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(54) **METHOD AND APPARATUS OP INCREASING THE THICKNESS OF RELIEF DECORATIONS,
PROCESS AND PLANT FOR RELIEF DECORATION OF SURFACES**

VERFAHREN UND VORRICHTUNG ZUR VERSTÄRKUNG DER DICKE VON
RELIEFDEKORATIONEN, VERFAHREN UND ANLAGE FÜR RELIEFDEKORATION VON
OBERFLÄCHEN

PROCÉDÉ ET APPAREIL POUR AUGMENTER L'ÉPAISSEUR DE DÉCORATIONS EN RELIEF,
PROCÉDÉ ET INSTALLATION POUR LA DÉCORATION EN RELIEF DE SURFACES

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Description

[0001] The present invention relates to a method and an apparatus for increasing the thickness of relief decorations and in addition to a process and a plant for relief decoration of surfaces.

[0002] Preferably, the present invention relates to execution of three-dimensional decorations defined by portions in relief relative to the base surface to be decorated, consisting of added decorative thermoplastic material.

[0003] In particular but not necessarily, the present invention relates to the decoration of objects in the form of sheets such as fabrics, leather, imitation leather, etc.

[0004] As known, the relief decoration of surfaces can be carried out with added materials through hot transfer of the decoration from support paper or films to the object to be decorated. The material constituting the decoration is first applied to the support film through known methods. The decoration on the support film is in relief. The support film is subsequently applied to the surface to be decorated and pressed against the same, supplying heat through a heated calender for example. Heat and pressure cause transfer of the decoration from the film to the object to be decorated. The film is then separated from the object and the decoration remains on the surface of the object itself.

[0005] Document US 3,523,031 discloses a process for producing an ornamental plastic sheets by placing a layer of plastic powder onto a strip of material, heating the plastic powder until it becomes tacky, distributing a layer of plastic pellets over the tacky layer of powder, heating the pellets until they become soft and cooling the sheet.

[0006] Document FR 2.135.315 discloses a process for covering glass bottles with plastic material.

[0007] Document US 3,560,239 discloses a method of coating a steel wire or the like with resins by passing it through a fluidized bed of powdered resin.

[0008] The known method of the above-described type however has some drawbacks, mainly concerning the poor three-dimensional effect obtained. In fact, compression of the film against the surface to be decorated, which is required for transfer, causes uniform flattening of the decoration. As a result, the decoration thickness is minimum and, above all, this thickness cannot be set "a priori" with a sufficient accuracy. In addition, it is not possible to obtain regions with different thickness in the same decoration.

[0009] In this context, the technical task underlying the present invention is to propose a method and an apparatus for increasing the thickness of relief decorations and a process and plant for the relief decoration of surfaces overcoming the above mentioned drawbacks of the known art.

[0010] In particular, the present invention aims at making available a method and an apparatus for increasing the thickness of relief decorations first of all enabling the three-dimensional effect of the decoration to be made more apparent and in addition the thickness to be con-

trolled and regions to be generated which have more or less marked relief areas in the same decoration.

[0011] The technical task mentioned and the aims specified are substantially achieved by a method and an apparatus as well as a process and a plant comprising the technical features set out in the appended claims.

[0012] More specifically, in a first aspect, the present invention relates to a method of increasing the thickness of relief decorations, comprising:

- i) providing a decorated object having at least one portion in relief made of a decorative thermoplastic or thermoadhesive material disposed on a decorated surface of said object;
- ii) heating the portion of decorative thermoplastic or thermoadhesive material applied to the decorated surface until making it sticky;
- iii) spreading a powdered material on the decorated surface, said powdered material adhering to the portion of decorative thermoplastic or thermoadhesive material; wherein step iii) is carried out by dipping the object at least once in a fluid bed made up of said powdered material.

[0013] Preferably, the fluid bed is generated by introducing a fluid under pressure through the powdered material.

[0014] Preferably, step ii) is carried out before and after step iii).

[0015] In a preferred embodiment, the method comprises a plurality of steps ii) alternated with steps iii).

[0016] Preferably, after step iii), the powdered material in excess is removed from the decorated surface.

[0017] Preferably, fluid introduction takes place with a pressure included between about 1 bar and about 5 bars.

[0018] Preferably, in step ii) the portion of decorative thermoplastic or thermoadhesive material is brought to a temperature "T" included between about 120°C and about 170°C.

[0019] Preferably, the powdered material has a particle size included between about 100 µm and about 500 µm. Preferably, the powdered material is a thermoplastic or thermoadhesive material, preferably selected from the group comprising: polyamide, polyethylene, acrylic-polyurethane, glass, ceramics.

[0020] Preferably, the powdered material is selected from the group comprising: glass, ceramics, wood, plastic material, steel. For instance, it is defined by transparent or coloured pyroceram balls.

