



US 20060201092A1

(19) **United States**

(12) **Patent Application Publication**
Saathoff et al.

(10) **Pub. No.: US 2006/0201092 A1**

(43) **Pub. Date: Sep. 14, 2006**

(54) **CARRIER TILE CONSISTING OF FILM-LIKE PLASTIC**

Publication Classification

(76) Inventors: **Werner Saathoff**,
Bodmann-Ludwigshafen (DE);
Hermann Hartl, Haiterbach (DE)

(51) **Int. Cl.**
E04F 13/08 (2006.01)
(52) **U.S. Cl.** **52/385; 52/389**

(57) **ABSTRACT**

Correspondence Address:
KRIEGSMAN & KRIEGSMAN
30 TURNPIKE ROAD, SUITE 9
SOUTHBOROUGH, MA 01772 (US)

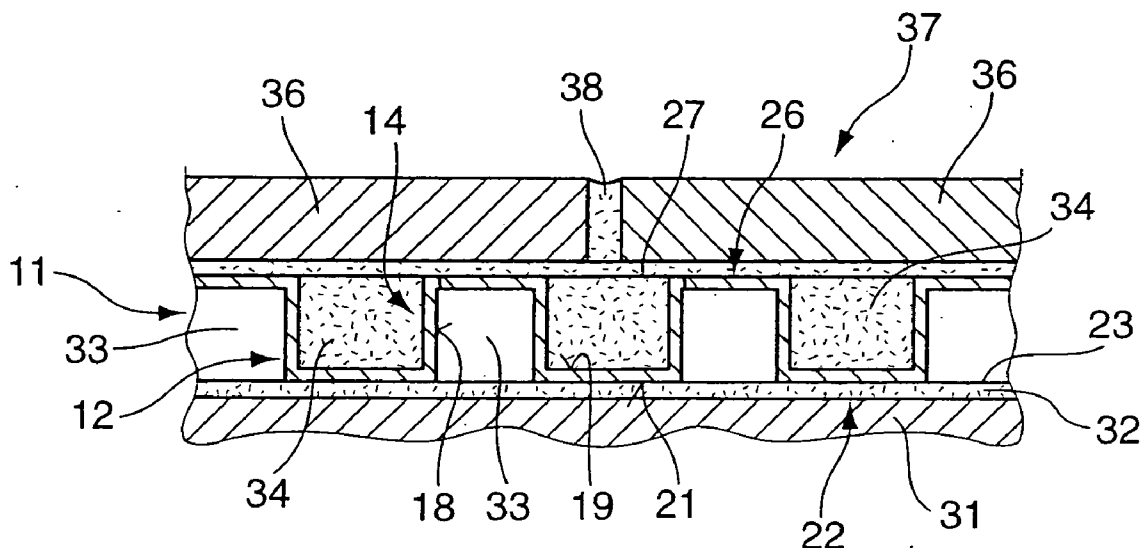
The invention relates to a carrier tile consisting of film-like plastic for a floor, wall or ceiling structure, in particular a tile-clad wall or floor structure, for achieving decoupling between the base and a surface cladding to be applied to the film-like tile which has a multiplicity of chambers which are formed by depressions out of a plane of the carrier tile and the outer end faces of which form the first tile side, the depressions being designed for receiving a curing contact means, such as mortar or adhesive, provided for forming a contact layer with the surface cladding to be applied, and with a net-like fabric or nonwoven arranged on the first tile side, wherein the chambers between the first and an opposite tile side have an undercut-free wall portion, and wherein a net-like fabric overlapping the depressions is provided on the opposite tile side.

