Title: COMPOSITION FOR PAINT HAVING MIRROR EFFECT, METHOD FOR ITS APPLICATION AND PRODUCTS THUS OBTAINED

Abstract: The invention concerns a composition for paint having reflecting effect, the method for its application and the products thus obtained, wherein said composition comprises a mixture of aluminium powder and liquid solvent and wherein said aluminium powder is present in percentages preferably comprised between 0.1 and 1.5 % by weight and wherein said method provides for the opportunity of producing both transparent products having a mirror-like effect and mat products having a reflecting surface on any kind of material.
TITLE:
COMPOSITION FOR PAINT HAVING MIRROR EFFECT, METHOD FOR ITS APPLICATION AND PRODUCTS THUS OBTAINED

The invention concerns a composition for paint having reflecting effect, the method for its application and the products thus obtained.

Usually, in order to obtain reflecting surfaces on both mat and transparent industrial products, silver nitrate base paints are used.

However, silver nitrate is an expensive product and the known application methods are complicated, require particular equipment and specialised labour. Moreover, the traditional methods to obtain reflecting surfaces are not fit for being used on some kinds of materials, particularly plastic materials.

It is the object of the present invention to provide a composition for paint to obtain reflecting surfaces, preferably mirror-like, on any kind of material.

Another object of the invention is to provide a composition for paint having the above-mentioned properties that can be easily applied, without needing particular equipment and specialised labour.

A further object of the invention is to provide a method of applying a paint, to obtain reflecting surfaces, preferably mirror-like, on any kind of material.

These and other objects are achieved with the composition and the method as claimed in the enclosed claims.

According to the invention, it is provided for obtaining reflecting surfaces, preferably mirror-like, i.e. having a reflecting power of about 100% (reflection factor close to 1), by using a composition for a paint comprising aluminium powder in a percentage comprised between 0,1 and 1,5%, diluted into a liquid solvent or into a mixture of liquid solvents.

A first formulation of paint composition according to the invention preferably comprises (percentages indicated by weight):

- Al powder in a percentage comprised in the range 0,1±1,5%;
- ethyl acetate in a percentage comprised in the range between 40±55%;
- isopropyl alcohol in a percentage comprised in the range between 45±55%.

A second formulation of paint composition according to the invention preferably comprises (percentages indicated by weight):

- Al powder in a percentage comprised in the range 0,1±1,5%;
- ethyl acetate in a percentage comprised in the range 4±8%;
- propylene glycol monomethyl ether in a percentage comprised in the range 35±45%;
- n-butyl acetate in a percentage comprised in the range 45±55%.

Always according to the invention, the paint composition is spray applied on the product on which the mirror-like reflecting effect is wanted to be obtained. The spray application can advantageously take place at room temperature.

In case a transparent product is treated, for instance slabs of transparent plastics, glass, acrylic materials, etc., to which a reflecting effect to be perceived through the material itself is wanted to be given, for instance when producing a mirror, the paint application takes place on the opposite face (rear face) with respect to the one through which a reflecting effect is wanted to be obtained (front face). In such way, mirrors having a reflecting power close to 100% can be produced on materials of any kind and nature, even for instance flexible, provided they are transparent.

After having applied the reflecting paint according to the invention, if necessary in order to maintain the properties of the obtained product, the reflecting material layer can be advantageously covered with a layer of protective material, such as a water base or a solvent base paint, in case even in powder, even itself for instance spray applied. Thanks to such protective layer, the deterioration and the removal of the reflecting layer, which can be caused by abrasions due to the contact against other surfaces, are thus avoided.

In case a mat product is treated such as for instance a surface of wood, plastics, metal, stone, etc., the paint application takes place on the same face on which the reflecting effect is wanted to be obtained. In such way, silvery ornamental products having a reflecting power of at least 85% and even up to 90% can be produced, starting from mat materials of any kind and nature. The same technique can be used on transparent products that are wanted to be made reflecting directly onto the outside surface without exploiting their transparency properties.