[0021] Preferably, the powdered material has a neutral colour.

[0022] Preferably, the decorative thermoplastic or thermoadhesive material is selected from the group comprising: polyamide, polyethylene. The present invention discloses an apparatus for increasing the thickness of relief decorations, comprising: at least one support for a decorated object, said decorated object having at least one portion in relief of decorative thermoplastic or thermoad-

hesive material disposed on a decorated surface of said object; at least one heating device acting on said support; at least one fluid-bed container (16) having a wall provided with holes and delimiting a holding volume for the powdered material; means for admission of fluid under pressure into the holding volume, through said wall provided with holes; means for transferring the decorated object from said support to said container and/or vice versa.

[0023] Preferably, the apparatus comprises a first support and a first heating device disposed upstream of the fluid-bed container and a second support and a second heating device disposed downstream of said fluid-bed container relative to a feeding direction (X) of the decorated objects.

[0024] Preferably, said at least one support comprises a conveyor belt.

[0025] Preferably, said at least one heating device comprises at least one lamp facing said support.

[0026] In a second aspect, the present invention relates to a process for relief decoration of surfaces, comprising: applying at least one portion in relief of decorative thermoplastic or thermoadhesive material onto a surface of an object to be decorated; characterised in that it further comprises a method as above described.

[0027] Preferably, during application, some regions of the surface to be decorated are left clear of the decorative thermoplastic or thermoadhesive material.

[0028] Preferably, the application comprises: providing a support film carrying the portion of decorative thermoplastic or thermoadhesive material, applying and pressing the support film against the object's surface, heating at least the portion of decorative thermoplastic or thermoadhesive material for causing transfer thereof onto said surface, separating the support film from the decorated object.

[0029] In a third aspect, the present invention relates to a plant for relief decoration of surfaces comprising: means for applying at least one portion in relief of decorative thermoplastic or thermoadhesive material onto a surface of an object to be decorated; characterised in that it further comprises an apparatus as above described, wherein said at least one support is operatively disposed downstream of the application means.

[0030] Preferably, the application means comprises a heated calender.

[0031] Further features and advantages of the present invention will become more apparent from the description, given by way of non-limiting example, of a preferred embodiment of a process for relief decoration of surfaces and a preferred embodiment of a plant for relief decoration of surfaces, as illustrated in the accompanying drawings, in which:

- Fig. 1 is a diagrammatic view of a plant made in accordance with the present invention;
- Fig. 2 is a plan view of an object decorated in accordance with the invention;

- Fig. 3 is a cross-sectional view of the object seen in Fig. 2 after a first step of the process;
- Fig. 4 is a cross sectional view of the object seen in Fig. 2 after a second step of the process.

[0032] With reference to the accompanying drawings, a plant for relief decoration of surfaces 2 of objects 3 in accordance with the present invention has been identified with reference numeral 1.

[0033] Plant 1 is designed for decoration of surfaces 2, preferably although not exclusively, of objects in the form of sheets, such as leather, imitation leather or fabrics.

[0034] As shown in Figs. 2, 3 and 4, the decorations preferably consist of portions 4 of thermoplastic or thermoadhesive material transferred onto the surface 2 to be decorated delimited by regions 5 of said surface 2 that are clear of such a material, so as to give the decoration said three-dimensional effect.

[0035] In the present specification and in the appended claims, by the term "thermoplastic or thermoadhesive material" it is generally intended a material that at room temperature is substantially stiff and acquires malleability - i.e. becomes soft - and sticky properties under the action of heat. Therefore the term "thermoplastic or thermoadhesive material" refers not only to true plastic materials (polymers, such as polyethylene, polyamide, acrylic-polyurethane) but also to other products such as pyrocerams.

[0036] The decorative thermoplastic or thermoadhesive material can be coloured (in a single colour or in different colours), transparent, opaque, etc.

[0037] Plant 1 therefore comprises means 6 suitable to apply the thermoplastic or thermoadhesive material to the surface 2 of the object 3.

[0038] In the embodiment shown in Fig. 1, the object 3 is a continuous sheet of fabric, leather or imitation leather unrolled from a reel, not shown, and conveyed through a calender 7 made up of a pair of heated rollers 8. Plant 1 herein shown therefore works continuously.

[0039] In a variant not shown of the present invention, the plant works on smaller objects (such as pieces of leather, fabric or imitation leather, tiles, individual pieces, etc.) with discrete work cycles. A press is for example present instead of calender 7.

