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(54) **System for the formation of a floor**

(57) System for the formation of a floor of the type that comprises a plurality of individual sections of floor that rest on a supporting surface, these individual sections having an overhanging upper edge with a number sealing elements being positioned on said supporting surface, forming a bidirectional frame that essentially configures a plurality of adjoining enclosures wherein one or more adjoining individual sections of floor are laid, forming respective continuous sections of floor with a

similar outline to that of the enclosures and separated from one another so that, when the pieces being manufactured are loaded onto the floor, the overhanging edges around the outside of each continuous section of floor press downwards and slightly deform the sealing elements, producing a sealed closure and closing off the passage to the residual solid particles that could fall through the joints between the continuous sections of the floor.

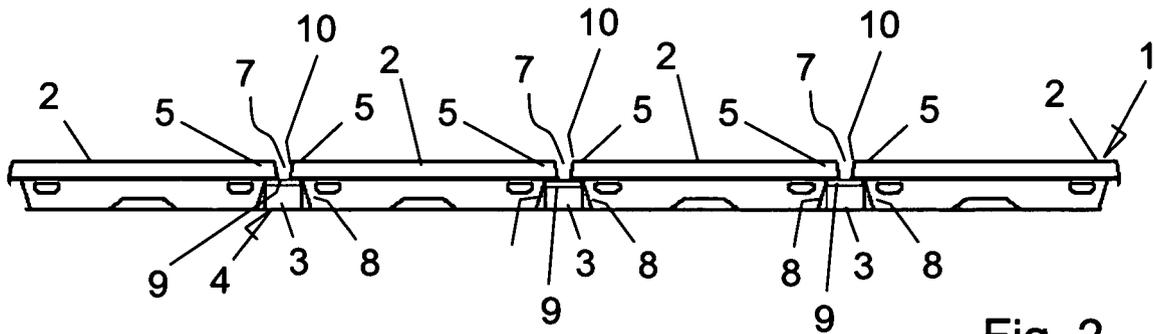


Fig. 2

Description**Technical field of the invention**

[0001] The invention relates to a system for the formation of a floor of the type that comprises a set of sections of floor particularly designed to form the load-bearing surface of a tunnel kiln car, or a fixed floor in a kiln, to serve as a support for the blocks of an over-floor layer or for the pieces being manufactured.

Background of the invention

[0002] In the industrial sector of ceramic materials manufacture, the pieces being manufactured are normally supported and transported by placing said sections of floor on cars that move through the production plant and along a tunnel kiln, whereon the pieces undergo different steps of the process. In general, an over-floor layer is placed on top of the floor of the car, consisting of blocks normally made from a heat-resistant material, whereon the pieces are piled during the manufacturing process.

[0003] Despite the fact that the sections that form the over-floor layer contain holes to aid the circulation of air and, therefore, improve the dissipation of heat from the ceramic pieces that are in contact with the over-floor layer, it is often the case that said dissipation is not sufficient and the pieces being manufactured crack and break. Moreover, the mechanical handling of the pieces being manufactured as they are loaded onto and unloaded from the car causes various breakages and chipped edges.

[0004] The solid residual particles that result from the breakage of pieces remain on the surface of the floor and over-floor layer, although they can also fall between the joints that separate the sections that form said floor.

[0005] Despite the fact that problems are caused by the broken fragments of the pieces being manufactured falling between the joints, said joints are necessary because the sections forming the floor expand due to the heat produced inside the kiln. The joints therefore ensure that the sections of the floor have sufficient space to expand laterally, thus maintaining the outer dimensions of the assembly.

[0006] A ceramic fibre joint is currently inserted between the sections of floor, which is compressed by the sections of floor when they expand. These joints make it difficult for any fragments on the surface of the floor to pass through, but they do not prevent said joints, when the sections of floor contract, from leaving small gaps through which smaller fragments can pass. These fragments must not be allowed to remain inside the joints because when the sections of floor expand again in a subsequent production cycle, these fragments, which now lie between the sections of floor, would prevent said sections from expanding, causing them to break or possibly resulting in an increase of the outer dimensions of the assembly which could cause them to interfere with the walls of the kiln or with other floors of adjacent cars.

For this reason, the sections of floor have a lower lateral indentation that determines, together with the indentations of the adjacent sections, a number of small chambers for collecting the debris and fragments of broken pieces that fall through the joints, thus avoiding that they remain in the areas where there is a narrower separation between the sections of floor. However, as the fragments accumulate in these chambers it becomes necessary to raise the sections of floor to aspirate the support surface and thus the fragments accumulated and collected in these chambers. This operation must be carried out very frequently, which involves the expense of staffing the procedure and replacing the material that forms the joints.

[0007] Furthermore, in some production processes sand or other aggregates are used to demould the ceramic pieces or to achieve certain aesthetic effects on the surface of the ceramic pieces to be manufactured. The shedding of these aggregates during the production process causes similar effects to those described above for the fragments of material and therefore further accelerates and worsens the degradation process.

[0008] One objective of the present invention is a system for the formation of a floor that aids the removal of the fragments accumulated on the surface and particularly between the sections that form the floor, thus avoiding the presence of undesired fragments between the sections that form said floor, in such a way that these sections do not have to be lifted so often to remove the fragments that fall through the joints and accumulate on the car floor.

