METHOD OF PRODUCING SLABS OF ARTIFICIAL STONE AND POLYMERISABLE RESIN HAVING A VEINED EFFECT BY MEANS OF VIBRO-COMPRESSION UNDER VACUUM

VERFAHREN ZUR HERSTELLUNG VON PLATTEN AUS KUNSTSTEIN UND POLYMERISIERBAREM HARZ MIT ADERUNGSEFFEKT MITTELS VIBROKOMPRESSION UNTER VAKUUM

PROCEDE DE FABRICATION DE PANNEAUX EN PIERRE ARTIFICIELLE ET EN RESINE POLYMERISABLE A EFFET VEINE OBTENUS AU MOYEN D’UN SYSTEME DE VIBROCOMPRESSION SOUS VIDE

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References cited:
EP-A1- 1 005 967
EP-A2- 0 511 545
ES-A1- 2 187 313
GB-A- 2 233 640

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A process for manufacturing artificial stone boards with polymerizable resin with a veined effect by means of the vibro-compression under vacuum system, similar to marbles, granite and other natural stones.

The present invention relates to a process for manufacturing boards particularly with a veined effect.

The process marketed by Breton S.p.A (Italy) who developed the technology called "Breton Stone" is described in US patent 4,698,010 (Marcello Toncelli, October 6, 1987) in which aggregates of a material of variable particle size are mixed with a binder (organic or inorganic), and after said mixture has been homogenized it is discharged into a mould which, in turn, is transferred to the interior of a press where it is subjected to pressure and vibration under vacuum, the mixture being hardened and giving as a result blocks that can be cut into others of smaller dimensions.

The process marketed by the authors of the present application as SILESTONE, formed by an aggregate of natural quartz and pigmented crystal and bound with polyester-type resin, based on patent ES 2 187 313 of June 1, 2003, describes a process for manufacturing artificial stone boards formed by a mixture of ground materials of different granulometry of silica, glass, granite, quartz, ferrosilicon and/or other materials such as plastics, marbles and metals with liquid state polyester resins by vibro-compression under vacuum, heating, cooling and polishing, especially applicable for indoors and decoration.

The present authors have also developed several boards similar to those described previously with respect to the filler materials but which only use liquid methacrylate resin as polymerizable resin (international patent application PCT/ES2005/000152 applied for on March 22, 2005) with which boards are obtained that are much more resistant to ultraviolet light so they can be used in outdoor walls, staircases and decoration without the risk of wearing which can be caused by the continuous exposure to rays of sunlight.

In the mentioned cases, the different appearance of the obtained boards is obtained by varying the composition and granulometry of the products forming the filler, colouring different proportions of said filler with various colours and subsequently homogenizing the entire filler until a more or less uniform colour is obtained. Nevertheless, in many cases it is desirable to obtain a board with different colours which will form well defined veins imitating natural stones, i.e. a "veined effect".
boards, comprising a grinding phase of the different materials forming the filler with varied granulometry, another phase containing the resin with the catalyst and optionally the colouring, the mixing of said phases until the homogenization of the materials with the resin, a moulding and compaction phase of the obtained paste by vibro-compression under vacuum, and a hardening phase by polymerization of the resin by means of heating, ending with a cooling, cutting and polishing phase, said boards being obtained with a veined effect due to the addition of a colouring, either during the mixing phase in upper mixers or inside the homogenization ring at the same time that the material falls from the upper mixers or onto the belt leading to the distributor before falling to the distributor or inside the distributor before distributing the material in the mould in order to pass to the vibro-compression under vacuum phase, such that the veined effect is observed in the final product on all the faces of the board even with continuity of the vein in the sides thereof.

The vein is based on being added in the areas of the process in which a subsequent mixing is produced so that the vein is distributed throughout the entire board.

