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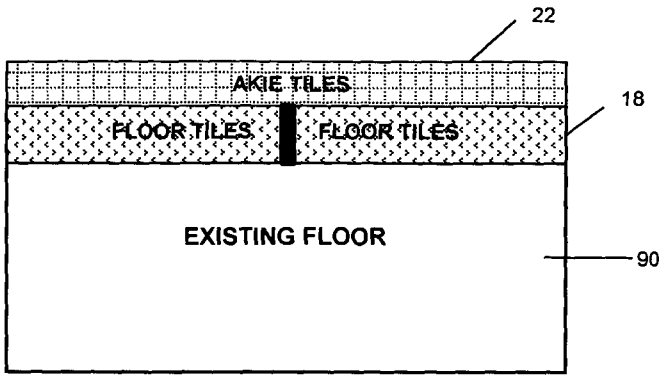


Fig. 1

(57) Abstract: A compound for renewing damaged wall/tile is disclosed, which comprises a first coating (filt compound), a second coating (slit compound) and a third coating (cote compound), wherein the filt compound comprises 25-50% cement, 10-30% water, 0-2% natural earth pigment, and 10-20% sand; the slit compound comprises 20-50% n-butyl acetate, 10-25% lead sulfochromate yellow, 10-25% xylene, 2.5-10% solvent napththa, 1-2.5% ethylbenzene, 0-1% decanedioic acid, 0-1% polyurethane, and the cote compound comprises 40-60% homopolymer, 20-50% n-butyl acetate, 10-30% methylethyl acetate, 1-1.5% xylene, 0-1.2% ethylbenzene, 0.1-1% tosyl isocyananate and 0.1-1% hexamethylene-di-isocynate, all by % of volume. The present invention also relates to using these compounds to renewing damaged tile or wall structure.

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TITLE OF THE INVENTION

# Coating Compound For Resurfacing Damaged Wall/Tiles And The Method Of Using The Same

## FIELD OF INVENTION

The present invention related to coating compound for renewing and resurfacing in tile or wall. More particularly, the present invention relates to renewing and resurfacing damaged wall/tile and floor structure. The present invention also relates to a method of applying the coating compound on damaged wall or tile.

## BACKGROUND OF THE INVENTION

For wall or wall tiles used in commercial and residential buildings, the wall tiles are easily broken, cracked or damaged, and need to be either replaced or resurfacing after a long period of use. Sometimes, a person may no longer like the design of the wall tiles and may wish to change to a desirable design. Thus, these wall tiles need to be either removed or coated with some other design on the surface of the damaged wall tiles. The conventional method of removing the damaged wall tile is rather time consuming, requiring a lot of patience and effort. At times the wall tiles cannot be removed easily, heavy machines are needed and the structure of wall may be affected. Accordingly, a need for a wall resurfacing remains so as to efficiently replace the design of the wall.

An example of wall tiles that need to be resurfaced for instance are wall tiles of most toilets of the commercial buildings. The wall tiles always remain dirty especially the grooves between the tiles or the filt joint. This has led to a very intensive cleaning using chemicals with corrosive characteristics. These chemicals are generally harmful to human body and therefore it is a hazard to the cleaners.

US Patent No. 5,620,768 issued to Hoffman A three-layer surface repair patch assembly for covering a hole in a wall under repair, the assembly comprising: a deformable yet relatively rigid sheet means, the sheet means having an inward-facing side and an outward-facing side, both sides of the sheet means being free of adhesive prior to engagement of the sheet means with an inner and outer mesh means, the inward-facing side of the sheet means remaining free of adhesive after engagement of the sheet means with the inner and outer mesh means, the sheet means being disposed between the inner mesh means and the outer mesh means, an inward-facing side of the inner mesh means being coated with pressure-sensitive adhesive material for instantly adhering to the surface to be repaired under manual pressure, an outward-facing side of the inner mesh means being free of adhesive, an inward-facing side of the outer mesh means being coated with pressure-sensitive adhesive material for adhering to an outward-facing side of the sheet means and for

adhering an outer margin of the outward-facing side of the inner mesh means under manual pressure, the inner mesh means includes an outer margin disposed between an outer periphery of the sheet means and an outer periphery of the inner mesh means, the outer mesh means includes an outer margin disposed between the outer periphery of the sheet means and an outer periphery of the outer mesh means, the sheet means being held in place when the assembly is attached to a wall by adherence of the sheet means to the inward-facing side of the outer mesh means and by adherence of the outer margin of the outer mesh means to the outer margin of the inner mesh means, no pressure-sensitive adhesive material migrates from the inner mesh means to the inward-facing surface of the sheet means, no pressure-sensitive adhesive material migrates from the outer mesh means to the inward-facing surface of the sheet means, the assembly being held in place when the assembly is attached to the wall by adherence of the inward-facing side of the inner mesh means to the wall.

