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(71) Applicant: **Todeschini, Danilo**
20010 Casorezzo (MI) (IT)

(72) Inventor: **Todeschini, Danilo**
20010 Casorezzo (MI) (IT)

(74) Representative: **Beneduce, Gianna**
Via Poggibonsi 7
20146 Milano (IT)

(54) A transferable decalcomania of permanent type and decoration process using said decalcomania

(57) A transferable decalcomania, in particular for architectural decorations, provided with means allowing to transfer the colour in a permanent manner on the surface of the support to be decorated, in a warm damp ambient. The process for architectural decoration using said new decalcomania is also described.

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Description

[0001] The present invention concerns a new decalcomania suitable for transferring a colour in a permanent manner. The invention also concerns the process for architectural decoration using said new decalcomania.

[0002] The field of the invention is that of the transferable decalcomanias, i.e. that technique which allows the application of an industrially ready-made colour on a selected support such as a masonry or a wooden wall. The colour may consist in a painting, a drawing, a fresco, a decoration in general and the like, which is printed on a decalcomania and, from this decalcomania, is transferred on the support to be decorated. For this purpose, the decalcomania with the colour consists of a sheet of coated paper, i.e. treated with layers of colloidal substances, the sizing, which has the purpose of preventing the colour from seeping into the fibres of the paper itself, which would compromise the following transfer.

[0003] The actual decalcomanias have a coating material which is particularly suitable for dissolution when in contact with cold water. The water has in fact the aim of dissolving the sizing in order to cause the detachment of the colour from the paper and to activate the adhesive, usually albumen, which fixes the colour to the support to be decorated.

[0004] This kind of technique, accomplished in actual decalcomanias, has the main inconvenience of giving a very fragile product.

[0005] In fact the colour, after being transferred, tends to come off the support when in the presence of humidity and abrasions such as scratches, rubbings and the like, so hindering its application, for instance, on outside masonries.

[0006] Moreover, as already said, the decalcomania is ready-made with a water-based adhesive, which serves to fix it on the support to be decorated. In order to give the product the best possible adherence by the adhesive employed, this is industrially applied by "zones" or "areas" on the decalcomania. Due to technical reasons of the industrial production, the adhesive material usually exceeds the margins of the drawing outline, so forming glossy zones which give the decoration the look of a ready-made and glued figure instead of a hand-made drawing as desired.

[0007] Therefore the main aim of the present invention is to provide a decalcomania which allows the transfer, in a permanent manner, of an image on a support so that it becomes resistant to abrasions, weather inclemensies, etc.

[0008] A further aim of this invention is to supply a decalcomania that, even if industrially ready-made, when applied to the support to be decorated, gives it a look as similar as possible to the one of a craft decoration or a hand-made image.

[0009] Another aim of the invention is to provide a new process which, when using the decalcomania of the above said type, allows the decoration, in a permanent manner, of a masonry, a wooden wall or another not perfectly smooth or regular surface, provided that it is compact, not pulverizing, not absorbing and washable, with a painting which can be compared for its high affinity or similarity with craft or hand-painted decorations.

[0010] These and other aims are obtained by the transferable decalcomania according to the present invention which is in particular described in the following claim 1. Further characteristics of this decalcomania are described in dependent claims 2 and 3.

[0011] A further aim of the invention is to provide a process for transferring an image on a support by the use of the above-mentioned decalcomania as defined in claim 4 and in the following claims from 5 to 7.

[0012] In comparison with known decalcomania, the one object of the present invention provides the important advantage that it is of a permanent type, due to its characteristic of resistance, once transferred, to abrasions and to atmospheric agents. For this reason, unlike similar known products, the decalcomania object of the present invention, is also suitable for application on outdoor as well as indoor masonry surfaces.

[0013] Moreover, unlike traditional decalcomanias, the colour transferred according to the decalcomania of the invention is characterized by a natural look, due to the direct application of the adhesive at the moment of the colour setting up on the support to be decorated. For this reason, the adhesive material may be selected so that it shows the best possible aesthetical compatibility with the support, in order not to have oustanding prominences in the image area.

[0014] This method allows a fixing no more by zones, but located point by point on the transferred image.

