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(54) Floor and wall coverings

(57) This invention relates to the production of coverings on floors, walls and the like using prefabricated panels. A base layer is applied to the substratum whereupon prefabricated panels, which form an intermediate layer, are laid on the base layer, the weight of said panels being such as to counteract the generation of vapour pressure from the substratum. Finally a topping layer of plastics material is applied over the intermediate layer. The material of the base layer may be a plastics material, bitumen, or concrete and generally the prefabricated panel is made of plastics mortar.

ERRATUM

SPECIFICATION NO 2024907

Page 3, line 68, *after* 11. *start new paragraph insert* New claims or amendments to claims filed on 12 September 1979

Superseded claims 1 to 12

New or amended claims:—

1. A method of producing a covering on an existing floor substratum, which method comprises applying a fluid plastics material to the substratum to form a base layer which hardens as the plastics material sets, laying prefabricated panels made of plastics mortar side-by-side on the base layer, while the plastics material is still fluid and before it has set, to form an intermediate layer which together with the base layer forms a foundation, said panels having a weight such as to counteract the effect of any vapour pressure generated between the substratum and the foundation, and applying a covering layer of plastics material to the intermediate layer, whereby to form a covering which is capable of bearing heavy loads and resisting penetration by water or moisture.

2. A method as claimed in claim 1, wherein said panels have an irregular structure at least on their opposite faces.

3. A method as claimed in claim 1 or 2, wherein said panels are provided with perforations.

4. A method as claimed in any one of the preceding claims, wherein said panels have free reactive molecules at least on their opposite faces, said molecules entering into a bond with said base layer and said covering layer.

5. A method as claimed in any one of the preceding claims, wherein on their opposite faces adjacent said covering layer, said prefabricated panels carry ornamentation and wherein said covering layer consists of a transparent and scratch-resistant plastics material.

6. A method as claimed in claim 5, wherein said ornamentation is located on a carrier means and is in the form of printing and said carrier means is applied separately to said prefabricated panels.

7. A method of producing a covering on an existing substratum as claimed in claim 1 and substantially as hereinbefore described with reference to the Examples.

8. A covering produced by a method claimed in any one of claims 1 to 7.

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SPECIFICATION

Floor and wall coverings

The present invention relates to the production of coverings on floors, walls and the like using prefabricated panels.

The problem is often encountered in practice of providing floor surfaces with a covering which has to meet specific requirements dictated by the nature and location of the floor. In such cases, special conditions are set by inter alia, the standard of seal required, insulating effect, mechanical strength, and resistance to liquids coming from outside.

To cover and insulate terraces and flat walk-on roofs, bitumen can be used in which sheeting, foil material or other constructional materials are laid. Since butumen has a tendency to melt under the influence of heat, terraces particularly often have a further upper topping layer of stone slabs, cement or asphalt applied to them. In the case of flat roofs on the other hand a relatively thick covering layer of gravel is often spread on the bitumen insulation.

Bitumen insulation has the disadvantage that it ages with time, cracks, and thus begins to leak. Also, even when the various layers are being laid, a stone or some sharp object may be pressed through the soft layer of bitumen and break its seal. Finding the leak is then a particular problem, since the entry of water and damp in the room situated underneath does not generally become apparent exactly at the point where the leak is situated. Thus, the only way to make good the damage is often to remove the entire topping layer, and then repair the insulating layer or even remove it and then relay it.

The same disadvantages are found if, in the case of flat roofs for example, the insulation is produced in the form of a roof skin from plastics foils, which have to be bonded or welded to the structure and which are unsealed or become unsealed at the joins.

Recently, floors, terraces and flat roofs have also been coated with plastics material. It is true that a layer of this nature, which is kept relatively thin for reasons of cost, is generally able to be walked on and is resistant to heat, but it does have certain unfortunate characteristics. Because of its poor elasticity splits occur if there are movements in the structure. Also the layer of plastics material may be forced up by vapour pressure acting from below and may thus be damaged. The reason for this is that in any underlying structure, i.e. in a concrete floor which is to be covered for example, there is always a certian amount of inherent moisture. The warmth from heating or, above all, radiant heat arising from solar radiation heats this moisture and this produces water vapour at a given vapour pressure which may lift the plastics coating and burst it.

