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(54) **Flat tile and flooring for sporting events**

(57) The invention relates to a flat tile (1), the dimensions of which are defined by a larger side (*LM*) and smaller side (*lm*) and thickness (*e*), made of reinforced concrete, i.e. concrete reinforced by two steel mesh structures; and having joining elements (10) along its perimeter to join it to another tile, said joining elements being configured inwardly in such a way that each joining ele-

ment fits tightly into the correlative tile and no air is trapped between the tile and joining element.

The invention also relates to flooring for sporting events comprised of a set of tiles (1) placed over a lower leveled bed or surface (100), consisting of inert, rigid and stable material.

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Description

OBJECT OF THE INVENTION

[0001] The present invention relates to special flooring for sporting events - for the practice of sports such as tennis, paddle, soccer, basketball, squash, volleyball and those that require or can be played on a floored surface -, and which could also be applicable to other special events - such as festivals, dancing, group meetings, concerts, plays, etc.; the flooring is completely dry-laid, recoverable and reusable.

BACKGROUND OF THE INVENTION

[0002] For example, European Patent EP-0715038 relates to an improved floor for the practice of sports in covered pavilions, e.g. basketball, soccer, handball, volleyball, etc., with improved biomechanical characteristics and a vertical bounce height of over 90%; it also has the suitable friction coefficient to allow players to run and swivel quickly. The floor consists of a pair of laminated wood panels, adhered to each other with an angular imbalance of 45%, support pads made of rubber or similar material in contact with the floor, which are added to the lower panel; a layer of adhesive is applied to the visible side of the second panel in order to harden the agglomerated cork sheets to form a joined configuration; finally, two layers of varnish are applied.

[0003] Similarly, Spanish Patent 479717 relates to the construction process of concrete tiles of reduced thickness for building platforms located several centimeters above the floor and especially platforms used to practice sports, such as tennis. It consists of placing an undeformable form plane at the desired distance from the floor, held up by supports that can be recovered after cleaning and drying the platform, and simultaneously providing the expansion joints required to adequately maintain said platform with the help of dismountable means, allowing the platform to be compacted via vibration.

[0004] This flooring, and in general those existing to date, once fitted in a specific location for any kind of use, is fitted in an irrecoverable and burdensome way, with the drawbacks that this involves.

DESCRIPTION OF THE INVENTION

[0005] The invention relates to a flat rectangular tile in accordance with claim 1, and to sports flooring in accordance with claim 7. Preferred embodiments of the tiles and flooring are described in the dependent claims.

[0006] The present invention provides a flat rectangular tile for the construction and installation of flooring, especially for sporting events, which is easily installed -and thus cheaper- and recoverable, in accordance with the new characteristics of the invention set out below.

[0007] The present invention solves the problem posed, by means of the subject-matter included in the

attached independent claims.

[0008] In accordance with a first aspect of the invention, said invention relates to a flat rectangular tile with dimensions defined by a larger side LM and a smaller side lm and thickness e ,

- made of reinforced concrete, i.e. concrete strengthened with two steel mesh structures;
- and which has joining elements along its perimeter so that the tiles fit together, said joining elements being configured inwardly in such a way that each joining element of the tile is tightly fitted to the inner side of the correlative tile, in order to avoid air being trapped between the tile and joining element.

[0009] The perimetral joining elements may be metal or hardened plastic, and are embedded into the concrete of the tile.

[0010] Each joining element preferably consists of a profile that extends in a parallel longitudinal direction, for each joining element, on either side of the tile's perimeter, and said profile has a cross-section:

- which has a central branch extending from the upper part to the lower part of the tile, the height of which corresponds to the thickness e of the tile,
- which towards the interior of the tile consists of a bracket with branches perpendicular to that of the central branch and separated by a distance corresponding to the thickness e of the tile, and ending in a pair of vertical tabs that extend to said first larger elements,
- which towards the exterior of the tile is configured in a groove formed by two branches that extend perpendicular to that of the central branch and separated by a distance h .

[0011] The thickness e of the flat rectangular tile is preferably less than 30 mm; and even more preferably, less than 20 mm.

[0012] Preferably, in the two steel mesh structures the first larger elements parallel to the larger side LM of the tile that they constitute are positioned close to the lower and upper edge of said tile, and the second smaller elements of which, which are parallel to the smaller side lm , are placed internally to said first larger elements, and joined together by means of spot welding.

[0013] The flat tile of the invention preferably has four drill or access holes to metal elements which, embedded in the reinforced concrete, allow the tile to be lifted and transported.