**Explanation of the Invention**

**[0013]** The invention is a process for manufacturing artificial stone boards with a "veined effect" comprising the following steps:

- a) a grinding phase of the different materials of varied granulometry forming the filler;
- b) another phase containing the resin with the catalyst, the accelerator, the binder and optionally the colouring;
- c) mixing said phases until homogenization of the materials with the resin, divided into two parts, mixing inside the upper mixers and mixing in the homogenization ring;
- d) transporting the homogenized mixture by means of a belt from which it falls to a distributor;
- e) discharging, from the distributor to the moulds, the amount of filler necessary for making a board according to the dimensions of the mould;
- f) protecting the mass formed by the boards with a paper such as Kraft paper, or with an elastomer, such as for example a rubber layer, in order to pass to
- g) a moulding and pressing phase of the paste in each mould carried out by vibro-compression under vacuum;
- h) a hardening phase by polymerization of the resin by means of heating;
- i) ending with a cooling, calibrating, polishing and cutting phase.

**[0014]** The veined effect can be achieved in various ways: the colouring (either in solid or liquid form) can be incorporated in phase c) during the mixing of materials both in upper mixers and in the homogenization ring, d) in the journey of the mass towards the distributor or in the distributor itself, or also in phase e) when the mass is being distributed in the moulds, injecting the colouring in liquid form under pressure or in pigment form on the mass in any of the options. Subsequently, the pressing by vibro-compression under vacuum makes the vein be distributed not only on the surface but in the entire depth of the board.

**[0015]** The invention also includes boards obtained by said process.

**Description of the Drawings**

**[0016]** Figure 1 represents a veined board A obtained according to a process of the state of the art and another veined board B obtained according to the process of the present invention.

**Detailed Description and Preferred Embodiment of the Invention**

**[0017]** In order to obtain the veined boards object of the invention, materials of varied granulometry forming part of the filler, among others, marble, dolomite, opaque quartz, crystalline quartz, silica, glass, mirror, cristobalite, granite, feldspar, basalt, ferrosilicon etc. can be used, as long as they are compatible with the resin. Other filler materials can also be used, in the same granulometry as the materials indicated previously, such as coloured plastics, metals, woods, graphite etc.

**[0018]** The part of the filler used to obtain a specific decorative effect can be intimately mixed with the rest of the filler of similar granulometry or it can be placed on the surface afterwards.

**[0019]** The mentioned materials form part of the composition with the following granulometry:

- 10% to 70% of the filler, of micronized or ground powder, with a granulometry comprised between 0.1 mm to 0.75 mm;
- 1% to 80% of the filler, of ground material with a granulometry comprised between 0.76 mm and 1.20 mm; and optionally,
- 10% to 50% of the filler, of ground material with a granulometry comprised between 1.21 mm and 15 mm.

**[0020]** The percentage of each granulometry depends on the use of the board to be obtained, said percentages varying according to the colour and visual effect desired.

**[0021]** For the process, the starting material is prepared by grinding it until the desired granulometry is obtained, the different percentages of each granulometry being mixed and then being loaded in the planetary mixers.

**[0022]** Optionally, this filler can be distributed in different mixers such that a solid colouring or pigment is added to each mixer. If the colouring is a liquid it is added to the
Method for carrying out the Veined Effect in Boards made by Vibro-Compression.

[0024] The new method for carrying out the veined effect in boards is based on the use of solid pigments and/or liquid colourings, independent of those used in the process of the mixers, so that these stand out on the already mixed mass of the mixers. These colourings can be inorganic, such as iron oxides, organic, phthalocyanines, either the solid pigment, with granulometries less than 0.75 mm, or dissolved (liquids) in a carrier compatible with the resin to be used and which may be polymerizable, with the catalysts and accelerators of the base resin: styrene, methacrylate, saturated or unsaturated resin, etc.

[0025] Various paths can be followed in order to achieve the veined effect:

a) Adding it to the upper mixers.
b) Adding it to the homogenization ring at the same time that the mixed material falls from the upper mixers.
c) Adding it to the belt leading to the distributor or in the distributor itself.

