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(54) **A slab of stone material with multiple layer paper and phenolic resin-based backing, and method for making slab**

(57) A marble, granite or stone tile for building uses has on the surface not on view a glued kraft paper or phenolic resin-based backing, preferably a multilayer of kraft paper and phenolic resins, as used in manufacturing plastic laminates.

The procedure provides that after obtaining a chunk or square block of marble (20), each of the two surfaces thereof undergo application of the backing (21,22) as stated above and then the block is divided in two along a plane (p) parallel to the largest surfaces, to obtain slabs or blocks (20a,20b) of the desired thickness, which are then cut to the desired shape and size.

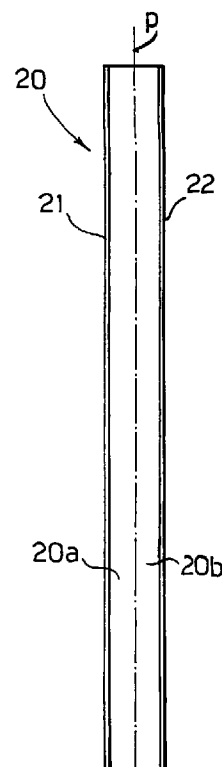


FIG. 5

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Description

The invention relates to the field of marble processing to produce so-called marble-chip floor tiles or marble tiles, or generally slabs of marble, granite or stone, or stone material in general. For simplicity's sake reference will be made hereunder to marble; it is understood, however, that the invention applies to stone material in general, including stone, granites, etc. as well as marble. Reference will also be made to slabs or tiles without distinction, it being understood that the invention applies to one and the other without limitations of size.

Some precious marbles have fractures or microfractures that compromise their consistency and therefore they cannot be processed by normal procedures, or, at least, the usual procedures give rise to considerable waste (up to 80% of the initial raw material). Various solutions to this problem have been studied. For example, use has been made of liquid resins applied to give consistency to the product, but without appreciable results.

Another prior art solution to the problem consists in applying a nylon net to the back of the tile as a support. However, this solution does not give the tile satisfactory stability and there are quite a few breakages during polishing, with consequent slowing of the automatic production lines.

According to another procedure known to the art, fibreglass is sprayed on top of a liquid resin applied to the back of the tile. However, in this case also the results obtained are not satisfactory and besides the working environment is made hazardous by the harmful micro-particles which are dispersed into the air.

Some companies in the field have made use of a marble backing as a base layer for working such friable materials; this procedure is quite successful, but has a very high cost, due both the somewhat complex application procedure and to the cost of the material used as a backing.

Having examined the products and procedures of the prior art, the applicant set out to achieve stability of the material during processing even for relatively small thicknesses of material and thus obtain a considerable reduction in production waste. A further object is to make the tiles stronger over time, that is, to ensure that the tiles do not suffer structural or cosmetic changes once applied either due to the application materials or due to environmental factors.

A further object is to obtain the preceding objects at a cost compatible with the market.

These objects have been achieved with a product as claimed in claim 1 and a procedure as claimed in claim 4.

The new product comprises a layer of marble coupled, by gluing on the back, to a single layer or a multilayer of kraft paper impregnated with phenolic resin.

A laminate known as LPR - a registered trademark of LIRI Industriale - or FORMICA - a registered trade-

mark of the FORMICA CORPORATION - without the outer layer of melamine resin can be used as the backing.

According to the procedure, a block of marble is coupled on its two larger surfaces with respective backing sheets as stated above, by means of gluing and then it is divided or separated, that is, cut in half parallel to the larger surfaces, so as to obtain two slabs, which are then cut to the desired shape and size.

The new tile with a backing according to the invention has numerous advantages. The perfect adhesion of the backing to the marble and its characteristic of elasticity mean that, besides stability, flexibility and tensile stress are increased. Consequently there is less waste during processing and a greater yield, and in addition the covering with the tiles lasts longer and is stronger.

The consistency obtained makes it possible to create tiles with smaller thicknesses than those currently on the market, which allows them to be used for tiling in sectors where greater lightness is particularly necessary (tiling of ships, lifts, skyscrapers, etc.) and with a considerable saving on the raw material used. The reduction in specific weight is about 10% or even more. This also results in a reduction in transport costs.

A further advantage is that the material can be set in place using normal glues, without having to use specific products to make it adhere walls and without the colour of the glue appearing on the visible surface of the tile.

