(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 156 248 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
19.04.2017 Bulletin 2017/16

(51) Int Cl.:
B41M 3/12 *(2006.01)* ***B44C 1/17*** *(2006.01)*

(21) Application number: **16194054.9**

(22) Date of filing: **14.10.2016**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **14.10.2015 IT UB20154676**

(71) Applicant: **Graphic Report S.N.C. Di Brigato Antonio & C.**
35026 Conselve (PD) (IT)

(72) Inventor: **BRIGATO, Antonio**
I-35026 Conselve (PD) (IT)

(74) Representative: **Gallo, Luca**
Gallo & Partners S.r.l.
Via Rezzonico, 6
35131 Padova (IT)

(54) PROCESS FOR MAKING TRANSFERRABLE DECORATIONS AND TRANSFERRABLE DECORATION

(57) The present invention regards a process for making, by means of digital printing, transferrable decorations with pre-spaced graphic elements.

More in detail, such process comprises the following operative steps: a step for arranging a sheet-like medium (2); a step for printing a graphic element (7) on the sheet-like medium (2), in which a digital printer deposits an ink layer (9) on the sheet-like medium (2) in order to make the graphic element (7) on a corresponding print area (10); a step for making an adhesive surface (11) aligned with the border (7') of the graphic element (7), such adhesive surface (11) extended on the print area (10) above the corresponding ink layer (9) and delimited by an edge (B2) coinciding with the edge (B1) of the print area (10) itself.

Also forming an object of the present invention is a transferrable decoration with pre-spaced elements, in particular obtained by means of the aforesaid process.

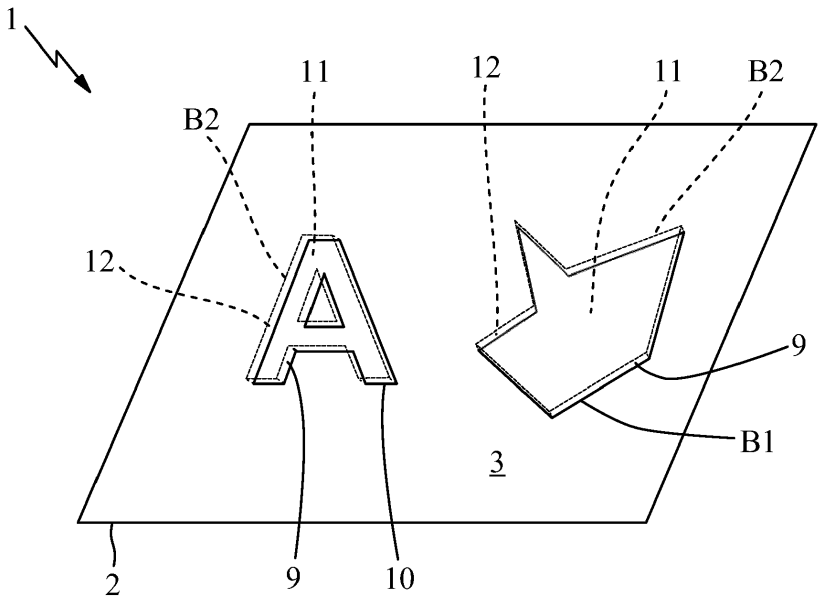

Fig. 2A

EP 3 156 248 A1

Description

Field of application

[0001] The present invention regards a process for making transferrable decorations and a transferrable decoration in particular obtained by means of said process.

[0002] The process and the transferrable decoration, object of the present invention, are inserted in the field of production for making decorations to be transferred, preferably under cold conditions, onto surfaces of any kind - both smooth and rough (such as wood, glass, metal, plastic, plaster, etc.) - for internal and external settings, and in particular also on wall surfaces, e.g. on walls and ceilings of building rooms, building facades, on fencing walls, etc.

[0003] In particular, the present invention allows making, by means of the use of digital printers, transferrable decorations having pre-spaced graphic elements.

State of the art

[0004] For some time, printable media for making decorations on surfaces e.g. of panels, windows, wall surfaces have been known on the market, which allow transferring onto a surface to be decorated an image that was previously printed or painted thereon.

[0005] Such printable media for example comprise a first support layer constituted by a paper sheet, a second water-repellent resin layer placed to cover the first support layer, and a transparent film on which the decoration to be transferred is made. In order to apply the lateral onto the surface to be decorated, it is provided to apply a continuous layer of glue on the printed face of the transparent film and to attach the latter to the surface itself. Subsequently, the paper sheet of the first layer is removed in order to uncover the transparent film on which the decoration is printed.

[0006] There is widespread use on the market of pre-spaced adhesives which comprise multiple adhesive elements, each for example depicting a letter, intended to be attached to the surface to be decorated; such elements are separated from each other so as to form a decoration (for example comprising a word), in which the interspace between the different letters is not covered with transparent film.

[0007] The achievement of decorations with pre-spaced graphic elements provides for arranging an adhesive paper provided with a siliconized paper support sheet, on which an adhesive film is attached.

[0008] Then, a step is provided for printing the decoration, in which a printer is employed for making - on the film of the adhesive paper - an illustration provided with multiple separate graphic elements (e.g. the letters of an inscription or a line drawing coming from vector rows).

[0009] Subsequently, a cutting step is provided, in which the film of the adhesive paper is cut out along the borders of the single graphic elements of the illustration, by means of for example a cutting plotter.

[0010] For such purpose, in the step for printing the decoration, specific reference points are printed on the adhesive paper, which must be read by a camera of the cutting plotter in order to determine the position of the printed areas in the adhesive paper.

[0011] After the cutting step, a step is provided for removing the film scraps between each graphic element, such that only the parts of the film containing graphic elements to be applied to the surface to be decorated are left on the adhesive paper. Such scrap removal step is normally executed manually.

[0012] Finally, a step is provided for applying a further adhesive film (termed "application tape" in the field jargon) which, during application of the decoration to the surface to be decorated, has the function of transporting the graphic elements from the adhesive paper to the surface to be decorated itself.

[0013] More in detail, in the decoration application step, the support sheet of the adhesive paper is removed and the application tape is pressed against the surface to be decorated (such as the window of a store) in order to attach to such surface the parts of the adhesive film that contain the graphic elements. Subsequently the application tape is removed, uncovering the cut-out graphic elements that form the decoration.

[0014] A first drawback of the pre-spaced adhesives of known type briefly described above is due to the fact that long times are required for the achievement thereof, since it is necessary to print the decoration on adhesive paper, bring it to the cutting plotter in order to execute the cutting step, manually execute the scrap removal step and apply the application tape.

[0015] Such drawback also makes it particularly difficult or even operatively impossible to make very complex decorations, provided with numerous separate small-size graphic elements, in particular due to the need to cut out the film of the adhesive paper along the edges of all the graphic elements of the decoration.

[0016] A further drawback of the pre-spaced adhesives of known type is due to the fact that they are not adapted to be applied on rough or course surfaces (such as wall plaster, wood, rough drywall) or to surfaces subjected to heat sources such as spotlights, since the film parts of the single pre-spaced graphic elements (in particular if of small size) tend to not stably adhere to the surface to be decorated, for example being detached even already from the time of removal of the application tape.