By treating mat materials, prior to the application of the reflecting paint according to the invention, it is preferred to apply on the face that is wanted to be made reflecting a layer of bright primer, for instance by means of powder paints, polyurethane paints, acrylic paints or paints of different kinds provided they are able to give a bright appearance to the surface.

A first example of such paints for executing a bright primer is given by the following composition: 25% by weight of heavy aromatic solvent naphtha (oil), 12.49% by weight of xylene, 2% by weight of 1,2,4-trimethylbenzene, 2% by weight of solvent naphtha.
(coal) and 0,25% by weight of hexafluorosilicate; about 20% by weight of catalyst comprising 50% by weight of n-butyl acetate, 50% by weight of isocyanates and 0,25% by weight of hexamethylen-1,6-diisocyanate; and about 10-20% by weight of thinner comprising 50% by weight of n-butyl acetate and 50% by weight of xylene.

A second example of such paints for executing a bright primer is given by the following composition: 25% by weight of xylene, 12,49% by weight of 4-methyl-pentan-2-one (methylisobutylketone), 9% by weight of n-butyl acetate and 6% by weight of cyclohexanone; 20% by weight of catalyst comprising 60% by weight of isocyanates, 25% by weight of 1-methyl-2-methoxyethyl acetate, 20% by weight of n-butyl acetate, 7% by weight of light aromatic solvent naptha (oil), 0,25% by weight of hexamethylen-1,6-diisocyanate and 0,25% by weight of 3-isocyanatemethyl-3,5,5-trimethylcyclohexyl isocyanate.

Also in this case, after having applied the reflecting paint according to the invention, if necessary in order to maintain the properties of the obtained product, the reflecting material layer can be advantageously covered with a layer of protective material, which in this case shall necessarily be transparent, such as that one obtainable with a water base or a solvent base paint, said paint possibly being even in powder, even itself for instance spray applied. In such way, once dried, the protective layer will avoid the removal of the reflecting layer caused by abrasions against other surfaces.

Particular chromatic effects can be given to products on which the layer of reflecting paint has been applied, by incorporating one or more coloured pigments into the transparent protective paint.

Example 1

In a first embodiment of the invention, a slab of plexiglas shaped in such a manner to reproduce an alphabet letter was painted on the rear face with the paint according to the invention obtained with the following formulation:

<table>
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<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
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<tbody>
<tr>
<td>Isopropyl alcohol</td>
<td>52,5%</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>46,75%</td>
</tr>
<tr>
<td>Aluminium powder</td>
<td>0,75%</td>
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</table>

The rear face of the slab was painted with the above-mentioned composition by spray gun under conditions of air-rich mixture. Both the application and the drying of the layer of the reflecting paint took place at room temperature.
The product thus obtained showed a substantially mirror-like reflecting surface visible through the front face, while the rear face appeared metallised and substantially mat.

Example 2
In a second embodiment of the invention, the container, made of mat plastics, of an electronic apparatus was first painted with a powder paint so to realise a bright layer on the container. Then, the dried bright layer was covered with the paint according to the invention obtained with the following formulation:

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<tr>
<th>Ingredient</th>
<th>%</th>
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<tbody>
<tr>
<td>Isopropyl alcohol</td>
<td>52.8</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>46.7</td>
</tr>
<tr>
<td>Aluminium powder</td>
<td>0.5</td>
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</table>

The container was painted by spray gun under conditions of air-rich mixture.
Both the application and the drying took place at room temperature.
The product thus obtained showed a reflecting surface having a reflecting power of about 85-90%.

