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(54) **Identification document with colored personalization inside.**

(57) The invention relates to identification documents with embedded color printed personalization information (15). In such documents, the colored person-

alization data (15) are located in the bottom (31) of a cavity (35) created in the body and covered by an at least translucent piece (30). Thus, the color personalization is embedded into the thickness of the body of the document.

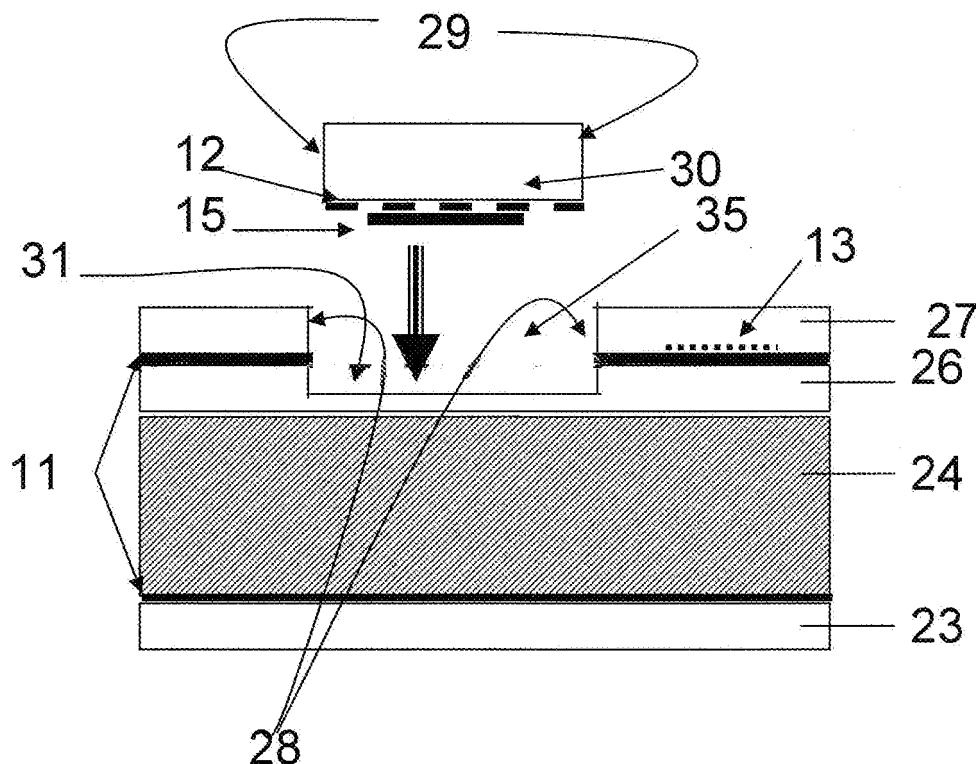


Figure 2

Description

BACKGROUND

[0001] This invention relates generally to identification documents and a method for making such identification documents. More particularly, this invention relates to identification documents with embedded color printed personalization information.

[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 for. They may take the shape of card or a booklet or something else.

[0003] 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.

[0004] Identification cards are generally made with several layers made in plastic material, such as PVC, PET, ABS or Polycarbonate. These layers are attached by means of conventional technology, such as lamination for example. Nowadays, polycarbonate is a very promising compound for such security document because after lamination step of the constitution layers of polycarbonate, these layers are fused together, so that the resulting identification document takes the form of only one piece instead of having many collated layers. Consequently, the resulting document is very secure because it cannot be delaminated.

[0005] The personalization information is then printed either onto the surface of the document and protected by a protective layer also called overlay, or into the thickness of a constitution layer. A well-known technique to print personalization information inside the document is to use laser-engraving technology. For that, the layer, into which data are engraved, is made with plastic containing particles that are laser sensitive. Personalization information is then printed by means of a laser beam, and particles of the layers are burnt under the beam and blackened. This well-known technology enables to insert personalization data into the thickness of the document, so that the data are secured because impossible to remove. However, such personalization is monochrome, i.e black and white, and today, there is a strong request from the customers to have color personalization for

there identification document.