[0017] The patent application WO 86/04303 describes a transferrable decoration of known type which comprises a transparent sheet-like medium on which a first glue layer is deposited, and on such first glue layer an ink layer for making a graphic element is in turn printed. The transferrable decoration also comprises a second glue layer sensitive to actinic rays deposited above the ink of the graphic element. It is provided to apply actinic rays to the decoration in order to neutralize the zones of the

second glue layer that are extended outside the graphic element. In this manner, when the sheet-like medium is removed from the wall to which the decoration is applied, the aforesaid neutralized zones of the second glue layer are removed, leaving attached to the wall the parts of such second glue layer below the ink of the graphic element.

[0018] The decoration described in the patent application WO 86/04303 is complex and costly to achieve, in particular requiring the treatment of the decoration with actinic rays.

Presentation of the invention

[0019] In this situation, the main object of the present invention is therefore to eliminate the abovementioned drawbacks of the solutions of known type, by providing a process for making transferrable decorations and a transferrable decoration which allow applying, in a simple and quick manner, decorations with pre-spaced graphic elements on surfaces to be decorated.

[0020] Further object of the present invention is to provide a process for making transferrable decorations that is simple and quick to actuate, in particular without having to employ cutting plotters nor execute scrap removal operations.

[0021] Further object of the present invention is to provide a process for making transferrable decorations capable of being applied on any type of surface, in particular even on rough, irregular or porous surfaces, ensuring an optimal adhesion of the decorations to the surface.

[0022] Further object of the present invention is to provide a process for making transferrable decorations which allow making decorations that are resistant over time.

[0023] Further object of the present invention is to provide a process for making transferrable decorations which allow attaining decorations of particularly thin thickness, and in particular which do not have reliefs from the decorated surface that are substantially visible to the naked eye.

[0024] Further object of the present invention is to provide a process for making transferrable decorations which allow simply and quickly transferring the graphic elements onto the surface to be decorated, in particular under cold conditions (i.e. without having to warm the surface to be decorated or the printable decoration itself) and under dry conditions (i.e. without having to wet or moisten the transferrable decoration with water or with aqueous solutions).

[0025] Further object of the present invention is to provide a transferrable decoration that is simple and inexpensive to produce.

Brief description of the drawings

[0026] The technical characteristics of the invention, according to the aforesaid objects, can be clearly seen in the contents of the below-reported claims and the advantages thereof are clearer from the following detailed description, made with reference to the enclosed drawings, which represent several merely exemplifying and non-limiting embodiments of the invention, in which:

- figures 1A and 1B respective show, in a side section and perspective view, a step for printing graphic elements according to the process for making transferrable decorations, object of the present invention;
- figures 2A and 2B respective show, in a side section and perspective view, a step for making adhesive surfaces according to the present process for making transferrable decorations, in accordance with a first embodiment of the present invention;
- figures 3A and 3B respective show, in a side section and perspective view, a stage for spreading a glue layer of a step for making adhesive surfaces, in accordance with a second embodiment of the process, object of the present invention;
- figures 4A and 4B respective show, in a side section and perspective view, a stage for printing an anti-adhesive material of the step for making adhesive surfaces, in accordance with the aforesaid second embodiment of the process, object of the present invention.

Detailed description of a preferred embodiment

[0027] The process for producing transferrable decorations, object of the present invention, allows making graphical decorations to be transferred, preferably under cold conditions, onto surfaces of any kind, smooth or rough (such as wood, glass, metal, plastic, plaster etc.), both for internal and external settings, and in particular also on wall surfaces, e.g. on walls and ceilings of building rooms, building facades, on fencing walls, etc. Advantageously, the present process allows attaining pre-spaced transferrable decorations, which comprise in particular multiple graphic elements (such as letters, words, signs, images, drawings, etc.) that are separated from each other, and are intended to be applied on the surface to be decorated with such cut-out graphic elements.

[0028] According to the invention, the present process, for making a transferrable decoration 1, comprises a step for arranging a flexible sheet-like medium 2, provided with a first face 3 and preferably provided with a second face 4 directed in opposite sense with respect to the first face 3 itself.

[0029] Advantageously, the sheet-like medium 2 (or transfer medium) comprises a support sheet 5, in particular made of polyester, and a water-repellent material layer 6 deposited on the support sheet 5 and adapted to define the aforesaid first face 3 of the sheet-like medium 2. Preferably, the water-repellent material layer 6, having for example thickness less than 1 μm, comprises at least one silicone polymer, in particular obtained by means of a UV silicon sealing.

[0030] The present process also comprises a step for feeding the aforesaid sheet-like medium 2 to a printer, preferably of ink jet digital type.

[0031] Advantageously, the aforesaid printer comprises multiple print heads, each provided with corresponding supply nozzles and connected to a corresponding cartridge, and with a control unit adapted to control the operation of the heads, in a manner *per se* known to the man skilled in the art and therefore not described in detail hereinbelow.

[0032] With reference to the enclosed figures 1A and 1B, the present process comprises a step for printing, on the sheet-like medium 2, at least one graphic element 7 provided with a border 7' thereof, preferably obtained by means of ink jet digital printing.

[0033] With the term graphic element 7, it is intended any one letter, word, sign, image or drawing provided with a border 7' thereof and obtained by means of depositing one or more ink layers. In particular, each graphic element 7 is obtained with a single corresponding ink layer, or with multiple side-by-side, adjacent ink layers that may also have different color.

[0034] In particular, in the case of graphic elements internally provided with empty closed zones 8 (lacking ink, such as in the letter "A" illustrated in the embodiment of figure 1), the border 7' of the graphic element 7 comprises at least one external line and at least one internal line (delimiting the corresponding empty closed zones 8), and between such lines the ink is extended that constitutes the graphic element 7 itself.

[0035] Preferably, in accordance with the embodiment illustrated in figure 1, the aforesaid printing step provides for making multiple graphic elements 7 (such as letters and/or drawings) spaced from each other and each delimited by a corresponding border 7' thereof.

[0036] According to the invention, in the aforesaid step for printing the graphic element 7, the printer deposits at least one ink layer 9 on the first face 3 of the sheet-like medium 2 in order to make the corresponding graphic element 7. More in detail, the ink layer 9 covers a corresponding print area 10 delimited by a first edge B1 thereof which defines the border 7' of the corresponding graphic element 7.

[0037] Preferably, the printer, in order to achieve the step for printing the graphic element 7, comprises one or more first heads connected to corresponding first cartridges containing corresponding inks, e.g. of different colors (such as black, cyan, magenta, yellow and suitably also white, transparent, etc.).

[0038] In particular, the ink layer 9 is deposited by the printer on the water-repellent material layer 6 which defines the first face 3 of the sheet-like medium 2. Opportunely, the water-repellent material layer 6 suitably accepts the ink layer 9 deposited thereon in the printing step, ensuring a suitable adhesion of the ink in order to precisely obtain in particular the border 7' of the graphic element 7, and simultaneously ensuring the correct separation of the ink layer 9 from the sheet-like medium 2 when the transferrable decoration 1 is applied to the surface to be decorated, in order to leave the graphic element 7 attached to the surface itself, as described in detail hereinbelow. Advantageously, in the aforesaid step for printing the graphic element 7, the printer deposits two or more ink layers 9 superimposed on the same print area 10, for example in order to make the graphic element 7 more covering.