(21) Appl. No.: **11/372,674**

(22) Filed: **Mar. 10, 2006**

(30) **Foreign Application Priority Data**

Mar. 11, 2005 (DE)..... 20 2005 004 127.0



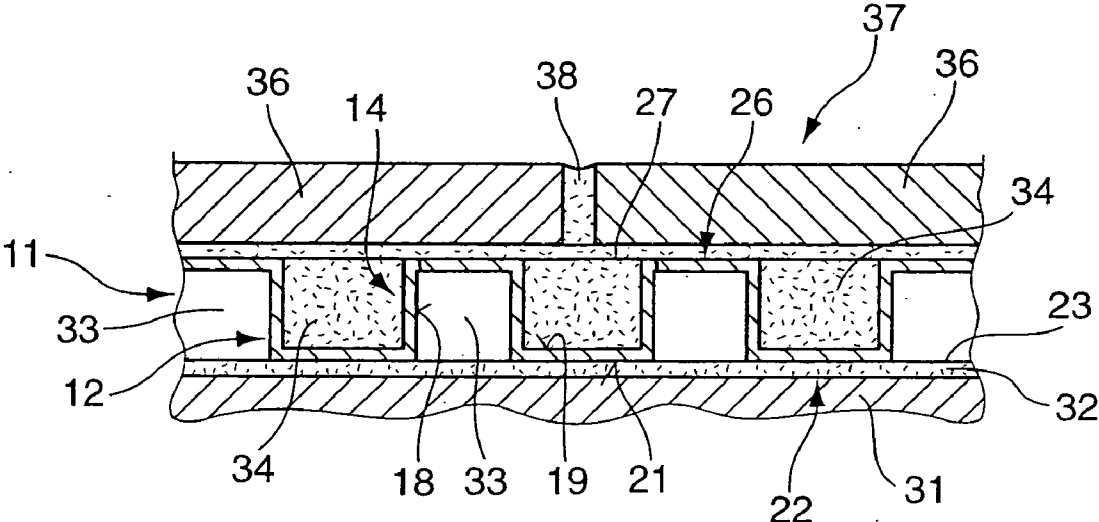


Fig. 1

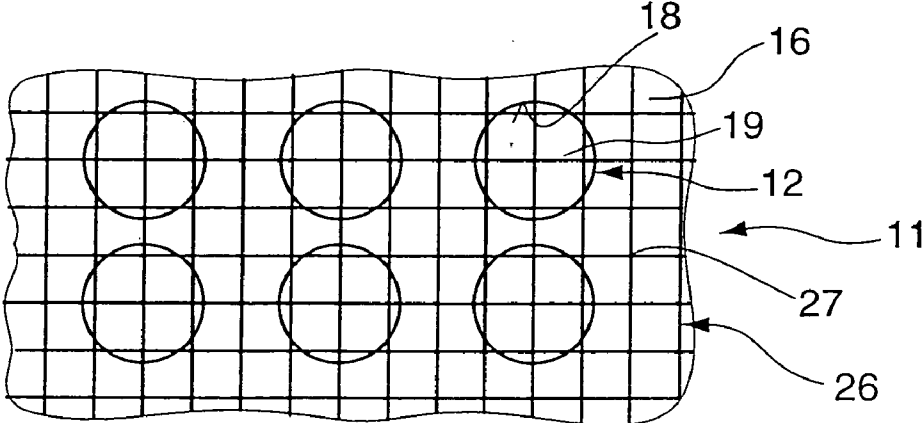


Fig. 2

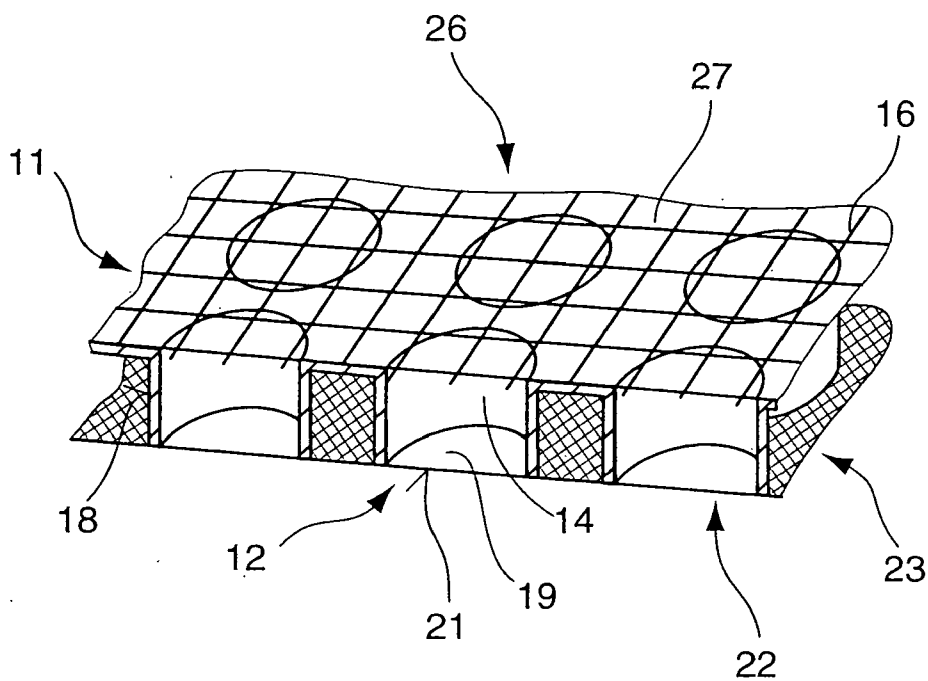


Fig. 3

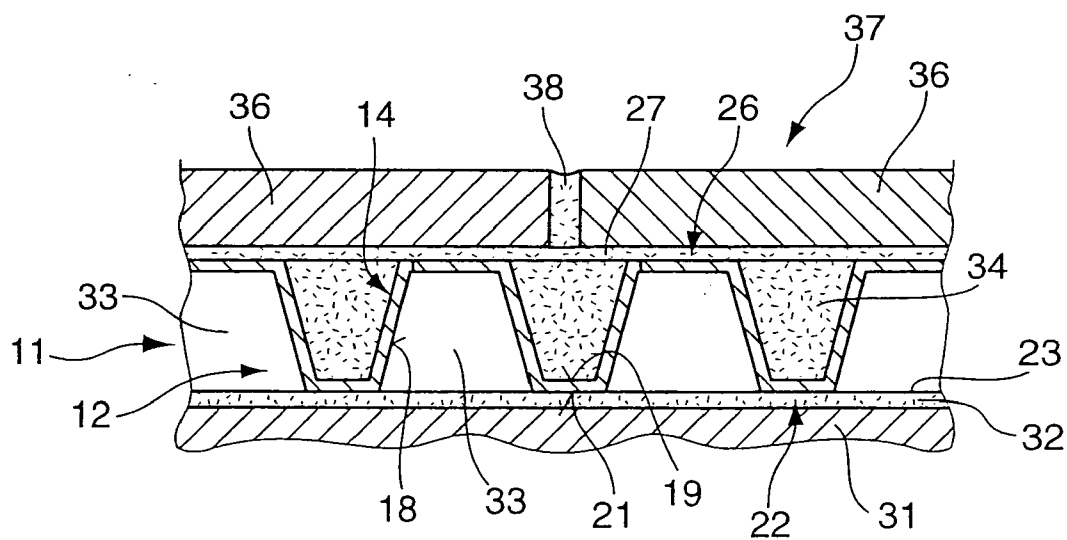


Fig. 4

**CARRIER TILE CONSISTING OF FILM-LIKE
PLASTIC**

[0001] The invention relates to a carrier tile consisting of film-like plastic for a floor, wall or ceiling structure, in particular for a tile-clad wall or floor structure, for achieving decoupling between the base and the surface cladding to be applied to the film-like tile.

[0002] Tile coverings are often laid by what is known as the thin-bed method, a suitable contact adhesive being used in order to fix the tile coverings to the base. On account of different thermal expansions of the cladding and of the base and the associated stresses, cracks may occur in the surface cladding and may cause parts of the surface cladding to come loose.