[0040] Moreover, a support film 9 is conveyed between rollers 8, on which film the portions 4 of decorative thermoplastic or thermoadhesive material to be transferred onto the object 3 are attached. This support film 9, also known as transfer paper, is produced following techniques known by themselves and therefore herein not described. Upstream of rollers 8, said portions 4 of decorative thermoplastic or thermoadhesive material face surface 2 of sheet 3. During passage between rollers 8, the support film 9 is coupled to surface 2 and pressed against it. Simultaneously, the support film 9 with the decorative thermoplastic or thermoadhesive material and sheet 3 are heated. Pressure and heat cause adhesion

of the decoration to surface 2.

[0041] Downstream of rollers 8 relative to a feeding direction "X" of the sheet 3, the film 9 is separated, by a hot or cold treatment, from sheet 3 on which the portions 4 of the decorative thermoplastic or thermoadhesive material defining the relief decorations (shown in Fig. 3) are now attached.

[0042] Plant 1 further comprises an apparatus 10 (Fig. 1) suitable to increase the thickness of the relief decorations, preferably but not exclusively obtained following the previously described working.

[0043] In the non-limiting embodiment shown, apparatus 10 comprises a first support 11 in turn comprising a conveyor belt 12 passing over a pair of drive rollers 13. The conveyor belt 12 preferably comprises non-stick material, Teflon® for example. The sheet 3 bears on an upper surface of the conveyor belt 12 and its decorated surface faces upwards. The sheet 3 is fed along the feeding direction "X". A heating device 14 defined by a series of infrared lamps 15 sending out radiation to the sheet during passage thereof is installed above the conveyor belt 12.

[0044] Disposed downstream of the first support 11 is a fluid-bed container 16 inside which the sheet 3 is caused to pass. The fluid-bed container 16 comprises a vat 17 inside which a wall 18 is disposed which is provided with a plurality of holes (having a diameter in the order of microns). The wall 18 divides the inner space confined by vat 17 into an upper holding volume 19 that is open upwards and a lower hollow space 20. The wall 18 delimits the upper holding volume 19 at the lower part thereof. The lower hollow space 20 is in fluid communication with a source of fluid (preferably air) under pressure, such as a compressor, through a duct 21.

[0045] The upper holding volume 19 is filled with powdered material 22 that is the same as, or different from the material constituting the decoration already laid down on sheet 3.

[0046] Preferably, the powdered material 22 consists of plastic granules (polyethylene or polyamide, acrylic-polyurethane, for example) or powdered products in general, such as transparent or coloured balls of pyroceram or also steel, wood. The powdered material 22 therefore can be either of the thermoplastic or thermoadhesive type (plastic material, glass, ceramics) according to the above definition, or not (steel, wood).

[0047] The powdered material 22 preferably has a particle size (expressed as the mean diameter of the granules) included between about 100 μm and about 500 μm . The powdered material 22 can be coloured, transparent or neutral.

[0048] Preferably, the fluid-bed container 16 further comprises a guide roller 23 disposed close to the first support 11 and parallel to the drive rollers 13, the function of which is to guide and drag along the sheet 3 coming from said first support 11 at the inside of vat 17.

[0049] Positioned downstream of the fluid-bed container 16 is a second support 24 that can have the same

structure as the first support 11 (conveyor belt 12, drive rollers 13, heating device 14 and infrared lamps 15).

[0050] A further guide roller not shown can be also provided; it is disposed on the fluid-bed container 16 and close to the second support 24, its function being that of guiding and dragging along the sheet 3 coming from vat 17 on the second support 24.

[0051] In use, the fluid source is activated and admits air into the hollow space 20 at a pressure included between about 1 bar and 5 bar. The air filters through the holes of wall 18 and the powdered material 22 contained in the upper holding volume 19 of vat 17. When the air flow passes through the powdered material 22 it fills the space between the particles, and a condition is reached at which the aerodynamic force acting on the particles is capable of counteracting the forces of gravity, the granular solid starts expanding and the upper surface of the bed takes a movable profile similar to the free surface of a liquid.

[0052] The decorated sheet 3 coming from calender 7 (shown in Fig. 3) passes under the infrared lamps 15 disposed above the first support 11 and is heated to a temperature "T" (preferably included between about 120°C and about 170°C) sufficient to make portions 4 of thermoplastic material sticky.

[0053] Subsequently, sheet 3 falls or is dragged along into vat 17 so as to dip it into the fluidized powdered material 22. During travel of sheet 3 in the fluidized bed, the particles of the powdered material 22 adhere to and/or fully or partly penetrate into the portions 4 of heated decorative thermoplastic or thermoadhesive material. A stirring device, not shown, can transversely (relative to the feeding direction "X") move the sheet in transit to further make uniform the distribution of the powder particles on surface 2.

