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(54) Title: TERRAZZO FLOORING SYSTEM

(57) Abstract: A terrazzo or terrazzo-like flooring system and method of producing such a flooring system is described in which either existing concrete floors or fresh concrete floors are treated by applying a primer coating to the concrete floor before applying a mixture containing at least a binder and an aggregate allowing the mixture to cure before grinding the cured mixture to produce a substantially uniform flat and smooth surface having a pleasing appearance wherein the uniformed surface has a thickness of less than about 40 mm. The flooring system of this invention allows flexibility in design including having multi-coloured areas of the seamless flooring to rejuvenate or decorate the concrete floors.



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TERRAZZO FLOORING SYSTEM

The present invention relates generally to flooring systems, particularly flooring systems made from or containing naturally occurring materials, such as concrete, terrazzo, marble, granite or the like, including imitations of such materials. More particularly, the present invention relates to a flooring system having the appearance of exposed aggregate, imitation terrazzo type flooring, or the like that can be applied over existing or newly laid concrete floors and to methods of forming such flooring systems. Even more particularly, the present invention relates to a flooring treatment, covering or system which is referred to as a bonded *in situ* surface covering or topping containing selected aggregates, pigments or tints in admixture with other additives, including binders, which are applied to and over existing substrates in the form of a continuous covering to achieve a seamless flooring having the appearance of natural or imitation exposed aggregate or imitation terrazzo type flooring. The present invention also finds particular application in methods of forming such flooring systems.

Although the present invention will be described with particular reference to one form of the seamless flooring and to one method of achieving the seamless flooring, it is to be noted that the scope of the present invention is not limited to the described embodiment, but rather the scope of the present invention is more extensive so as to include other forms of the flooring and other methods of making the flooring, and the use of the flooring in a variety of applications and having a variety of appearances.

Flooring and/or flooring systems or treatments for domestic and commercial buildings can take a number of different forms. One form of flooring which is particularly used in commercial establishments, is concrete flooring, due to the durability of concrete and the

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relative ease of forming such floors. However, bare concrete by itself is not usually appealing and if not sealed or treated has a tendency to produce dust particles and to discolour over time which further distracts from its usefulness and appearance. Therefore, there have been many attempts to disguise the appearance of bare concrete in the past, such as by laying tiles, usually ceramic, over the surface of the concrete or by covering the concrete with a surface treatment, such as for example painting or coating the concrete floor with one or more of the different types of surface coatings available including both decorative or non-decorative coatings. However, laying of ceramic, granite, marble or similar tiles on a concrete surface is time consuming, expensive and not always appropriate, owing to the activities to be carried out upon the floor, particularly if a substantially smooth and seamless floor is required, since it is usually not possible to produce a seamless floor with ceramic tiles or the like.

Other attempts at improving the appearance of bare concrete floors include grinding and polishing the top surface of the concrete to expose the aggregate that was used in making the concrete for forming the floor. By grinding the top surface of the concrete an appearance of a terrazzo or terrazzo-like flooring can be produced when the aggregate used to make the concrete is exposed after having been ground smooth and flat. However, merely grinding the existing upper surface of the concrete floor only produces a floor in the natural colour of bare concrete whilst showing the aggregate as dark stones or similar. Such floors are not very pleasing in appearance and suffer from the same drawbacks as conventional concrete flooring.

In addition to being unable to change the colour of concrete flooring, the main disadvantage of grinding the concrete to produce this type of flooring is the random distribution of the aggregate within the concrete mixture from which the flooring was made. Prior to grinding the floor, there is no way of determining the final appearance

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of the floor and of guaranteeing the consistency of the amount and uniformity of the distribution of the aggregate exposed during the grinding operation. This is due to the following factors:

- 5 1) The amount and distribution of aggregate in the original mixture forming the concrete floor;
- 2) The size distribution of the aggregate;
- 3) The method of placement of the concrete mixture prior to cure; and
- 10 4) The amount and areas that have been vibrated during placement which can cause random sinking and uneven dispersion of aggregate in the concrete floor.

15 If any one of the above factors is present, the final appearance of the floor will not be acceptable so that all of the above factors either singly or in combination contribute to the uncertainty of obtaining a pleasing finish. It is only after commencement of the
20 grinding can the final appearance be ascertained which is then too late to stop the procedure.