[0026] Adding the colourings to make the veins dissolved in resin causes the mixing times in the mixers of the resin with the filler to vary considerably so that the mixture is packed as much as possible and the resin is well absorbed in the fillers, i.e. in normal mixing conditions, this lasts 10 minutes, with the new system the mixing time has to be extended to more than 15 minutes and even to 20 minutes. Although the mixing time is longer, the process is the same, giving as a result a homogeneous mixture, preferably between 1000 and 2000 kg.

[0027] For case a), add it to the upper mixers.

[0028] Once the mixing has been carried out in the mixers and before discharging the mass to the homogenization ring, a new colouring, either as a pigment or as a liquid coloring, will be discharged very slowly onto the mass of each mixer and it will be stirred very slowly for 15 seconds so that the colour is dispersed on the surface of the mixture.

[0029] In order to achieve this, a new system has to be assembled for weighing the colouring in the mixers and the conditions of the automatic mixing cycle have to be varied so that it considers this new process of adding colouring after having added the coloured resin as usual.

[0030] Subsequently, the discharging onto the homogenization ring will be carried out and the homogenization will be performed by lowering the mixing fingers which are the mixing blades included in any mixer of this type.

[0031] Once the movement in the circular mixer has been completed, the mass will be led to the distribution area and pressed in the same conditions mentioned previously.

[0032] The following system for carrying out the veined effect is:

[0033] The mixing conditions in the mixers are varied in the same way as indicated previously and instead of introducing the new colour in the mixers themselves, it is poured while the mass is discharged from the homogenization ring, when it falls to the belt feeding the distributor or in the distributor itself, before filling the mould, forming the layers of each colour; in this way, it is also obtained that the new colour is superficially distributed on the surface in which injectors of the paint spray gun type are projected on the entire discharged mass and it is then homogenized inside the distributor and then led towards the pressing area. The way to introduce this new colour, in the case of introducing colouring in liquid form, is to pump it towards the mass in the form of spray or in a continuous swaying jet while the mass falls to the belt leading to the distributor or when the mass is mixed inside the distributor.

[0034] The colour is sprayed on the material which is being discharged by means of a system similar to spray gun painting with compressed air. A bridge is assembled on the belt or on the distributor, such that the colouring spray gun can move longitudinally on the bridge and cover all the material in its spraying process. The bridge moves to distribute the colouring simulating the effect of a hand that would support the gun and move it with a swaying motion. The material moves on the belt or inside the distributor at the same time as the spraying.

[0035] Another system for carrying out the veined effect is:

[0036] The mixing conditions in the mixers are varied in the same way as indicated previously and instead of introducing the new colour in the mixers themselves, it is poured while the mass is discharged in the homogenization ring, when it forms the layers of each colour; in this way, it is also obtained that the new colour is superficially distributed on the surface in which injectors of the paint spray gun type are projected on the entire discharged mass and it is then homogenized, lowering the homogenization fingers which are the blades included in any normal mixer and which are usually used for mixing and is then led towards the distribution and pressing area. The way to introduce this new colour, in the case of introducing colouring in liquid form, is to pump it towards the mass in the form of spray or in a continuous swaying jet while the mixer rotates and the masses of each main mixer are discharged.

[0037] The colour is sprayed on the material which is being discharged by means of a system similar to spray
gun painting with compressed air. A bridge is assembled on the homogenization mixer, so that the colouring spray gun can move longitudinally on the bridge and cover all the material in its spraying process. The bridge moves to distribute the colouring simulating the effect of a hand that would support the gun and move it with a swaying motion. The material rotates inside the homogenization mixer and is being moved by the blades of this mixer at the same time as the spraying.

**[0038]** The solution of the second coloring in liquid form added to the gun preferably has the following formulation:

- resin, 20% to 60% of the filler;
- colouring, 30% to 70% of the filler;
- styrene, 1% to 20% of the filler;
- catalyst, 0.5% to 5% of the weight of the resin;
- accelerator, 0.05 to 0.5% of the weight of the resin; and
- binder, 0.5% to 5% of the weight of the resin.

