


PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P00032WO	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/NL2017/050566	International filing date (<i>day/month/year</i>) 29.08.2017	Priority date (<i>day/month/year</i>) 31.08.2016
International Patent Classification (IPC) or national classification and IPC INV. E01C5/00		
Applicant Zoontjens Beton B.V.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>6</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of <u>11</u> sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2).</p> <p><input type="checkbox"/> superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)).</p> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in the form of an Annex C/ST.25 text file, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3ter of Annex C of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand 26.03.2018	Date of completion of this report 21.11.2018	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465	Authorized officer Movadat, Robin Telephone No. +49 89 2399-4382	



Box No. I Basis of the report

1. With regard to the **language**, this report is based on
- the international application in the language in which it was filed
 - a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3(a) and 23.1(b))
 - publication of the international application (under Rule 12.4(a))
 - international preliminary examination (under Rules 55.2(a) and/or 55.3(a) and (b))
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1, 3, 6, 8	as originally filed	
2, 4, 5, 7	filed in electronic form on	13-08-2018

Claims, Numbers

1-16	filed in electronic form on	13-08-2018
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Drawings, Sheets

1/4-4/4	as originally filed	
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- a sequence listing - see Supplemental Box Relating to Sequence Listing.

3. The amendments have resulted in the cancellation of:
- the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):
- the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
5. This report has been established:
- taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
 - without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91(Rules 66.4bis and 70.2(e)).

6. With regard to top-up searches (Rules 66.1 *ter* and 70.2(f)):
- A top-up search was carried out by this Authority on 19.06.2018 (all discovered documents are listed in the Supplemental Box Relating to Top-up Search).
 - Additional relevant documents have been discovered during the top-up search.
 - No top-up search was carried out by this Authority because it would serve no useful purpose.
7. Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

* *If item 4 applies, some or all of those sheets may be marked "superseded".*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-11, 15, 16</u>
	No: Claims	<u>12, 13</u>
Inventive step (IS)	Yes: Claims	<u>1-11, 15, 16</u>
	No: Claims	<u>12-14</u>
Industrial applicability (IA)	Yes: Claims	<u>1-16</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Re Item V

- 1 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claim 12 is not new.
- 1.1 **WO-A-2012/168846** discloses a combination of a tile (2) with multiple lower corners and at least one corner element (7 - "anchoring areas 7 of the plates 2 connected to the plate 2 itself by gluing", cf. p.9/par.3), wherein the at least one corner element (7) comprises [implicitly] a corner plate with an upper side and a lower side, the upper side is fixedly connected ("glued") to one of the lower corners of the tile (2) and the lower side is dimensioned *such as to be received by a tile support*, and the corner element (7) comprises at least one anti-lift wall (15) which extends from the lower side, whereby the anti-lift wall (15) comprises a protrusion (8) and is provided at a lower end of the anti-lift wall (15), and the anti-lift wall is *engageable by a locking element of the tile support for locking the anti-lift wall*.
- 1.2 The anti-lift walls 15 "are arranged on two opposite sides relative to the connecting portion 9 (in particular in relation to the plurality of pins", cf. page 8, paragraph 3). Such anti-lift walls being spread in a "plurality" of regions in relation to the "plurality of pins (not shown)" have an extent to be considered as "fixing pins" in the meaning of the application, whereby this fixing pins comprise protrusions (8).
- 1.3 The tile support comprising the locking element is not part of the subject-matter of claim 12. The functional features in relation to said support, i.e. "*to be received by a tile support*" and "*engageable by a locking element of the tile support*" can thus be satisfied by a given tile support, although not disclosed by WO-A-2012/168846.
- 1.4 **WO-A-2012/168846** thereby discloses all technical features of claim 12.
- 2 Dependent claims 13,14 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of novelty and/or inventive step:
- claim 13; **WO-A-2012/168846**, rectangular tile, four corner elements, Article 33(2) PCT;

- claim 14; ceramic material is considered a slight constructional change in the tile support respectively tile, which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen; consequently, the subject-matter of said claims lacks an inventive step, Article 33(3) PCT.

3 The subject-matter of claim 1 is however new in the sense of Article 33(2) PCT and does involve an inventive step in the sense of Article 33(3) PCT.