Terrazzo or terrazzo-like flooring is usually described as aggregates of rock or stone embedded in a matrix of cementitious material containing cement, sand and
25 other additives, including colours, tints, pigments or the like. One way of imparting the look of terrazzo-like flooring to bare concrete flooring is to form a layer of terrazzo on the top of the bare concrete flooring. This can be done in at least two different ways.

30 In the first form, known as the tile form, a layer of adhesive or mortar is used to form a bed upon which terrazzo tiles are placed, so as to adhere the terrazzo tiles to the concrete floor. In this form, the tiles must be greater than a minimum thickness in order to
35 provide a satisfactory flooring. As an example, the tiles could be of a thickness of up to 40 mm. Furthermore, the space between the individual tiles must be filled with

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grout to form a smooth and flat surface. Such flooring has many, if not all of the drawbacks of tiled floors.

The second type of terrazzo flooring is known as the *in situ* form, which involves preparing a suitable
5 cementitious mixture of cement and aggregate and applying a thick layer of this mixture onto the top of the bare concrete floor. With this type of *in situ* flooring the layer of mixture containing the aggregate must be of a minimum thickness of 40 mm.

10 Although floors having acceptable appearances can be formed by either of these methods, both forms of existing terrazzo flooring require a number of days before the flooring can be finished, such as for example, waiting before grinding can commence, either due to the application
15 and curing of the grouting required for the tile form, or waiting for the top layer to cure or set. Furthermore, with both forms, re-grouting of the floor surface is required after it has been ground to fill any voids or holes, followed by a period of a number of days for further
20 curing prior to the final stages of polishing and sealing the flooring. Thus, both the tile form and *in situ* form are time consuming involving a number of different steps with periods of waiting in between.

Irrespective of the type of terrazzo flooring
25 used, both forms require considerable time and many operations before the flooring is complete. Thus, there is a need to be able to produce a terrazzo or terrazzo-like floor or a floor having a terrazzo or terrazzo-like appearance more quickly and easily, as well as there being
30 a need for more flexibility in designing the appearance of the flooring and being able to incorporate different colours and the like.

Therefore, it is an aim of the present invention to address the shortcomings of previously available methods
35 by providing an improved flooring and a method of making the flooring, in particular to provide a flooring that can be used over bare concrete in place of ceramic tiles or

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terrazzo tiles, to produce a substantially seamless flooring system using selected materials such as aggregates, pigments and tints, and binders and the like in the matrix composition. In addition, the flooring systems of the present invention can be formed of layers having reduced thickness when compared to traditional terrazzo flooring formed from tiles or *in situ*.

According to the present invention there is provided a method of producing a terrazzo or terrazzo-like flooring having a pleasing appearance including at least the steps of:

pre-treating an existing or fresh substrate, particularly a concrete substrate;

applying a first coating to the pre-treated substrate;

applying a mixture containing at least a binder and an aggregate to the coated substrate;

allowing the mixture to cure for a first time period;

grinding the cured mixture to produce a uniform flat and smooth surface;

wherein the uniform surface has a thickness of less than about 40 mm.

According to another aspect of the present invention there is provided a flooring system having a terrazzo or terrazzo-like appearance particularly adapted for use with a concrete substrate or similar, said system including a top surface of a cementitious mixture of at least a binder and aggregate wherein the surface of the top surface is substantially flat and smooth as a result of having been subjected to a grinding process and wherein the thickness of the ground top surface is less than about 40 mm.

Typically, the method of the present invention includes further additional steps. One such step includes adding one or more additional additives to the cementitious mixture. Other additional steps include performing

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repeated grinding steps and/or polishing steps, coating the flooring at one or more different stages, and the like.

Typically, the terrazzo-like flooring is a seamless flooring. More typically, the seamless flooring is coloured, preferably multi-coloured, by being made up of two or more different colours. More preferably, the different colours are separated by a border. Even more preferably, the border is a metal strip or trim, a hardwood strip or trim, or the like. Even more preferably, the metal strip or trim is a brass strip laid end-on in the flooring so as to present the thickness of the strip when viewing the floor.