[0054] Subsequently, sheet 3 is drawn out of the fluid bed and dragged along on the second support 24, where it passes under the infrared lamps 15 disposed above the second support 24 and is heated to a temperature (preferably included between about 120°C and about 170°C) sufficient to cause partial melting of the portions 4 of decorative thermoplastic or thermoadhesive material and the powdered material 22 ((if it is thermoplastic or thermoadhesive) that has adhered to the portions 4 of decorative thermoplastic or thermoadhesive material, and mixing of them occurs. The powdered material 22 becomes part of the portions 4 of decorative thermoplastic or thermoadhesive material and increases thickness thereof (as shown in Fig. 4).

[0055] Preferably, the powdered material 22 is of a neutral colour, so that once incorporated into the portions 4 of decorative thermoplastic or thermoadhesive material it does not alter the original colours. The powdered material 22 can also be coloured so as to provide particular chromatic effects to the final decoration.

[0056] The powdered material that during dipping into the fluid bed 19 is deposited on the free regions 5 of surface 2 (which are devoid of the portions 4 of decorative

thermoplastic material) does not adhere to these regions 5 and can be easily eliminated before or after the second heating step.

[0057] The method of the invention can also contemplate several dipping operations into the fluid bed and several heating steps, each carried out between one dipping operation and the following one.

[0058] The present invention reaches the intended purposes and achieves important advantages.

[0059] First of all, the method according to the present invention enables the thickness of the decoration to be increased in a simple, quick and efficient manner.

[0060] In addition, it is possible to obtain different thickness degrees on the same decoration. In fact, portions with a greater surface area tend to accumulate more powdered material, which will involve a greater thickness increase than where there are smaller portions.

[0061] The method of the invention, due to use of the fluid bed, allows the powdered material to be distributed evenly on the portions of decorative thermoplastic or thermoadhesive material of the decorated surface without uncontrolled formation of accumulated material at particular points. As a result, the variables of the method and consequently the features of the finished product can be controlled in a safer manner. In particular, as already mentioned above, due to the control of the powdered material distribution, the same is prevented from adhering to the surface regions on which the portions of decorative thermoplastic or thermoadhesive material are not present.

[0062] In addition, by suitable setting the parameters of the method, such as features of the powdered material, temperatures, dipping and heating steps, it is possible to fix the amount and distribution of the thickness increase "a priori".

[0063] The apparatus of the invention is of simple structure and allows the method to be put into practice with ease. In addition, if provided with conveyor belts, the apparatus can work continuously, which will involve time saving and reduction in the production costs.

Claims

1. A method of increasing the thickness of relief decorations, comprising:

- i) providing a decorated object (3) having at least one portion in relief made of a decorative thermoplastic or thermoadhesive material (4) disposed on a decorated surface (2) of said object (3);
- ii) heating the portion of decorative thermoplastic or thermoadhesive material (4) applied to the decorated surface (2) until making it sticky;
- iii) spreading a powdered material (22) on the decorated surface (2), said powdered material (22) adhering to the portion of decorative ther-

moplastic or thermoadhesive material (4);

characterized in that step iii) is carried out by dipping the object (3) at least once in a fluid bed made up of said powdered material (22).

- 2. A method as claimed in claim 1, wherein the fluid bed is generated by introducing a fluid under pressure through the powdered material (22).
- 3. A method as claimed in claim 1, wherein step ii) is carried out before and after step iii).
- 4. A method as claimed in claim 1, wherein after step iii) the powdered material (22) in excess is removed from the decorated surface (2).
- 5. A method as claimed in claim 1, wherein the powdered material (22) has a particle size included between about 100 μm and about 500 μm .
- 6. A method as claimed in claim 1, wherein the powdered material (22) is a thermoplastic or thermoadhesive material, preferably selected from the group comprising: polyamide, polyethylene, acrylic-polyurethane, glass, ceramics.
- 7. A method as claimed in claim 1, wherein the powdered material (22) is selected from the group comprising: glass, ceramics, wood, plastic material, steel.
- 8. A method as claimed in claim 1, wherein the powdered material (22) has a neutral colour.
- 9. A method as claimed in claim 1, wherein the decorative thermoplastic or thermoadhesive material (4) is selected from the group comprising: polyamide, polyethylene.
- 10. A method as claimed in one of claims 1 to 9, comprising:

- applying at least one portion in relief of decorative thermoplastic or thermoadhesive material (4) onto a surface (2) of an object (3) to be decorated.

11. A method as claimed in claim 10, wherein, during application, some regions (5) of the surface to be decorated (2) are left clear of the decorative thermoplastic or thermoadhesive material (4).