**[0039]** In the case of solid pigment, the latter is introduced by weighing it in a suitable container and, by means of vibrating sieving, it will be added to the mass while the rotating mixer is discharged. In other words, the pigments are sprinkled in the rotating movement of the mass in the mixer and mixed with the homogenization blades.

**[0040]** The final veined effect is obtained in the press, i.e., this new colour added to the mixture, since it is superficially aggregated on the colours of the masses (mixtures) made in the mixers and introduced in the entire mass, when the boards are pressed in the press, and due to the vibro-compression and expansion system of the board, the new colour expands throughout the entire mass, giving a fine and continuous vein in the entire contour of the board and even a large continuity of the vein in the edges.

**[0041]** This obtained veined effect is independent of the system used as a protection of the boards before pressing, paper or rubber, improving the obtained board compared to those obtained by other methods of the state of the art, because it achieves leading the vein to the ends of the board and throughout the entire material, therefore, the vein in the board is visible in all its surfaces and has the same features, favouring two-face polishing and the polishing of the edges, unlike the other methods in which the colouring is sprayed on the surface of the mass of the board after the distributor when the product is not mixed again, with which once pressed, the paint penetrates 2 or 3 mm of the surface but does not reach the lower face therefore, the polishing offers different faces because the vein has not reached the lower face. The same occurs with the edges; since a rake-type device is used to stir the blotches of colouring placed in the surface, this rake does not reach the edges completely, therefore, they do not show the veined effect either when polished.

**[0042]** The mixture thus obtained is transported by means of a belt and is taken to a distributor to make the boards. These are formed when the mass falls on the moulds which will have the dimensions which are desired for the boards. Generally, the boards will be rectangles from 50 cm x 50 cm to 140 cm x 310 cm with thicknesses comprised between 0.5 cm and 8 cm, the preferred size being those of 140 cm x 310 cm and a thickness of 2 cm.

**[0043]** Subsequently, the mould with the load is protected with paper or rubber. Having protected and coupled the mixture in the mould, it is led to a vibro-compaction under vacuum press responsible for compressing the material and compacting it for which it first carries out the vacuum by removing the air and then presses the material by vibro-compression with a power of 6 kg/cm², the whole process lasting 2 to 3 minutes.

**[0044]** The pressed board is led to an oven at a temperature between 80°C and 110°C for the polymerization of the resin providing the board with hardness. The time that each board remains in the oven is 30 to 60 minutes.

**[0045]** Once it is out of the oven, the board is left to cool for approximately 24 hours at room temperature, later giving it the treatment which would be given to a conventional stone of marble, granite, etc, i.e. it is calibrated, polished and cut.

**[0046]** This obtained veined effect is independent of the system used as a protection of the boards before pressing, paper or rubber, improving the obtained board compared to those obtained by other methods of the state of the art, because it achieves leading the vein to the ends of the board and throughout the entire material, therefore, the vein in the board is visible in all its surfaces and has the same features, favouring two-face polishing and the polishing of the edges, unlike the other methods in which the colouring is sprayed on the surface of the mass of the board after the distributor when the product is not mixed again, with which once pressed, the paint penetrates 2 or 3 mm of the surface but does not reach the lower face therefore, the polishing offers different faces because the vein has not reached the lower face. The same occurs with the edges; since a rake-type device is used to stir the blotches of colouring placed in the surface, this rake does not reach the edges completely, therefore, they do not show the veined effect either when polished.

**[0047]** These boards with a "veined effect" can be used both indoors and outdoors in floors, countertops, facades, staircases, etc.