Typically, the existing or fresh substrate is a floor, typically a concrete floor, either a coloured or natural floor. More typically, pre-treatment of the concrete floor involves grinding the surface of the floor to produce a substantially flat and smooth surface.

Typically, the first coating applied to the treated floor is a primer coating. More typically, two or more separate primer coatings are applied to the pre-treated floor. Optionally, the coating, once applied, is sanded or ground prior to a further coating or layer being applied. Even more typically, the primer coating is an acrylic/methacrylic coating or a PVA coating. Even more typically, the acrylic/methacrylic coating contains one or more acrylic or methacrylic monomers. More typically, the coating is a PVA based coating or a mixed coating containing PVA and one or more acrylic/methacrylic monomers. Even more typically, the coating is a bonding agent for bonding to concrete. One example of the coating is Bond-creteTM or a similar or equivalent material. In use, the coating applied to the floor surface seals the floor of the substrate, such as the slab flooring to stop entrapped air rising through the mixture when applied to or over the slab flooring.

Typically, the acrylic primer coating is applied in such a manner as to achieve maximum penetration of the

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coating into the pre-treated substrate. More typically, the primer coating is applied with a mop or broom, preferably a mop or broom having nylon bristles or strings. Even more typically, the primer coating is worked into the concrete so as to permeate the substrate.

Typically, the aggregate is of any suitable particle size, such as for example up to about 40 mm, preferably up to about 20 mm, more preferably from 4 to 14 mm, and most preferably from about 6 to 8 mm. Typically, the aggregate may be made from any suitable material, such as for example marble, granite, stone, ceramic, rock or the like, including naturally occurring and synthetic materials, and mixtures and combinations thereof. Typically, the aggregate can be of any colour or colours and can include naturally coloured or neutrally coloured materials. Particularly preferred materials include quartzite, basalts, limestones, marbles or granites. Additionally, the aggregates can include other materials such as glass, plastics or the like.

Typically, the binder included in the mixture is a Portland cement based acrylic copolymer composition.

Typically, the amount of binder and aggregate relative to the other cementitious components can vary widely. A typical aggregate mixture includes the range from about a ratio of about 1:1 binder to aggregate to about 1:5 binder to aggregate preferably 1:2. A preferred aggregate mixture is about 20 kg binder combined with about 20 to 25 kg aggregate, depending upon the physical properties of the aggregate, including the size of the aggregate being used, the final appearance of the floor desired, and the type of aggregate used.

Typically, the first period of time that the aggregate mixture is allowed to cure is up to about 48 hours, preferably from 2 to 24 hours, more preferably from 4 to 24 hours.

Typically, the mixture is applied in a layer of up to 40 mm thick, preferably up to about 20 mm thick, and

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more preferably up to about 16 mm thick.

Typically, the layer containing the aggregate mixture is subject to one, two, three, four or more separate grinding treatments. More typically, the separate grinding treatments are performed with grinders of different grit sizes, such as for example differently sized diamonds. Even more typically, the grinding operations may be dry and dustless grinds, or may be wet grinds. When used, the wet grinds may include polishing.

Typically, the layer of aggregate mixture is reduced in thickness to about 12 mm after all grinding steps have been performed.

Typically, the ground and polished flooring may be optionally treated, such as for example, with one or more sealing coatings. The different sealant coatings may be the same or different and may include compositions such as water based epoxy coatings, acrylic type coatings and the like, including mixtures thereof.

Typically, the method of the present invention may include additional steps, such as cleaning the polished flooring, and the like to improve the appearance of the finished flooring.

By way of illustration of the present invention, a typical non-limiting example of the invention will now be described.

EXAMPLE 1

A newly laid or existing concrete floor is first pre-treated before the flooring mixture of the present invention is added to the pre-treated substrate. The flooring substrate is treated by using dustless diamond concrete grinding to prepare a generally flat, smooth surface, free of contaminates. A primer, typically an acrylic primer is then applied to the smoothly ground substrate, such as for example by means of a nylon broom or mop, in order to achieve maximum penetration of the primer

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into the pre-treated substrate. If necessary, a second coat of acrylic primer can be applied, depending upon the porosity of the substrate and the thickness of the first layer of primer. Typically, the or each primer coating
5 takes about four hours to dry.