[0006] Consequently, there is a strong request now to find solutions to be able to insert color personalization inside the identification document.

[0007] Attempts have been made to personalize identity documents in color. For example, patent US 6, 867, 167 describes a solution, which consists in applying a lacquer onto the surface of a layer of polycarbonate. This lacquer enables to modify the molecules in the area close to the surface of the layer, so that adhesive properties of the surface of the layer are improved. Then, colored images are applied onto the surface of the layer, by thermal transfer technology and adhere well onto the surface of the document. However, in this case, the color personalization is provided onto the external surface of the document and is subjected to environmental and mechanical stresses, so that it is not compliant with the long-term life usually required for identification documents.

[0008] Another solution, described in the patent US 6, 986, 926, consists in providing at least one color pigment into a constitution layer, in irradiating this color pigment by means of a laser beam at a predetermined wavelength, in order to cause an irreversible change of color in the irradiated region, said color change resulting in a bleaching. This solution is close to the laser-engraving. However, the difficulty is to find the right pigments that will react well to laser beam for providing a colored printing of good quality. Moreover, such pigments are expensive and they contribute to the increase of costs of finished products.

[0009] Considering the above, a problem intended to be solved by the invention, is to propose an identification document comprising colored personalization data inside its body, which is easy to manufacture, which cannot be easily falsified or modified, and which is of lower cost than the existing solutions of color printed identification document.

SUMMARY

[0010] The solution of the invention to this problem relates to the fact that the colored personalization data are located in the bottom of a cavity created in the body and covered by an at least translucent piece.

[0011] Thus, the colored personalization is no more covered by a thin top layer, also called overlay, that covers the entire surface of the document, but it is covered by a thicker piece, whose shape is complementary from the cavity, the thickness of the piece corresponding substantially to the depth of the cavity, more or less 30 μm. This piece is preferably made with plastic material. Then the piece is fixedly attached to the remaining body, for example by welding the vertical edges of the piece with the vertical walls of the cavity. By this way, the color personalization is embedded into the thickness of the body of the document.

[0012] According to another aspect, the invention relates also to a method for manufacturing an identification

document comprising colored personalization data inside its body, said method comprising the following steps :

- providing a body,
- creating a cavity in the body,
- printing personalization data either directly onto the bottom of the cavity or onto a surface of an at least translucent piece, said piece having a complementary shape of the cavity,
- inserting said at least translucent piece in said cavity, ,
- fixedly attaching said at least translucent piece with the body of the document, so that the printed colored personalization data are located against the bottom of the cavity.

BRIEF DESCRIPTION OF DRAWINGS

[0013] The invention will be better understood with reference to the drawings, in which:

Figure 1 is a schematic front view of an identification document, in the form of a card, with colored personalization inside,

Figure 2 is a schematic half-exploded cross-sectional view of an identification document according to the invention, during its manufacturing,

Figure 3 is a cross-sectional view of a finished identification document according to a variant of implementation,

Figure 4 is a flow chart schematizing the main steps of the manufacturing process of an identification document according to the invention.

DETAILED DESCRIPTION

[0014] 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.

[0015] Figure 1 shows a schematic front view of an identification card 10 according to a first embodiment. This card comprises for example a first area 13 holding a first security feature, which can be, but is not limited to, an optically variable device 13 such as an hologram for example. Another area 15 is intended to hold colored personalization information, which can be for example provided on an optional background 12, both background

12 and colored personalization information 15 being visible through the upper layers. Another area 11 of the card, which corresponds to the remaining surface of the card in the illustrated example, may further be provided with another background 11, such as artwork, fine wavy lines such as guilloches pattern, fine logos or texts etc....

[0016] Such an identification document and its manufacturing process will be better understood with figure 2 together with figure 4, which show respectively a half exploded cross-sectional view of an example of such identification document and a flow chart of the main manufacturing steps.