US Patent No. 5,075,149 issued to Owens et al discloses a three-layered patch with a metal plate disclosed between two polyester sheets. The metal plate is held in place between the two polyester sheets with a semi-solid adhesive such as urethane. The semi-solid adhesive fixedly attaches the two polyester sheets together as well as fixedly attaching the reinforcing metal plate between the two sheets. Owens is not useful for repairs which require the application of bonding material or plaster to the repair patch because the bonding material or plaster cannot readily pass through the mesh due to the presence of the urethane adhesive.

US Patent No. 7,716,893 issued to King Harry discloses a wall resurfacing kit for allowing users to quickly and easily resurface a damaged wallpapered surface, said kit comprising: a plurality of mesh screen sheets, said plurality of mesh screen sheets being made of fiberglass and further being directly attachable to said wallpapered surface; a reinforcing member being applied directly onto said plurality of mesh screen sheets such that said reinforcing member penetrates through said plurality of mesh screen sheets, wherein said reinforcing member directly couples said plurality of mesh screen sheets to said wallpapered surface; and a set of instructions indicating a decoration mode, said decoration mode being used to decorate said wallpapered surface; wherein said plurality of mesh screen sheets are coextensively shaped and offset from each other when applied to said wallpapered surface; wherein said mesh screen sheets are arranged in an offset pattern so that a first pair of outer edges of each said mesh screen sheets do not over-lap while a second pair of outer edges of each said mesh screen sheets over-lap when applied to said wallpapered surface.

US Patent No. 4,370,363 issued to Peter Schulz discloses a method for glazing the surfaces of silica bricks used in coke ovens, which comprises forming a suspension of water-glass powder and glass powder in a concentrated water-glass solution, applying the suspension in solution to the surfaces of silica bricks, drying said bricks, and then baking said bricks to

form a protective layer which will prevent the penetration of liquid and gaseous substances into the brick. US Patent No. 4,370, 363 also discloses a coating compound for silica bricks, particularly silica bricks intended for use in the construction of pitch coke ovens, where it is necessary to protect the bricks against penetration of liquid and gaseous substances and impede the formation of graphite incrustations.

US Patent No. 4,122,225 issued to Holmstrom et al discloses method for coating tile having an exposed decorative surface subject to wear including high areas subject to greater than average wear and low areas subject to less than average wear comprising the steps of: providing a plurality of base tiles, each tile having pre-formed front, back, and side edges, in a continuous succession with the front and back edges of adjacent tiles abutting one another; while said front and back edges are abutting, spraying a first coating of protective material onto said exposed surface from one or more points vertically within said pre-formed side edges so that the exposed surface shadows said side edges from the spray; at least partially curing said first coating; applying a second coating of protective material primarily onto the high areas of said exposed surface; and curing the protective material. US Patent No. 4,122,225 also discloses a coated tile comprising a base layer having a decorative exposed surface having high areas and low areas defining said exposed surface, and disposed upon said exposed surface of said base layer a coating of protective material which has an average thickness on the high areas of the surface of said base layer which is greater than the average thickness on the low areas of said surface.

SUMMARY OF THE INVENTION

In view of the foregoing background, it is therefore an object of the present invention to provide a coating compound for resurfacing and renewing damaged wall tile and the method of using the same, allowing the users to quickly and easily resurface old, dirty and damaged wall tiles.

Yet another object of the present invention is to provide a coating compound for resurfacing damaged wall tiles, such that the toilet walls after being treated with, the toilet wall is maintenance free. That is, the wall tiles of the toilet are being transformed into one large original tile.