[0003] To reduce such stress differences, according to DE 37 04 414 A1, a carrier plate consisting of film-like plastic was proposed, which comprises dovetailed grooves which are open alternately on both sides and which can be moved transversely with respect to the run of the grooves under compressive and tensile stress. A net-like nonwoven is provided on one side of the carrier tile, in order to connect the carrier tile to the base, such as, for example, screed, and to achieve higher adhesion with an adhesive. This carrier tile has the disadvantage that it is expandable or compressible only in a limited direction, to be precise transversely with respect to the longitudinal extent of the dovetailed grooves. The necessary stress reduction is often not possible by means of such a carrier tile.

[0004] In order to allow stress reduction in both directions, according to DE 299 24 180 U1, a carrier tile was proposed, which comprises on one tile side intersecting embossings which in each case form circumferentially closed chambers. The chambers serve for receiving an adhesive or mortar, thus giving rise to an intimate bond with the adhesive or mortar layer and with the surface cladding applied to it. By virtue of these intersecting embossings, a film-like tile is proposed which is expandable or contractable at least to a slight extent in both directions of its plane of extent, so that stress differences arising from the base and the cladding can be absorbed by the carrier tile. In addition, the chambers have undercuts, with the result that the adhesive or mortar stilts introduced into the chambers hook together with the undercuts of the chambers.

[0005] This embodiment has the disadvantage that, in the region of the undercut, the mortar stilts have a necking with respect to the contact surface in the bottom of the chambers, and that, in the region of the undercut, there is a cracking of the contact elements introduced in the chambers, these contact elements coming loose from the mortar layer lying above them. The positive cramping achieved initially by means of the undercut is loosened due to the formation of cracks in the necking plane. The intimate bond is no longer afforded, and the stress reduction between the base and the cladding is no longer possible.

[0006] The object on which the invention is based is, therefore, to propose a carrier tile consisting of film-like plastic for floor, wall or ceiling construction, in particular for tile-clad wall or floor construction, by means of which an improvement in the decoupling or reduction of different stresses between the base and surface cladding becomes possible.

[0007] This object is achieved, according to the invention, by means of a carrier tile according to the features of claim 1. This carrier tile according to the invention has chambers formed from depressions and possessing undercut-free wall portions, the depressions of the chambers being covered or overlapped by a net-like fabric. As a result of the undercut-free design of the wall portions, there is in the respective chamber no cross-sectional narrowing of mortar or adhesive stilts which enters the chamber in spite of the net-like fabric. There is therefore an improved force flux for dissipating the forces under vertical loads acting from above, and cracking in the transitional region between the mortar stilts and the sheet-like mortar layer is prevented. The net-like fabric ensures that the adhesive or mortar layer, which is suitable, for example, for flags, fine-stoneware slabs, ceramic or clay tiles or tiles consisting of further materials, such as plastics, wood, cork or the like, bonds with the tile side to which the net-like fabric is applied. What is additionally achieved is that the net-like fabric is stretched out or tied in between the mortar or adhesive layer receiving the surface cladding and the contact elements or mortar stilts and forms a cramping. Alternatively, a surface cladding, such as, for example, plaster, can also be applied directly, which is anchored firmly with the net-like fabric and is decoupled from the base. By virtue of this embodiment according to the invention of the carrier tile, an optimum reduction of stresses which occur and permanent decoupling between the base and a surface cladding are achieved.

[0008] According to a first advantageous embodiment of the invention, there is provision for the chamber-wall portions to extend vertically between the end faces forming one tile side and the opposite tile side which is formed by surface portions connecting the chambers. Column-shaped contact elements can thereby be formed. The area in horizontal projection or the form of the chamber may in this case be configured with any desired geometry. For example, triangular or polygonal or even round areas in horizontal projection of the chambers may be formed.