These disadvantages could be avoided by applying a layer of plastics material or plastics mortar of suitable thickness. Apart from the increased cost which it involves, the laying of such coverings also involves a great deal of trouble and expense in connection with mixers which have to be made available, and the provision of suitably trained personnel. Finally, it must also be borne in mind that with coverings of this thickness a low level of elasticity and a certain amount of shrinkage in the material must be expected when the plastics material sets and these may result in the material warping.

Thus, what is said above also applies to the floors and walls of wet chambers and rooms in which acids or chemicals are used. Examples which come to mind are swimming baths, toilets, hotel kitchens, laundries, breweries, dairies, dye works and so.

In the case of rooms or enclosed spaces of this kind the practice with known methods has been to apply to the floor to be insulated bitumen, plastics sheeting or similar materials which are then coated with mortar and covered with flag stones, face bricks, or other stoneware slabs to form a topping layer. With coverings of this nature, it is inevitable that in the course of time, even if the members in the topping layer are well jointed initially, moisture will infiltrate into the joints or through narrow cracks and will collect underneath. The possible damage which may be done by vapour pressure in this case has already been mentioned. Also, particularly in breweries and dairies, this liquid, which cannot be reached by cleaning operations, produces decay and as a result of this an unpleasant smell.

It is an object of the invention to provide a method for the purpose hereinabove set forth which will overcome or minimise the problems set forth. It is a further object to provide an economical and simply performed method, in particular for covering floors and walls, which will produce good insulation and a durable covering over long periods.

To enable these and other objects to be achieved, the method accordingly consists in applying a base layer, preferably composed of plastics material, to the substratum, whereafter panels forming an intermediate layer are laid on the base layer, the weight of the panels being made such as to counteract the generation of vapour pressure above the substratum, and then a topping layer of plastics material is applied to the intermediate layer.

The word "substratum" is herein used to denote any basis on which the covering is laid, and may include the actual foundation of a building if the floor is being covered at ground level, or an intermediate floor of a building if it is on an upper floor, or a roof deck if a flat roof is being covered.

Although the base layer will usefully be produced from plastics material, other materials which may be considered are bitumen, concrete or the like.

If plastics material is used to produce the base layer, use may be made of a reactive synthetic resin which is mixed with hardeners and applied in liquid form to the substratum and which forms an intimate bond with the panels which are laid immediately thereafter.

The panels used to produce the intermediate layer are so designed in respect of their weight that they will satisfactorily counteract any vapour pressure which may be expected above the covered substratum as a result of the action of heat. Practical experiments have shown that satisfactory results can be achieved with a thickness for the panels of between 10 and 20 mm when the material used for the panels is plastics mortar. What this material is is a plastics material acting as a binder for quartz sand or other fillers. The thickness selected for the panels will also be guided by the material of the panels in any given case and the particular application involved. Thus, if the effects of heat are expected to be severe, the panels will have to be made correspondingly thicker than in cases where the effect of heat is expected to be slight and thus almost no vapour pressure is expected. In addition to plastics mortar other materials may be considered for the panels such as concrete or wood for example.

A good connection between the intermediate layer and the base and topping layers can be achieved by making the panels coarse-pored on at least their broad faces. For the same purpose, the panels may be provided with perforations which extend through them from their top face to their bottom face. In such cases if would be possible if required to make a saving of the base layer of plastics material since, when the topping layer is applied to the laid panels, liquid plastics material will make its way through the perforations to the substratum and will there ensure that the topping layer and the intermediate layer are well connected to the substratum. The topping layer material which makes it way between the joints in the panels to the substratum acts in the same way.

A futher possible way of ensuring a good connection is for the panels to have free reactive molecules on at least their broad faces, which molecules enter into a bond with the base layer and topping layer. If no base layer is used, it will be appreciated that molecules of this nature need only be provided on that side of the panel to which the topping layer will subsequently be applied.

The colour of the topping layer will generally determine the final colour and ornamental effect of the covering. However, it is also possible for the broad faces of the panels adjacent the topping layer to have ornamentation or to be provided with ornamentation which is visible at the surface of the covering and which produces its effect if the topping layer is formed from transparent plastics material. Particularly in cases of this kind, the material of the topping layer should be especially scratch-proof.

A procedure which may be adopted to produce the ornamentation on one broad face of the panels is for the ornamentation to be printed on a carrier which is then applied to the panels as required. Foils, which may be printed with any desired designs, may for example be considered as carrier materials.

