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(54) Process for the production at least partly double-effect mirror surface decorations and product obtained

(57) The invention is a new process for the production of at least partly double-effect mirror surface decorations comprising the application on a transparent support (1) of a first layer of paint (2) in correspondence with areas whose shapes and dimensions are such as to obtain the parts of the image with least reflection, the application of a second layer of covering paint (3) with greater reflection on the whole surface of the image to be obtained, including the areas covered by said first layer of less reflecting paint, the application of a layer of protective paint (4) over the whole surface of the image to be obtained, and the application of a layer of coloured paint (5), also over the whole surface of the image to be obtained.

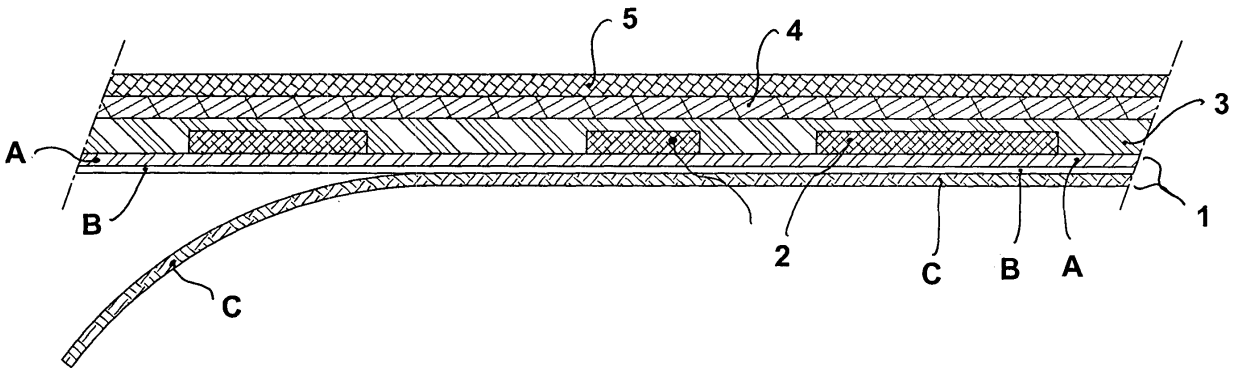

Fig. 2

EP 1 700 716 A2

Description

[0001] The present patent relates to processes for printing of decorations with reflecting surface and in particular concerns a process for the production of decorations with two different mirror finishes combined so as to obtain a three-dimensional effect.

[0002] Processes are known for the production of a reflecting layer on a transparent support, which can be flexible if necessary.

[0003] Processes are also known for the production of a more or less opaque image with windows on the transparent support before production of the reflecting layer.

[0004] Said continuous reflecting layer is normally produced on transparent supports, on the side opposite the one that is seen.

[0005] Said transparent supports can be rigid or flexible, depending on their use.

[0006] Processes are known via which a monochrome or polychrome image is impressed on the transparent support, before production of the reflecting layer. This image can be without some parts, commonly known as windows, via which the rear reflecting layer, which is applied subsequently, can be seen.

[0007] The known processes provide a continuous reflecting layer, or a layer with one single reflection, with one single level of opacity or degree of reflection.

[0008] The subject of the present invention is a process for the production of at least partly double-effect mirror surface decorations and the product obtained.

[0009] The aim of the new process is to obtain, on a transparent support, a decoration with portions or areas having two different levels of reflection.

[0010] A further aim of the new process is to obtain, on a transparent support, a decoration with portions or areas having two different degrees of opacity.

[0011] A further aim of the new process is to obtain said zones or areas with different reflection and/or opacity in an alternating sequence, thus obtaining decorations or motifs or ornaments as required with three-dimensional effect.

[0012] A further aim is to obtain transparent supports, with or without windowed polychrome image, having a double-effect mirror surface decorated layer visible through said transparent support.