Whilst waiting for the primer coat to dry, the flooring aggregate is prepared. Four litres of clean water, together with a small amount of whitening agent, are placed in a mixing drum, rotary mixer or similar. 20 kg of
10 cementitious binder is added to the mixing drum and the contents are mixed to achieve a lump-free mixture. The cementitious matrix may be of any suitable composition and can include a mixture of cement, sand, binder or any other suitable additives in a wide range of mixing ratios,
15 depending upon the properties required of the final flooring. As an example, 25 kg of size 0 aggregate, such as for example green marble chips having a size range of about 4-14 mm, is then added and the mixture thoroughly mixed to achieve consistency. Pigments, tints or other
20 colouring materials are added to the mixture in accordance with requirements. The mixture is transferred to the work area and is applied to the now cured or substantially dried primed substrate by a trowel or similar to an average thickness of 16 mm. If necessary, the surface of the
25 applied aggregate flooring may be rough-trowelled to provide a generally even surface. It is to be noted that the initial set or cure of this mixture will occur in about two hours, depending upon such variables as ambient temperature, humidity, size of floor, thickness of mixture,
30 and the like and that the flooring is sufficiently cured after about two to four hours for the flooring surface to be walked upon. Once the generally even distribution of aggregate has been achieved, the mix is left to set or cure for about 24 hours.

35 After about 24 hours, the grinding process can commence, typically using a Dia-Logic 800 dual drive grinder to perform a dry and dustless grind to remove

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excess mixture and to achieve a uniformly flat surface. It is to be noted that the green marble chips are exposed during this grinding operation. After completion of the initial grind cut, the grinder is re-configured with a
5 finer size grit to perform a second diamond grind, also in the dry and dustless state, to remove any excess material and to remove the initial grinding marks from the previous grind which was carried out using a coarser grade grit.

If, upon inspection, the floor requires re-
10 grouting to fill any voids or holes which have been formed or exposed during the grinding operations, a waterproof, fast-setting, co-polymer grout tinted to the same colour as the flooring matrix is applied via a trowel. Preferred forms of the grouting material including epoxy resins,
15 polyester resins, or mixtures of epoxy and polyester resins. Further, the grouting compositions are tinted to the same colour as the matrix and can have very fast curing times, such as from about half an hour to two to three hours. After allowing the grouting to cure, which can take
20 up to about 12 hours, a further set of grinding diamonds are fitted to the grinder and a wet grind commenced to remove excess grout and polish the surface of the flooring mix. After the third grind is finished, a further set of grinding diamonds are fitted to the grinder which is
25 operated to produce a final, polished floor. This process is also done as a wet grind.

When the fourth grind is complete, the floor is then cleaned with clean water and left to dry for one to two hours. After the floor has been thoroughly dried, one
30 or more coats of a suitable sealing composition are applied to the flooring to seal the flooring and to enhance the appearance of the flooring.

Typical properties of the finished flooring include the following:

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Initial set, ASTM C191	Approx. 30 mins at 20°C
Final set, ASTM C191	Approx 2 hrs at 20°C

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Compressive strength, ASTM C109/mod	42 MPA after 28 days
Compressive strength, ASTM C109/mod	Approx 20 MPA after 24 hours
Flexural strength, ASTM C348	8 MPA after 28 days
Flammability, ASTM E84	Flame spread - 0
	Fuel contribution - 0
	Smoke development - 0

By using the flooring of the present invention, and the method of applying the flooring to a newly laid or existing concrete substrate, it is possible to obtain a

5 terrazzo or terrazzo-like flooring finish in a much shorter time than previously available methods, and to provide a seamless flooring without the need to grout individual tiles together. It is possible to achieve the flooring of the present invention by using the binder in the aggregate

10 mixture which provides improved properties, such as stress-free bonded topping, a more durable and flexible coating, better binding of the aggregates and increased resistance to degradation of the layer containing the aggregates.