[0017] In this example, the card body is made with several constitution layers 23 to 27 that are attached together by means of a conventional process (step 41). Such assembly of the layers can be made either by hot lamination and/or by using a strong adhesive for example. The card body can also be made directly in one piece, by molding for example. If layers are used, they are preferably made of polycarbonate. Indeed, this material is very interesting because, when they are laminated, the layers are fused 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.

[0018] All the layer(s) intended to be under the color personalization can be either opaque or at least translucent, and laser-sensitive or not. In the illustrated example, which is of course only one example amongst a plurality, layers 23, 26 and 27 are at least translucent, while other layer(s) 24, which can be made of several layers, are either opaque or translucent, and laser-sensitive or not. By the wording "at least translucent", it should be understood that it is at the most transparent. A background 11 or artwork may be printed on at least one layer 26 or 27 and/or 23 or 24, so that it can be seen from one and/or each external surface, through the upper (or external) translucent layers 23, 27. In the illustrated example, the entire layer 27 is at least translucent so that the hologram 13 and the underneath printed background 11 can be seen. The background 11 can be printed by any conventional printing process such as offset printing for example. In this case, even if a background 11 is printed onto a surface of the layer 27, this layer sticks well onto the underneath layer 26, because the lines of the background are so fine and spaced from each other by non-printed areas of the plastic material that are of sufficient size to still adhere onto the other layer.

[0019] All material 30 intended to cover the embedded colored personalization 15 has to be at least translucent so that said colored personalization can be seen through this material, from the external surface.

[0020] After having made the body of the identification document, either by molding or by assembling several layers, a further step 42 consists in creating a cavity 35 into the body, for example by milling. Such cavity can be milled through at least one of the layers. It can also be

made by lamination. In this case, lamination plate, in contact with card surface where cavity has to be created, has an over-thickness with the size and thickness of cavity, so that after lamination step, there is on the card a space having size and thickness defining a cavity. The cavity can be created into at least one or more layer(s), depending on the desired depth. In the illustrated example, it is created through the two first upper layers 26 and 27, but its depth can be such that bottom 31 is located either in layer 27, or layer 26, or layer 24. This cavity 35 is designed to receive an at least translucent piece 30. As the constitution layers, this piece is made preferably in polycarbonate material, but it could also be made with other plastic material such as PCV, ABS, PET etc...

[0021] Colored personalization data 15 can be printed either directly onto the bottom 31 of the cavity 35 or onto a surface of the at least translucent piece 30 intended to be inserted into the cavity 35.

[0022] The piece 30 presents a thickness substantially equal to the depth of the cavity 35 more or less 30 μ m. In example of figure 2, it holds the colored personalization data 15 that have been printed onto one of its main surfaces. This piece is for example obtained by punching (step 43).

[0023] All conventional printing process can be used to print colored personalization data either onto the plastic piece 30 or onto the bottom surface 31 of the cavity 35 (step 44). The second variant, i.e; printing these data onto the bottom surface 31 of the cavity 35 is preferred because it appears more secure. However, the other variant consisting in printing colored personalization data onto one of the main surfaces of the plastic piece 30 works well too. In the flow chart of figure 4, the preferred sequence is drawn in continuous lines, while the other sequence is drawn in dotted lines. Furthermore, since today there is a problem of adherence of color inks on plastics, an inkjet printing process is preferred. Indeed, a piezoelectric drop on demand inkjet technology, which has been developed by a company named Impika, seems to demonstrate interesting results because it is compatible with all types of substrates and enables to print in color with a good quality and a good adherence. This technology uses UV ink. Once ink is dried, adhesion of personalized data 15 on plastic material 30, 31 is quite good.

[0024] Optionally, before the printing of the colored personalization data 15, a background 12 may also be printed by any conventional printing process, such as offset or other. Such background printing may be made indifferently either before or after the punching of the piece 30. This additional optional background 12 is interesting because it enables to enhance even more the security of the embedded colored personalization. Indeed, if an infringer attempts to cut the piece 30 in order to remove the colored personalization, he will destroy the background at the same time of the removing, so that if he repositions the piece with another falsified colored personalization, the counterfeiting will appear immedi-

ately to naked eye.