3.1 **GB-A-1536424** discloses a system, cf. fig. 4, *for forming a tiled floor on an outdoor subsurface, such as a roof, balcony, or an outdoor corridor*, comprising a tile support (3) for supporting at least two tiles and a corner element (6) for receiving a lower corner of a tile, wherein the corner element (6) comprises a corner plate with an upper side and a lower side, the upper side being connectable to the lower corner of the tile and the lower side being dimensioned such as to be received by the tile support (3), the tile support (3) comprises an upper receiving face (12) for receiving at least two corner elements (6) and a lower face (40) which is [suitable to be placed and thus] *placeable on the outdoor subsurface*, or on a pedestal (1) positioned on the outdoor subsurface.

Moreover, GB-A-1536424 discloses that the corner element (6) comprises at least one fixing pin (61) which extends vertically from the lower side, and the tile support (3) comprises at least one pin receiving hole (31) with an inner shape and dimensions that corresponds to the outer shape and dimensions of the fixing pin (61), wherein in an assembled state of the system, the lower side of the corner element (6) rests on the upper receiving face of the tile support (3) and the fixing pin (61) extends fittingly in the pin receiving hole (3).

3.2 The subject-matter of claim 1 therefore differs from this known system in that the fixing pin is a locking pin, and the tile support comprises a locking element provided at the pin receiving hole, the locking element is movable from an open position to a locking position, and the locking element engages the locking pin in the locking position for locking the locking pin in the receiving hole, and is therefore new (Article 33(2) PCT).

3.3 The problem to be solved by the present invention may be regarded as to ensure a secure assemblage.

- 3.4 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

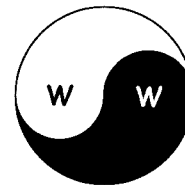
Indeed, a movable locking element prevents vertical displacement of the corner element with respect to the tile support, making it impossible for unauthorised people to lift a tile out of the tile surface. The skilled person would not find this solution in GB-A-1536424 nor in any other of the cited prior art.

- 4 The same reasoning applies, mutatis mutandis, to the subject-matter of the corresponding **independent claim 15**, which therefore is also considered new and inventive.

- 5 **Claims 2-11** are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VII

- 6 Moreover, the following should be noticed:
- 6.1 The features of claim 16 are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
- 6.2 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in **GB-A-1536424** and **WO-A-2012/168846** is not mentioned in the description, nor are these documents identified therein.



>Return address: Talbotstraat 166, NL-1087 DM Amsterdam

European Patent Office
80298 Munich

AMSTERDAM, 13 AUGUST 2018

Title: SYSTEM FOR FORMING A TILED FLOOR ON AN OUTDOOR SUBSURFACE,
COMBINATION OF A TILE AND A CORNER ELEMENT, TILED FLOOR, METHOD FOR
ASSEMBLING A TILED FLOOR
Application no: PCT/NL2017/050566
Publication no.: 2018/044158
Applicant: Zoontjens Beton B.V.
Our ref: P00032WO

Dear Mr. Movadat,

Receipt of the 2nd Written Opinion of the IPEA is acknowledged, for which you are thanked. Attached you will find a set of claims, which have been amended under Art. 34 PCT, the amendments being explained below. Moreover, corrected pages 5 and 7 of the description are filed herewith. This letter concludes with discussing the novelty and inventive step of the claims.

Amendments

Claims

Claim 12 has been amended, by deleting the phrase 'in particular', and introducing the phrase 'characterised, in that', before the feature that the fixing pin comprises a protrusion. As a result, no new matter has been added, because an optional feature has become part of the claim.

The previous filed amendment to claim 12 is maintained (see letter with Demand of 21 March 2018). However, the phrase 'a locking element (32) of a tile support (4)' has been corrected to 'a locking element (32) of the tile support (4)', as there is antecedent basis for the tile support in the preamble of claim 12.

Claim 16 has been amended with respect to the previous set, by changing back the words 'locking pin' to 'fixing pin', as in the application as filed. It is noted that the second instance of 'fixing pin' was erroneously spelled in the application as filed as 'fitting pin'. The relevant feature was preceded by the definite 'the', and there is no other pin mentioned in the claim. Moreover, from a technical perspective it is clear that it is the fixing pin that enters the respective pin receiving hole, as the claim defines that the shape and dimensions of the pin receiving hole corresponds to the outer shape and dimensions of the fixing pin. It is thus clear for the skilled person that 'fitting pin' should be 'fixing pin', and that nothing else could have been meant.