12. A plant for increasing the thickness of relief decorations, comprising:

- means (6) for application of at least one portion in relief of decorative thermoplastic or thermoad-

hesive material onto a surface (2) of an object to be decorated (3);

- at least one support (11, 24) for a decorated object (3), said decorated object (3) having said at least one portion in relief of decorative thermoplastic or thermoadhesive material (4) disposed on the decorated surface (2) of said object (3); wherein said at least one support (11, 24) is operatively disposed downstream of the application means (6);
- at least one heating device (14) acting on said support (11, 24);

characterized in that it comprises:

- at least one fluid-bed container (16) having a wall (18) provided with holes and delimiting a holding volume (19) for the powdered material (22);
- means for admission of fluid under pressure into the holding volume (19), through said wall (18) provided with holes;
- means for transferring the decorated object (3) from said support (11, 24) to said container (16) and/or vice versa.

13. A plant as claimed in claim 12, comprising a first support (11) and a first heating device (14) disposed upstream of the fluid-bed container (16) and a second support (24) and a second heating device (14) disposed downstream of said fluid-bed container (16) relative to a feeding direction (X) of the decorated objects (3).

Patentansprüche

1. Verfahren zur Verstärkung der Dicke von Reliefdekorationen, umfassend:

- i) Bereitstellen eines dekorierten Gegenstands (3), aufweisend mindestens einen Reliefabschnitt, bestehend aus einem Thermoplast- oder thermisch haftenden Dekorationsmaterial (4), angeordnet auf einer dekorierten Oberfläche (2) des Gegenstands (3);
- ii) Erwärmen des an der dekorierten Oberfläche (2) angebrachten Abschnitts aus Thermoplast- oder thermisch haftendem Dekorationsmaterial (4), bis er klebrig wird;
- iii) Verteilen eines Pulvermaterials (22) auf der dekorierten Oberfläche (2), wobei das Pulvermaterial (22) am Abschnitt aus Thermoplast- oder thermisch haftendem Dekorationsmaterial (4) haftet,

dadurch gekennzeichnet ist, dass Schritt iii) durchgeführt wird, indem der Gegenstand (3) min-

destens einmal in ein Mediumbett, bestehend aus dem Pulvermaterial (22), getaucht wird.

2. Verfahren nach Anspruch 1, wobei das Mediumbett dadurch erzeugt wird, dass ein Medium unter Druck durch das Pulvermaterial (22) eingeführt wird.

3. Verfahren nach Anspruch 1, wobei Schritt ii) vor und nach Schritt iii) ausgeführt wird.

4. Verfahren nach Anspruch 1, wobei das überschüssige Pulvermaterial (22) nach Schritt iii) von der dekorierten Oberfläche (2) entfernt wird.

5. Verfahren nach Anspruch 1, wobei das Pulvermaterial (22) eine Teilchengröße zwischen ungefähr 100 µm und ungefähr 500 µm aufweist.

6. Verfahren nach Anspruch 1, wobei das Pulvermaterial (22) ein Thermoplast- oder thermisch haftendes Dekorationsmaterial ist, vorzugsweise ausgewählt aus der Gruppe umfassend: Polyamid, Polyethylen, Acryl-Polyurethan, Glas, Keramik.

7. Verfahren nach Anspruch 1, wobei das Pulvermaterial (22) aus der Gruppe umfassend Glas, Keramik, Holz, Kunststoffmaterial, Stahl ausgewählt ist.

8. Verfahren nach Anspruch 1, wobei das Pulvermaterial (22) farblos ist.

9. Verfahren nach Anspruch 1, wobei das Thermoplast- oder thermisch haftende Dekorationsmaterial (4) ausgewählt ist aus der Gruppe umfassend: Polyamid, Polyethylen.

10. Verfahren nach einem der Ansprüche 1 bis 9, umfassend:

- Anbringen von mindestens einem Reliefabschnitt aus Thermoplast- oder thermisch haftendem Dekorationsmaterial (4) auf einer Oberfläche (2) eines zu dekorierenden Gegenstands (3).

11. Verfahren nach Anspruch 10, wobei beim Anbringen einige Regionen (5) der zu dekorierenden Oberfläche (2) frei vom Thermoplast- oder thermisch haftendem Dekorationsmaterial (4) gelassen werden.

12. Anlage zur Verstärkung der Dicke von Reliefdekorationen, umfassend:

- Mittel (6) zum Anbringen von mindestens einem Reliefabschnitt aus Thermoplast- oder thermisch haftendem Dekorationsmaterial auf einer Oberfläche (2) eines zu dekorierenden Gegenstands (3);

- mindestens einen Träger (11, 24) für einen dekorierten Gegenstand (3), wobei der dekorierte Gegenstand (3) mindestens einen Reliefabschnitt aus Thermoplast- oder thermisch haftendem Dekorationsmaterial (4) aufweist, angeordnet auf einer dekorierten Oberfläche (2) des Gegenstands (3), wobei der mindestens eine Träger (11, 24) betriebswirksam nach den Anbringungsmitteln (6) angeordnet ist;
- mindestens eine Heizvorrichtung (14), die auf den Träger (11, 24) wirkt,

dadurch gekennzeichnet, dass sie umfasst:

- mindestens einen Mediumbettbehälter (16), aufweisend eine Wand (18), versehen mit Löchern und abgrenzend ein Haltevolumen (19) für das Pulvermaterial (22);
 - Mittel zum Einleiten von Medium unter Druck in das Haltevolumen (19) durch die mit Löchern versehene Wand (18) ;
 - Mittel zum Transferieren des dekorierten Gegenstands (3) vom Träger (11, 24) in den Behälter (16) und/oder umgekehrt.
- 13.** Anlage nach Anspruch 12, umfassend einen ersten Träger (11) und eine erste Heizvorrichtung (14), angeordnet vor dem Mediumbettbehälter (16), und einen zweiten Träger (24) und eine zweite Heizvorrichtung (14), angeordnet nach dem Mediumbettbehälter (16) relativ zur Zuführungsrichtung (X) der dekorierten Gegenstände (3).

Revendications

- 1.** Procédé pour augmenter l'épaisseur de décorations en relief, comprenant :
- i) prévoir un objet décoré (3) comportant au moins une partie en relief constituée d'un matériau thermoplastique ou thermodhésif (4) disposée sur une surface décorée (2) dudit objet (3) ;
 - ii) chauffer la partie de matériau thermoplastique ou thermodhésif (4) appliquée sur la surface décorée (2) jusqu'à ce qu'elle devienne collante ;
 - iii) répandre une matière en poudre (22) sur la surface décorée (2), ladite matière en poudre (22) adhérent à la partie de matériau thermoplastique ou thermodhésif (4) ;

caractérisé en ce que l'étape iii) est réalisée en trempant l'objet (3) au moins une fois dans un bain fluidisé constitué de ladite matière en poudre (22).

- 2.** Procédé selon la revendication 1, dans lequel le bain

fluidisé est généré en introduisant un fluide sous pression à travers la matière en poudre (22).

- 3.** Procédé selon la revendication 1, dans lequel l'étape ii) est réalisée avant et après l'étape iii).
- 4.** Procédé selon la revendication 1, dans lequel après l'étape iii), la matière en poudre (22) en excès est retirée de la surface décorée (2).
- 5.** Procédé selon la revendication 1, dans lequel la matière en poudre (22) comporte des dimensions de particule comprise entre 100 et environ 500 µm.
- 6.** Procédé selon la revendication 1, dans lequel la matière en poudre (22) est un matériau thermoplastique ou thermodhésif, de préférence sélectionné parmi les éléments du groupe suivant : polyamide, polyéthylène, acrylique-polyuréthane, verre, céramiques.
- 7.** Procédé selon la revendication 1, dans lequel la matière en poudre (22) est sélectionnée parmi les éléments du groupe suivant : verre, céramiques, bois, matière plastique, acier.
- 8.** Procédé selon la revendication 1, dans lequel la matière en poudre (22) possède une couleur neutre.
- 9.** Procédé selon la revendication 1, dans lequel le matériau thermoplastique ou thermodhésif (4) décoratif est sélectionné parmi les éléments du groupe suivant : polyamide, polyéthylène.
- 10.** Procédé selon l'une des revendications de 1 à 9, comprenant :
- appliquer au moins une partie en relief de matériau thermoplastique ou thermodhésif (4) décoratif sur une surface (2) d'un objet (3) à décorer.
- 11.** Procédé selon la revendication 10, dans lequel, lors de l'application, certaines zones (5) de la surface à décorer (2) ne comportent pas de matériau thermoplastique ou thermodhésif (4) décoratif.
- 12.** Installation pour augmenter l'épaisseur de décorations en relief, comprenant :
- des moyens (6) d'application d'au moins une partie en relief de matériau thermoplastique ou thermodhésif décoratif sur une surface (2) d'un objet (3) à décorer ;
 - au moins un support (11, 24) pour un objet décoré (3), ledit objet décoré (3) comportant ladite au moins une partie en relief de matériau thermoplastique ou thermodhésif (4) décoratif disposée sur la surface décorée (2) dudit objet

(3) ; dans laquelle ledit au moins un support (11, 24) est fonctionnellement disposé en aval des moyens d'application (6) ;
 - au moins un dispositif de chauffage (14) agissant sur ledit support (11, 24) ;

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caractérisée en ce qu'elle comprend :

- au moins un récipient (16) à bain fluidisé comportant une cloison (18) pourvue d'orifices et délimitant un volume de rétention (19) pour la matière en poudre (22) ;
 - des moyens d'amenée d'un fluide sous pression dans le volume de rétention (19) à travers ladite cloison (18) pourvue d'orifices ;
 - des moyens servant à transférer l'objet décoré (3) dudit support (11, 24) au dit récipient (16) et/ou vice versa.