[0013] These and further aims, direct and complementary, are achieved by the new process for the production of at least partly double-effect mirror surface decorations comprising:

- deposit on a transparent support of a first layer of paint located in correspondence with areas whose shapes and dimensions are such as to obtain the parts of the image with least reflection;
- deposit of a second layer of covering paint with greater reflection on the whole surface of the image to be obtained, including the areas covered by said first layer of less reflecting paint;
- application of a layer of protective paint, covering the whole surface of the image to be obtained;
- application of a layer of coloured paint, also covering the whole surface of the image to be obtained.

[0014] It is possible to print a monochrome or polychrome image with windows directly on the transparent support before application of the layers of reflecting paint.

[0015] Said transparent support can be made of a multilayer film consisting of a protective film, an adhesive layer and a film or sheet of paper protecting the adhesive layer. The mirror paints are deposited on the protective film; when the protective film or paper is removed, the transparent support with the image can be applied on a transparent object and can be seen from the opposite side.

[0016] The product obtained via this process is a decoration with zones or areas having different reflection and/or opacity in an alternating manner, which thus makes it possible to obtain decorations or motifs or ornaments as required, if necessary in combination with a monochrome or polychrome image.

[0017] The characteristics of the new process for the production of at least partly double-effect mirror surface decorations and the product obtained will be highlighted in greater detail in the following description with reference to the drawings attached as non-limiting

examples.

[0018] Figure 1 shows a section of the new product obtained via the process.

[0019] The new process involves the use of a flat transparent support (1).

[0020] Said transparent support (1) can conveniently be made of polycarbonate, polyester, polyurethane, polyamide 6, paper, polymethylacrylate of suitable thickness, generally between 50 and 500 microns.

[0021] On said transparent support (1) a first layer of glossy reflecting paint (2) is deposited in correspondence with areas whose shapes and dimensions are such as to obtain the parts of the image with least reflection.

[0022] Said first layer of opaque reflecting paint (2) is preferably deposited by means of a screen printing system via a polyester fabric stretched to a tension of 18/20 Newtons at 90° with a weft and warp titer of 380/31 dctex.

[0023] The paint (2) used consists preferably of:

- Phenoxyethyl Acrylate 10~25%;
- Multifunctional Acrylate (nos) 2.5~10%;
- Ester Monomer Acrylate (nos) 25~50%;
- 2-Hydroxyethyl Acrylate 0~2.5%;
- Monoalkylacryl Ester 10~25%

[0024] As said, the first paint (2) is deposited only in some points, zones or areas.

[0025] Subsequently a second glossy reflecting paint (3) is deposited to cover the whole area of the image, both the zones or areas already covered by the first paint (2) and the zones or areas left exposed by said first paint (2).

[0026] Deposit of the second reflecting paint (3) is also preferably performed by screen printing system via a polyester fabric stretched to a tension of 18/20 Newton at 90° with a weft and warp titer of 380/31 dctex.

[0027] The paint (3) used consists preferably of media-slurry resin in 15% solid in 80/15 N-Butyl Acetate/Dowanol PM solvent in Paraloid Resin Medium 30% solid in 90/10 Toluene/Butan-2-ol solvent mixture.

[0028] A layer of protective paint (4) is applied to the second layer of reflecting paint (3).

[0029] Said protective paint (4) is applied by screen printing system via a polyester fabric stretched to a tension of 18/20 Newton at 90° with a weft and warp titer of 195/48 dctex.

[0030] Said protective paint preferably consists of basic Aliphatic Polyurethane with Reactive Hydroxyl groups in dry extract 50/52%, approximate density 980 kg/m3, in 51 % N-Butyl Acetate/N-methyl-2-pyrrolidone.

[0031] Said protective paint is also applied over the entire surface of the image to be obtained.

[0032] It is possible to provide for the application of a further coloured paint (5) on the layer of protective paint (4).

[0033] Said coloured paint (5) is conveniently applied by screen printing system via a polyester fabric stretched to a tension of 18/20 Newton at 90° with a weft and warp titer of 230/40 dctex.