[0009] According to an alternative embodiment of the invention, there is provision for the wall portions to have a conical run between one tile side and the opposite tile side, these wall portions narrowing from one tile side, which is formed by the surface portions connecting the chambers, to the other tile side, which is formed by the end faces of the chambers. These conical surfaces make it easier for the mortar or adhesive to be introduced completely into the chambers for complete filling-up with mortar or adhesive.

[0010] The inclination of the conically running wall portions is advantageously provided at an angle of less than 20°. This optimizes force absorption, on the one hand, and the filling of the chambers, on the other hand.

[0011] The net-like fabric covering the depression of the chambers is advantageously glued to the surface portions of the one tile side which connect the chambers. As a result, different materials may be selected for the net-like fabric and for the carrier tile consisting of film-like plastic. Furthermore, gluing affords the advantage that the net-like fabric projects slightly with respect to the surface portions, and additional meshing with the adhesive or mortar layer adhering to the surface cladding becomes possible.

[0012] According to an alternative embodiment of the invention, there is provision for the net-like fabric covering

the depressions to be welded to the surface portions connecting the chambers. It thereby becomes possible for the net-like fabric and the carrier tile to be connected, in the contact regions, so as to form a unit, with the result that very high strengths can be achieved. At the same time, the advantages of the glued-on embodiment of the net-like fabric can be preserved. Alternatively, there may also be provision for the net-like fabric to be embedded at least partially into the tile side during the welding-on process.

[0013] To produce a fusion-welded joint between the net-like fabric and the carrier tile, there is advantageously provision for the net fabric to be produced from a thermoplastic. Such thermoplastics are acid-resistant and have high strength.

[0014] According to a further advantageous embodiment of the invention, there is provision for the net-like fabric overlapping or covering the depressions to have a mesh width of at least 0.04 mm^2 , in particular 0.5 to 5 mm^2 . It thereby becomes possible easily to introduce or fill the chambers with an adhesive or mortar layer and with further flowable and curable materials. At the same time, however, it is ensured that a sufficient number of meshes overlap the depression or the chambers, in order to make it possible to fix the adhesive or mortar stilt within each chamber. Preferably, there is provision for at least two meshes to be provided for each chamber. The size of the chamber and the mesh width of the net-like fabric or nonwoven can in this case be adapted to one another so as to afford optimum cramping.

[0015] The net-like fabric for covering the depressions is preferably produced in the manner of a grid from rovings welded to one another. In this case, there is provision for the net-like fabric to have identical tensile strengths in both directions of the plane of extent, in order to allow a uniform stress reduction.

[0016] The rovings for the net fabric are preferably formed from twisted individual fibres, in order to have a high compressive strength.

[0017] According to a further embodiment of the invention, there is provision for the mesh width of the net-like fabric or nonwoven to be designed to be smaller than a surface portion between two chambers. As a result, at least two intersecting fibres of the fabric or at least one warp and one weft of the fabric can be welded or glued to the surface portion. The free orifice of the chamber can thereby be spanned by a tauter fabric or nonwoven portion.

[0018] The invention and further advantageous embodiments and developments of this are described and explained in more detail below by means of the examples illustrated in the drawings. The features to be gathered from the description and the drawings may be used, according to the invention, individually in themselves or severally in any desired combination. In the drawings:

[0019] FIG. 1 shows a perspective illustration of the carrier tile according to the invention,

[0020] FIG. 2 shows a diagrammatic top view of the carrier tile,

[0021] FIG. 3 shows a diagrammatic sectional illustration of a carrier tile according to the invention in an installation situation for the decoupling of stress differences, and

[0022] FIG. 4 shows a diagrammatic sectional illustration of an alternative embodiment of the carrier tile in an installation situation according to FIG. 1.