The final part of claim 16 had to be rewritten, in order to include the feature that the fixing pin is a locking pin in the characterising portion. Accordingly, it has been added between the one but last, and the last method step: 'characterised, in that the fixing pin is a locking pin, and that the placing step is followed by a step of'.

Basis for the feature that the fixing pin is a locking pin can be found in multiple places, including claim 3 as filed. It is noted that the other features of claim 3 have not been copied to claim 16, as these are already present in claim 16, phrased as a method step.

Basis for the phrase 'that the placing step is followed by a step of' is found in claim 16 as filed, which stated at the end of the placing step: 'in particular followed by a step of'.

Description

In the description, the phrase 'In an embodiment' has been deleted from page 2, line 26 in order to make the description consistent with the claims. The words 'In particular' have been deleted from page 4, line 12 for the same reason.

The above mentioned error in the claims occurs in the description too. In these instances, first a fixing pin is introduced, and then later reference is made to the fitting pin as well. Accordingly, 'fitting pin' has been corrected to 'fixing pin' on:

- page 5, lines 11 and 14; and
- page 7, line 30.

Novelty and inventive step

Novelty and inventive step of claims 1 and 15 have been acknowledged in the 2nd Written Opinion, which is appreciated. It is noted that method claim 16, as currently amended, comprises method steps which correspond to all distinguishing system features of claim 1. As a result, claim 16 is novel and inventive as well.

Claim 12 as amended distinguishes over GB-A-1536424 (GB'424) and WO-A-2012/168846 (WO'846) by the following features:

- the fixing pin (16, 18, 20) comprises a protrusion (34, 38), and
- the fixing pin is engageable by a locking element (32) of a tile support (4) for locking the locking pin.

While these differences are clear with respect to GB'424, it may be helpful to have a closer look at the disclosure of WO'846. WO'846 does disclose plates 2 with 'a plurality of, preferably 2, pins spaced-apart and projecting transversally (...) to the plane 12 of the plate 2' (page 7, lines 21-25). There are no reference numbers for these pins, and they are not shown in the figures. The description does not mention any protrusion related to these pins. Moreover, it is clear from the disclosed function ('to prevent both relative translations and relative rotations between the connector 3 and the plates 2 on a plane parallel to the plane 12 of the plates 2'; page 8, lines 2-6) that these pins do not have a protrusion.

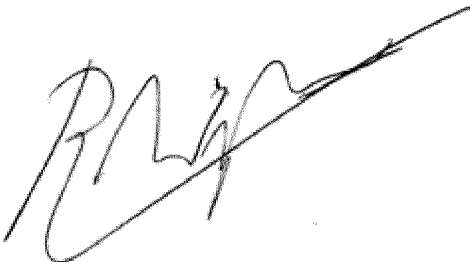
It is noted that an 'anti-lift tooth 8' is described and shown. However, this tooth 8 is not provided on the pins, but on 'anti-lift walls 15 that are arranged on two opposite sides relative to the connection portion 9 (in particular in relation to the plurality of pins), wherein the anti-lift teeth 8 project from the anti-lift walls 15 towards the connecting portion 9' (page 9, lines 11-17). These anti-lift walls 15 cooperate with 'detents 13 which are provided along outer edges 16 and inner relief windows of the connector 3' (sentence bridging pages 8 and 9). Moreover, these detents 13 (which are part of the connector 3) are 'inserted and snap locked within gaps provided between the connecting portion 9 and the anti-lift walls 15' (last sentence page 8). In short: the anti-lift walls 15 are *not* pins, and they do not enter a corresponding pin receiving holes, as claimed in the preamble of claim 12.

Moreover, neither the pins, nor the anti-lift walls 15 of WO'846, are engageable by a locking element of a tile support for locking the locking pin. In fact, WO'846 does not disclose a tile support, let alone a locking element. WO'846 does disclose that the plates 2 are interconnected by the connector 3. It is acknowledged that anchoring area 7 of the plates 2 may be a separate element connected to the plates 2, as indicated in the 2nd Written Opinion. However, this does not mean that the lower side of said anchoring area is dimensioned such as to be received by a tile support, as WO'846 does not disclose a tile support but rather the connector 3. The connector 3 is not designed to support tiles on a subsurface, but to interconnect the plates 2 ('at least one connector 3 releasably connectable to a plurality of at least two of the plates 2 to connect them to each other'; page 5, lines 20-23). In fact, the floor plates of WO'846 rest directly on the floor, not via the connector 3: 'Each of the plates 2 comprises (...) and a support surface 6 opposite the on-sight surface 5 intended to abut against a laying surface' (paragraph bridging pages 5 and 6). Therefore, the connector of WO'846 does not support the tiles and is not a tile support. Even if this connector 3 were to be considered a tile support (quod non), then there is still no locking element.