[0034] The coloured paint (5) preferably consists of acrylic resin with dry extract equal to 22% in xylene equal to a ratio 5/15% and a naphtha solvent 1/15% N-butyl acetate 1/10% and butyl glycolate 1/10% with organic pigments of various colours in a ratio of 5/15%.

[0035] It is possible to print a monochrome or polychrome image with windows on the transparent support (1) before application of the paints (2,3,4,5).

[0036] The product obtained is a transparent support having a decoration with different reflection and/or opacity with three-dimensional effect.

[0037] Said transparent support (1) can be suitable for transfer application. For said purpose the transparent support (1) consists of a transparent film (A), an adhesive layer (B) and a film or sheet of paper (C) to protect the adhesive layer (B), as can be seen in figure 2.

[0038] The paints (2, 3, 4, 5) are applied to the transparent film (A).

[0039] When the protective film or paper (C) are removed, the transparent film (A) with the double-effect mirror surface decoration can be applied to a transparent object so that it can be seen from the opposite side.

[0040] With reference to the preceding description and the attached drawings, the following claims are therefore expressed.

Claims

1. Process for the production of decorations, **characterised in that** it comprises the application to a transparent support (1) of:

   ■ a first layer of paint (2) in correspondence with areas whose shapes and dimensions are such as to obtain the parts of the image with least reflection;
   ■ a second layer of covering paint with greater reflection (3) over the whole surface of the image to be obtained, including the areas covered by said first layer of less reflecting paint;
   ■ a layer of protective paint (4) over the whole surface of the image to be obtained;
   ■ a layer of coloured paint (5) over the whole surface of the image to be obtained.

2. Process for the production of decorations according to claim 1, **characterised in that** the first reflecting paint consists of Phenoxyethyl Acrylate 10~25%, Multifunctional Acrylate (nos) 2.5~10%, Ester Monomer Acrylate (nos) 25~50%, 2-Hydroxyethyl Acrylate 0~2.5%, Monoalkylacryl Ester 10~25%.

3. Process for the production of decorations according to claims 1, 2, **characterised in that** the second reflecting paint consists of media-slurry resin in 15% solid in 80/15 N-Butyl Acetate/Dowanol PM solvent in Paraloid Resin Medium 30% solid in 90/10 Toluene/Butan-2-ol solvent mixture.

4. Process for the production of decorations according to claims 1, 2, 3, **characterised in that** the protective paint consists of basic Aliphatic Polyurethane with Reactive Hydroxyl groups in dry extract 50/52%, approximate density 980 kg/m3, in 51% N-Butyl Acetate/N-methyl-2-pyrrolidone.

5. Process for the production of decorations according to the preceding claims, **characterised in that** the coloured paint (5) consists of acrylic resin with dry extract equal to 22% in xylene equal to a ratio of 5/15% and a naphtha solvent 1/15% N-butyl acetate 1/10% and butyl glycolate 1/10% with organic pigments of various colours in a ratio of 5/15%.

6. Process for the production of decorations according to the preceding claims, **characterised in that** the first reflecting paint (2) is applied by means of a screen printing system via a polyester fabric stretched to a tension of 18/20 Newtons at 90° with a weft and warp titer of 380/31 dctex.

7. Process for the production of decorations according to the preceding claims, **characterised in that** the second reflecting paint (3) is applied by means of a screen printing system via a polyester fabric stretched to a tension of 18/20 Newtons at 90° with a weft and warp titer of 380/31 dctex.

8. Process for the production of decorations according to the preceding claims, **characterised in that** the protective paint (4) is applied by means of a screen printing method via a polyester fabric stretched to a tension of 18/20 Newtons at 90° with a weft and warp titer of 195/48 dctex.

9. Process for the production of decorations according to the preceding claims, **characterised in that** the coloured paint (5) is applied by means of a screen printing system via a polyester fabric stretched to a tension of 18/20 Newton at 90° with a weft and warp titer of 230/40 dctex.

