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(54) **Tile with connection means, and process for laying such tile**

(57) A tile (1) is disclosed that is equipped with connection means (3), which are adapted to connect the tile (1) to immediately-adjacent tiles (1) thereby obtaining a complete seal against seepages of foreign substances

into spaces between adjacent tiles (1). In particular, the connection means are composed of at least one band of plastic or tin material placed around the tile (1). A process is further disclosed for laying such tiles (1).

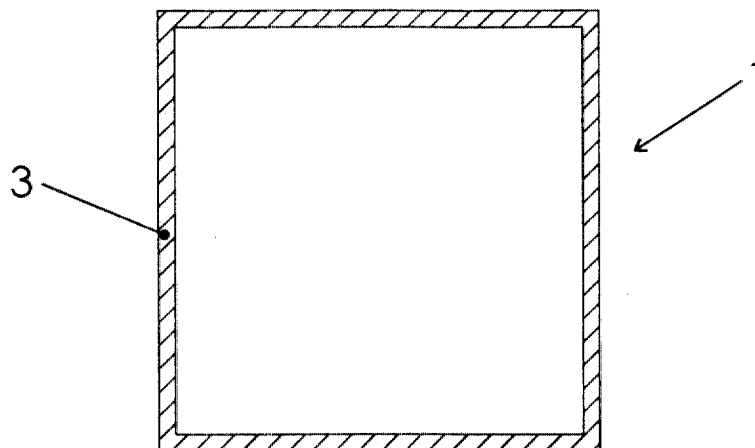


Fig. 1

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Description

[0001] The present invention refers to an improved tile, and in particular to a paving tile equipped with connection means, and to a process for laying such tile.

[0002] The present invention will be described herein with reference to paving tiles, but, as will be better shown in the following description, it clearly appears that it can also be applied to any type of tiles, such as for example filled bricks, hollow bricks, ceramics products, products made of ceramic gres, paving bricks, etc.

[0003] Various types of paving tiles are known in the art, and are used for coating floors, walls and the like. In order to lay them, it is necessary, after having glued such paving tiles to their support base, to proceed with inserting stucco into the spaces existing between adjacent tiles, in order to prevent foreign substances (such as water, dirt, etc.) from entering therein, such substances being able to damage the finished coating. The operations of laying, glueing and stucco inserting are therefore long and complex, and they are still more so in particular cases, such as the paving of terraces or other open surfaces, in which it is necessary to also proceed with the laying of a plane of tar in order to guarantee a satisfactory sealing against penetration of atmospheric agents.

[0004] Object of the present invention is solving the above prior-art problems, by providing an improved tile, and in particular a paving tile equipped with connection means, that allows reducing laying operations, time and costs, while guaranteeing an optimum seal against penetration of foreign substances.

[0005] A further object of the present invention is providing a process for laying tiles that can be quickly carried out and that allows doing without the step of inserting stucco into the spaces being present between one tile and the other.

[0006] A further object of the present invention is equipping a tile with retaining-type guide means to optimise the laying of the tile itself also by non-trained personnel.

[0007] The above and other objects and advantages of the invention, as will appear from the following description, are obtained by a tile as claimed in Claim 1 and by a process for laying such tile as claimed in Claim 24. Preferred embodiments and non-trivial variations of the present invention are claimed in the dependent Claims.

[0008] The present invention will be better described by some preferred embodiments thereof, given as a non-limiting example, with reference to the enclosed drawings, in which:

- Figure 1 is a top view of a preferred embodiment of a paving tile according to the present invention;
- Figure 2 is a side view of the paving tile of Fig. 1;
- Figure 3 is a side view of the paving tile of Fig. 1 in another possible arrangement thereof;

- Figure 4 is a side sectional view of the tile of the invention in another possible arrangement thereof; and
- Figure 5 is a side sectional view of the tile of the invention in a further possible arrangement thereof.

[0009] With reference to Figs. 1 to 3, a preferred embodiment of a paving tile 1 is shown as an example of an improved tile of the present invention. It will be immediately clear to a skilled person in the art that numerous other arrangements of tiles are possible, all equipped with connection means to the other tiles, that are not expressly shown hereing but that fall within the scope of the present invention, as claimed in the enclosed Claims.

[0010] With reference to the Figures, therefore, the paving tile 1 of the invention is shown as equipped with connection means 3, whose characteristic is that of being made of such a material as to allow the connection with a tile 1 equipped with connection means 3 that are identical or at least functionally similar thereto, that is adapted to be unmovably joined to the connection means 3 of the first paving tile 1.