[0015] In particular the invention shows the important advantage of creating images or decorations which form a substantial unity with the support, giving the impression that these are directly made on it, as, e.g., in the case of a painting on plaster.

[0016] Furthermore, the decalcomania of the invention, unlike known decalcomanias, has the advantage that it can also be applied on slightly defective surfaces, such as plastered walls or not perfectly uniform supports. A suitable surface for decoration with the decalcomania of the invention, is preferably a wall of interior or exterior architecture, made with building materials, painted or not, such as plaster, stucco, plastic, metal or fabrics treated with stucco or plaster, provided that they have a compact, non-pulverising, non-absorbing and washable surface. Other supports which can be used effectively in the invention are the ones compatible with the adhesive for the image transfer, such as, cardboard, wood or plastered, painted or coloured fabrics, etc.

[0017] The paper used for the manufacture of the decalcomania of the present invention is a paper permeable to water and steam (rag pulp, whitened cellulose, wood pulp and the like), but still seep-resistant. This paper is moreover of a kind suitable for printing

according to the usual technologies of the printing field, i.e. offset, serigraphy, typography, rotogravure, flexography and computerized print with printers and plotters or by manual application.

[0018] In the new decalcomania of the invention, the paper coating material has the property of being cold water resistant, while it reacts when in contact with stern or hot water, preferably at a temperature above 70°C. The coating, which has the traditional function of preventing the colour from penetrating inside the paper, is also suitable for the same purpose as for the adhesive used to fix the drawing on the support to be decorated.

[0019] Examples of substances that, when used separately or in a mixture of two or several of them, are suitable for the preparation of the coating of the decalcomania of the present invention, are flour glue, animal gelatine glue, starch and tragacanth gum being the animal gelatine glue and the starch selected among those which are, once applied, only soluble in warm conditions. Moreover, when using these substances, the coating is applied to the paper in one or more layers: this is a technology which helps to increase the coating resistance to the action of cold water.

[0020] When in mixture, the compounds forming the coating composition of the paper do not require to be present in critical amounts. It is in fact sufficient that the weight ratio of the different compounds is such as to give the composition, dissolved in water, those properties which make it suitable to be applied in thin layers on the decalcomania paper.

[0021] The colour used for the printing on the paper of the decalcomania of the invention is a colour which, when dry on the coated paper, can resist to the action of the water and the adhesive used. Examples of colours that can be used are those suitable for printing in offset, rotogravure, flexography, serigraphy, plotter technologies, by hand with brush and the like.

[0022] As already mentioned, the use of the decalcomania of this invention includes the use of an adhesive resin which, applied at the moment of the decoration set up according to the procedure hereinafter described, serves to transfer the colour from the paper and, after its solidification, to fix it definitively, and in a permanent manner, on the support to be decorated.

[0023] Suitable adhesives are the water soluble ones based on acrylic, vinylic, epoxidic, polyurethanic resins and similar, such as DUCOTONE (registered trademark of DUCOTONE SpA), CERAMIZZANTE EXTRA 082103 (registered trademark of LECHLER SpA), CAPAPLEX S product (registered trademark of CAPAROL GmbH). To these products suitable hardeners or catalyst agents, suitable for speeding up the resin drying time as well as possible colouring and opacifying agents may be added.

[0024] The process for the setting up of a decoration with the use of the above described decalcomania, is as follows.

1st Operation

[0025] The decalcomania, prepared with the coated and pre-printed paper according to the previously described technique, is wetted with cold water. This operation has the aim of softening and lengthening the paper so as to give it the degree of flexibility necessary both to avoid formation of creases at the moment of the following treatment with the adhesive, and to allow the paper to combine perfectly with the outline of the support to be decorated. The previous lengthening of the paper by wetting has in particular the purpose of avoiding that the same phenomenon happens at the moment of contact of the pre-printed coated paper with the adhesive. The lengthening of the paper in this phase would cause creasing of the paper itself thus provoking a consequent imperfect adhesion to the support and absorption of the adhesive. Furthermore, wetting the paper with water prevents the adhesive, subsequently applied, from clogging the pores of the paper on the surface, which would compromise its required permeability to steam or to the following treatment with hot water.