It is another object of the present invention is to provide a coating compound for resurfacing damaged wall tiles, wherein the compound comprises a first coating (filt compound), a second coating (slit compound) and a third coating (cote compound), wherein the filt compound comprises 25-50% cement, 10-30% water, 0-2% natural earth pigment, and 10-20% sand; the slit compound comprises 20-50% n-butyl acetate, 10-25% lead sulfochromate yellow, 10-25% xylene, 2.5-10% solvent napththa, 1-2.5% ethylbenzene, 0-1% decanedioic acid, 0-1% polyurethane, and the cote compound comprises 40-60% homopolymer, 20-50% n-butyl acetate, 10-30% methylethyl acetate, 1-1.5% xylene, 0-1.2%

ethylbenzene, 0.1-1% tosyl isocyananate and 0.1-1% hexamethylene-di-isocynate, all by % of volume.

Another object of the present invention is to provide a method of using a coating compound for resurfacing damaged wall tile, where the method does not require the change of tiles/wall and the resurfacing is duration to as long as more than 10 years.

Still another object of the present invention is to provide a method of using a coating compound for resurfacing damaged wall tile, wherein the use of heavy machinery which affects the surrounding is eliminated.

Yet a further object of the present invention is to provide a coating compound for resurfacing damaged wall tiles, wherein a minimum time for reconstructing of 3 days.

Another object of the present invention is to provide a method of resurfacing the wall tiles comprising the steps of: (i) resurfacing the surface of the old tiles by using an electric-powered abrasive means until a flat surface is obtained; (ii) filting the entire surface of the resurfaced tilts with a filt compound and ovening the coated surface 6-9 hours at a temperature of 100-150 degree C; (iii)sliting the tile obtained in step (ii) with a slit compound and leaving the tile to dry at similar condition of step (ii), and (iii)applying a cote compound onto the tile of step (ii) at room temperature and with a thickness of 2-4mm for 30 minutes to 120 min and leaving the surface to process with an ovening step.

Yet still another object of the present invention is to provide a method of resurfacing the wall tiles, wherein the temperature for ovening is preferably at 110-120 degree C.

A further object of the present invention is to provide a method of resurfacing the wall tiles, wherein the step of filting is the filling up the gaps or cracks on tiles using the filt compound comprising 25-50% cement, 10-30% water, 0-2% natural earth pigment, and 10-20% sand; wherein the step of sliting is the coating of the slit compound comprising 20-50% n-butyl acetate, 10-25% lead sulfochromate yellow, 10-25% xylene, 2.5-10% solvent napththa, 1-2.5% ethylbenzene, 0-1% decanedioic acid, 0-1% polyurethane onto the top of the tiles; and the step of coting is the last coating onto the tiles with colouring, the cote compound comprises 40-60% homopolymer, 20-50% n-butyl acetate, 10-30% methylethyl acetate, 1-1.5% xylene, 0-1.2% ethylbenzene, 0.1-1% tosyl isocyananate and 0.1-1% hexamethylene-di-isocynate, all by % of volume.

Yet another object of the present invention is to provide a method of resurfacing wall tiles, wherein drying process may be employed with a single step.

As described above, according to the embodiment of the present invention, the coating compound that can be used could be formed from many preferred embodiments.

These and other objects, features and advantages of the present invention will become more apparent in light of the following detailed description of best mode embodiments thereof, as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional view showing the coating of the present invention being coated onto existing damaged wall.

Figs. 2 and 3 are schematic views showing the coating of the present invention onto the damaged wall of the present invention.

Fig. 4 is a cross section view showing the layer of the coated compound onto damaged wall tile in accordance with the present invention.

Fig. 5 is a flow chart showing the process of renewing damaged wall tile in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which a preferred embodiment of the invention is shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiment set forth herein. Rather, this embodiment is provided so that this application will be thorough and complete, and will fully convey the true scope of the invention to those skilled in the art. Like numbers refer to like elements throughout the figures.

The present invention relates to chemical compounds that are used onto existing old or damaged wall tiles so as to renew the original look of the original tile. Referring to FIG. 1, there is shown a sectional view of the original tile after renewing treatment in accordance with the present invention. On existing floor 100, where generally is a concrete or cement floor, there are tiles being cemented so as to provide a pleasant appearance and an easily maintenance. However, after an extended period, the gaps between the tiles on the floor or the tiles per se become bigger and bigger and dirt or cracks appear. In the present invention, a method is proposed to renew the floor. A coating compound for resurfacing and renewing damaged wall tile is used, and the method of using these compounds on the existing wall tile, allowing the users to quickly and easily resurface old, dirty and damaged wall tiles.