15 Advantages of the present invention include the following:

- The flooring finish has a uniform distribution of exposed aggregate as the aggregate was prepared
- 20 with the cementitious matrix binder to be consistent, and was uniformly distributed over the surface of the flooring prior to grinding.
- If non-uniform distribution is required the distribution of the aggregate can be tailor made
- 25 or customised over different areas which increases the design flexibility for forming or rejuvenating existing floors.
- The flooring is seamless as there is no need to grout between individual terrazzo tiles.

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- A finished flooring can be produced in a much shorter time than with existing methods. For example, with a terrazzo tiled floor made using the conventional method, a minimum time of three to five days curing after initial placement is required before the first grinding step can be started. Then another three to five days of curing time is required for the grouting of the flooring before the final stages of grinding and polishing can take place. For terrazzo *in situ* flooring, a curing period of seven days is required before the initial grind can commence, and an extra three to five days curing is required for the re-grouting before the following stages of grinding and polishing can commence.

- Floors of different colours and designs can be obtained quickly and easily merely by changing the colour, texture and particle size range of the aggregate and of the cementitious material in accordance with the final design requirements of the flooring. Even though different colours, textures and particle size ranges of the aggregate are used, the floor can still be seamless.

25 The described arrangement has been advanced by explanation and many modifications may be made without departing from the spirit and scope of the invention which includes every novel feature and novel combination of features herein disclosed.

Those skilled in the art will appreciate that the invention described herein is susceptible to variations and modifications other than those specifically described. It is understood that the invention includes all such variations and modifications which fall within the spirit and scope.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method of producing a terrazzo or terrazzo-like flooring having a pleasing appearance characterised in that
5 the method includes at least the steps of:
 - pre-treating a substrate, particularly a concrete substrate;
 - applying a first coating to the pre-treated substrate;
 - 10 - applying a mixture containing at least a binder and an aggregate to the coated substrate;
 - allowing the mixture to cure for a first time period;
 - grinding the cured mixture to produce a
15 substantially uniform flat and/or smooth surface;
 - wherein the uniform surface after grinding has a thickness of less than about 40 mm.
2. A flooring system having a terrazzo or terrazzo-like appearance, particularly adapted for use with a
20 concrete substrate or similar, said system including a top surface of a cementitious material of at least a binder and an aggregate wherein the surface of the top surface is substantially flat and smooth as a result of having been subjected to a grinding process and wherein the thickness
25 of the ground top surface is less than about 40 mm.
3. A flooring system or a method according to claim 1 or 2 characterised in that the method includes further additional steps of treating or coating the concrete substrate.
- 30 4. A flooring system or method according to claim 3 characterised in that one of the further additional steps includes adding one or more additional additives to the cementitious material when forming the aggregate mixture.
5. A flooring system or method according to any
35 preceding claim characterised in that further additional steps include one or more pre-treatment steps, one or more grinding steps and/or polishing steps, and/or coating the

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flooring in one or more different stages.

6. A flooring system or method according to any preceding claim characterised in that the flooring system is a terrazzo or terrazzo-like flooring formed over a concrete floor.
7. A flooring system or method according to any preceding claim characterised in that the flooring is a seamless flooring.
8. A flooring system or method according to any preceding claim characterised in that the seamless flooring is coloured.
9. A flooring system or method according to any preceding claim in which the seamless flooring is multi-coloured and the different coloured areas are separated by a border.
10. A flooring system or method according to any preceding claim characterised in that the border is a metal strip or trim, a hardwood strip or trim or similar.
11. A flooring system or method according to any preceding claim characterised in that the metal strip or trim is a brass strip layed end on in the flooring so as to present the thickness of the strip on viewing the finished floor.
12. A flooring system or method according to any preceding claim characterised in that the substrate is a concrete floor either an existing concrete floor or a newly formed concrete floor.
13. A flooring system or method according to any preceding claim characterised in that the pre-treatment of the concrete floor involves grinding the surface of the floor to produce a substantially flat and smooth surface.
14. A flooring system or method according to any preceding claim characterised in that the first coating is a primer coating.
15. A flooring system or method according to any preceding claim characterised in that there are two or more separate primer coatings applied to the pre-treated floor.