[0039] Advantageously, in the step for printing the graphic element 7, the latter is printed on the first face 3 of the sheet-like medium 2 in a mirrored manner, in particular it being intended that the graphic element 7 is reproduced on the first face 3 in a mirrored manner with respect to the orientation of the decoration when it is applied to the surface to be decorated.

[0040] In accordance with the idea underlying the present invention, the process for making transferrable decorations comprises a step for making at least one adhesive surface 11 aligned with the border 7' of the corresponding graphic element 7. Such adhesive surface 11 is extended on the corresponding print area 10 above the ink layer 9 of the corresponding graphic element 7 and is delimited by a second edge B2 thereof substantially coinciding with the first edge B1 of the corresponding print area 10.

[0041] In the present description, with the expression "substantially coinciding" it is intended that the second edge B2 of the adhesive surface 11 is arranged superimposed (with or without contact) on the first edge B1 of the corresponding print area 10 with a tolerance margin given for example by the heads of the printer or by the particular printing technique employed for making the aforesaid step for printing the graphic element 7.

[0042] In addition, with the expression "substantially coinciding", it is also intended that the second edge B2 of the adhesive surface 11 can be arranged outside the print area 10 by an over-extension distance not greater than about 1 mm. In accordance with the latter definition, the step for aligning the adhesive surface 11 advantageously provides for making the adhesive surface 11 with a peripheral overlap strip thereof, which is extended along the corresponding second edge B2, is extended outside the first edge B1 of the corresponding print area 10 and has width substantially comprised between 0.1 mm and 1 mm (with width of the over-extension strip it being intended the distance between the first edge B1 and the corresponding second edge B2).

[0043] Suitably, the adhesive surface 11 is substantially extended exclusively within the corresponding print area 10 to cover the ink layer 9 of the corresponding graphic element 7, with the expression "exclusively within" it being intended a significance analogous to that specified above for the expression "substantially coinciding" relative to the second edge B2 of the adhesive surface 11.

[0044] Advantageously, in accordance with a first embodiment of the present invention illustrated in the embodiment of figures 2A and 2B, the step for making the

adhesive surface 11 comprises a stage for the alignment printing of at least one first glue layer 12, such stage obtained by means of the aforesaid printer.

[0045] More in detail, in such stage for alignment printing of the first glue layer 12, the printer supplies on the print area the first glue layer 12, which is placed to cover the ink layer 9 of the corresponding graphic element 7 and is perimetrically delimited by the aforesaid second edge B2, in a manner such that such first glue layer 12 defines the adhesive surface 11 of the corresponding print area 10.

[0046] In particular, in accordance with such first embodiment, the first glue layer 12 is deposited by the printer substantially exclusively within the corresponding print area 10. Preferably, the aforesaid stage for alignment printing of the first glue layer 12 is obtained by means of ink jet digital printing, and in particular by means of the use of the aforesaid printer of ink jet digital type.

[0047] Advantageously, for the purpose of achieving the stage for alignment printing of the first glue layer 12, the printer is provided with at least one second head connected to at least one corresponding second cartridge containing the glue to be deposited on the print area 10 in order to make the corresponding adhesive surface 11.

[0048] Advantageously, the glue of the first glue layer 12, supplied by the second head of the printer during the aforesaid alignment printing stage, has viscosity comprised between about 5 cP (100 poise) and 20 cP, and preferably between about 7 cP and 14 cP, at a temperature comprised between about 35°C and 55°C, and preferably between about 40°C and 45°C.

[0049] The aforesaid viscosity values of the glue surprisingly confer physical properties to the latter that make such glue particularly suitable for printing the first glue layer 12 by means of the ink jet digital printer.

[0050] In particular, such viscosity values of the glue allow the latter to suitably exit from the nozzles of the second head of the printer in drop form, advantageously and simultaneously preventing the suction of outside air within the second head.

[0051] Preferably, the glue of the first glue layer 12, supplied by the second head of the printer during the aforesaid alignment printing stage, has surface tension comprised between about 20 dyn/cm and 35 dyn/cm.

[0052] Such surface tension of the glue allows the latter to pass through the nozzles of the second head with a fluid-dynamic behavior that allows the glue to be separated in drops of appropriate volume (e.g. between about 6 and 14 picoliters), in particular allowing the correct interaction with the ink layer 9 in order to suitably cover it so as to form the first glue layer 12. In addition, the aforesaid viscosity values simultaneously allow the glue to be supplied without wetting the nozzles of the second head, with consequent correct operation of the printer.

[0053] Advantageously, the stage for alignment printing of the first glue layer 12 provides for, after the glue has been deposited by the second head of the printer on the print area 10, executing a treatment of such glue by means of irradiation of electromagnetic radiations, such as preferably UV rays.

[0054] Such treatment is obtained in particular by means of UV lamps (e.g. of LED type) integrated in the printer.

[0055] The treatment by means of irradiation causes the polymerization of the glue of the first glue layer 12, therefore bringing the latter substantially to the solid state.

[0056] For such purpose, in particular, the glue of the first glue layer 12 is of photocrosslinkable type.

[0057] Suitably, the glue of the first glue layer 12 is of pressure sensitive adhesive (PSA) type. In accordance with a second embodiment of the present invention illustrated in the embodiment reported in figures 3A, 3B, 4A and 4B, the step for making of the adhesive surface 11 comprises a stage for spreading at least one second glue layer 13, preferably continuous, on the first face 3 of the sheet-like medium 2. With reference in particular to the embodiment of figures 3A and 3B, in such spreading stage, the second glue layer 13 is deposited to cover the ink layer 9 (printed on the corresponding print area 10), and preferably to also cover the zones of the first face 3 of the sheet-like medium 2 arranged outside the print area 10, in particular covering the entire first face 3 of the sheet-like medium 2.

[0058] Preferably, in accordance with the aforesaid second embodiment of the invention, before the aforesaid stage of spreading the second glue layer 13, a step is provided for picking up the sheet-like medium 2 with the graphic elements 7 printed thereon from the printer.

[0059] Subsequently, at such pick-up step, the second glue layer 13 is deposited on the first face 3 of the sheet-like medium 2, e.g. in a manual manner by means of an application roller *per se* known to the man skilled in the art.

[0060] In accordance with the aforesaid second embodiment of the invention, the present process comprises a stage for printing at least one layer of anti-adhesive material 14, said stage being obtained in particular by means of digital printing.

[0061] Preferably, such step for printing the anti-adhesive material layer 14 is preceded by a further step for feeding the printer with the sheet-like medium 2 having, extended thereon, the second glue layer 13 made in the aforesaid spreading stage.

[0062] With reference to the embodiment of figures 4A and 4B, in the stage for printing the anti-adhesive material layer 14 the printer deposits, on the second glue layer 13, the anti-adhesive material layer 14, which is extended on an anti-adherent area 15 substantially complementary to the print area 10 and is provided with at least one opening 16 substantially coinciding with the print area 10 of the corresponding graphic element 7 and delimited by the corresponding second edge B2, so as to delimit the corresponding adhesive surface 11.

[0063] In particular, the anti-adherent area 15, on which the anti-adhesive material layer 14 is deposited,

is extended outside the print areas 10, covering the second glue layer 13 except for its openings 16 arranged at the print areas 10 themselves. In this manner, the zone of the second glue layer 13 facing the corresponding opening 16 of the anti-adhesive material layer 14 defines the corresponding adhesive surface 11 intended to adhere to the surface to be decorated, while the remaining zone of the second glue layer 13 (arranged outside the print areas 10) is covered by the anti-adhesive material layer 14 and therefore cannot be attached to the surface to be decorated, as described in detail hereinbelow.