In accordance with the present invention, the compound and method is applied for renewing damaged wall tiles, such that the toilet walls after being treated with, the toilet

wall is maintenance free. That is, the wall tiles of the toilet are being transformed into one large original tile.

On existing old or damaged tile, the surface is being resurfaced by using abrasive devices or machines until a flat surface tile is obtained. The step 10, in accordance with the present method, is to obtain a flat and even surface. Any kind of abrasive machines can be used. The surface is then left to dry at ambient temperature.

A filt compound is prepared which comprises 25-50% cement, 10-30% water, 0-2% natural earth pigment, and 10-20% sand. The filt compound is a thick solution and is applied onto the surface of the filted tile. The amount of filt compound used in step 2, denoted by reference number 20 as shown in Fig. 5, is an sufficient amount to even the gaps between the tiles or cracks on the tiles, and leaving an even surface after it dried.

An ovening device is used to heat up the tile at step 40 (shown in FIG. 5) at a temperature ranging from 100-150 degree C, preferably 110-120. The duration of the ovening step is about 6-9 hours, preferably 7-8 hours.

A second coating (slit compound) is prepared for step 50. In accordance with one preferred embodiment of the present invention, the slit compound comprises 20-50% n-butyl acetate, 10-25% lead sulfochromate yellow, 10-25% xylene, 2.5-10% solvent napththa, 1-2.5% ethylbenzene, 0-1% decanedioic acid, 0-1% polyurethane, by volume. The compound or the first coating is applied onto the surface of the tile.

Similarly, upon the application of the slit compound onto the tile in step 50, the tile is left to open air drying step 60.

As shown in FIG. 5, in step 70, a coting compound is prepared to proceed the tile to a coting step. In accordance with one preferred embodiment of the present invention, the cote compound comprises 40-60% homopolymer, 20-50% n-butyl acetate, 10-30% methylethyl acetate, 1-1.5% xylene, 0-1.2% ethylbenzene, 0.1-1% tosyl isocyananate and 0.1-1% hexamethylene-di-isocynate, all by % of volume.

The cote compound is applied to the surface of the tile and the appropriate amount of the cote compound is 2-4 mm thick. The period of time for such coting step is about 30-120 minutes and preferably, about 1 hour. The final step in accordance with the present invention is to proceed the tile to another ovening step 80, where the conditions for ovening in step 40 are applicable. The final product that is obtained is shown in FIG. 2 and FIG. 3. That is the old and damaged tiles are covered.

In accordance with the present invention, the present method does not require the change of tiles/wall and the resurfacing is duration to as long as more than 10 years. No heavy duty machine is used to demolish the existing wall tiles and therefore, affects to the surrounding is reduced to a miminal.

Based on the present method and the compound used, for a toilet, a minimum time for renewing is about 3 days.

In short, the method of renewing the wall tiles comprises the steps of: (i) resurfacing the surface of the old tiles by using an electric-powered abrasive means until a flat surface is obtained; (ii) filting the entire surface of the resurfaced tilts with a filt compound and ovening the coated surface 6-9 hours at a temperature of 100-150 degree C; (iii)sliting the tile obtained in step (ii) with a slit compound and leaving the tile to dry at similar condition of step (ii), and (iii)applying a cote compound onto the tile of step (ii) at room temperature and with a thickness of 2-4mm for 30 minutes to 120 min and leaving the surface to process with an ovening step. The preferred temperature for ovening is at 110-120 degree C.

In the preferred embodiment of the present invention, the step of filting is the filling up the gaps or cracks on tiles using the filt compound comprising 25-50% cement, 10-30% water, 0-2% natural earth pigment, and 10-20% sand. The step of sliting is the coating of the slit compound comprising 20-50% n-butyl acetate, 10-25% lead sulfochromate yellow, 10-25% xylene, 2.5-10% solvent napththa, 1-2.5% ethylbenzene, 0-1% decanedioic acid, 0-1% polyurethane onto the top of the tiles; and the step of coting is the last coating onto the tiles with colouring, the cote compound comprises 40-60% homopolymer, 20-50% n-butyl acetate, 10-30% methylethyl acetate, 1-1.5% xylene, 0-1.2% ethylbenzene, 0.1-1% tosyl isocyananate and 0.1-1% hexamethylene-di-isocynate, all by % of volume.