### Claims

1. A process for manufacturing artificial stone boards with a "veined effect" with polymerizable resins by means of the vibro-compaction under vacuum process comprising the following steps:

   a) a grinding phase of the different materials of varied granulometry forming the filler;
   b) another phase containing a polymerizable and thermosetting resin optionally with the catalyst, the accelerator, the binder and the colouring,
   c) the mixing of said phases until the homogenization of the ground materials with the resin;
   d) transporting the homogenized mixture by means of belt from which it falls to a distributor;
   e) discharging, from the distributor to the mould, the amount of filler necessary for making a board according to the dimensions of the mould;
   f) protecting the boards with a paper such as
Kraft paper, or an elastomer, such as for example a rubber layer, in order to pass to
g) a moulding and pressing phase of the paste in each mould carried out by compaction under
vibro-compression under vacuum;
h) a hardening phase by polymerization of the resin by means of heating in an oven between
80°C and 110°C;
i) ending with a cooling, calibrating, polishing and cutting phase;
characterized in that the veined effect is obtained by incorporating a new colouring in phase
c) once the mixing of materials has been carried out both in upper mixers and in the homogeni-
zation ring, in phase d) in the journey of the mass towards the distributor or in the distributor itself,
or also in phase e) when the mass is being distributed in the moulds, injecting the colouring in liquid form under pressure, such that the obtained board has veins of this new colour in all its surfaces.

2. A process for manufacturing artificial stone boards with a "veined effect" with polymerizable resins by means of the vibro-compaction under vacuum process according to claim 1, characterized in that the colouring incorporated in any of the mentioned phases is a solid pigment.

3. A process for manufacturing artificial stone boards with a "veined effect" with polymerizable resins by means of the vibro-compaction under vacuum process according to claim 2, characterized in that the colouring incorporated in any of the phases mentioned in claim 1 is a solid pigment of granulometry of less than 0.7 mm.

4. A process for manufacturing artificial stone boards with a "veined effect" with polymerizable resins by means of the vibro-compaction under vacuum process according to claim 1, characterized in that the colouring incorporated in any of the mentioned phases is a liquid colouring or a dissolved solid pigment forming a liquid solution.

5. A process for manufacturing artificial stone boards with a "veined effect" with polymerizable resins by means of the vibro-compaction under vacuum process according to claim 4, characterized in that the colouring incorporated in any of the phases in liquid form is done so by means of an arm which sprays it on the mass.

6. A process for manufacturing artificial stone boards with a "veined effect" with polymerizable resins by means of the vibro-compaction under vacuum process according to claim 4, characterized in that the colouring incorporated in any of the phases is dissolvèd in the polymerizable and thermosetting resin of phase b).

7. A process for manufacturing artificial stone boards with a "veined effect" with polymerizable resins by means of the vibro-compaction under vacuum process according to claim 4, characterized in that the colouring incorporated in any of the phases in liquid form is dissolved in a monomer compatible with the polymerizable and thermosetting resin of phase b) incorporating the same accelerator, catalyst and binder as in phase b).

8. A process for manufacturing artificial stone boards with a "veined effect" with polymerizable resins by means of the vibro-compaction under vacuum process according to claims 1-7, characterized in that the boards can be protected before being pressed with Kraft paper or an elastomer (rubber).

9. An artificial stone board with a "veined effect" distributed throughout the entire board obtainable by the process of claims 1 to 8, of the type comprising artificial stone and polymerizable and thermosetting resins, together with solid pigments and/or liquid colourings, independent of those used in the process of the mixers.
g) einer Formungs- und Pressphase der Paste in jede Form, welche durch Verdichtung unter Rüttelkompression unter Vakuum stattfindet; h) eine Aushärtungsphase durch Polymerisati-
on des Harzes mittels Aufwärmung in einem Ofen zwischen 80°C und 110°C; i) Beenden mit einer Abkühlungs-, Eichungs-, Polier- und Schnittpahse; 

dadurch gekennzeichnet, dass der Maserungseffek-
ft durch die Einbeziehung eines neuen Farbstoffs in der Phase c), wenn die Mischung der Materialien, sowohl in den oberen Rührwerken als auch in dem Homogenisierungsring, durchgeführt worden ist, in der Phase d), bei der Bewegung der Masse zum Verteiler oder in dem Verteiler selbst, oder auch in der Phase e), wenn die Masse in die Formen verteilt wird, erhalten wird, unter Einspritzten des Farbstoffs in flüssiger Form unter Druck, so dass die erhaltene Platte Masern mit dieser neuen Farbe auf jeder ihrer Flächen besitzt. 