[0025] Then, at step 45, the at least translucent piece 30 is inserted into the cavity 35, in such a manner that the colored personalized data 15 are located against the bottom 31 of the cavity 35, wherever the colored personalization data 15 have been printed.

[0026] Then, at step 46, the piece 30 is fixedly attached with the remaining body. The fixation can be made for example by welding the lateral edges 29 of the piece 30 with the lateral vertical walls 28 of the cavity 35, and/or the inserted surface of the piece 30 with at least partially the bottom surface 31 of the cavity. Such welding can be implemented by using either ultrasounds or laser beam or hot stamping process.

[0027] When ultrasounds or hot stamping process is used to weld the piece 30 into the cavity 35, a relief tool is preferably used in order to start the welding of the printed color personalization data with the plastic material, at some locations where relief of the tool sink into the plastic material.

[0028] Another way to fix the piece 30 into the cavity 35 can be the use of specific glue applied onto the vertical walls 28 of the cavity and/or the bottom 31 of the cavity. However, if it is applied onto the bottom 31 of the cavity or onto the surface of the printed color personalization data 15, it must be chosen in order not to damage the colored printing applied. Such glue may be chosen among thermoplastic polyurethane. For example, the glue sold by the company Epurex under the trademark name "Platilon" gives satisfactory results. Among properties of this type of glue, there are compliance with plastic such as polycarbonate, good adhesion on plastic and the activation under temperature lower than melting point of plastic material.

[0029] Another way to fix the piece 30 into the cavity 35 can be a soft lamination stage, which is implemented in lower temperature and during a shorter duration than usual, in order not to damage the colored personalization data 15. For that, the temperature can be set lower than 230°C, and the duration of lamination can be set lower than 4 minutes

[0030] Figure 3 shows a cross-sectional view of another document manufactured according to the process that has just been described, and comprising optional features that can be produced during optional steps.

[0031] After having inserted and fixedly attached the plastic piece 30 into the cavity 35, an optional step can be to add some additional features enhancing the security of the embedded color personalization 15.

[0032] For that, both the plastic piece 30 and one of the layers 33, through which the cavity 35 has been created, can be laser-sensitive. Then, a last optional stage of the manufacturing process consists in adding other personalization information 37 by laser engraving, in such a manner that the laser-engraved information 37 overlaps both the laser sensitive layer 33 and the plastic piece 30. In this case, if an infringer tries to cut the welds around the inserted plastic piece in order to remove the

color personalization, he will also break the laser-engraved information 37. Consequently, it is difficult to reposition the plastic piece 30 with a falsified colored personalization and to reposition it, in such a manner that the different parts of the laser-engraved information 37 face each other. Moreover, if the colored personalization has been changed, the laser-engraved personalization information has also to be modified, and this latter step is difficult to implement without leaving visible marks.

[0033] Optionally, another thin surface layer 36 can be attached on the external surface of the piece 30, in such a manner that it covers both the plastic piece 30 and at least partially the surface of the remaining external layer 27. Such a surface layer 36 can hide the relief effects that could appear after the insertion of the plastic piece into the cavity.

[0034] Other personalization data, such as name, birth date, ID number, etc...can also be added on the document by using another personalization process like laser engraving by means laser beam.