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- 13.** Installation selon la revendication 12, comprenant un premier support (11) et un premier dispositif de chauffage (14) disposés en amont du récipient (16) à bain fluidisé ainsi qu'un second support (24) et un second dispositif de chauffage (14) disposés en aval dudit récipient (16) à bain fluidisé par rapport à une direction d'alimentation (X) des objets décorés (3).

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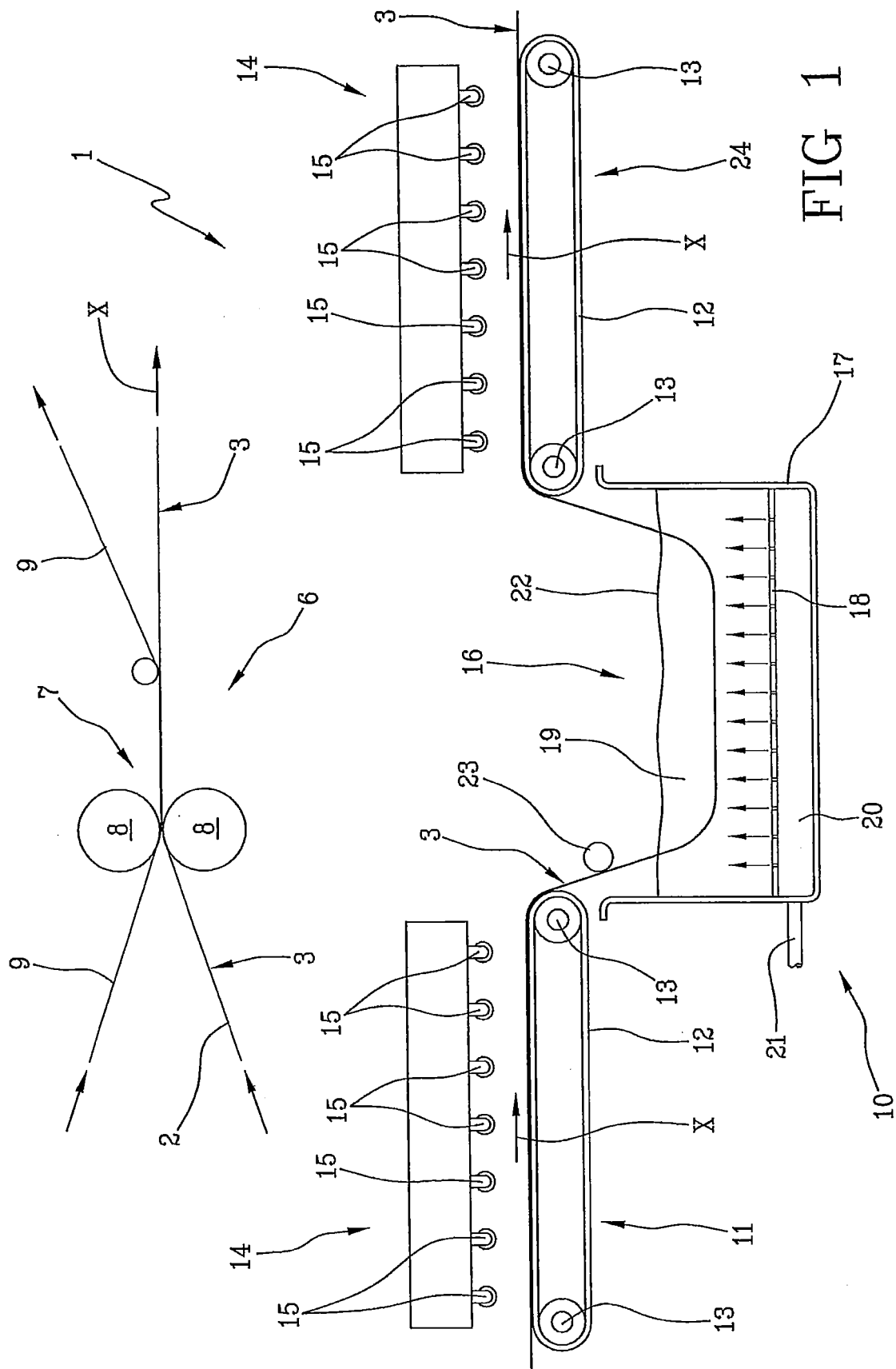