In general, it will be sufficient for the joints between the laid panels to be filled by the material of the topping layer when this layer is laid. If however relatively extensive expansion or movement is expected in the underlying structure, it will be found useful to fill the joints between the panels with a permanently elastic material before the topping layer is applied.

By making use of the method according to the invention, it is possible to obtain many advantages. Some of these will be briefly dealt with below.

For reasons of expense and the work involved it is far better to use prefabricated panels of plastics mortar or other suitable materials than to apply a continuous floor of plastics mortar. When produced in the factory, panels made of plastics mortar can in fact be manufactured in such a way that the proportion of filler is correspondingly higher than in a continuous laying operation in the building itself, especially as the cheapest fillings suitable for the purpose are not always available in the latter case. Furthermore, in the case of prefabrication, the characteristics of the panels can be adjusted more easily and can be monitored during the process of manufacture. Also, when such panels are used, the technique of laying is relatively simple.

Should a leak ever occur in the covering, it is immediately apparent to the eye at the surface of the topping layer and can easily be repaired without the need to remove all or part of the covering as was necessary previously.

Furthermore, any unevennesses which there may be in the substratum can be levelled out relatively simply when the base layer is applied. If there is relatively pronounced unevenness, such as differences in level of 5 cm and above, it will be useful to produce the base layer from relatively cheap concrete. Since panels of plastics mortar would not adhere to a fresh or not fully set layer of concrete and since, for reasons of time, it is not normally possible to wait for two to three weeks until the concrete base layer has set, the following procedure is adopted to solve this problem.

What are used in such cases are prefabricated panels which comprise two layers, namely a lower layer of concrete and an upper layer of plastics mortar. It will be appreciated that such panels can be laid even on fresh concrete since the latter will then readily form a good bond with the concrete layer of the panels. As in the case of the options dealt with above, the upper layer of plastics mortar in the panels will provide a good connection with the final topping layer. In place of concrete, bitumen could also be used for the base layer and one of the panel layers.

Finally, it should be mentioned that the field to which the method described may be applied extends to all floors or walls which are to be provided with coating or coverings of the kind mentioned. In the case of walls care merely has to be taken that after the formation of the intermediate layer the material selected for the topping layer is of a consistency such that it will

not start to run after application and thus during the setting process. Special applications are the covering of industrial floors, the floors and walls of wet chambers, flat roofs, the floors of terraces, the floors of gymnasiums and sports grounds. In the case of coverings for sports grounds however, resilient fillings, such a cork and granulated rubber, will preferably have to be used for the panels and it would be useful to select a material which remains relatively elastic for the topping layer.

CLAIMS

1. A method of producing wall or floor coverings which are subject to heavy loads and/or which are exposed to water or moisture from the weather or to other external influences, using prefabricated panels, which method consists in the steps of a) applying a base layer to the substratum, b) laying prefabricated panels, which form an intermediate layer, on said base layer, the weight of said panels being arranged to counteract the generation of vapour pressure above said substratum, and c) applying a topping layer of plastics material to said intermediate layer.

2. A method as claimed in claim 1, wherein the material of said base layer is selected from plastics material, bitumen, or concrete.

3. A method as claimed in claim 1 or 2, wherein said prefabricated panels consist of plastics mortar.

4. A method as claimed in claim 1, 2 or 3, wherein said panels have an irregular structure at least on the outer faces thereof.

5. A method as claimed in any one of the preceding claims, wherein said panels are provided with perforations.

6. A method as claimed in any one of the preceding claims, wherein said panels have free reactive molecules on at least their broad faces, said molecules entering into a bond with said base layer and said topping layer.

7. A method as claimed in any one of the preceding claims, wherein, on their broad faces adjacent said topping layer, said prefabricated panels carry ornamentation and wherein said topping layer consists of a transparent and scratch-proof plastics material.

8. A method as claimed in claim 7, wherein said ornamentation is located on a carrier means in the form of printing and said carrier means is applied separately to said prefabricated panels.

9. A method as claimed in any one of the preceding claims, wherein joints between said prefabricated panels are filled with a permanently elastic material.

10. A method as claimed in any one of claims 2 to 9, wherein said base layer consists of concrete, the faces of said prefabricated panels adjacent said base layer are also of concrete, and the faces of said prefabricated panels adjacent said topping layer are of plastics mortar.

11. A method of producing wall or floor coverings as claimed in claim 1 and substantially as hereinbefore described with reference to the Examples.

12. A wall or floor covering produced by a method claimed in any one of claims 1 to 11.

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