The effect of the distinguishing protrusion is that it improves the connection between the corner element and the tile support (application, page 2, lines 24-25). Thus, an objective problem of GB'424 is that corner members 6 of floor panels 5 unintentionally detach from jack head 3. This problem is solved (in short) by providing a protrusion to the fixing pin, which fixing pin is engageable by a locking element of a tile support. This solution is not disclosed in GB'424, nor in WO'846, as both disclose a simple pin without a protrusion.

It is concluded that all independent claims are novel and inventive over the cited prior art, and a positive IPRP is requested accordingly. The examiner is invited to contact the undersigned by telephone, in case any further issues need to be resolved before such a positive IPRP can be established.

Yours sincerely,
WijnstraWise Patents B.V.

A handwritten signature in black ink, appearing to read 'RW', with a long horizontal stroke extending to the right.

Reinier Wijnstra
Dutch and European Patent Attorney

CLAIMS

1. System for forming a tiled floor (2) on an outdoor subsurface (3), such as a roof, balcony, or an outdoor corridor, comprising a tile support (4) for supporting at least two tiles (6) and a corner element (5) for receiving a lower corner of a tile (6), wherein
- 5 the corner element (5) comprises a corner plate (7) with an upper side (8) and a lower side (10), the upper side (8) being connectable to the lower corner of the tile (6) and the lower side (10) being dimensioned such as to be received by the tile support (4),
- the tile support (4) comprises an upper receiving face (12) for receiving at least two
- 10 corner elements (5) and a lower face (14) which is placeable on the outdoor subsurface (3), or on a pedestal (15) positioned on the outdoor subsurface (3),
- the corner element (5) comprises at least one fixing pin (16, 18, 20) which extends vertically from the lower side (10), and
- the tile support (4) comprises at least one pin receiving hole (26, 28, 30) with an inner
- 15 shape and dimensions that corresponds to the outer shape and dimensions of the fixing pin (16, 18, 20), wherein in an assembled state of the system, the lower side (10) of the corner element (5) rests on the upper receiving face (12) of the tile support (4) and the fixing pin (16, 18, 20) extends fittingly in the pin receiving hole (26, 28, 30), characterised, in that
- the fixing pin is a locking pin (16), and the tile support (4) comprises a locking element
- 20 (32) provided at the pin receiving hole (26), the locking element (32) is movable from an open position to a locking position, and the locking element (32) engages the locking pin (16) in the locking position for locking the locking pin (16) in the pin receiving hole.
2. System according to claim 1, wherein the fixing pin (16, 18, 20) comprises a protrusion (34, 38).
- 25
3. System according to claim 1, or 2, wherein the locking element (32) is rotatable from the open position to the locking position.
4. System according to claim 1 and 2, wherein the protrusion of the locking pin (16) is a restricted
- 30 protrusion (34) with a length which is less than a length of the locking pin (16), the restricted protrusion is provided at a lower end of the locking pin (16), and the locking element (32) engages an upper face (36) of the restricted protrusion for locking the locking pin (16) in the pin receiving hole in the locking position.