[0014] In accordance with a second aspect of the invention, said invention relates to flooring for sporting events comprised of a set of tiles as previously defined, and where said set of tiles is placed over a leveled bed or lower surface, consisting of an inert, rigid and stable material, such as for example, the crushed stone of railway sleepers.

[0015] The flooring thus installed constitutes resistant, rigid and continuous flooring that distributes loads - both static and dynamic - towards the lower layer without becoming deformed or altered.

[0016] Said set of tiles are preferably joined together by means of cotter pins introduced in the grooves of the perimetral joining elements.

[0017] Said bed or lower surface underneath the tiles has unique characteristics, given that it relates to the application of inert material that guarantees the structural and functional independence of the flooring of the invention in relation to the ground (soil, indoor or outdoor flooring) on which it rests (or rather, floats).

[0018] That is, the invention relates to an alternative method of laying tiles and installing flooring in general, especially for the practice of sports.

[0019] In order for the sports flooring to be one hundred percent dry-laid, and therefore totally dismountable and recoverable so that it can be reassembled wherever necessary, the present invention proposes doing so with reinforced concrete tiles or elements (of reduced thickness and weight).

[0020] The tiles are flat, and the number and size of said tiles will be adapted to the outer size of the final court or surface desired.

[0021] Said tiles have the adequate weight required to stabilize the bed or lower surface leveled underneath, for example, the sleepers, so that on placing the tiles over said bed or lower surface, these are joined together by means of previously defined perimetral joining elements, constituting a resistant, rigid and continuous surface capable of distributing loads - both static and dynamic - towards the underlying lower bed without becoming deformed or altered. These loads are considered moderate when people (the players) accelerate and/or brake, while a maximum load would be constituted by people when seated or walking over the floor.

[0022] The bed or lower surface acts as a transition element between the tiles and the ground on which the flooring of the invention is installed.

[0023] When the flooring is installed outdoors, said bed shall be comprised of a granulated, inert, rigid and continuous material capable of distributing the tile loads towards the ground, thus allowing these to rest or float over said material; for example, said bed may consist of gravel, rubble, crushed stone, pebbles, etc. In the event that the flooring of the invention is assembled over an existing surface that must remain intact (indoor or outdoor floors made of wood, marble, ceramic, etc.), said bed shall be constituted by synthetic carpeting (such as rugs), expanded polystyrene, polyurethane foam, glass wool, or any other synthetic covering that can be installed in-between to protect the exposed and existing flooring.

[0024] The flooring to which the present invention relates can be used directly as tiling or can also be applied to other, more specific floors - such as synthetic fitted carpets, artificial lawn, linoleum, ceramic or rocky material, rubber, wood, plastic, aluminium, steel, glass, etc.

DESCRIPTION OF THE DRAWINGS

[0025] In order to complement this description and to better understand the characteristics of the invention, in accordance with an example of preferred embodiment thereof, a set of drawings has been included as part of said description, which represent the following in an illustrative and unlimitative manner:

Fig. 1 is a top plan view of a tile in accordance with a possible embodiment of the invention;

Fig. 2 is a sectional view of part of a tile in accordance with a vertical cross-section along line A-A of Figure 1;

Fig. 3 is a sectional view similar to that of Figure 2, but of the outer part of two tiles and their union to comprise the flooring to which the invention relates.

PREFERRED EMBODIMENT OF THE INVENTION

[0026] The flooring to which the invention relates can be applied, for example, to a tennis court. In this case it would be installed with 2,045 mm x 3,167.5 mm reinforced concrete tiles, with a total of 92 tiles when the space behind the base line measures 6,425 mm and 102 tiles when said space measures 9,025 mm.

[0027] In this case a synthetic fitted carpet would be applied over the tiles, comprising a continuous surface without joints, perforated in order to transfer rainwater towards the lower support bed and subsequently, for the rainwater to drain towards the ground, or not perforated for water that is pitched to drain towards a pipe underneath the mains and then evacuated through conduits towards an existing collection chamber or maintained for indoor purposes.

[0028] Figure 1 shows a tile 1 in accordance with a possible embodiment of the invention; the tile is rectangular in shape with a larger side *LM* and a smaller side *lm* and thickness *e*. It has four access holes 30 to metal elements 31 which, embedded in the concrete, allow the tile to be lifted and transported.

[0029] In this case the tiles have a thickness *e* of 20 mm and are made of highly reinforced concrete, with special elements to allow the tiles to be handled and lifted manually or mechanically. It is important to clarify that the size of the tiles in terms of length and width may vary according to the reinforcement requirements, and may be either very large in size, requiring transport by machines or eight persons, or small, allowing it to be transported and installed by one or two persons.