[0064] In particular, with anti-adhesive material it is intended a material that allows avoiding the gluing between two elements in contact, such as in the present case the surface to be decorated and the zones of the second glue layer 13 arranged below the anti-adherent area 15 (and hence outside the print areas 10 of the transferrable decoration 1).

[0065] Preferably, the anti-adhesive material comprises a preferably transparent varnish.

[0066] Advantageously, for the purpose of attaining the stage for printing the anti-adhesive material layer 14, the printer is provided with at least one third head connected to at least one corresponding third cartridge containing the anti-adhesive material (such as the aforesaid varnish) to be deposited on the second glue layer 13 in order to form the aforesaid anti-adherent area 15.

[0067] Preferably, between the first face 3 of the sheet-like medium 2 and the ink layer 9, and/or between the ink layer 9 and the first glue layer 12, and/or between the ink layer 9 and the second glue layer 13, and/or between the second glue layer 13 and the anti-adhesive material layer 14, one or more intermediate layers can be provided comprising varnishes, primers, etc., *per se* known to the man skilled in the art.

[0068] The thickness of the sheet-like medium 2 and of the layers 9, 12, 13, 14, illustrated in the embodiments reported in the enclosed figures, are merely indicative, in particular it being intended that the thicknesses of the aforesaid layers are circa on the order of several microns or tens of microns, in a manner *per se* known to the man skilled in the art.

[0069] Advantageously, the present process comprises, after the step for making of the adhesive surface 11, a coating step in which a protection sheet (not illustrated in the enclosed figures) is deposited to cover at least the adhesive surface 11, and in particular to cover the entire first face 3 of the sheet-like medium 2.

[0070] In particular, such protection sheet allows preventing the degradation of the adhesive surfaces 11 during the transportation of the transferrable decoration 1 to the place where the surface to be decorated is situated.

[0071] Preferably, in accordance with the aforesaid first embodiment of the invention, the protection sheet is arranged to cover the first glue layer 12 which defines the corresponding adhesive surface 11 and zones of the first face 3 of the sheet-like medium 2 outside the print areas 10 (and hence outside the adhesive surfaces 11).

[0072] In accordance with the aforesaid second embodiment of the invention, the protection sheet is arranged to cover the zone of the second glue layer 13 which is arranged facing the corresponding opening 16 of the anti-adhesive material layer 14 (and which defines the corresponding adhesive surface 11) and to cover the defined anti-adherent area 15 of the anti-adhesive material layer 14 itself.

[0073] Advantageously, the protection sheet comprises a sheet of wax paper.

[0074] Also forming the object of the present invention is a transferrable decoration 1, in particular obtained according to the above-described process.

[0075] Hereinbelow, for the sake of description simplicity, reference will be made to the same nomenclature introduced thus far.

[0076] According to the invention, the present transferrable decoration 1 comprises a flexible sheet-like medium 2, provided with a first face 3 and with a second face 4, and preferably comprising a support sheet 5 and a water-repellent material layer 6, in accordance with that described above.

[0077] The transferrable decoration 1 also comprises at least one ink layer 9 deposited on the first face 3 of the sheet-like medium 2, and in particular on the water-repellent material layer 6 of the sheet-like medium 2 itself. Such ink layer 9 covers a corresponding print area 10 delimited by a first edge B1 thereof which defines a border 7' of a corresponding graphic element 7.

[0078] Preferably, the transferrable decoration 1 can also comprise multiple aforesaid graphic elements 7, each obtained with one or more ink layers 9, in accordance with that reported above.

[0079] The transferrable decoration 1 also comprises at least one adhesive surface 11 extended aligned with the border 7' of the corresponding graphic element 7. Such adhesive surface 11 is extended on the corresponding print area 10 above the ink layer 9 of the corresponding graphic element 7 and is delimited by a second edge B2 substantially coinciding with the first edge B1 of the corresponding print area 10.

[0080] Advantageously, in accordance with the first embodiment of the present invention illustrated in the embodiments of figures 2A and 2B, the adhesive surface 11 comprises a first glue layer 12 which is printed on the corresponding print area 10 to cover the ink layer 9 of the corresponding graphic element 7 and is perimetrically delimited by the second edge B2 of the corresponding adhesive surface 11, in a manner such that the first glue layer 12 defines the adhesive surface 11 itself.

[0081] Preferably, the first glue layer 12 is obtained by means of a glue having, during printing, viscosity comprised between about 5 cP and 20 cP, and preferably between 7 cP and 14 cP, and preferably between about 7 cP and 14 cP, at a temperature comprised between about 35°C and 55°C, preferably between about 40°C and 45°C.

[0082] Suitably, the glue of the first glue layer 12 has,

during printing, surface tension comprised between about 20 dyn/cm and 35 dyn/cm.

[0083] Advantageously, in accordance with the second embodiment of the present invention illustrated in the embodiments of figures 3A, 3B, 4A and 4B, the transferrable decoration 1 comprises a second glue layer 13, preferably continuous, deposited on the first face 3 of the sheet-like medium 2, and an anti-adhesive material layer 14 deposited on such second glue layer 13. The anti-adhesive material layer 14 is extended on an anti-adherent area 15 which is complementary to the corresponding print area 10 and is provided with an opening substantially coinciding with such print area, and is delimited by the second edge B2 of the corresponding adhesive surface 11. In this manner, the zone of the second glue layer 13 facing the corresponding opening 16 of the anti-adhesive material layer 14 defines the corresponding adhesive surface 11 intended to adhere to the surface to be decorated.

[0084] Advantageously, in accordance with an embodiment not illustrated in the enclosed figures, the adhesive surface 11 of the transferrable decoration 1 is provided with a peripheral overlap strip, which is extended along the corresponding second edge B2, is extended outside the first edge B1 of the corresponding print area 10 and has width substantially comprised between 0.1 mm and 1 mm.

[0085] Preferably, the present transferrable decoration 1 comprises the further advantageous characteristics of the decoration 1 itself described in accordance with that reported above in the description of the process for making transferrable decorations, object of the invention.

[0086] In operation, in order to transfer the graphic elements 7 of the transferrable decoration 1 onto the surface to be decorated, it is preferably provided to remove the protection sheet in order to uncover the adhesive surfaces 11 of the transferrable decoration 1 arranged at the respective print areas 10 of the graphic elements 7 themselves.

[0087] Then, the transferrable decoration 1 is made to adhere on the surface to be decorated with the side of the first face 3 of the sheet-like medium 2, in a manner such that the adhesive surfaces 11 are attached to the surface to be decorated.

[0088] Preferably, it is provided to press on the second face 4 of the sheet-like medium 2, with hands or by means of suitable tools (such as spatulas), at least on the zone of the second face 4 arranged at the print areas 10, in order to facilitate the gripping of the corresponding print areas 10 themselves to the surface to be decorated of the adhesive surfaces 11.

[0089] In particular, with reference to the first embodiment of the present invention, the transferrable decoration 1 is applied to the surface to be decorated in a manner such that the first glue layer 12 (printed aligned with the corresponding print area 10 in order to define the corresponding adhesive surface 11) adheres to the surface to be decorated itself.

