	1-12	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 November 2009	Examiner Sigurd, Karin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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