The method of resurfacing wall tiles allows all users to have easy maintenance and a change of wall color and design without much construction.

The process according to the invention is used preferably in renewing tiles of toilets, particularly toilet tiles or wall renewing or refinishing. It may also, however, be used in renewing old damaged tiles within the house, particularly refinishing or renewing tiles used indoor.

In accordance with the preferred embodiment of the present invention, the filt compound, the slit compound and the cote compound are prepared on the basis of the following example.

EXAMPLE 1

Preparation of A Filt Compound

A filt coating compound was prepared by adding water to cement well-mixed with sand and natural earth pigment. By volume, the cement was 25%, sand 20% and 2% of natural earth pigment, water was added to the above. A mixer was used to stir the mixture til a paste-like

solution was obtained. Heat may be applied to adjust the viscosity of the filt coating compound.

Preparation of A Slit Compound

A slit coating compound was prepared by mixing 40% n-butyl acetate, 20% lead sulfochromate yellow, 25.5 % xylene, 10% solvent napththa, 2.5% ethylbenzene, 1% decanedioic acid, 1% polyurethane. A mixer was used to stir the mixture until a paste-like solution was obtained. Preferably, the prepared paste-like compound has a viscosity that allow the slit compound to be used without special care.

Preparation of the cote compound

A cote compound was prepared by mixing 40-60% homopolymer, 20-50% n-butyl acetate, 10-30% methylethyl acetate, 1-1.5% xylene, 0-1.2% ethylbenzene, 0.1-1% tosyl isocyananate and 0.1-1% hexamethylene-di-isocynate, all by % of volume. The compound gave the furnish a glossy surface with an option to add coloration to the furnished product.

Referring to FIG. 5, there is shown the steps to achieve renewing damaged tiles. The damaged tile is first located and the surface of the tile is cleaned manually or using a tile polishing device or an abrasive device. Waiting for the tile to become dry, the filt compound is applied to the surface of the tiles. The tile is then proceeded to an ovening step 40, before a slit compound is applied in step 50. Similarly, the tile is left at ambient condition to dry, before a cote compound is applied in step 70. After that, the coted tile is left to undergo an ovening step with the same condition as that of step 40.

Figs. 2 and 3 are schematic views showing the coating of the present invention onto the damaged wall of the present invention.

As shown in the figures, the renewed tile 22 is formed on the existing tiles 18, where the gaps 32 in between existing tiles 18 are filted. Similarly, the hairline cracks 16 on existing tile 18 are covered by cote compound and a finished renewed tile 22 is formed, as shown in Fig. 3.

Fig. 4 is a cross section view showing the layer of the coated compound onto damaged wall tile in accordance with the present invention. As shown, the finished product 22 is on the top surface of the existing tile 18.

While the invention has been described with respect to a certain specific embodiment, it will be appreciated that many modifications and changes may be made by those skilled in the art without departing from the spirit of the invention. It is intended, therefore, by the appended claims to cover all such modifications and changes as fall within the true spirit and scope of the invention.

Fig. 4 is a cross section view showing the layer of the coated compound onto damaged wall tile in accordance with the present invention. As shown, the finished product 22 is on the top surface of the existing tile 18.

While the invention has been described with respect to a certain specific embodiment, it will be appreciated that many modifications and changes may be made by those skilled in the art without departing from the spirit of the invention. It is intended, therefore, by the appended claims to cover all such modifications and changes as fall within the true spirit and scope of the invention.

CLAIMS

1. A compound for renewing damaged wall/tile comprises

a first coating (filt compound), a second coating(slit compound) and a third coating (cote compound), wherein the filt compound comprises 25-50% cement, 10-30% water, 0-2% natural earth pigment, and 10-20% sand; the slit compound comprises 20-50% n-butyl acetate, 10-25% lead sulfochromate yellow, 10-25% xylene, 2.5-10% solvent napththa, 1-2.5% ethylbenzene, 0-1% decanedioic acid, 0-1% polyurethane, and the cote compound comprises 40-60% homopolymer, 20-50% n-butyl acetate, 10-30% methylethyl acetate, 1-1.5% xylene, 0-1.2% ethylbenzene, 0.1-1% tosyl isocyananate and 0.1-1% hexamethylene-di-isocynate, all by % of volume.