[0030] The tiles have extruded metal elements 10 (aluminium, stainless steel, galvanized steel) along their perimeter, formed or pre-folded as detailed in Figures 2 and 3. These joining elements can also be made of hard plastic, embedded in the concrete of the tile, with the configuration shown in Figures 2 and 3, or similar.

[0031] Each joining element 10 -as shown in Figures 2 or 3- consists of a profile extending in parallel with the

longitudinal direction along either side of the tile perimeter. Said profile has a cross section with a central branch 11 extending from the upper to the lower part of the tile, with a height corresponding to the thickness e of the tile; which towards the interior of the tile consists of a bracket 12 with branches perpendicular to that of the central branch separated by a distance corresponding to the thickness e of the tile, ending in a pair of vertical tabs 13 that extend towards the first larger elements 21; which towards the exterior of the tile is configured in a groove 14 comprised of two branches that extend perpendicular to that of the central branch and separated by a distance h . The joining elements are configured so that they join inwards in such a way that each joining element of the tile is tightly fitted to the inner side of the correlative tile, in order to avoid air being trapped between the tile and the joining element.

[0032] As shown in Figure 3, the tiles 1 are placed side by side over a continuous covering or bed 100, which in this case is crushed stone, fine rubble or chippings with a granulometry ranging from 6 to 20 mm in diameter. The metal joining elements 10 of each tile face their counterparts in the adjacent tiles as shown in Figure 3. This figure also shows the cotter pins 110 (also metal) which fit tightly into the grooves 14 which the metal joining elements have so as to fasten one tile to another and thus provide a continuous surface. In some cases the cotter pins may be movable in order to, if required, assemble or disassemble the tiles, by rotating to free said tiles. If the cotter pins are fixed and do not rotate, in order to allow the tiles to be disassembled and removed, the cotter pins are cut with a cutting disk from the surface and through the joint between the tiles, thus allowing these to be lifted in order to disassemble the flooring. The tiles are then reassembled with cotter pins or fastened with screws applied to the joints from the surface, thus joining the tiles to each other.

[0033] These cotter pins, two or three for each linear meter, prevent the edge of one tile from moving up or down with respect to another and even the relative rotation of one tile with respect to another. This leads to not total but partial relative fitting between the tiles so as to better distribute the load on the edges.

[0034] The vertical loads are diluted so as to gradually decrease pressure on the underlying bed, and the horizontal braking and/or acceleration components are also distributed amongst the tiles by means of the aforementioned fitting and, definitively, by the friction of the set of tiles with the bed of crushed stone or chippings and of the bed with the natural compacted ground.

[0035] The confining effect of the leveling bed (chippings, rubble, crushed stone, etc.) caused by the almost perfectly continuous tiled surface has a highly stabilizing effect on this support bed.

[0036] In another example of embodiment such as, for example, boat decks or moving surfaces, the tiles are applied as in the case of indoor flooring or flooring that must be preserved, in addition to considering fastening

the ends, perimeter or surface in general, if necessary, to the deck or floor of the boat.

[0037] For different sports and games, flooring with different thicknesses and materials can be designed with types of joints that infer greater or less ball speed, bounce quality, finishings determined by aesthetics or functionality in the case of standing or seated spectators, etc. That is, in each case the flooring may be tailor made, but maintaining the basic qualities of speed and ease of installation, in addition to the possibility of recovering and transporting the whole floor within or outside the manufacturing country.

[0038] Different practical embodiment possibilities of the invention are described in the attached dependent claims.

[0039] In view of this description and set of figures, the person skilled in the art will understand that the described embodiments of the invention may be combined in multiple ways within the scope of the invention. Although the invention has been described according to a preferred embodiment of said invention, for the person skilled in the art it will be evident that multiple variations may be introduced to said preferred embodiment without exceeding the scope of the claimed invention.

Claims

1. Flat tile (1), the dimensions whereof are defined by a larger side (LM) and smaller side (lm) and thickness (e),
characterized in that
 - it is made of reinforced concrete, i.e. concrete reinforced by two steel mesh structures;
 - and **in that** it has joining elements (10) along its perimeter that join it to another tile, said joining elements being configured inwardly in such a way that each joining element fits tightly into the correlative tile and no air is trapped between the tile and joining element.
2. Flat tile according to claim 1, **characterized in that** in the two steel mesh structures the first larger elements (20) parallel to the larger side (LM) of the tile they constitute are placed next to the lower and upper edges of said tile, and whose second smaller elements (21) parallel to the smaller side (lm) are placed inwards to said first larger elements, and joined together by spot welding (22).
3. Flat tile according to any of the previous claims, **characterized in that** it has four drill (20) or access holes to metal elements (31) which, embedded in the reinforced concrete, allow the tile to be lifted and transported.
4. Flat tile according to any of the previous claims,

characterized in that the thickness (e) of said tile is less than 30 mm.