10. Process for the production of decorations according to the preceding claims, **characterised in that** the transparent support (1) consists of a film of polycarbonate, or polyester, or polyurethane, or polyamide 6, or paper, or polymethylacrylate.

11. Process for the production of decorations according to the preceding claims, **characterised in that** the transparent support (1) consists of a transparent film (A) according to claim 10, an adhesive layer (B) and a film (C) to protect the adhesive layer (B), wherein the mirror paints (2, 3, 4, 5) are deposited on the transparent film (A) on the side opposite the adhesive layer (B) and the protective film (C).

12. Process for the production of decorations according to the preceding claims, **characterised in that** a monochrome or polychrome image, if necessary with windows, is printed on the transparent support (1) before application of the mirror (2, 3) and protective (4, 5) paints.

13. Transparent support with mirror-finish image or decoration, **characterised in that** it comprises:

- a first layer of paint (2) in correspondence with areas whose shapes and dimensions are such as to obtain the parts of the image with least reflection;
- a second layer of covering paint with greater reflection (3) over the whole surface of the image to be obtained, including the areas covered by said first layer of less reflecting paint;
- a layer of protective paint (4), over the whole surface of the image to be obtained;
- a layer of coloured paint (5) over the whole surface of the image to be obtained.

14. Transparent support with mirror-finish image or decoration according to claim 13, **characterised in that** the first reflecting paint consists of Phenoxyethyl Acrylate 10~25%, Multifunctional Acrylate (nos) 2.5~10%, Ester Monomer Acrylate (nos) 25~50%, 2-Hydroxyethyl Acrylate 0~2.5%, Monoalkylacryl Ester 10~25%.

15. Transparent support with mirror-finish image or decoration according to claims 13, 14, **characterised in that** the second reflecting paint consists of media-slurry resin in 15% solid in 80/15 N-Butyl Acetate/Dowanol PM solvent in Paraloid Resin Medium 30% solid in 90/10 Toluene/Butan-2-ol solvent mixture.

16. Transparent support with mirror-finish image or decoration according to claims 13, 14, 15, **characterised in that** the protective paint consists of basic Aliphatic Polyurethane with Reactive Hydroxyl groups in dry extract 50/52%, approximate density 980 kg/m3, in 51% N-Butyl Acetate/N-methyl-2-pyrrolidone.

17. Transparent support with mirror-finish image or decoration according to claims 13, 14, 15, 16, **characterised in that** the coloured paint (5) consists of acrylic resin with dry extract equal to 22% in xylene equal to a ratio of 5/15% and a naphtha solvent 1/15% N-butyl acetate 1/10% and butyl glycolate 1/10% with organic pigments of various colours in a ratio of 5/15%.

18. Transparent support with mirror-finish image or decoration according to claims 13, 14, 15, 16, 17, **characterised in that** the transparent support (1) consists of a film of polycarbonate, or polyester, or polyurethane, or polyamide 6, or paper, or polymethylacrylate.

19. Transparent support with mirror-finish image or decoration according to claims 13, 14, 15, 16, 17, 18, **characterised in that** the transparent support (1) consists of a transparent film (A) according to claim 10, an adhesive layer (B) and a film (C) to protect the adhesive layer (B), wherein the mirror paints (2, 3, 4, 5) are applied to the transparent film (A) on the side opposite the adhesive layer (B) and the protective film (C).

20. Transparent support with mirror-finish image or decoration according to claims 13, 14, 15, 16, 17, 18, 19, **characterised in that** a monochrome or polychrome image, with windows if necessary, can be printed on the transparent support (1) before application of the mirror (2, 3) and protective (4, 5) paints.