5. System according to claim 2, wherein the fixing pin is a jamming pin (18, 20), and the protrusion is a continuous protrusion (38) which extends in a length direction of the jamming pin (18, 20), in particular along substantially the full length of the jamming pin (18, 20), and the pin receiving hole (28, 30) has a continuous cross section which corresponds to the cross section of the jamming pin (18, 20) with the continuous protrusion.
6. System according to any one, or more, of the preceding claims, wherein the corner element (5) comprises multiple fixing pins (16, 18, 20), and the tile support (4) comprises multiple corresponding pin receiving holes (26, 28, 30).
7. System according to claims 1, or 4, and 5 and 6, wherein at least one of the multiple fixing pins (16, 18, 20) is a locking pin (16), and at least one other one of the multiple fixing pins is a jamming pin (18, 20).
8. System according to any one, or more, of the preceding claims, wherein the corner element (5) comprises at least one positioning wall (22) for positioning the tile (6) on the corner element (5), in particular the corner element (5) comprises two positioning walls (22).
9. System according to any one, or more, of the preceding claims, wherein the tile support (4) comprises a positioning ridge (34) along an edge of the upper receiving face (12) for positioning the corner element (5) on the tile support (4) along the positioning ridge.
10. System according to any one, or more, of the preceding claims, wherein the tile support (4) comprises at least one tile spacer (36) which extends from the upper receiving face (12).
11. System according to claims 9 and 10, wherein the tile support (4) comprises at least two tile spacers (36), and the tile support (4) and corner element (5) are dimensioned such that the corner element (5) fits between the positioning ridge (34) and the tile spacers (36).
12. Combination of a tile (6) with multiple lower corners and at least one corner element (5), wherein the at least one corner element (5) comprises a corner plate (7) with an upper side (8) and a lower side (10), the upper side (8) is fixedly connected to one of the lower corners of the tile (6) and the lower side (10) is dimensioned such as to be received by a tile support (4), and the corner element (5) comprises at least one fixing pin (16, 18, 20) which extends from the lower

side (10), characterised, in that the fixing pin (16, 18, 20) comprises a protrusion (34, 38), which in particular extends in a length direction of the fixing pin (16, 18, 20) and/or is a restricted protrusion (34) with a length which is less than a length of the fixing pin (16, 18, 20) and is provided at a lower end of the fixing pin (16, 18, 20), and the fixing pin is engageable by a locking element (32) of the tile support (4) for locking the locking pin.

13. Combination according to claim 12, wherein the tile (6) is rectangular and is provided with multiple corner elements (5), in particular four corner elements (5).

14. Combination according to claim 12, or 13, wherein the tile (6) is made of a ceramic material.

15. Tiled floor (2), comprising multiple combinations of a tile (6) and at least one corner element (5), as defined in claims 12-14, and multiple tile supports (4) provided at corners of the tiles (6), wherein the tile supports (4) each comprises an upper receiving face (12) for receiving at least two corner elements (5) and a lower face (14) which is placeable on the outdoor subsurface (3), or on a pedestal (15) positioned on the outdoor subsurface (3), the tile support (4) comprises at least one pin receiving hole (26, 28, 30) with an inner shape and dimensions that corresponds to the outer shape and dimensions of the fixing pin (16, 18, 20), the lower side (10) of the corner element (5) rests on the upper receiving face (12) of the tile support (4), and the fixing pin (16, 18, 20) extends fittingly in the pin receiving hole (26, 28, 30), characterised, in that

the fixing pin is a locking pin (16), and the tile support (4) comprises a locking element (32) provided at the pin receiving hole (26), the locking element (32) is movable from an open position to a locking position, and the locking element (32) engages the locking pin (16) in the locking position for locking the locking pin (16) in the pin receiving hole, in particular the locking element (32) is rotatable from the open position to the locking position.

16. Method for assembling a tiled floor above an outdoor subsurface, such as a roof, balcony, or an outdoor corridor, comprising the steps of:

- providing multiple tiles with corner elements under at least one of the respective tile corners, wherein the corner elements each comprises at least one fixing pin which extends vertically from the lower side of the corner element,
- providing tile supports, wherein the tile supports each comprise at least one pin receiving hole with an inner shape and dimensions that corresponds to the outer shape and dimensions of the fixing pin,

- positioning the tile supports in a grid-like configuration corresponding to the dimensions of the tiles, either directly on the outdoor subsurface or on a pedestal placed on the outdoor subsurface,
- placing each of the multiple tiles with a vertical movement on the tile supports, such that the fixing pins enter the respective pin receiving holes until the corner element rests on the tile support, characterised, in that the fixing pin is a locking pin, and that the placing step is followed by a step of:
 - moving, in particular rotating, a locking element of the tile support such that the locking element engages the locking pin in order to lock the locking pins relative to the pin receiving holes.

throws it from the elevated roof of corridor downwards, which could be lethal for a person walking downstairs.

The invention aims to solve at least one of these problems, or at least to provide an alternative. In particular, the invention aims to provide a system that is more safe.