2nd Operation

[0026] The adhesive, consisting of a resin selected from the above cited ones, is spread with a brush, a roll or suitable means on the coloured side of the decalcomania and is preferably also spread on the support to be decorated.

[0027] In the latter case the spreading is preferably carried out on a surface slightly larger in size than that corresponding to the area really occupied by the decalcomania.

3rd Operation

[0028] The surface of the decalcomania carrying the colour is laid on the support to be decorated, sticking it thereon by means of the previously applied adhesive.

4th Operation

[0029] A sponge soaked in cold water can be laid, pressed and rubbed on the outstanding surface of the decalcomania in order to eliminate the excess of resin on the surface to be decorated as well as possible air and adhesive bubbles between the coated paper and the support, and to carry out a first levelling or smoothing of the decalcomania. It should be pointed out that according to the invention, the treatment with cold water carried out in this phase and in the previous one (1st operation) will not destroy or dissolve the coating of the paper, since the coating material is insoluble in cold water, consequently this treatment does not cause any detachment of the colour which, still in this phase, keeps well stuck to the coated paper surface.

[0030] The materials used in coating the paper can be

of any type, provided that they are suitable for keeping the colour during the contact of the decalcomania with cold water and for releasing it for a successive treatment under warm-damp conditions.

[0031] These materials must also be suitable both for the prevention of the colouring agent and the adhesive resin penetrating into the paper, which would compromise the successful result of the transfer.

5th Operation

[0032] In this phase a roller, having a felt or a foam-rubber or similar surface, optionally wetted with cold water, is made to roll, under a certain pressure, on the facing external surface of the decalcomania which is glued on the support to be decorated. In this way the residual unevenness from the previous operation (bubbles, folds, etc.) are completely eliminated.

6th Operation

[0033] The decalcomania, now well adherent to its support, is allowed to rest for the required time necessary to complete the adhesive setting. In the absence of hardeners the time required may be longer than 10 hours.

7th Operation

[0034] In this phase of the treatment, the adhesive has completed the setting of the colour on the surface to be decorated so the paper can be removed to provide the required transfer of the figure. For this purpose, the facing external surface of the decalcomania is treated with a source of hot and damp air, giving a disgregating effect on the coating supporting the colour. This result can be obtained by a steam jet or by wetting the paper with water followed by evaporation of the same by means of an appropriate device, such as the hot surface of an iron or simply by wetting the paper with hot water. The steam tends to diffuse from the external surface of the decalcomania through the fibres of its paper support so reaching and dissolving the coating layer which fixes the image on the decalcomania.

Example 1

[0035] According to a preferred embodiment of the process of the invention, the paper used for preparing the decalcomania is permeable to both water and steam and has a thickness depending on the size of the decalcomania itself. The coating material consists of gelatine and white flour, dissolved in water in equal proportions. The adhesive is Ceramizzante Extra 082103 and the detachment of the paper is carried out using a stern jet iron or a similar device. The animal gelatine is made to swell in cold water and subsequently is dissolved in a bain-marie on hot water. Separately, the wheat flour is dissolved in cold water, then, under stirring, it is brought to boiling temperature until a homogeneous and semi-transparent mixture is obtained. The mixture is added under stirring to the gelatine, optionally adding further water if necessary to obtain a liquid which can be perfectly spread in a thin layer on the paper. After the coating application is completed and dried, printing can start.

[0036] For transferring the image on the support, operation is carried out as follows:

- wet the paper to obtain its lengthening and softening;
- spread with a brush the adhesive Ceramizzante extra 082103 on the coloured side of the decalcomania and preferably also on the surface of the support to be decorated and to place the decalcomania on the support itself;
- with a wet sponge, remove any traces of glue from the support and from the paper surface, pressing it slightly in all directions and repeating this operation if necessary. It is important to make sure at this stage that the paper is perfectly clean from any traces of glue, smooth and pressed, eliminating any possible air and glue bubbles, with the help of a sponge or any flexible, absorbing material roller, so that the paper, the layer of adhesive and the printed image can stick to any imperfection of the support.
- The following day, when the glue is completely hardened, the process of paper detachment can start, using a steam jet iron.