2. A method of renewing damaged wall tiles comprising the steps of:

(i) resurfacing the surface of old tiles by using an electric-powered abrasive means until a flat surface is obtained;

(ii) filting the entire surface of the resurfaced tile with a filt compound comprising 25-50% cement, 10-30% water, 0-2% natural earth pigment, and 10-20% sand, and ovening the tile surface for about 6-9 hours at a temperature of 100-150 degree C;

(iii) sliting the tile obtained in step (ii) with a slit compound comprising 20-50% n-butyl acetate, 10-25% lead sulfochromate yellow, 10-25% xylene, 2.5-10% solvent napththa, 1-2.5% ethylbenzene, 0-1% decanedioic acid, 0-1% polyurethane, and leaving the tile to oven at similar condition of step (ii), and (iii)applying a cote compound comprising 40-60% homopolymer, 20-50% n-butyl acetate, 10-30% methylethyl acetate, 1-1.5% xylene, 0-1.2% ethylbenzene, 0.1-1% tosyl isocyananate and 0.1-1% hexamethylene-di-isocynate onto the tile of step (ii) at room temperature and with a thickness of 2-4mm; and

(iv) ovening the tile from step (iii) for about 30-120 minutes leaving the surface to process with an ovening step for about 30 to 120 minutes at a temperature of 100-150 degree C.

3. A coting compound for tile renewing comprising 40-60% homopolymer, 20-50% n-butyl acetate, 10-30% methylethyl acetate, 1-1.5% xylene, 0-1.2% ethylbenzene, 0.1-1% tosyl isocyananate and 0.1-1% hexamethylene-di-isocynate, all by % of volume.

4. The compound for renewing damaged wall/tile of Claim 1, wherein the filt compound is used to fill up the gaps formed between tiles or on the tiles.

5. The compound for renewing damaged wall/tile of Claim 1, where the slit compound is used to form the first layer of coating on the tile after being filted.

6. The compound for renewing damaged wall/tile of Claim 1, wherein the cote compound is the final layer of coating which gives the color and texture of the renewed tile.

7. The method of renewing damaged wall tiles of Claim 2, wherein the filt compound is used to fill up the gaps formed between tiles or on the tiles.

8. The method of renewing damaged wall/tile of Claim 2, where the slit compound is used to form the first layer of coating on the tile after being filted.

9. The method of renewing damaged wall/tile of Claim 2, wherein the cote compound is the final layer of coating which gives the color and texture of the renewed tile.

10. The method of renewing damaged wall tiles of Claim 2, wherein the ovening step of the tile is carried out at a temperature ranging from 100-150 degree C for 6-9 hours.

11. The method of renewing damaged wall/tile of Claim 10, wherein the ovening step of the tile is carried out at a preferred temperature ranging from 110-120 degree C.

12. The method of renewing damaged wall/tile of Claim 10 or 11, wherein the ovening step of the tile is carried out at a period of 7-8 hours.