[0011] Figure 1 shows a paving tile 1 of the invention according to a square-shaped arrangement equipped with connection means 3 placed all around its external perimeter. Obviously, several arrangements and sizes of the paving tile 1 are possible, such as, for a non-limiting example, the rectangular, hexagonal, circular shapes and the like.

[0012] In the most immediate preferred arrangement, the connection means 3 are composed of at least one band of plastic material, that can for example be simply plastics or tin or resin or, still more, similar connection materials. The characteristic of such material is that it is adapted to be melted at relatively low temperatures and, upon its cooling, to be unmovably joined to the material of which the connection means 3, with which the adjacent paving tiles 1 are equipped, are made.

[0013] Such band 3 is preferably placed all around the perimeter of the paving tile 1, but could assume any arrangement at will, and for example could be placed around only one or more sides of the tile 1 itself.

[0014] Moreover, as can be seen in Figs. 2 and 3, the height of the connection means 3 could be equal to or greater than the height of the paving tile 1 (Fig. 3) or less than such height (Fig. 2). Finally, the union between paving tile 1 and connection means 3 could be obtained by glueing, retaining or other methods suitable for such purpose.

[0015] The paving tile 1 is a common tile, made of ceramics material and used, for example, as coating for floors, walls, terraces, pavements, ceilings and the like.

[0016] As further and always non-limiting chance of embodying the present invention, the band 3, in addition to having the same coloring as of the paving tile 1 to which it is joined, could be used for forming the so-called fret-type ornaments, that is could be coupled with some

of the paving tiles of a family according to geometric drawings and crossings at will. Obviously, in this case, the external appearance or the material coloring of the bands 3 should be different from those of the paving tiles 1 in order to better point out the ornament produced by the bands 3: in this case, the enlargement/compression functionality of the bands 3 would be coupled to a further aesthetic function.

[0017] With a paving tile 1 as the one shown above, it is possible to carry out a laying process that allows doing without the step of inserting stucco between the different paving tiles being laid.

[0018] In particular, the inventive process comprises the following steps:

- laying a plurality of tiles 1 one beside the other for covering the surface to be coated: such step of laying comprises the glueing of tiles 1 onto the surface itself; and
- joining such plurality of tiles 1, each tile 1 to the tiles 1 adjacent thereto, where such union is carried out by melting the connection means 3 by applying heat thereto and afterwards by cooling the melted connection means 3.

[0019] The above-mentioned melting is carried out through common tools (not shown) that allow applying heat to the connection means 3: the best connection situation is obviously the one in which the connection means 3 are composed of the same material, even if different materials that are mutually compatible can be used, that is materials that are adapted to be mutually joined when they cool down after having been melted. As already seen, plastics and tin are the most efficient examples of such materials.

[0020] With such union of the connection means 3 of different tiles 1, a mutual seal of the tiles is realised, such seal being at least equal to, if not greater than, the one that is traditionally obtained by inserting stucco into the spaces between the tiles themselves. Such seal allows preventing external substances (such as water, dirt or the like) from entering into the spaces between adjacent tiles 1, also allowing optimisations such as doing without the layer of tar as a protection for terraces, pavements or other open surfaces.

[0021] With the tile 1 of the invention, the operation of replacing possible broken tiles is also very simplified: in fact, through a suitable tool, composed for example of an heated hook, the connection means 3 can be re-melted and mutually separated, in order to detach the tile 1 to be replaced.

[0022] Other advantages that are immediately evident by reading the present description are the cleanliness of the escape way, the chance of laying the tiles, for example onto a floor, with a pre-arranged escape width without the help of spacers, and the capability of such tiles to dampen, and therefore not to be impaired by, the effects of dilatation and settling.

[0023] Some preferred embodiments of the present invention have been previously shown and described: obviously, to the skilled people in the art, it will clearly appear that there are numerous variations and modifications, that are functionally equivalent to the previous ones, that fall within the scope of the invention as claimed in the enclosed Claims.

[0024] For example, as shown in Fig.s 4 and 5, it will be possible to provide the connection means 3 of the above-described paving tile 1 with retaining means, that can be present on one side of the paving tile 1 only or on more than one side, and eventually on all sides limiting the paving tile 1 itself. Such retaining means are shown in Fig.s 4 and 5 into two possible arrangements, even if the invention is not limited by them. The primary function performed by such retaining means, in addition to the one commonly performed by the connection means 3, is facilitating the laying of the paving tile 1, reducing laying times and improving work quality also when the operator has not a specific competence.