2. Verfahren für die Herstellung von künstlichen Steinplatten mit einem "Maserungseffekt" mit polymerisi-
sierbaren Harzen mittels des Rüttelverdichtungsver-
fahrens unter Vakuum nach Anspruch 1, dadurch gekennzeichnet, dass der in jeder der genannten Phasen einbezogene Farbstoff ein festes Pigment ist. 

3. Verfahren für die Herstellung von künstlichen Stein-
platten mit einem "Maserungseffekt" mit polymeri-
sierbaren Harzen mittels des Rüttelverdichtungsver-
fahrens unter Vakuum nach Anspruch 2, dadurch gekennzeichnet, dass der in jeder der Phasen in Anspruch 1 genannte einbezogene Farbstoff ein festes Pigment ist, welches eine Korngröße kleiner als 0,7 mm aufweist. 

4. Verfahren für die Herstellung von künstlichen Stein-
platten mit einem "Maserungseffekt" mit polymeri-
sierbaren Harzen mittels des Rüttelverdichtungsver-
fahrens unter Vakuum nach Anspruch 1, dadurch gekennzeichnet, dass der in jeder der genannten Phasen einbezogene Farbstoff ein flüssiger Farb-
stoff oder ein gelöstes festes Pigment ist, welches eine flüssige Lösung bildet. 

5. Verfahren für die Herstellung von künstlichen Stein-
platten mit einem "Maserungseffekt" mit polymeri-
sierbaren Harzen mittels des Rüttelverdichtungsver-
fahrens unter Vakuum nach Anspruch 4, dadurch gekennzeichnet, dass der in jeder der Phasen einbezogene Farbstoff in flüssiger Form mittels eines Armes aufgetragen wird, welcher diesen auf die Masse spritzt. 

6. Verfahren für die Herstellung von künstlichen Stein-
platten mit einem "Maserungseffekt" mit polymeri-
sierbaren Harzen mittels des Rüttelverdichtungsver-
fahrens unter Vakuum nach Anspruch 4, dadurch gekennzeichnet, dass der in jeder der Phasen einbezogene Farbstoff in flüssiger Form mittels eines Armes aufgetragen wird, welcher diesen auf die Masse spritzt.


8. Verfahren für die Herstellung von künstlichen Steinplatten mit einem "Maserungseffekt" mit polymerisierbaren Harzen mittels des Rüttelverdichtungsverfahrens unter Vakuum nach den Ansprüchen 1-7, dadurch gekennzeichnet, dass die Platten vor dem Pressen mit Kraftpapier oder einem Elastomer (Gummi) geschützt werden können.


Revendications

1. Procédé de fabrication de panneaux en pierre artifi-
cielle avec un « effet veiné » avec des résines poly-
merisables au moyen d’un système de vibrocom-
pression sous vide comprenant les étapes suivantes :

   a) une phase de broyage des différents matière-
riaux de granulométrie variée formant la charge ;
   b) une autre phase contenant une résine poly-
mérisable et thermodurcissable optionnelle-
ment avec le catalyseur, l’accélérateur, le liant et le colorant ;
   c) le mélange desdites phases jusqu’à l’homo-
génisation des matériaux broyés avec la résine ;
   d) transporter le mélange homogénéisé au moyen d’une bande à partir de laquelle il tombe dans un distributeur ;
   e) décharger, depuis le distributeur au moule, la
quantité de charge nécessaire pour réaliser un panneau selon les dimensions du moule ;
f) protéger les panneaux avec un papier tel que du papier Kraft, ou un élastomère, tel que par exemple une couche de caoutchouc, afin de passer à
g) une phase de moulage et de pressage de la pâte dans chaque moule réalisée par compactage vibrocompression sous vide ;
h) une phase de durcissement par polymérisation de la résine par chauffage dans un four entre 80 °C et 110 °C;
i) finir par une phase de refroidissement, de calibrage, de polissage et de découpage,