Though the invention has been disclosed with reference to a preferred embodiment, it is in general open to other applications and modifications that are intended to be included within the protective scope, as it will be evident to the person skilled in the art.
CLAIMS

1. A composition for paint having reflecting effect comprising aluminium powder in a percentage comprised between 0.1 and 1.5% by weight and solvent.
2. A composition according to claim 1, wherein said solvent is a mixture of ethyl acetate and isopropyl alcohol.
3. A composition according to claim 1, wherein said solvent is a mixture of ethyl acetate, propylene glycol monomethyl ether and n-butyl acetate.
4. A composition according to claim 2, wherein said composition comprises:
   - Al powder in a percentage comprised between 0.1 and 1.5% by weight;
   - ethyl acetate in a percentage comprised between 40 and 55% by weight;
   - isopropyl alcohol in a percentage comprised between 45 and 55% by weight.
5. A composition according to claim 3, wherein said composition comprises:
   - Al powder in a percentage comprised between 0.1 and 1.5% by weight;
   - ethyl acetate in a percentage comprised between 4 and 8% by weight;
   - propylene glycol monomethyl ether in a percentage comprised between 35 and 45% by weight;
   - n-butyl acetate in a percentage comprised between 45 and 55% by weight.
6. A method of painting to obtain reflecting surfaces comprising the steps of:
   - preparing a transparent object in which a front face and a rear face are defined and to which a reflecting appearance perceptible through said front face is intended to be given;
   - spray applying on said rear face of said object a composition for paint comprising aluminium powder in a percentage comprised between 0.1 and 1.5% by weight and solvent;
   - drying said aluminium powder and solvent base paint, so to obtain a mirror-like reflecting surface visible through said front face.
7. A method of painting to obtain reflecting surfaces comprising the steps of:
   - preparing an object to which a reflecting appearance is intended to be given;
   - applying a bright paint layer on at least one portion of said object;
   - drying said bright paint layer so to give a bright appearance to said object;
   - spray applying on said bright paint layer an aluminium powder in a percentage comprised between 0.1 and 1.5% by weight and solvent base paint;

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- drying said aluminium powder and solvent base paint so to obtain a reflecting surface.

8. A method according to claim 7, wherein said bright appearance is obtained by spray applying a bright paint.

9. A method according to claim 8, wherein said bright paint is a polyurethane paint or an acrylic paint.

10. A method according to claim 6 or 7, wherein said composition for aluminium powder base paint comprises:
    - Al powder in a percentage comprised in the range 0,1±1,5%;
    - ethyl acetate in a percentage comprised in the range between 40±55%;
    - isopropyl alcohol in a percentage comprised in the range between 45±55%.

11. A method according to claim 6 or 7, wherein said composition for paint comprises:
    - Al powder in a percentage comprised in the range 0,1±1,5% by weight;
    - ethyl acetate in a percentage comprised in the range 4±8% by weight;
    - propylene glycol monomethyl ether in a percentage comprised in the range 35±45% by weight;
    - n-butyl acetate in a percentage comprised in the range 45±55% by weight.

12. A method according to any of the claims 6 to 11, wherein after having dried said layer of aluminium powder and solvent base paint, a step of applying a protective material layer is provided for.

13. A method according to claim 12, wherein said protective material layer is obtained by a water base or a solvent base paint.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C09D5/00 C09D5/38 B05D/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C09D B05D C03C G02B C08J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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<td>US 2 941 894 A (MCADO WALTER R) 21 June 1960 (1960-06-21) claim 1</td>
<td>2,5,7-13</td>
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<td>X</td>
<td>US 4 287 231 A (DECARO ET AL) 1 September 1981 (1981-09-01) column 1, line 61 - column 2, line 9 column 4, line 13 - line 19</td>
<td>1,6,12, 13</td>
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents:
*A* document defining the general state of the art which is not considered to be of particular relevance
*E* earlier document but published on or after the international filing date
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
*O* document referring to an oral disclosure, use, exhibition or other means
*P* document published prior to the international filing date but later than the priority date claimed

*"I"* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*"X"* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*"Y"* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
*"S"* document member of the same patent family

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Authorized officer
Matthijssen, J-J
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column 4, line 21 - line 26  
claims 1, 7 | 2-5, 7, 13 |
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