[0025] Fig. 4 shows the arrangement in which the connection means 3 are shaped as to show on one side retaining means 5 in the shape of at least one projection, and on the opposite side retaining means 7 in the shape of at least one recess, adapted to receive a respective projection 5 of an adjacent paving tile 1. In the case in Fig. 4, the same connection means 3 are shaped in order to show such retaining means 5, 7. In Fig. 5, instead, the retaining means are composed of two separate bodies, the first one (designated as 9) shaped as to have at least one projection, and the second one (designated as 11) shaped as to have at least one recess adapted to house the projection 9. In the case in Fig. 5, the retaining means 9, 11 are secured to the connection means 3 by glueing or other known methods, and are preferably composed of the same material of the connection means 3.

[0026] The arrangements shown in Fig.s 3 and 4 only show two possible solutions: the insertion of the retaining means, in fact, in any arrangement adapted for the purpose, allows realising a guide for laying the paving tiles 1, preventing differences in height, between a paving tile 1 being laid and another paving tile 1, from occurring.

Claims

1. Tile (1) **characterised in that** it is equipped with connection means (3), said connection means (3) being adapted to connect said tile (1) to immediately-adjacent tiles (1) thereby obtaining a complete seal against seepages of foreign substances into spaces between adjacent tiles (1).
2. Tile (1) according to Claim 1, **characterised in that** said connection means (3) are adapted to be joined to corresponding connection means (3) of adjacent

tiles (1) by melting and following hardening.

3. Tile (1) according to Claim 2, **characterised in that** said melting is realised by applying heat and said hardening is realised by cooling.

4. Tile (1) according to Claim 1, 2 or 3, **characterised in that** said connection means (3) are composed of at least one band of elastic material.

5. Tile (1) according to Claim 4, **characterised in that** said band (3) is rectilinear.

6. Tile (1) according to Claim 4 or 5, **characterised in that** said band (3) is placed around at least one of the external sides of said tile (1).

7. Tile (1) according to Claim 6, **characterised in that** said band (3) is placed around all external sides of said tile (1).

8. Tile (1) according to any one of Claims 4 to 7, **characterised in that** said band (3) has a height that is equal to or greater than the height of said tile (1).

9. Tile (1) according to any one of Claims 4 to 7, **characterised in that** said band (3) has a height that is less than the height of said tile (1).

10. Tile (1) according to any one of the previous Claims, **characterised in that** said connection means (3) are secured to said tile (1) through glueing.

11. Tile (1) according to any one of Claims 1 to 9, **characterised in that** said connection means (3) are secured to said tile (1) through restraining.

12. Tile (1) according to Claim 4, **characterised in that** said band (3) made of elastic material is composed of plastics.

13. Tile (1) according to Claim 4, **characterised in that** said band (3) of elastic material is composed of a resin material.

14. Tile (1) according to Claim 4, **characterised in that** said band (3) of elastic material is composed of tin material.

15. Tile (1) according to Claim 1, **characterised in that** said tile (1) is a paving tile.

16. Tile (1) according to Claim 15, **characterised in that** said paving tile (1) is made of ceramic material and is used for coating floors, walls, terraces, pavements, ceilings and the like.

17. Tile (1) according to any one of the previous Claims,

characterised in that said connection means (3) are composed of a material whose outside appearance is the same as that of said tile (1).

18. Tile (1) according to any one of Claims 1 to 16, **characterised in that** said connection means (3) are used for forming hornamental geometric shapes, the outside appearance and/or the material coloring of said connection means (3) being different from those of said tile (1).

19. Tile (1) according to any one of the previous Claims, **characterised in that** said connection means (3) are equipped with retaining means (5, 7, 9, 11) adapted for mutually coupling with the respective retaining means (5, 7, 9, 11) with which each of the adjacent tiles (1) is equipped, said retaining means (5, 7, 9, 11) being present on at least one side of said tile (1).

20. Tile (1) according to Claim 19, **characterised in that** said retaining means (5, 7, 9, 11) are present on all sides surrounding the tile (1).

21. Tile (1) according to Claim 19 or 20, **characterised in that** said retaining means (5, 7, 9, 11) are composed of at least one projection (5) placed at least on one side and of at least one corresponding recess (7) placed on at least one other side, said connection means (3) being shaped as to realise themselves said at least one projection (5) and said at least one recess (7).

22. Tile (1) according to Claim 19 or 20, **characterised in that** said retaining means (5, 7, 9, 11) are composed of at least one projection (9) placed on at least one side and of at least one corresponding recess (11) placed on at least one other side, said retaining means (5, 7, 9, 11) being connected to said connection means (3).

23. Tile (1) according to Claim 22, **characterised in that** said retaining means (5, 7, 9, 11) are composed of the same material of which said connection means (3) are composed.

24. Process for laying a plurality of tiles (1) according to any one of the previous Claims, **characterised in that** it comprises the steps of:

- laying said plurality of tiles (1) one beside the other for covering a surface to be coated, said step of laying comprising the glueing of tiles (1) onto said surface; and
- joining said plurality of tiles (1), each tile (1) to the tiles (1) adjacent thereto, said step of joining being carried out by melting said connection means (3) by applying heat thereto and after-

wards by cooling said melted connection means (3).