[0023] A carrier tile 11 according to the invention is illustrated in perspective in FIG. 1. The carrier tile 11 consists of a plastic film which has a multiplicity of chambers 12 formed by depressions 14 of the plastic film. The chambers 12 are produced, for example, by vacuum forming or deep drawing. The carrier tile 11 has a multiplicity of chambers 12, which are arranged in a plurality of rows and columns or in defined patterns with respect to one another. Surface portions 16 which connect the chambers 12 to one another are formed between the depressions 14. According to the first embodiment, wall portions 18 arranged perpendicularly with respect to these surface portions 16 extend from the latter and merge into a bottom 19 forming with an outer end face 21 a first tile side 22. The end faces 21 of the chambers 12 have glued to them a net-like fabric or nonwoven 23 which serves for cramping the carrier tile 11 in a contact layer applied to a base. The net-like fabric or nonwoven 23 is designed as a fine-mesh grid fabric or as a perforated nonwoven and is secured to the end faces 21 of the chambers 12 by means of an adhesive bond. The fabric or nonwoven is produced, for example, from polypropylene.

[0024] A second tile side 26 is formed, opposite the first tile side 22, by the surface portions 16 connecting the chambers 12. This tile side 26 has applied to it a further net-like fabric 27 or nonwoven which differs from the net-like fabric or nonwoven 23 applied to the first tile side 22. This net-like fabric or nonwoven 27 applied to the second tile side 26 is designed with a coarse mesh and is connected to the surface portions 16 by means of an adhesive bond or a welded joint. The net-like fabric 27 extends with its meshes over the depressions 14 of the chambers 12. Preferably, the net-like fabric 27 is produced from the same material as the carrier tile 11. For example, HDPE plastic is used. The tearing or tensile strength of the fabric 27 is at least 250 N/5 cm . Furthermore, the fabric 27 preferably has an expandability of at least 5%, so that there is some elasticity for decoupling and in the event of temperature fluctuations.

[0025] The chambers 12 illustrated in FIG. 1 have a circular bottom 19 and an end face 21 and are of column-like or cylindrical design. Alternatively to the round area in horizontal projection, triangular, square or polygonal areas in horizontal projection or lozenge-shaped or trapezoidal areas in horizontal projection may also be provided.

[0026] FIG. 2 illustrates a top view of the carrier plate 11 according to the invention, as shown in FIG. 1. The net-like fabric 27 on the second tile side 26 has a mesh width which makes it possible to introduce mortar or adhesive into the chamber 12 virtually without obstruction. A mesh width of the fabric of at least 0.04 mm^2 is preferably provided. For the easy introduction of a tile adhesive or mortar, in particular, a mesh width of 0.5 mm^2 to 5 mm^2 is provided. That surface of the depression 14 which is to be covered is adapted to the mesh width of the fabric 27, so that at least two meshes overlap the depression 14. A sufficiently taut overlap of the depression 14 by the net-like fabric 27 thereby becomes possible.

[0027] FIG. 3 illustrates a diagrammatic sectional illustration of the carrier tile 11 according to the invention, as

shown in **FIGS. 1 and 2**, in an installation situation. An adhesive or mortar **32** is applied to a base **31**. After this, the carrier tile **11** is laid out with the fine-mesh net-like nonwoven **23** on the base **31**. The mortar **32** is cramped in the fine-mesh net-like nonwoven **23** which may be produced from a plastic or natural fibre material. The net-like nonwoven **23** is designed in such a way that, when the carrier tile **11** is laid out, there is no penetration of the mortar into regions **33**. Air circulation in these free spaces **33** can thereby take place.

[0028] After the carrier tile **11** has been laid out and secured on the base **31**, an adhesive or mortar **34** is introduced on to the carrier tile **11** and may deviate in consistency from the mortar or adhesive **32**. In this case, the mortar **34** is introduced through the coarse-mesh net-like fabric **27** for filling into the chamber **12**. At the same time, the mortar layer is hooked on the grid-like coarse-mesh fabric **27** which is provided on the surface portions **16**. After this, tiles **36** for forming a surface cladding **37** are applied to the mortar layer **34**. After the curing of the mortar **34**, the surface cladding **37** is finished by the introduction of joints **38**.