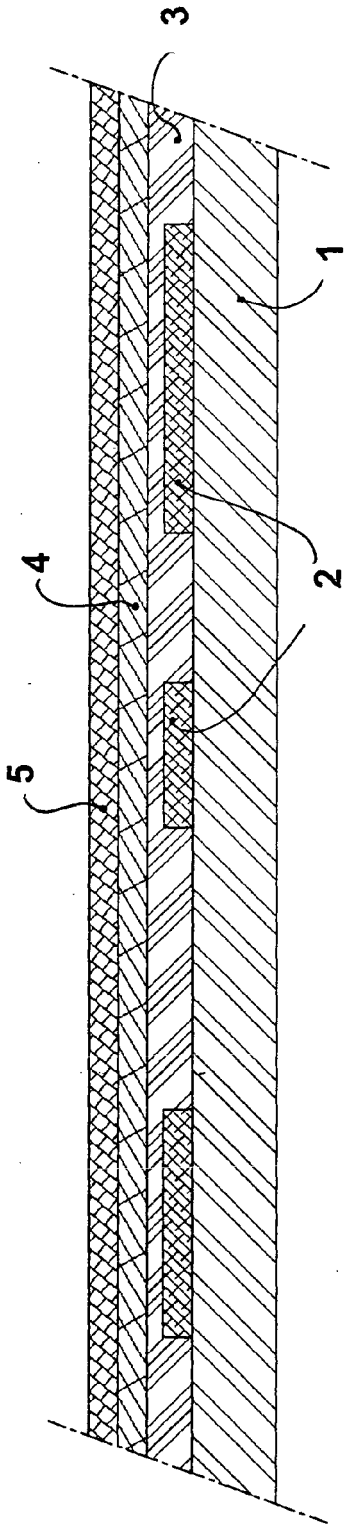

Fig. 1

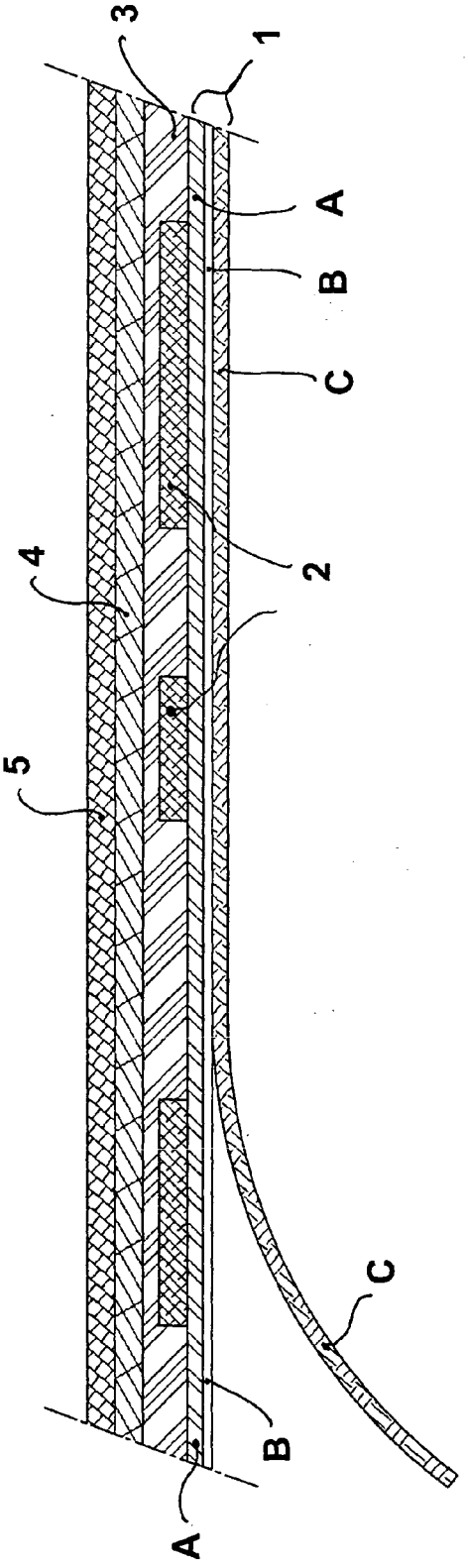

Fig. 2