A further advantage consists in the fact that, once the slab or tile has been set in place, the supporting sheet forms a barrier against damp rising from the wall to the marble, and thus the inherent problems such as stains or cracks are eliminated.

The product and the procedure forming the subject matter of the invention will be described in greater detail below with reference to the attached drawings, in which:

Figure 1 represents a perspective view of the tile according to the invention, with a part removed to show the supporting sheet;

Figure 2 is a view in profile of the tile

Figures 3, 4, 5 diagrammatically show the procedure of the invention.

With reference first to Figure 1, the new tile 10 according to the invention comprises a layer of marble 11 and a backing sheet 12 glued to the layer of marble on the back thereof. The backing according to the invention comprises a single layer or a multilayer of kraft paper impregnated with phenolic resins. For example, a laminated product known as LPR, or FORMICA, preferably deprived of the melamine layer, can be used.

This backing lends the tile flexural strength whether it bends with the marble surface on the extrados or with the support on the extrados (something which was not possible with prior systems).

With reference now to Figures 3-5, according to the

procedure a block of marble with a thickness more than double the final thickness that is to be obtained for the tiles, is first cut; said block is indicated by reference numeral 20. On the opposite larger faces of the block 20 two backing sheets 21, 22 in a single layer or a multi-layer of craft paper soaked in phenolic resins are applied. These backing sheets are applied by gluing. The block is then left to dry. The block is then divided or sawn roughly in half, or in any case in an intermediate position with respect to the thickness, along a plane p parallel to the planes of the larger faces, so as to obtain two strips 20a, 20b that each have an exposed marble surface and the backing. The two strips are then processed as desired on the surface on view and cut to the desired final shape and size of the tiles.

Claims

1. A slab of stone material, such as marble, granite or stone, for coverings comprising a layer of stone material (11) and a backing integral with each other, characterized in that said backing (12) comprises at least a sheet of paper or paper material impregnated with phenolic resins.
2. A slab according to claim 1 characterized in that said backing is multilayer kraft paper impregnated with phenolic resins.
3. A slab according to claim 1 characterized in that said support (12) is a plastic laminate comprising a base of kraft paper soaked in phenolic resins and layers of melamine resin, at least partially deprived of the melamine resin part.
4. A procedure to obtain a slab according to claim 1 characterized in that it comprises the following steps:
 - creating a block of stone material, substantially with flat surfaces with a thickness greater than double the final thickness desired for the tiles; applying a backing by gluing on the two opposite larger surfaces of the block, said backing comprising a layer of kraft paper impregnated with phenolic resins; dividing the block along a plane (p) parallel to the larger surfaces of the block so as to obtain two slabs each having a marble surface on view and said backing on the back.
5. A procedure according to claim 4 comprising the further step of: finishing the slabs thus obtained to obtain tiles.
6. A procedure according to claim 5 characterized in that said finishing step comprises cutting to define the single tiles.

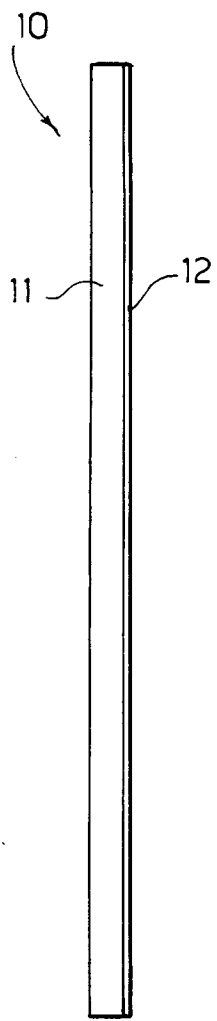
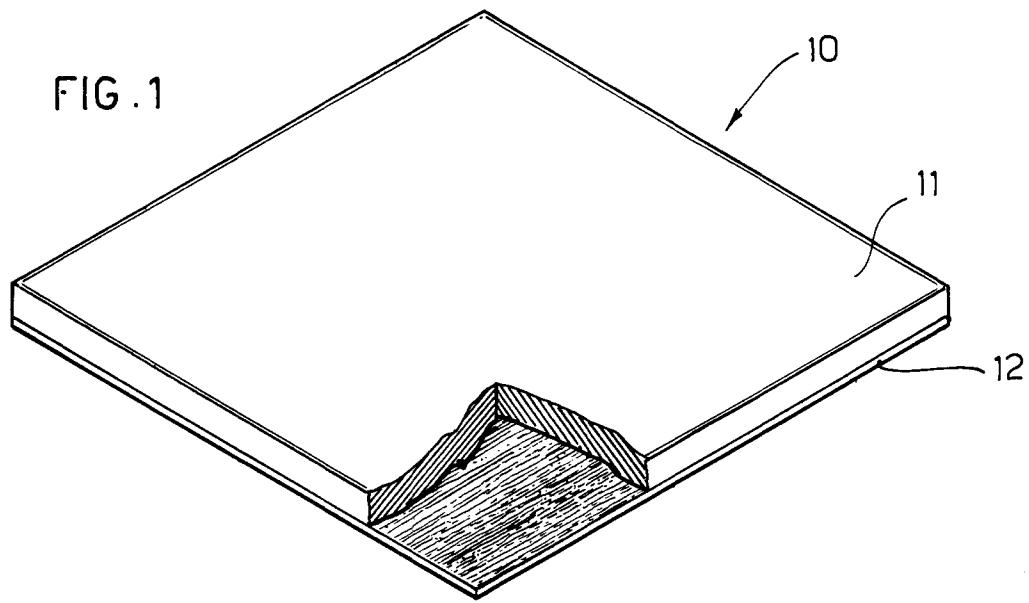