5 This aim is achieved by a system according to claim 1.

A system for forming a tiled floor on an outdoor subsurface, such as a roof, balcony, or an outdoor corridor, comprises a tile support for supporting at least two tiles and a corner element for receiving a lower corner of a tile. The corner element comprises a corner plate with an upper side and a lower side, the upper side being connectable to the lower corner of the tile and the lower
10 side being dimensioned such as to be received by the tile support. The tile support comprises an upper receiving face for receiving at least two corner elements and a lower face which is placeable on the outdoor subsurface, or on a pedestal positioned on the outdoor subsurface. The corner element comprises at least one fixing pin which extends vertically from the lower side. The tile support comprises at least one pin receiving hole with an inner shape and dimensions that
15 corresponds to the outer shape and dimensions of the fixing pin. In an assembled state of the system, the lower side of the corner element rests on the upper receiving face of the tile support and the fixing pin extends fittingly in the pin receiving hole.

Thanks to the fixing pin in the pin receiving hole, a tile that is connected to the corner element cannot tilt anymore as it can move only vertically with respect to the tile support. This not
20 only prevents unwanted tilting at the sides of a tiled surface, but it makes it also more difficult to lift a tile from the tile support, as manual lifting by unauthorised people usually involves grapping a tile at one side and then tilting it before completely lifting it.

Preferred embodiments are defined in the dependent claims.

In an embodiment, the fixing pin comprises a protrusion. A protrusion further improves the
25 connection between the corner element and the tile support.

The fixing pin is a locking pin, and the tile support comprises a locking element provided at the pin receiving hole. The locking element is movable from an open position to a locking position, and the locking element engages the locking pin in the locking position for locking the locking pin in the pin receiving hole. A movable locking element prevents even a vertical displacement of the
30 corner element with respect to the tile support, making it impossible for unauthorised people to lift a tile out of the tile surface. Only authorised people, who know where the locking element is and how to operate is, can disengage the locking element if a tile needs to be removed for maintenance purposes.

and the tile spacers. This ensures an easy and proper placement of the corner element on the tile support.

The invention further relates to a combination of a tile with multiple lower corners and at least one corner element, according to claim 12. The at least one corner element comprises a corner plate with an upper side and a lower side. The upper side is fixedly connected to one of the lower corners of the tile and the lower side is dimensioned such as to be received by a tile support. The corner element comprises at least one fixing pin which extends from the lower side. Such a combination provides the same technical effects as described above in relation to the inventive system, as it can be used in combination with the tile support as defined for the system. Moreover, the same preferred features as defined for the system are preferred features for the combination. Further preferred embodiments are defined in the dependent claims.

The fixing pin comprises a protrusion, which more in particular extends in a length direction of the fixing pin and/or is a restricted protrusion with a length which is less than a length of the fixing pin and is provided at a lower end of the fixing pin.

In an embodiment of the combination, the tile is rectangular and is provided with multiple corner elements, in particular four corner elements.

In an embodiment, the tile is made of a ceramic material. Ceramic is a light weight material, relative to its strength, and very suitable for surfaces that have a limited load-bearing capacity.

The invention further relates to a tiled floor, according to claim 15.

A tiled floor comprises multiple combinations of a tile and at least one corner element, as defined above and in claims 12-14, and multiple tile supports provided at corners of the tiles. The tile supports each comprises an upper receiving face for receiving at least two corner elements and a lower face which is placeable on the outdoor subsurface, or on a pedestal positioned on the outdoor subsurface. The tile support comprises at least one pin receiving hole with an inner shape and dimensions that corresponds to the outer shape and dimensions of the fixing pin. The lower side of the corner element rests on the upper receiving face of the tile support, and the fixing pin extends fittingly in the pin receiving hole.

The inventive tiled floor has the same technical effects, and may have the same preferred features, as the system which has been defined above and in claims 1-11.

The invention further relates to a method, according to claim 16.

A method for assembling a tiled floor above an outdoor subsurface, such as a roof, balcony, or an outdoor corridor, comprises the steps of:

- providing multiple tiles with corner elements under at least one of the respective tile corners, wherein the corner elements each comprises at least one fixing pin which extends vertically from the lower side of the corner element,
- providing tile supports, wherein the tile supports each comprise at least one pin receiving hole with an inner shape and dimensions that corresponds to the outer shape and dimensions of the fixing pin,
- positioning the tile supports in a grid-like configuration corresponding to the dimensions of the tiles, either directly on the outdoor subsurface or on a pedestal placed on the outdoor subsurface,
- placing each of the multiple tiles with a vertical movement on the tile supports, such that the fixing pins enter the respective pin receiving holes until the corner element rests on the tile support, in particular followed by a step of:
 - moving, in particular rotating, a locking element of the tile support in order to lock the fixing pins relative to the pin receiving holes.