Example 2

[0037] Operation is carried as follows:

- instead of gelatine and flour glue, the coating paper is made only of flour glue.
- proceed to paper printing, bathing and gluing phases with the "DUCOTONE" adhesive;
- when the adhesive is completely hardened, the paper detachment can start. This will be carried out by wetting the paper with water, vaporizing it by means of a dry hot iron or other device kept in contact with the wet surface.

Example 3

[0038] Operation is carried out using tragacanth gum as coating material.

[0039] To prepare the mucilage, said tragacanth gum is plunged into the water for a couple of days after its mincing in order to let it swell. When the mixture no

longer shows, under stirring, traces of fragments, the mucilage is warmed to boiling temperature and maintained under stirring for 1-2 hours. The mixture is then ready to be used as sizing.

Example 4

[0040] Operation is carried out using starch as coating material.

[0041] The starch powder is dissolved in water and then warmed to boiling temperature in order to obtain a semitransparent substance. After its application on paper as sizing and after printing, the phases of gluing and successive paper detachment with hot water can follow.

[0042] Obviously, it is possible to make some changes to the present invention, as above described, in order to carry out variants which, however, are included in the scope of the claims hereinafter mentioned.

[0043] So, for instance, the materials used in the paper coating can be of any type, provided that they are suitable to keep the colour during the contact of the decalcomania with cold water and to release it by a subsequent hot treatment.

[0044] These materials, moreover, must be suitable to make the paper impermeable both to the colour and to the adhesive, in order to avoid that these substances can obstruct the passage of stern from the outside of the decalcomania to its interior, up to the coated surface.

[0045] In the same way also the water-based resins for gluing the colour on the surface to be decorated can be different from the ones previously indicated, provided they are suitable for fixing the colour and compatible with the material of the support to decorate.

Claims

1. A transferable decalcomania, of the type comprising a paper support on which is fixed the colour to be transferred, characterized by the fact that said paper support is water and steam permeable, strong and easily adaptable, once wet, to the optional unevenness of the surface to be decorated and that between said paper support and the colour there is a suitable coating for the temporary fixing of the colour, which is resistant to the cold water action and which dissolves in a warm damp ambient so releasing the colour and that said colour, once dried, is resistant to the action of the water and of the adhesive used to fix the decalcomania to the surface to be decorated.

2. A decalcomania according to claim 1, characterized by the fact that said coating is formed by one or more layers of one or more compounds selected from the group consisting of flour glue, animal gelatine glue, starch or tragacanth gum, or by any mixture of said compounds.

3. A decalcomania according to claim 1 or 2, characterized by the fact that said colour may be printed on the paper support by means of offset, serigraphy, rotogravure, flexography, typography or by a computerized print with printers and plotters or by manual application.

4. A process for transferring the colour on a suitable support using the decalcomania according to anyone of the previous claims, characterized by the fact that said decalcomania is first wetted with cold water, then its surface carrying the colour and optionally the surface of said support to be decorated are treated with a suitable water-based adhesive for a permanent fixing of the colour, said water-based adhesive being consistent with said colour and optionally added with suitable catalyst and/or hardening and/or opacifying and/or colouring agents and that the so treated surface of the decalcomania and the optionally treated surface of the support to be decorated are brought into contact and that on the outward surface of the decalcomania, superimposed upon the surface of the support to be decorated, a suitable pressure is applied and that the adhesive exceeding the adhesion is optionally removed by washing it with cold water and that, after the adhesive has hardened, on the surface of said decalcomania is realized a warm-damp ambient which propagates from the external surface toward its internally coated surface carrying the colour and that the paper support of the decalcomania is removed from the same.

5. A process according to claim 4, characterized by the fact that said water-based adhesive is based on optionally mixed acrylic, vinyl, polyurethane, epoxidic resins.

6. A process according to claim 4 or 5, characterized by the fact that said warm damp ambient is obtained by steam jet, by wetting with water followed by heat or by wetting with hot water.

7. A process according to claim 4 or 5 or 6, characterized by the fact that said support to be decorated is selected among cardboard, wood, plaster, stucco, plastic, metal, plastered or stuccoed fabrics.

8. The use of the decalcomania and process according to anyone of the previous claims for transferring in a permanent manner a colour on a support selected among cardboard, wood, plaster, stucco, plastic, metal, plastered or stuccoed fabrics.