5. Flat tile according to any of the previous claims, **characterized in that** the thickness (e) of said tile is less than 20 mm. 5

6. Flat tile according to any of the previous claims, **characterized in that** each joining element consists of a profile extending parallel with the longitudinal direction, for each joining element, on either side of the tile perimeter, said profile having a cross-section: 10

- which has a central branch (11) extending from the upper part to the lower part of the tile, the height of which corresponds to the thickness (e) of the tile, 15
- which towards the interior of the tile consists of a bracket (12) with branches perpendicular to that of the central branch and separated by a distance corresponding to the thickness (e) of the tile, and ending in a pair of vertical tabs (13) that extend to said first larger elements (21), 20
- which towards the exterior of the tile is configured in a groove formed by two branches that extend perpendicular to that of the central branch and separated by a distance (h). 25

7. Flooring for sporting events comprised of a set of tiles (1) according to any of claims 1 to 6, **characterized in that:** 30

- said set of tiles (1) is placed over a lower leveled bed or surface (100), consisting of inert, rigid and stable material. 35

8. Flooring according to claim 7 when said claim depends on claim 6, **characterized in that** said set of tiles (1) is joined together by means of cotter pins (110) introduced into the grooves (14) in the peripheral joining elements (10). 40

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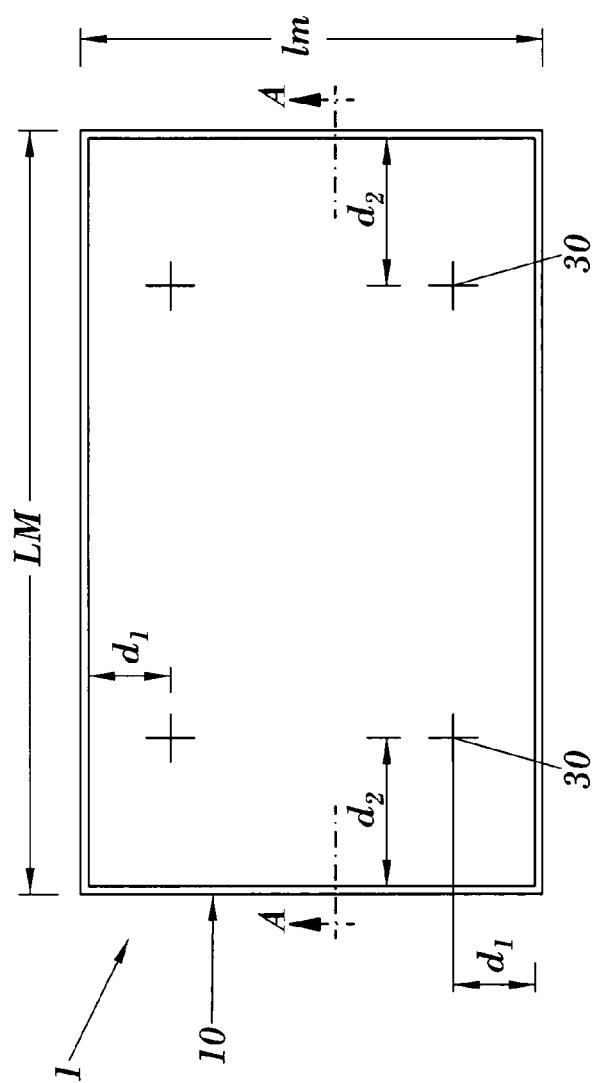