Claims

1. Identification document comprising colored personalization data (15) inside its body, **characterized in that** the colored personalization data are located in the bottom (31) of a cavity (35) created in the body and covered by an at least translucent piece (30).
2. Identification document according to claim 1, wherein colored personalization data (15) are printed onto the bottom surface (31) of said cavity (35).
3. Identification document according to claim 1, wherein colored personalization data (15) are printed onto an internal surface of said at least translucent piece (30), which is embedded into said cavity (35), said internal surface being designed to be inserted against the bottom (31) of said cavity.
4. Identification document according to anyone of preceding claims, wherein additional laser-engraved information (37) overlaps at least one layer (33) of the document and the said at least translucent piece (30).
5. Identification document according to anyone of preceding claims, wherein the body of the document and the at least translucent piece are made of polycarbonate material.
6. Identification document according to anyone of preceding claims, wherein a background (12) is printed onto the internal surface of the at least translucent piece (30), said internal surface being intended to be inserted against the bottom of said cavity (35).
7. Identification document according to anyone of preceding claims, wherein the at least translucent piece (30) is fixedly attached into the cavity (35) by means of ultrasound welding, hot-stamping welding, glue, or soft lamination.
8. Method for manufacturing an identification document comprising colored personalization data (15) inside its body, **characterized in that** it comprises the following steps:
 - providing a body,
 - creating a cavity (35) in the body,
 - printing personalization data (15) either directly onto the bottom surface (31) of said cavity (35) or onto a surface of an at least translucent piece (30), said piece having a complementary shape of the cavity,
 - inserting the at least translucent piece (30) in said cavity (35),
 - fixedly attaching said at least translucent piece (30) with the body of the document, so that the printed colored personalization data (15) are located against the bottom (31) of the cavity (35).
9. Method according to claim 8, wherein the body is made either by lamination of at least two constitution layers, or by molding.
10. Method according to anyone of claims 8 and 9, wherein the fixation of said piece (30) is made by welding, by means of ultrasounds or laser beam or hot-stamping.
11. Method according to claim 10, wherein when ultrasounds or hot-stamping are used for welding the at least translucent piece (30) into the cavity (35), a relief tool is used.
12. Method according to anyone of claims 8 and 9, wherein the fixation of said piece (30) is made by soft lamination with a temperature lower than 230°C, and heating time lower than 4min.
13. Method according to anyone of claims 8 and 9, wherein the fixation of said piece is made by using specific glue consisting of thermoplastic polyurethane.
14. Method according to anyone of claims 8 to 13, wherein an additional step, for enhancing the security of the embedded colored personalization data (15), consists in laser-engraving other personalization information (37) into the thickness of the document, in such a manner that said other information (37) overlaps both the body and the at least translucent piece (30).