15 This method results in a tiled floor with the same or similar technical effects as described above.

The invention, its effects, and advantages will be explained in more detail on the basis of the schematic drawing, in which:

20 Fig. 1 shows a schematic cross sectional view of a tiled floor according to the invention on a roof;

Fig. 2 shows a system according to the invention in an exploded perspective view;

Fig. 3 shows an upper perspective view of a corner element of the system of fig. 2;

Fig. 4 shows a lower perspective view of the corner element of the system of fig. 2;

25 Fig. 5 shows an upper plan view of the corner element of the system of fig. 2;

Fig. 6 shows a lower plan view of the corner element of the system of fig. 2;

Fig. 7 shows a partial cross-sectional view VII-VII from fig. 6;

Fig. 8 shows a detail VIII from fig. 6;

Fig. 9 shows a cross-sectional view IX-IX from fig. 8;

30 Fig. 10 shows an upper plan view of a tile support of the system of fig. 2;

Fig. 11 shows an upper plan view of the tile support of the system of fig. 2;

Fig. 12 shows a lower plan view of the tile support of the system of fig. 2;

Fig. 13 shows a lower perspective view of a locking element of the system of fig. 2;

Fig. 14 shows a lower plan view of the locking element of the system of fig. 2;

down). The locking element 32 engages the upper face 36 of the restricted protrusion 34 for locking the locking pin 16 in the pin receiving hole 26 in the locking position.

In this embodiment, the jamming pins 18, 20 each have a round cross-section, and a continuous protrusion 38 with a trapezoid cross-section. The continuous protrusion 38 extends in a length direction of the jamming pin 18, 20 along the full length of the jamming pin 18, 20 (fig. 6 and 7). The respective pin receiving holes 28, 30 have a cross section which is continuous in the length direction of the pin receiving holes 28, 30 and corresponds to the cross section of the jamming pin 18, 20 with the continuous protrusion 38.

In this embodiment, the tile support 4 comprises a positioning ridge 34 along an edge of the upper receiving face 12 of the tile support for positioning the corner element 5 on the tile support 4 along the positioning ridge 34. The tile support 4 further comprises four tile spacers 36 which extend vertically from the upper receiving face 12. The tile spacers 36 may be broken away from the corner element in order to provide a free upper receiving face 12. The tile support 4 and the corner element 5 are dimensioned such that the corner element 5 fits between a quarter part of the positioning ridge 34 and two of the tile spacers 36.

The rotatable locking element 32 of this embodiment is shown in more detail in figs. 13-14 and comprises a flat disc 40, a hollow pivot bulb 42, and four part-annular locking slits 44 with insert openings 46, and a hexagonal operative hole 48 inside the hollow pivot bulb 42. The rotatable locking element 32 is provided with the hollow pivot bulb 42 pointing downwards, in a space in the tile support 4 (figs. 15-16).

In use, a tiled floor is assembled above an outdoor subsurface, such as a roof, balcony, or an outdoor corridor, by means of the following steps. Multiple tiles 6, corner elements 5, tile supports 4, and pedestals 15 are provided.

The corner elements 5 are bonded to at least some of the corners of the multiple tiles 6 with the adhesive double-sided tape 24. The pedestals 15 are provided on the roof 3 at regular intervals, forming a grid with dimensions corresponding to the dimensions of the tiles 6. Tile supports 4 are placed on each pedestals 15. The insert openings 46 of the locking slits 44 are aligned with the pin receiving holes 26, if necessary by rotating the locking element with respect to the tile support 4. Each of the tiles 6 is placed with a vertical movement on four tile supports 4, such that the fixing pins 16, 18, 20 enter the respective pin receiving holes 26, 28, 30 until the corner elements 5 rest on the respective tile support 4. In this position, the restricted protrusion 34 has passed beyond the locking element 32, i.e. the upper face 36 of the restricted protrusion 34 is below the flat disc 40.