FIG. 2

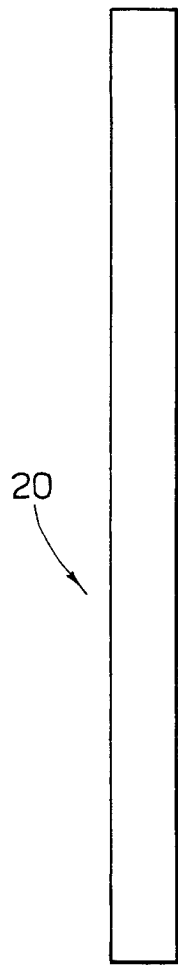


FIG. 3

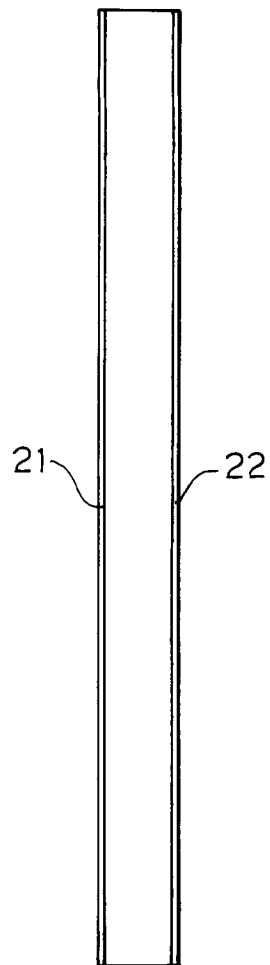


FIG. 4

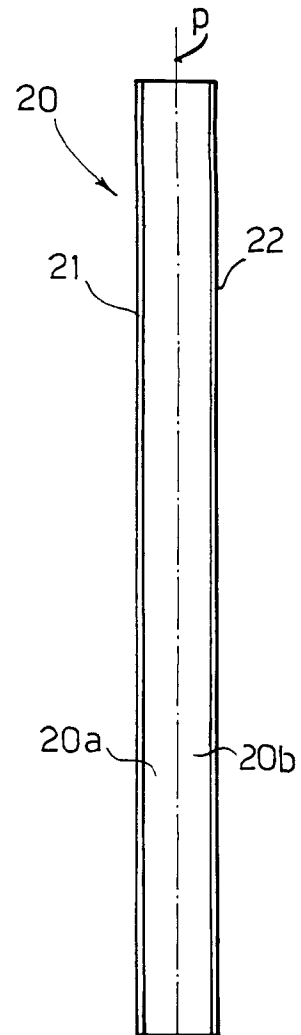


FIG. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 98 11 0541

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 4 063 982 A (P.T. BOURKE) 20 December 1977 * column 2, line 10 - line 20 * * column 2, line 59 - line 68 *	1, 2, 4-6	B28D1/00 E04C2/26
Y	---	3	
Y	EP 0 344 619 A (TECNOMAIERA SRL) 6 December 1989 * column 9, line 43 - line 47 * * figure 11 * -----	3	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B28D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22 September 1998	Examiner Moet, H
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