caractérisé en ce que l’effet veiné est obtenu en incorporant un nouveau colorant dans la phase c) une fois que le mélange des matériaux a été mené à terme aussi bien dans les mélangeurs supérieurs que dans un anneau d’homogénéisation, dans la phase d) dans le trajet de la masse vers le distributeur ou dans le propre distributeur, ou également dans la phase e) lorsque la masse est en train d’être distribuée dans les moules, en injectant le colorant sous forme liquide à pression, de manière que le panneau obtenu a des veines de cette nouvelle couleur sur toutes ses surfaces.

2. Procédé de fabrication de panneaux en pierre artificielle avec un « effet veiné » avec des résines polymérisables au moyen d’un système de vibrocompression sous vide selon la revendication 1, caractérisé en ce que le colorant incorporé dans l’une quelconque des phases précédentes est un pigment solide.

3. Procédé de fabrication de panneaux en pierre artificielle avec un « effet veiné » avec des résines polymérisables au moyen d’un système de vibrocompression sous vide selon la revendication 2, caractérisé en ce que le colorant incorporé dans l’une quelconque des phases précitées est un pigment solide de granulométrie inférieure à 0,7 mm.

4. Procédé de fabrication de panneaux en pierre artificielle avec un « effet veiné » avec des résines polymérisables au moyen d’un système de vibrocompression sous vide selon la revendication 1, caractérisé en ce que le colorant incorporé dans l’une quelconque des phases précitées est un colorant liquide ou un pigment solide dissout formant une solution liquide.

5. Procédé de fabrication de panneaux en pierre artificielle avec un « effet veiné » avec des résines polymérisables au moyen d’un système de vibrocompression sous vide selon la revendication 4, caractérisé en ce que le colorant incorporé dans l’une quelconque des phases sous forme liquide est réalisé au moyen d’un bras qui le pulvérise sur la masse.

6. Procédé de fabrication de panneaux en pierre artificielle avec un « effet veiné » avec des résines polymérisables au moyen d’un système de vibrocompression sous vide selon la revendication 4, caractérisé en ce que le colorant incorporé dans l’une quelconque des phases est dissout dans la résine polymérisable et thermodurcissable de la phase b).

7. Procédé de fabrication de panneaux en pierre artificielle avec un « effet veiné » avec des résines polymérisables au moyen d’un système de vibrocompression sous vide selon la revendication 4, caractérisé en ce que le colorant incorporé dans l’une quelconque des phases sous forme liquide est dissout dans un monomère compatible avec la résine polymérisable et thermodurcissable de la phase b) en incorporant le même accélérateur ; catalyseur et liant que dans la phase b).

8. Procédé de fabrication de panneaux en pierre artificielle avec un « effet veiné » avec des résines polymérisables au moyen d’un système de vibrocompression sous vide selon les revendications 1-7, caractérisé en ce que les panneaux peuvent être protégés avant d’être pressés avec du papier Kraft ou un élastomère (caoutchouc).

9. Un panneau en pierre artificielle avec un « effet veiné » distribué à travers tout le panneau pouvant être obtenu par le procédé des revendications 1 à 8, du type comprenant de la pierre artificielle et des résines polymérisables et thermodurcissables, avec des pigments solides et/ou des colorants liquides, indépendamment de ceux utilisés dans le procédé des mélangeurs.
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4698010 A, Marcello Toncelli [0004]
- ES 2187313 [0005]
- ES 2005000152 W [0006]
- EP 0970790 A, Luca Toncelli [0008]
- WO 03027042 A, Luca Toncelli [0008]
- GB 2233640 A [0010]