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16. A flooring system or method according to any preceding claim characterised in that the primer coating is an acrylic/methacrylic coating or a PVA coating or a coating containing an acrylic or methacrylic material.
- 5 17. A flooring system or method according to any preceding claim characterised in that the coating includes PVA and one or more acrylic/methacrylic monomers.
18. A flooring system or method according to any preceding claim characterised in that the coating material
10 is a bonding agent for bonding to concrete, including Bond-crete.
19. A flooring system or method according to any preceding claim characterised in that the primer coating permeates the pre-treated substrate.
- 15 20. A flooring system or method according to any preceding claim characterised in that the aggregate incorporated into the mixture for application to the substrate is of a particle size up to about 40 mm, preferably up to about 20 mm, more preferably from 4 to 14
20 mm and most preferably from about 6 to 8 mm.
21. A flooring system or method according to any preceding claim characterised in that the aggregate is made from marble, granite, stone, ceramic, rock or the like including combinations thereof and coloured combinations.
- 25 22. A flooring system or method according to any preceding claim characterised in that the aggregate is quartzite, basalt, limestone, marble or granite.
23. A flooring system or method according to any preceding claim characterised in that the binder included
30 in the mixture is a Portland cement based acrylic copolymer composition.
24. A flooring system or method according to any preceding claim characterised in that the first period of time that the aggregate mixture is allowed to cure or set
35 is up to about 48 hours, preferably from 2 to 24 hours, more preferably from 4 to 24 hours.
25. A flooring system or method according to any

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preceding claim characterised in that the mixture is applied in a layer of up to 40 mm thick, preferably up to 20 mm thick and more preferably up to about 16 mm thick.

26. A flooring system or method according to any preceding claim characterised in that the layer containing the aggregate mixture is subject to one or more separate grinding treatments, preferably the separate grinding treatments being performed with grinders having different grit sizes.

10 27. A flooring system or method according to any preceding claim characterised in that the grinding operation is dry and dustless or is a wet grind.

28. A flooring system or method according to any preceding claim characterised in that the wet grind includes polishing.

29. A flooring system or method according to any preceding claim characterised in that the layer of aggregate mixture is reduced in thickness to about 12 mm after all grinding steps have been performed.

20 30. A flooring system or method according to any preceding claim characterised in that the ground and polished flooring may be treated with one or more sealing coats.

31. A flooring system or method according to any preceding claim characterised in that the ratio of binder to aggregate is about 1:1 to about 1:5, more preferably 1:2 and most preferably 1:1.25.

32. A method of producing a terrazzo or terrazzo-like flooring having an appearance substantially as herein before described with reference to any one of the foregoing examples.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU00/01387

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: E04B 5/32, E04F 15/12

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)

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 practicable, search terms used)

ESPACE: terrazzo; USPTO: terrazzo; ALTAVISTA: terrazzo & concrete & grinding & primer

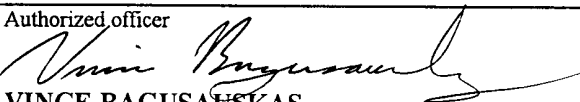
WPAT: terrazzo and keywords

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
O, P, X	Epoxy Systems™ Epoxy Terrazzo. Datasheet [online]. Epoxy Systems, Inc, 24 April 2000 [retrieved on 2000-11-23]. Retrieved from the Internet: < http://www.epoxysystems.com/terrazzo.htm >	1-7, 12-14, 17, 18, 20-22, 24-32
O, P, Y		8, 13, 19
O, P, Y	Monorrazzo™. Techdata [online]. Master Terrazzo Technologies, LLC, 2000 [retrieved on 2000-11-23]. Retrieved from the Internet: < http://www.masterterrazzo.com/Docs/3/MonorrazzoTechData.doc >	8
O, P, A		23
O, P, Y	Epoxy Systems™ Primer-Sealer Product #899. Datasheet [online]. Epoxy Systems, Inc, 24 April 2000 [retrieved on 2000-11-23]. Retrieved from the Internet: < http://www.epoxysystems.com/damp.htm >	13

☒ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" 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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 30 November 2000	Date of mailing of the international search report 7 - DEC 2000
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929	Authorized officer  VINCE BAGUSAUSKAS Telephone No : (02) 6283 2110

INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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		ES	2093923	FI	931380	GR	3021446
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							END OF ANNEX