FIG. 1

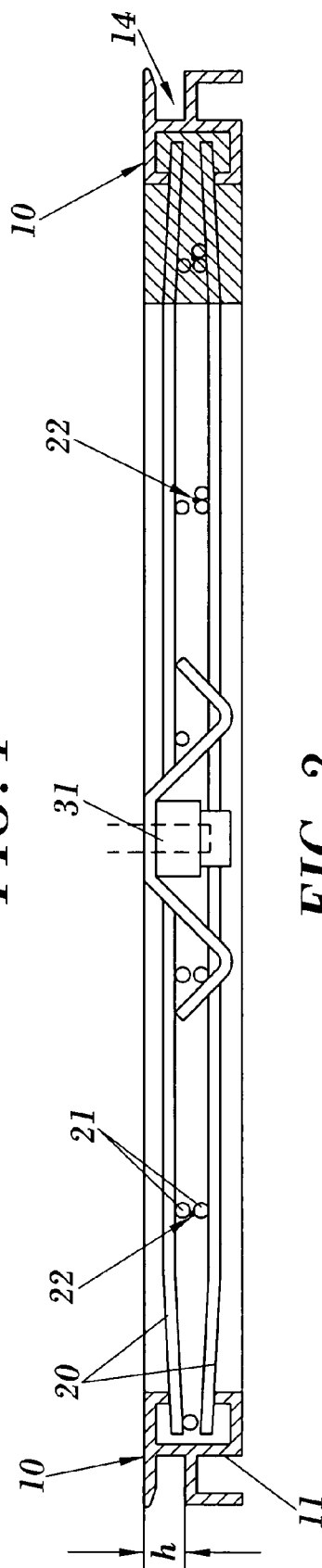


FIG. 2

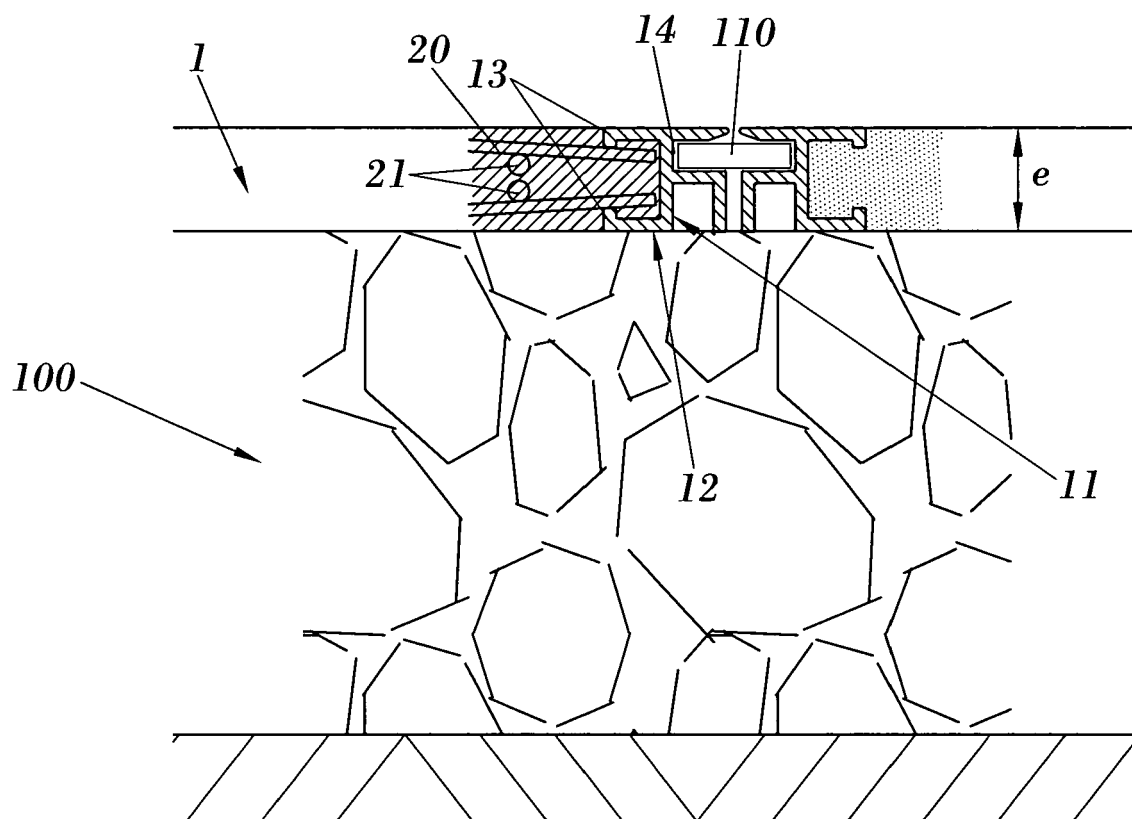


FIG. 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 38 0027

DOCUMENTS CONSIDERED TO BE RELEVANT			
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E01C E04F
Place of search Munich		Date of completion of the search 29 May 2007	Examiner Leher, Valentina
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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 38 0027

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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29-05-2007

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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