[0029] The mortar layer **34** forms, in the chambers **12**, contact elements or mortar stilts which allow load dissipation. Furthermore, shear forces which occur between the base **31** and the surface cladding **37** are decoupled by means of the carrier tile **11**. The net-like fabric **27** crosses the mortar stilt and makes it possible to stabilize and stiffen the mortar stilt, since the net-like fabric **27** acts as a reinforcement. As a result, the strength of the bond can be increased, and at the same time the formation of cracks can be reduced due to the stress decoupling.

[0030] **FIG. 4** illustrates an installation situation of an alternative embodiment of the carrier tile **11** according to the invention. This carrier tile **11** deviates from the carrier tile **11** according to **FIG. 2** in the form of the chambers **12**. The other features are identical, and therefore reference is made to the preceding figures. The carrier tile **11** according to **FIG. 4** has conical wall portions **18** which narrow towards the bottom **19**. Thus, as seen in cross section, in the case of a round bottom **19** frustoconical chambers **12** are formed. Alternatively, triangularly or polygonally designed forms of the bottom **19** and of the depression **14** or orifice to the depression **14** may also be produced. As a result of the even slight reduction in the bottom area **19** with respect to the depression **14** in the region of the surface portion **16**, the complete filling of the chamber **12** with mortar **34** can be facilitated. These cross-sectional forms of the chambers **12** likewise allow optimum load dissipation, a decoupling of stress differences and a reduction or prevention of the formation of cracks in the layer formed by the adhesive or mortar **34**.

What is claimed is:

1. Carrier tile consisting of film-like plastic for a floor, wall or ceiling structure, in particular a tile-clad wall or floor structure, for achieving decoupling between the base and a surface cladding to be applied to the film-like tile which has a multiplicity of chambers which are formed by depressions out of a plane of the carrier tile and the outer end faces of which form the first tile side, the depressions being designed for receiving a curing contact means, such as mortar or adhesive, provided for forming a contact layer with the surface cladding to be applied, and with a net-like fabric or nonwoven arranged on the first tile side, wherein the chambers between the first and an opposite tile side have an undercut-free wall portion, and wherein a net-like fabric overlapping the depressions is provided on the opposite tile side.

2. Carrier tile according to claim 1, wherein the wall portions of the chambers are arranged vertically between those end faces of the chambers which form one tile side and the surface portions which connect the chambers and which form the opposite tile side.

3. Carrier tile according to claim 1, wherein wall portions between those end faces of the chambers which form one tile side and surface portions which connect the chambers and which form the opposite tile side extend so as to narrow conically towards the end faces of the chamber.

4. Carrier tile according to claim 3, wherein the inclination of the wall portions is less than 20°.

5. Carrier tile according to claim 1, wherein the net-like fabric covering the depressions is glued to the surface portions of the tile side.

6. Carrier tile according to one of claims 1 to 4, wherein the net-like fabric covering the depressions is welded to the surface portions of the tile side.

7. Carrier tile according to claim 1, wherein the net-like fabric covering the depressions is produced from a thermoplastic.

8. Carrier tile according to claim 7, wherein the net-like fabric is made of high-density polyethylene.

9. Carrier tile according to claim 1, wherein the net-like fabric covering the depressions has a mesh width of at least 0.04 mm².

10. Carrier tile according to claim 1, wherein the net-like fabric covering the depressions has a mesh width of 0.5 to 5 mm².

11. Carrier tile according to claim 1, wherein the net-like fabric covering the depressions is produced from rovings welded to one another in a grid-like manner.

12. Carrier tile according to claim 11, wherein the rovings are in twisted form.

13. Carrier tile according to claim 1, wherein the mesh width of the net-like fabric or nonwoven is designed to be smaller than a surface portion between two chambers.

* * * * *