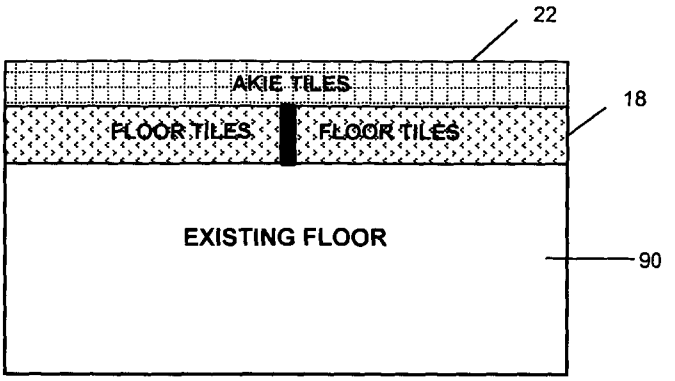
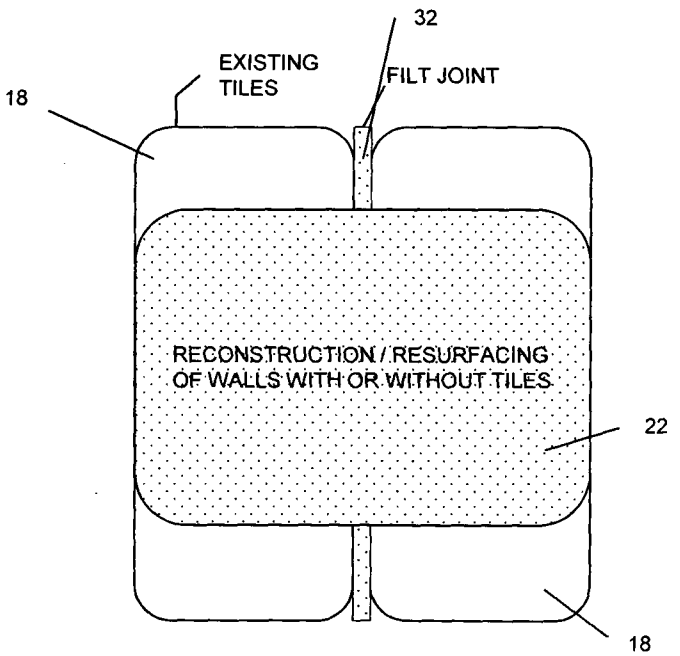

22
AKE TILES
18
FLOOR TILES
FLOOR TILES
EXISTING FLOOR
90

Fig. 1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EXISTING
TILES
FILT JOINT
18
RECONSTRUCTION / RESURFACING
OF WALLS WITH OR WITHOUT TILES
22
18

Fig. 2

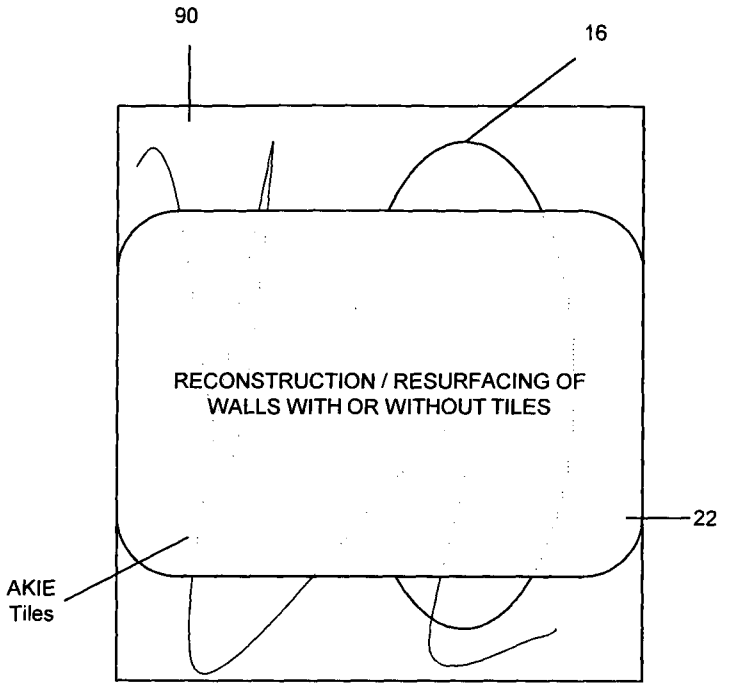
90
16
RECONSTRUCTION / RESURFACING OF WALLS WITH OR WITHOUT TILES
22
AKIE Tiles