25. Process according to Claim 24, **characterised in that** it further comprises the step of retaining each one of said tiles (1) into at least one adjacent tile (1) by using said retaining means (5, 7, 9, 11).

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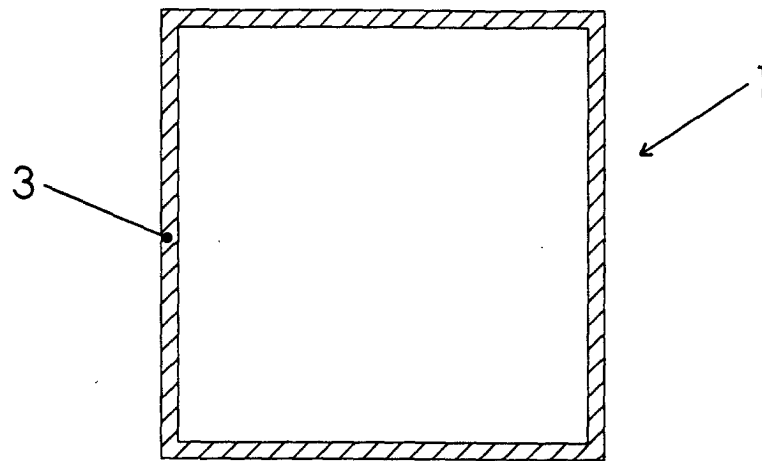


Fig. 1

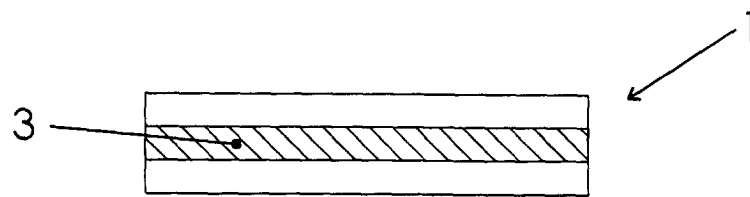


Fig. 2

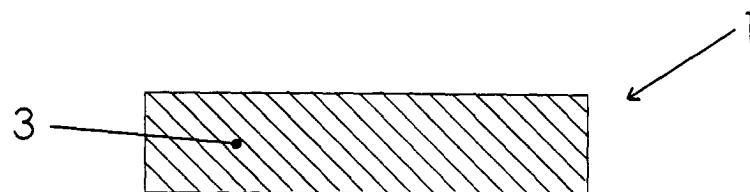


Fig. 3

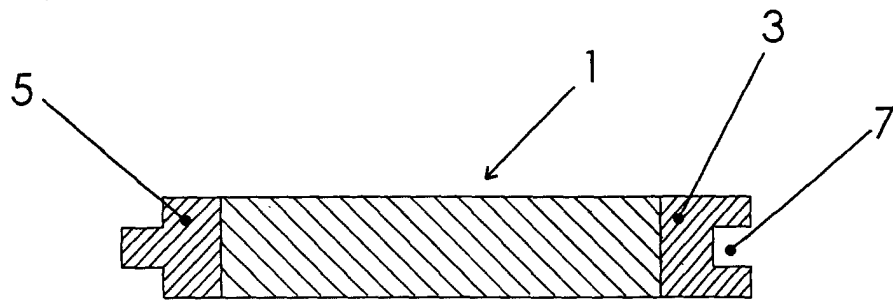


Fig. 4

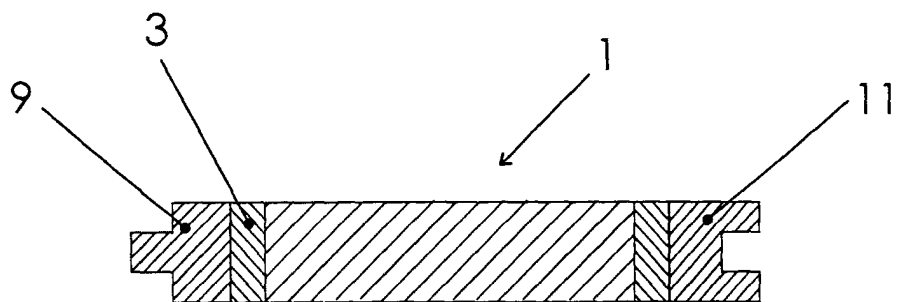


Fig. 5



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Application Number
EP 01 11 0970

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Place of search MUNICH		Date of completion of the search 21 September 2001	Examiner Khera, D
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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