[0090] In accordance with the second embodiment of the present invention, the transferrable decoration 1 is applied to the surface to be decorated in a manner such that the zones of the second glue layer 13 arranged at the openings 16 of the anti-adhesive material layer 14 (and defining the corresponding adhesive surfaces 11 at the corresponding print areas 10) adhere to the surface to be decorated itself. In particular, the anti-adhesive material layer 14 has thickness (on the order of several microns or tens of microns) such to allow the adhesive surfaces 11 arranged at the openings 16 to adhere to the surface to be decorated.

[0091] Still in accordance with the aforesaid second embodiment, the anti-adhesive material layer 14, at the anti-adherent area 15 defined thereby, abuts against the surface to be decorated, being interposed between the latter and the zone of the second glue layer 13 covered by the layer of anti-adhesive material 14 itself, in order to prevent the glue from attaching to the surface to be decorated at the aforesaid anti-adherent area 15.

[0092] After the adhesive surfaces 11 of the transferrable decoration 1 have been attached to the surface to be decorated, the sheet-like medium 2 is removed, leaving the ink layer 9 of each cut-out graphic element 7 attached to the surface to be decorated, such ink layer 9 retained to the surface to be decorated by the glue which defines the adhesive surface 11 arranged at the respective print area 10.

[0093] In accordance with the first embodiment of the present invention, when the sheet-like medium 2 is removed, the first face 3 of the latter, in particular due to the water-repellent material layer 6, at the print areas 10 is detached from the ink layer 9 of the corresponding graphic elements 7 and, at the zones outside the print areas 10, is detached from the surface to be decorated, leaving only the graphic elements 7 attached to the surface which is thus decorated.

[0094] In accordance with the second embodiment of the present invention, when the sheet-like medium 2 is removed, at the anti-adherent area 15 the anti-adhesive material layer 14 is separated from the surface to be decorated together with the sheet-like medium 2 and the glue arranged below the anti-adherent area 15 itself (in particular preventing the glue from being attached to the surface to be decorated). At the print areas 10, the first face 3 of the sheet-like medium 2, in particular due to the water-repellent material layer 6, is detached from the ink layer 9 of the corresponding graphic elements 7, leaving them attached to the surface which in this manner is decorated.

[0095] The invention thus conceived therefore attains the pre-established objects.

[0096] In particular, the present process, comprising the step for aligning adhesive surfaces 11 according to the invention, allows making transferrable decorations 1 in a simple, quick and inexpensive manner, in particular without having to employ the cutting plotter, remove scrap or apply application tape.

[0097] Advantageously, making the adhesive surface 11 by means of the stage for alignment printing of the first glue layer 12, in particular by means of ink jet digital printing, allows obtaining the adhesive surface 11 with only one operation, without making multiple layers with relative operative passages.

[0098] In addition, the present process allows attaining transferrable decorations 1 by means of which it is possible to apply pre-spaced graphic elements in an efficient manner to any type of surface, in particular also to rough or course surfaces.

Claims

1. Process for making transferrable decorations, such process providing for the following operative steps:

- a step for arranging a flexible sheet-like medium (2), provided with a first face (3);
- a step for feeding a printer with said sheet-like medium (2);
- a step for printing, on said sheet-like medium (2), at least one graphic element (7) provided with a border (7') thereof, in such printing step said printer deposits at least one ink layer (9) on the first face (3) of said sheet-like medium (2) in order to make said graphic element (7), such ink layer (9) covers a corresponding print area (10) delimited by a first edge (B1) which defines the border (7') of said graphic element (7);

said process being **characterized in that** it also comprises:

- a step for making at least one adhesive surface (11) aligned with the border (7') of said graphic element (7), such adhesive surface (11) is extended on said print area (10) above said ink layer (9) and is delimited by a second edge (B2) substantially coinciding with the first edge (B1) of said print area (10).

2. Process for making transferrable decorations according to claim 1, **characterized in that** said step for making said adhesive surface (11) comprises a stage for alignment printing of at least one first glue layer (12), and in such stage, said printer supplies said first glue layer (12) perimetrically delimited by said second edge (B2) on said print area (10) and above said ink layer (9).

3. Process for making transferrable decorations according to claim 2, **characterized in that** said stage for alignment printing of said first glue layer (12) is obtained by means of ink jet digital printing.

4. Process for making transferrable decorations according to claim 2 or 3, **characterized in that** the glue of said first glue layer (12), supplied by said printer during said alignment printing stage, has viscosity comprised between about 5 cP and 20 cP at a temperature comprised between about 35°C and 55°C.

5. Process for making transferrable decorations according to any one of the preceding claims 2 to 4, **characterized in that** the glue of said first glue layer (12), supplied by said printer during said alignment printing stage, has surface tension comprised between about 20 dyn/cm and 35 dyn/cm.

6. Process for making transferrable decorations according to claim 1, **characterized in that** said step for making said adhesive surface (11) comprises:

- a stage for spreading at least one second glue layer (13) on the first face (3) of said sheet-like medium (2) to cover at least said ink layer (9) printed on said print area (10);
- a stage for printing at least one layer of anti-adhesive material (14), and in such stage said printer deposits said anti-adhesive material layer (14) on said second glue layer (13), such anti-adhesive material layer (14) extended on an anti-adherent area (15) substantially complementary to said print area (10) and is provided with at least one opening (16) substantially coinciding with said print area (10) and delimited by said second edge (B2).

7. Process for making transferrable decorations according to any one of the preceding claims, **characterized in that** said sheet-like medium (2) comprises a support sheet (5) and a water-repellent material layer (6) deposited on said support sheet (5) and defining said first face (3) of said sheet-like medium (2).

8. Process for making transferrable decorations according to any one of the preceding claims, **characterized in that**, in said step for printing said graphic element (7), said graphic element (7) is printed in a mirrored manner on the first face (3) of said sheet-like medium (2).

9. Process for making transferrable decorations according to any one of the preceding claims, **characterized in that** it comprises a coating step, wherein at least one protection sheet is deposited to cover at least said adhesive surface (11).

10. Transferrable decoration (1), which comprises:

- at least one flexible sheet-like medium (2), provided with a first face (3);

- at least one ink layer (9) deposited on the first face (3) of said sheet-like medium (2), and such ink layer (9) covers a corresponding print area (10) delimited by a first edge (B1) which defines a border (7') of a graphic element (7);
- at least one adhesive surface (11) extended aligned with the border (7') of said graphic element (7), such adhesive surface (11) extended on said print area (10) above said ink layer (9) and delimited by a second edge (B2) substantially coinciding with the first edge (B1) of said print area (10).

11. Transferrable decoration (1) according to claim 10, **characterized in that** said adhesive surface (11) comprises at least one first glue layer (12) printed on said print area (10) to cover said ink layer (9) and perimetrically delimited by said second edge (B2).

12. Transferrable decoration (1) according to claim 10, **characterized in that** it comprises:

- at least one second glue layer (13) extended on the first face (3) of said sheet-like medium (2) to cover at least said ink layer (9) printed on said print area (10);
- at least one anti-adhesive material layer (14) deposited on said second glue layer (13), such anti-adhesive material layer (14) extended on an anti-adherent area (15) substantially complementary to said print area (10) and provided with at least one opening (16) substantially coinciding with said print area (10) and delimited by said second edge (B2).