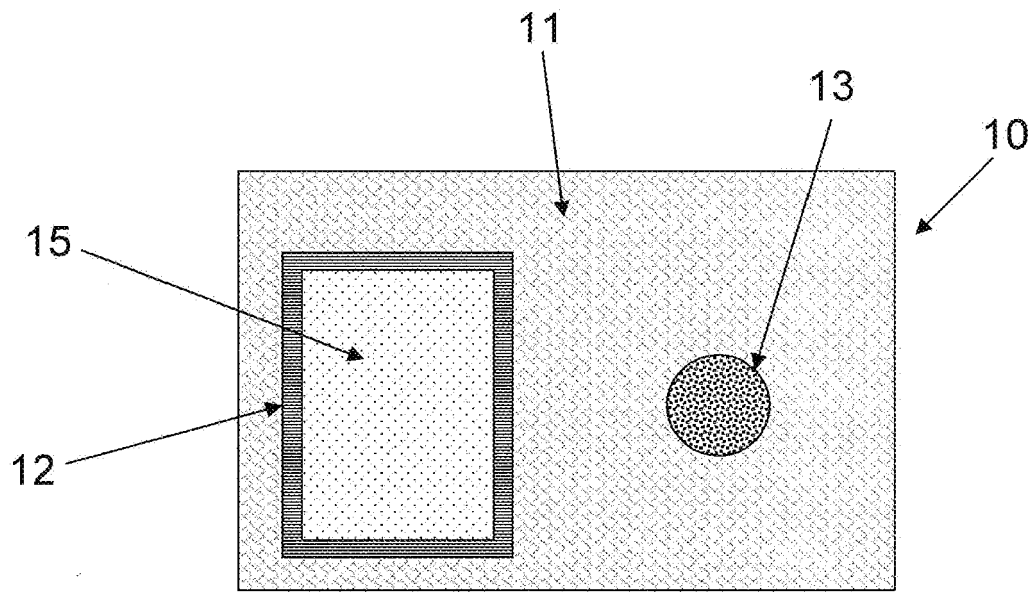


Figure 1

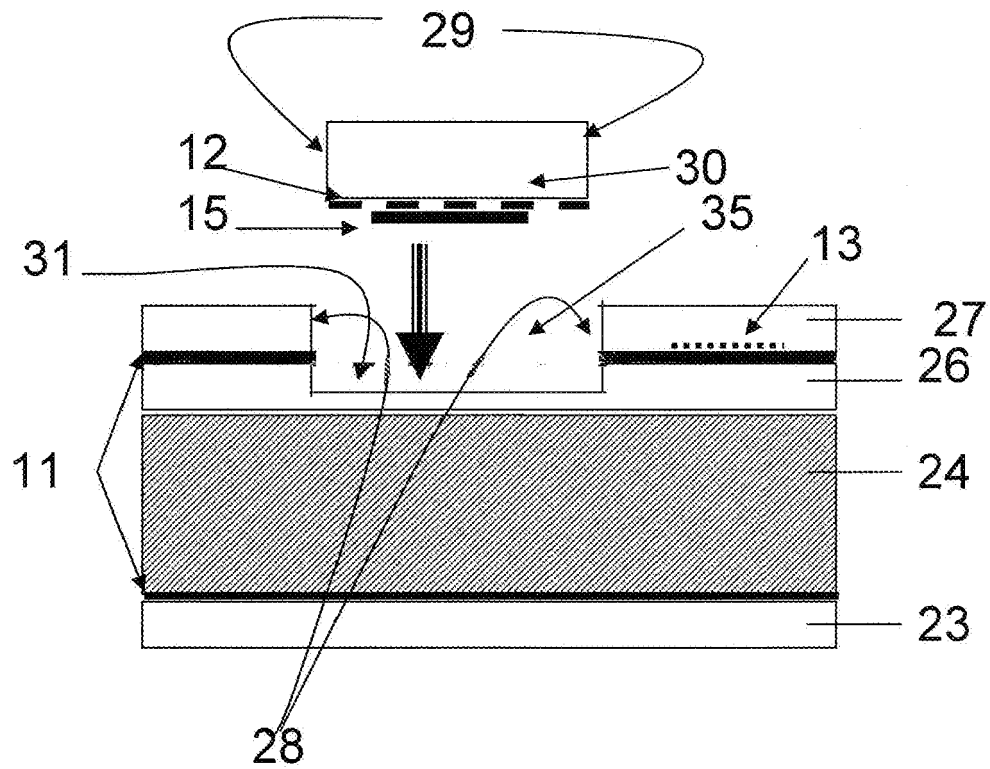


Figure 2

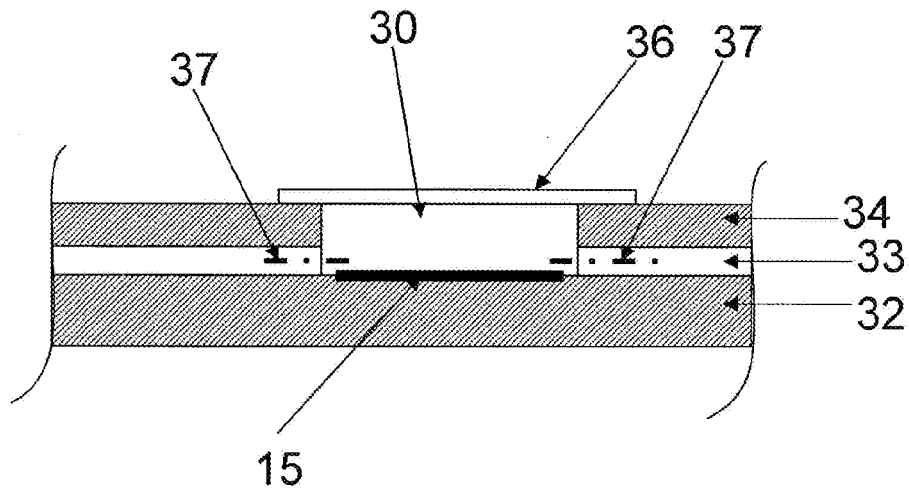


Figure 3

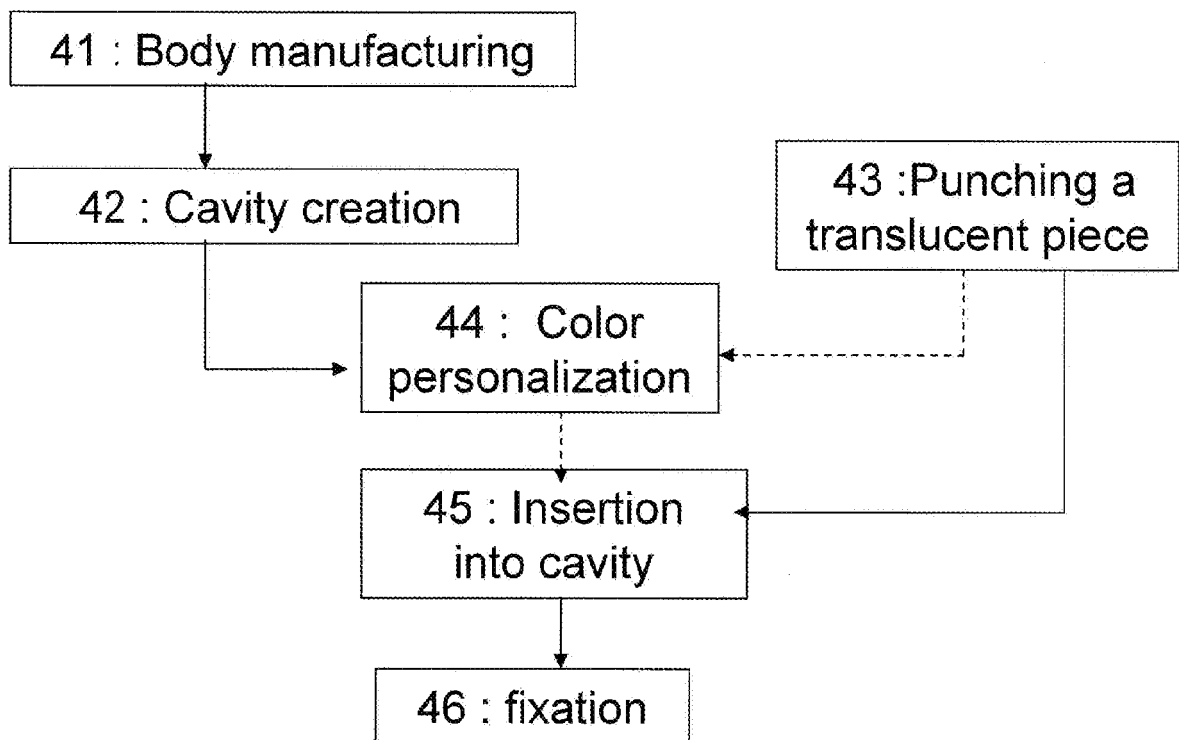


Figure 4



EUROPEAN SEARCH REPORT

Application Number
EP 08 16 6738

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 2004/104273 A1 (NAKAMURA YATSUKA [JP]) 3 June 2004 (2004-06-03) * paragraphs [0018] - [0030] * -----	1	INV. B42D15/10 G06K19/06
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
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Place of search		Date of completion of the search	Examiner
The Hague		27 March 2009	Curt, Denis
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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EPO FORM 1503 03.82 (P04001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 16 6738

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27-03-2009

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