Fig. 3

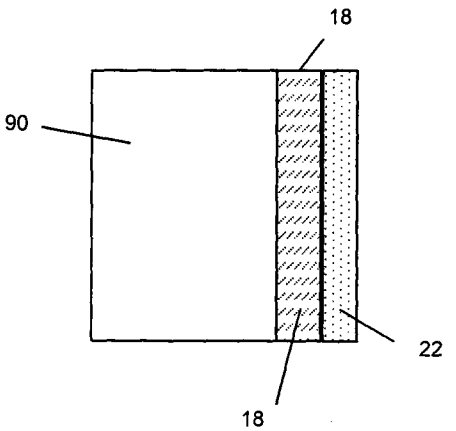
18
90
22
18

Fig. 4

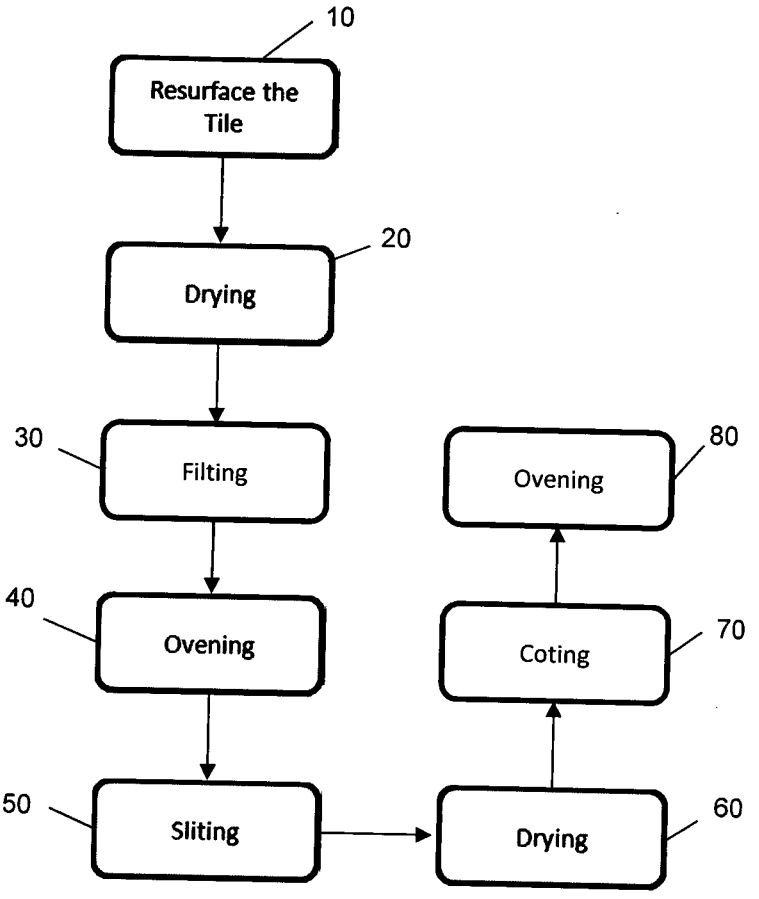
10
Resurface the Tile
20
Drying
30
Filting
40
Ovening
50
Sliting
60
Drying
70
Coting
80
Ovening

Fig. 5

**INTERNATIONAL SEARCH REPORT**

International application No.
**PCT/SG2013/000028**

A. CLASSIFICATION OF SUBJECT MATTER

***C09D 175/04 (2006.01)  C04B 41/89 (2006.01)***

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)

EPODOC, WPI, CAPLUS: tile, wall, renew, hexamethylene diisocyanate, tosyl isocyanate, butyl acetate, methylethyl acetate, xylene, lead sulfochromate and like terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| | Documents are listed in the continuation of Box C | |

[X] Further documents are listed in the continuation of Box C  [X] 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

"E" earlier application or patent 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

"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

"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

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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 28 February 2013 | 28 February 2013 |
| **Name and mailing address of the ISA/AU** | **Authorised officer** |
| AUSTRALIAN PATENT OFFICE<br>PO BOX 200, WODEN ACT 2606, AUSTRALIA<br>Email address: pct@ipaustralia.gov.au<br>Facsimile No.: +61 2 6283 7999 | Neville King<br>AUSTRALIAN PATENT OFFICE<br>(ISO 9001 Quality Certified Service)<br>Telephone No. 0262837953 |

| INTERNATIONAL SEARCH REPORT<br>C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | International application No.<br>**PCT/SG2013/000028** |
|---|---|---|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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| A | US 5179187 A (PEDAIN et al.) 12 January 1993<br>Examples 13 & 14 | 1-12 |
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| INTERNATIONAL SEARCH REPORT<br>Information on patent family members | International application No.<br>**PCT/SG2013/000028** |
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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

| INTERNATIONAL SEARCH REPORT<br>Information on patent family members | International application No.<br>**PCT/SG2013/000028** |
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