13. Transferrable decoration (1) according to any one of the preceding claims from 10 to 12, **characterized in that** said sheet-like medium (2) comprises a support sheet (5) and a water-repellent material layer (6) deposited on said support sheet (5) and defining said first face (3) of said sheet-like medium (2).

14. Transferrable decoration (1) according to claim 13, **characterized in that** said water-repellent material layer (6) comprises at least one silicone polymer.

15. Transferrable decoration (1) according to any one of the preceding claims 10 to 14, **characterized in that** said adhesive surface (11) is provided with a peripheral overlap strip which is extended along said second edge (B2), is extended outside the first edge (B1) of said print area (10) and has width substantially comprised between 0.1 mm and 1 mm.

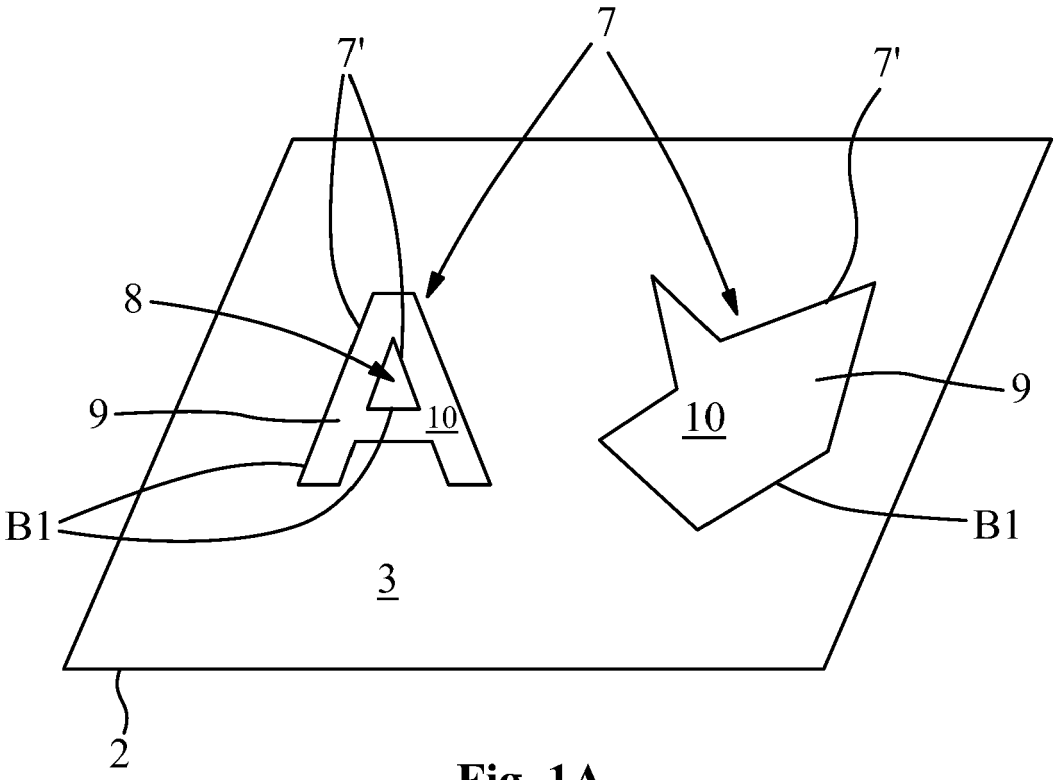

Fig. 1A