FIG 2

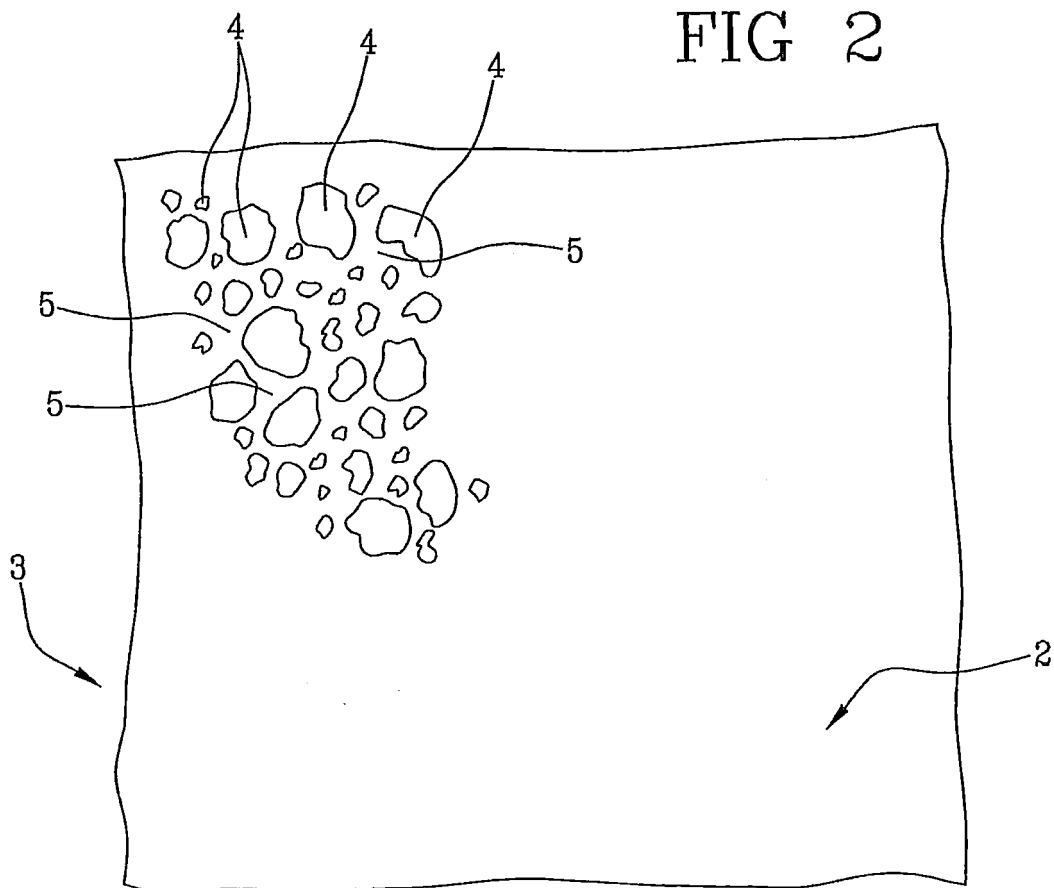


FIG 3

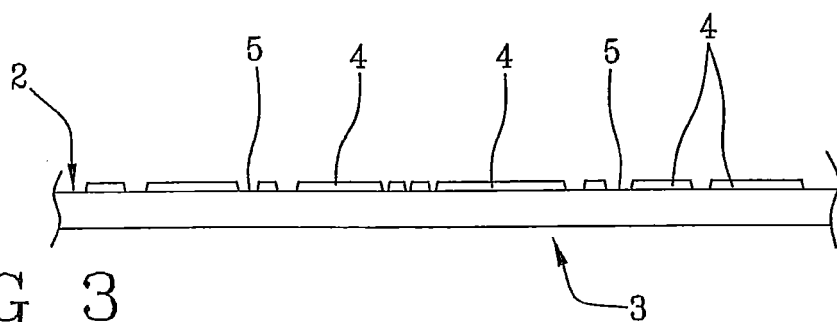
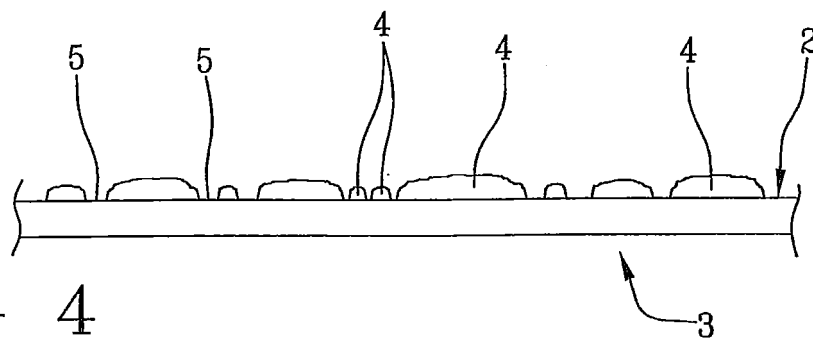


FIG 4



REFERENCES CITED IN THE DESCRIPTION

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