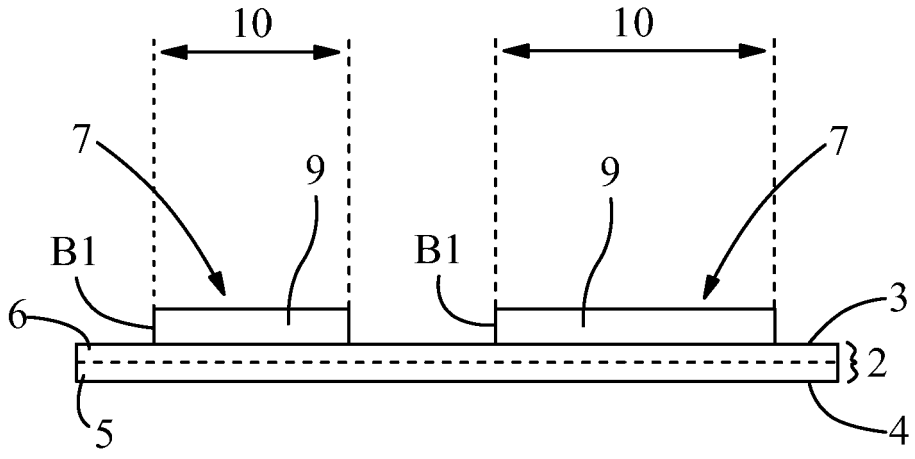

Fig. 1B

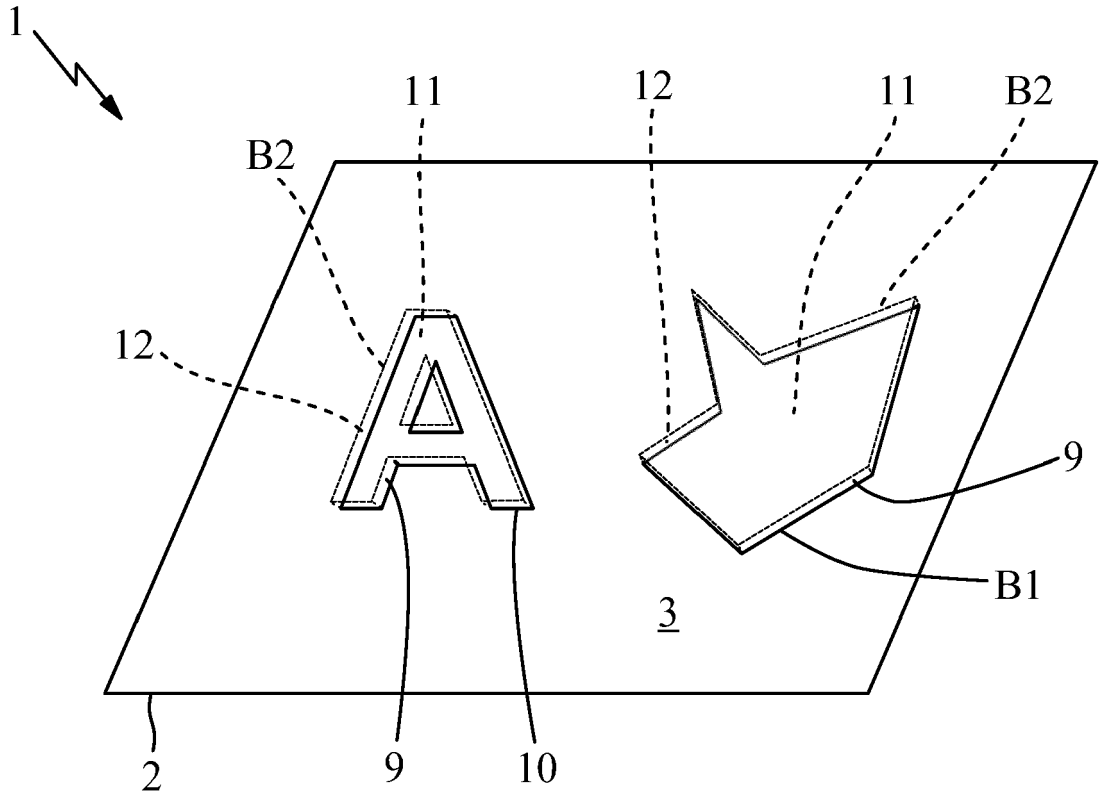

Fig. 2A

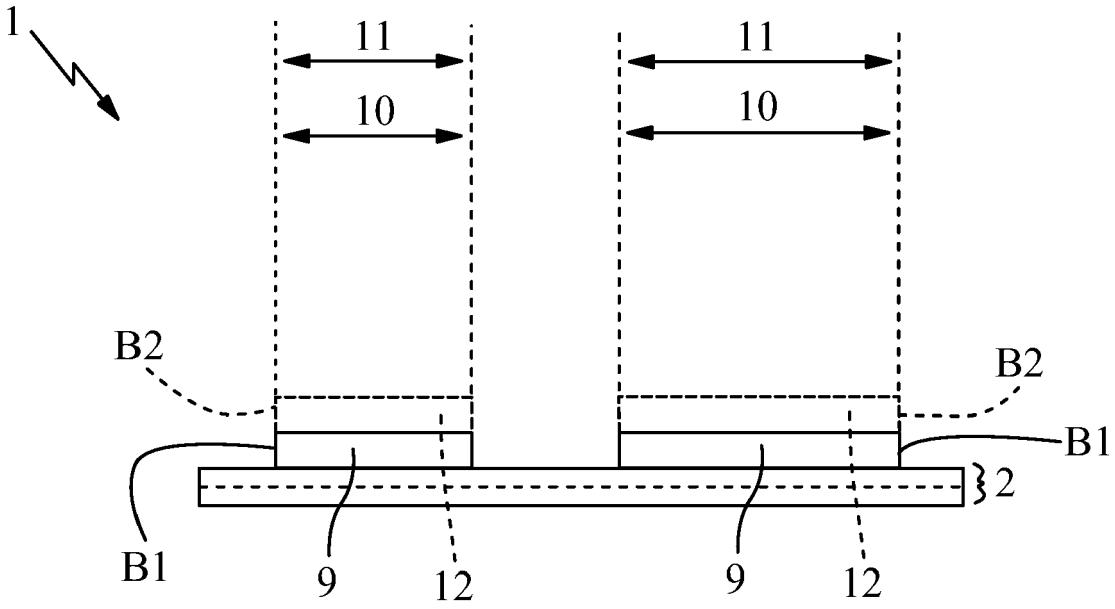

Fig. 2B

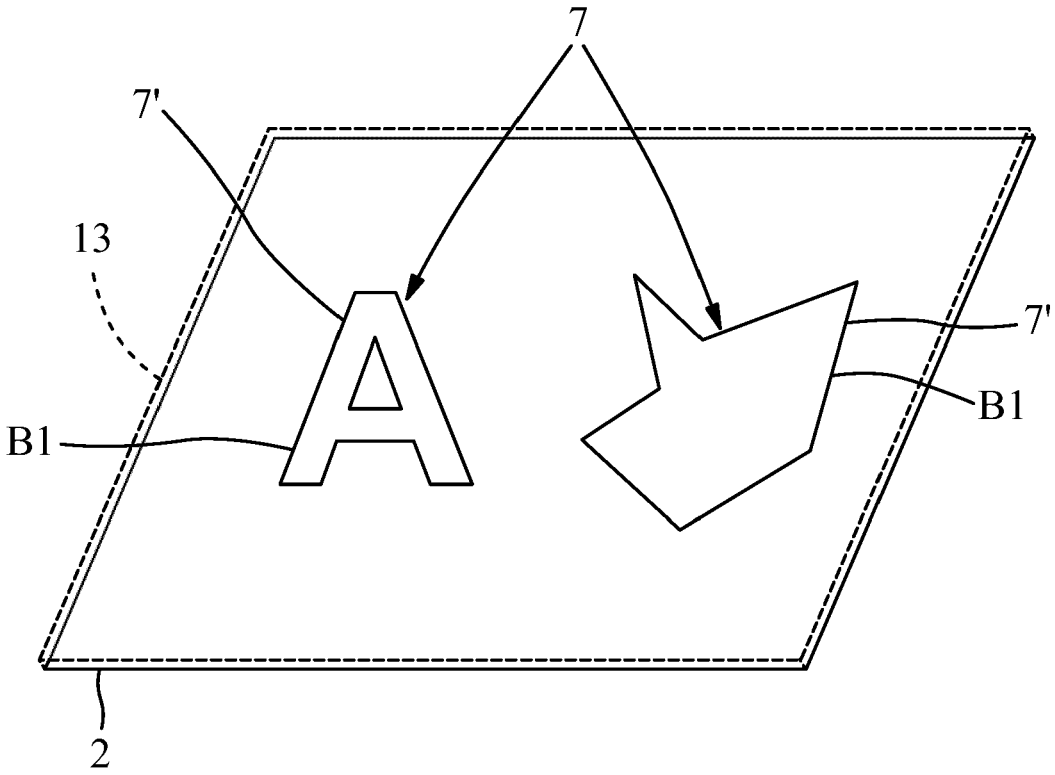

Fig. 3A

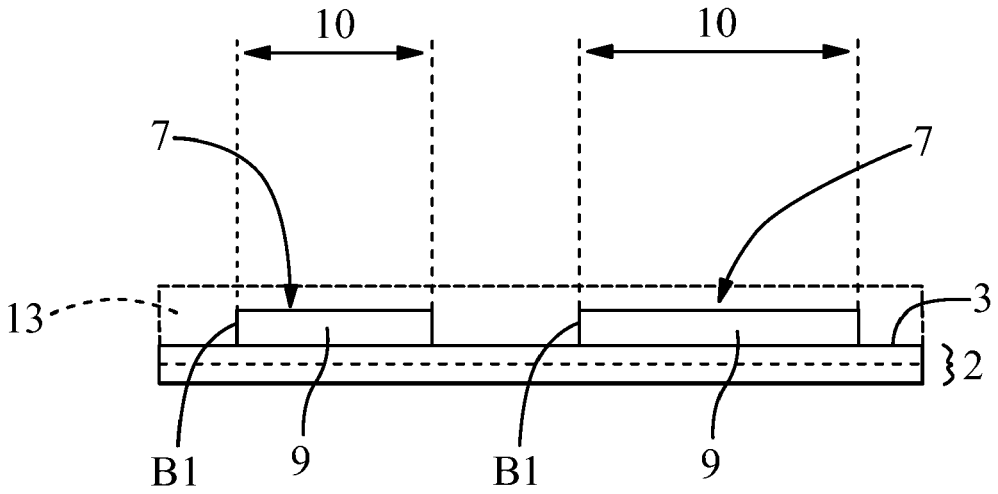

Fig. 3B

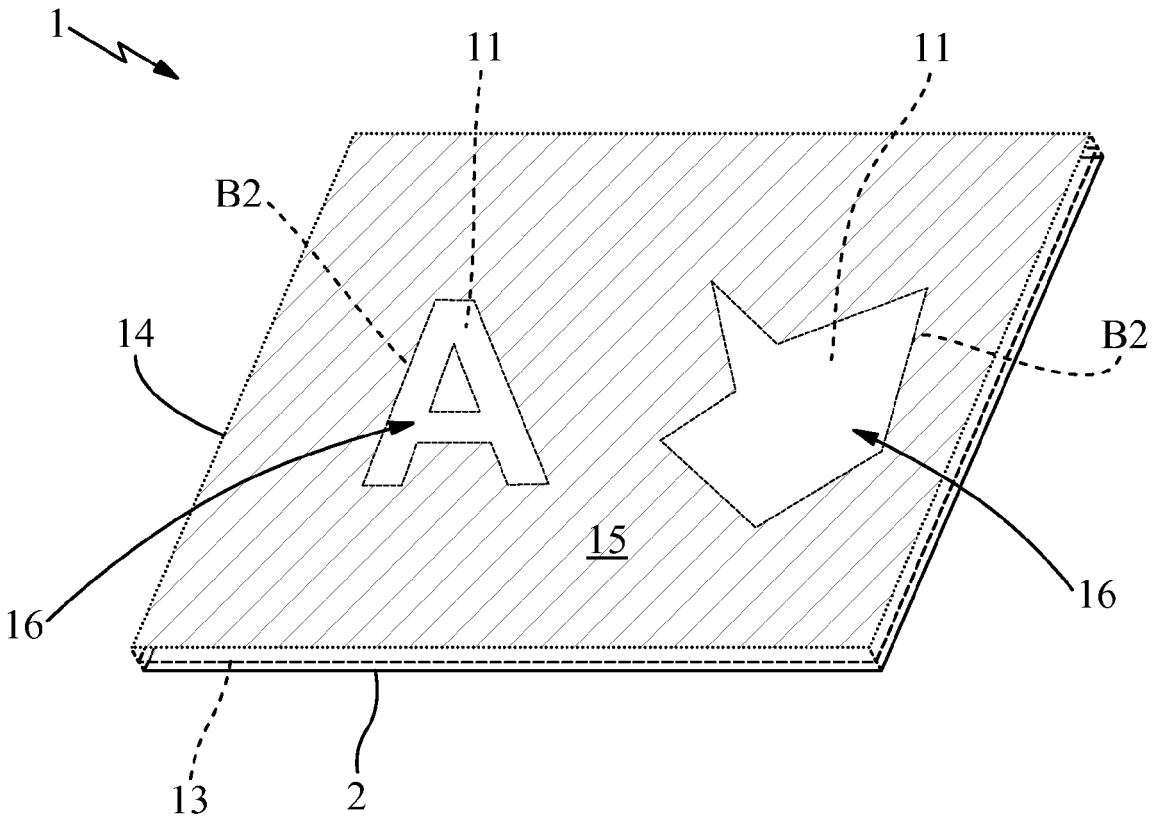
1
11
11
B2
14
B2
16
15
16
13
2

Fig. 4A

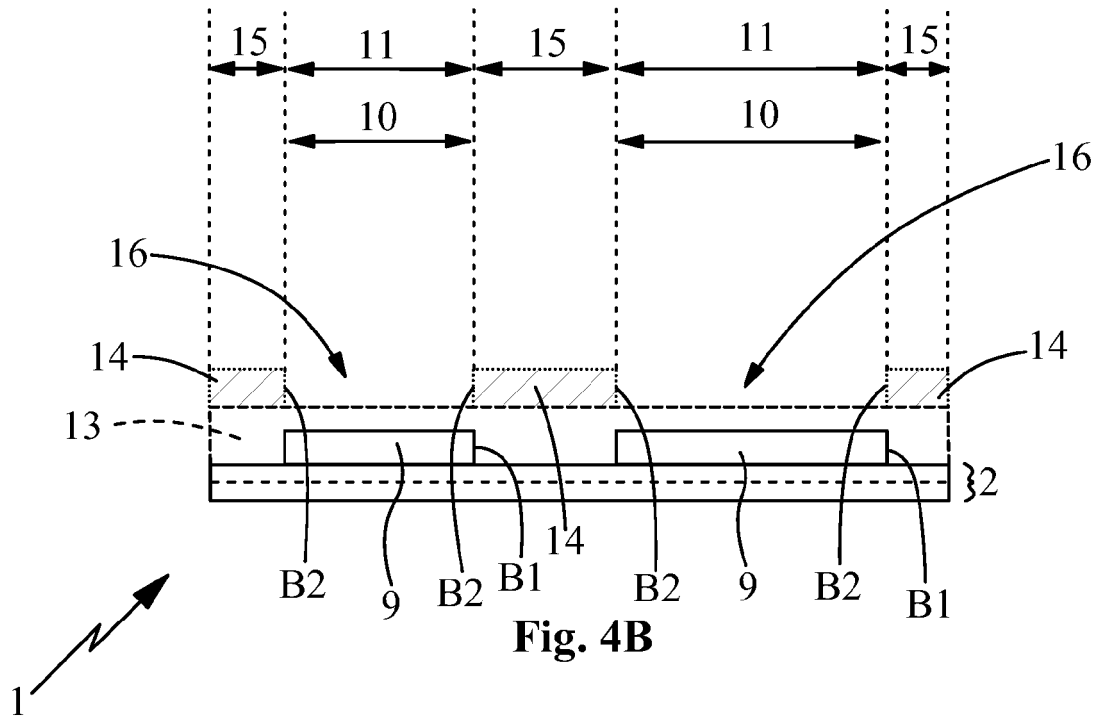
15
11
15
11
15
10
10
16
16
14
14
13
2
B2
9
B2
B1
14
B2
9
B2
B1
1

Fig. 4B

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 16 19 4054

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	EP 0 209 544 A1 (MINNESOTA MINING & MFG [US]) 28 January 1987 (1987-01-28)	1-5, 7-11, 13-15	INV. B41M3/12 B44C1/17
A	* claims; figures 1-8 *	6,12	
X	EP 0 241 212 A2 (MINNESOTA MINING & MFG [US]) 14 October 1987 (1987-10-14)	1-5, 7-11, 13-15	
A	* claim 1; figure 2 *	6,12	

TECHNICAL FIELDS SEARCHED (IPC)

B41M
B44C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 February 2017	Callan, Feargel

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 19 4054

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-02-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0209544 A1	28-01-1987	AU 571768 B2	21-04-1988
		BR 8507170 A	14-07-1987
		CA 1267046 A	27-03-1990
		DE 3576309 D1	12-04-1990
		EP 0209544 A1	28-01-1987
		ES 8800478 A1	01-01-1988
		JP S62501550 A	25-06-1987
		MX 163396 B	11-05-1992
		US 4640727 A	03-02-1987
		WO 8604303 A1	31-07-1986
		ZA 8600116 B	26-08-1987
EP 0241212 A2	14-10-1987	AR 246212 A1	29-07-1994
		AU 582681 B2	06-04-1989
		BR 8701468 A	19-01-1988
		CA 1275872 C	06-11-1990
		DE 3765446 D1	15-11-1990
		EP 0241212 A2	14-10-1987
		JP S62255199 A	06-11-1987
		MX 165721 B	02-12-1992
		US 4759968 A	26-07-1988
		ZA 8701943 B	26-10-1988

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 8604303 A **[0017] [0018]**