Explanation of the invention

[0009] The system for the formation of a floor that is the object of the present invention, which solves the problems described above, is of the type that comprises a plurality of individual sections of floor that rest on a supporting surface. Essentially, the system is characterised in that the individual sections of floor have an overhanging upper edge projecting outwards and in that a number of sealing elements are positioned on the supporting surface forming a bidirectional frame that essentially configures a plurality of adjoining parallelepipedic enclosures wherein one or more adjoining individual sections of floor are laid, forming respective continuous sections of floor, with a closed quadrangular outline similar to that of the enclosures and separated from one another, in such a way that, when the pieces being manufactured are loaded onto the floor, due to the weight, the overhanging edges around the outside of each continuous section of floor press downwards and slightly deform the sealing elements, producing a sealed closure and closing off the passage to any residual solid particles that could fall through the joints between the continuous sections of the floor.

[0010] According to these characteristics, instead of preventing residual solid particles from falling between the continuous sections of floor, for example by inserting

a fibre joint, according to the system disclosed by the invention, the separating space between said sections is left free and has a bottom, formed by the sealing elements, which is sufficiently close to the surface of the floor for the waste accumulated there to be aspirated without difficulty.

[0011] According to another characteristic of the invention, the sealing elements are made from ceramic fibre.

[0012] According to one variant of the invention, the sealing elements have elastic properties.

[0013] According to another characteristic of the invention, the lateral walls of the individual sections that form the floor which face the sealing elements are at an angle to the vertical, said sections narrowing towards their base.

[0014] According to another characteristic of the invention, at least the joining areas of the sealing elements that form the bidirectional frame are covered by a thin sheet, which is adapted to retain the solid particles that could fall through the joints between the continuous sections of the floor, these sheets being positioned between said sealing elements and the overhanging edges of the individual sections of the floor.

[0015] According to another characteristic of the invention, the upper edge of at least two parallel sides of the individual sections of the floor are bevelled, the width of the joints between said continuous sections thereby increasing progressively towards the upper surface thereof.

Brief description of the drawings

[0016] A variant of the system for the formation of a floor that is the object of the invention is illustrated in the attached drawings. In said drawings:

Fig. 1 is an aerial perspective view of a section of floor according to the invention;

Fig. 2 is an enlarged view taken along AA' of the section of floor shown in Fig. 1;

Fig. 3 is an enlarged view taken along BB' of the section of floor shown in Fig. 1; and

Fig. 4 is a perspective view of the underside of the section of floor shown in Fig. 1;

Detailed description of the drawings

[0017] The section of floor 1 shown in Fig. 1 consists of sixteen individual prismatic sections 2 made from a heat-resistant material with a slightly "I"-shaped cross-section having a first set of holes passing through them parallel to their generatrix. The individual sections 2 are laid out in rows and columns, forming a matrix of four by four sections that do not touch one another.

[0018] The individual sections 2, which rest on a lower supporting surface, have an overhanging upper edge 5 (see Figs. 2 and 3) whereby each individual section 2 presses on a number of sealing elements 3, 3' with elastic

properties, which form a bidirectional frame 4 and which form a plurality of adjoining parallelepipedic enclosures, designed to be occupied by the respective individual sections 2. To this end, the outline of each individual piece 2 is similar to the outline of each of the enclosures formed by the layout of the sealing elements 3, 3'. These sealing elements are designed to be positioned on the same supporting surface as the sections of floor, on a tunnel kiln car or on a fixed floor in a kiln.

[0019] Although not shown here, it would be possible to lay more than one individual section 2 in each enclosure and alternatively lay several adjoining individual sections 2 to form a continuous section of floor with an outline that is similar to that of the corresponding enclosure. The individual sections 2 can be laid in a row, for example. This particular layout of several adjoining individual sections 2 in a single enclosure is of particular interest in the manufacture of ceramic pieces whose handling does not produce excessive residual solid particles as a consequence of breakages and chipped edges.

[0020] The bidirectional frame 4 consists, in the example shown in Figs. 1 and 4, of a number of elements 3 formed by long straight rectangular parallelepipedic strips that extend in parallel along the length of the section of floor 1, and of a number of elements 3', also formed by shorter straight rectangular parallelepipedic strips positioned between the first elements 3 transversally in relation thereto from one end of the section of floor 1 to the other. The sealing elements 3 and 3' are made from ceramic fibre to prevent them from suffering damage when subjected to high temperatures.

[0021] According to the system of the invention, the height of the lower surface of the overhanging edges 5 of the individual sections 2, in relation to their corresponding base, is slightly less than the height of the sealing elements 3 and 3' so that when the individual sections 2 are laid in their corresponding enclosures on the sealing elements, said sections, due to their weight and the load that they are supporting, press on the sealing elements by means of their overhanging edges 5, deforming them slightly until the sections 2 come into contact with the lower supporting surface, producing a sealed closure and closing off the passage to the residual solid particles 6 (only shown in Fig. 3) that could fall through the joints 7 between the sections 2 of the floor 1 to the lower surface of the floor.

[0022] Unlike with known floors, the system according to the invention does not obstruct the joints between the individual sections 2, or between the continuous sections of floor formed by several individual sections 2, but rather these remain free so that the solid particles 6 formed by residual fragments or debris produced during the manufacturing cycles can fall into said joints without any obstacle, as is shown in Figs. 2 and 3. The depth of said joints, however, is less than that of known floors, as the sealing elements 3, 3' seal said joints from below, at a level immediately below the height of the overhanging edges 5 of the individual sections 2. The depth of the

joints 7 is sufficient to allow any solid fragments that could fall through the joints 7 to be aspirated in a known manner. Advantageously, the system makes it possible to provide the joints 7 with sufficient proportions of width and height to allow for an expansion of the adjoining sections of floor, so that even when the joints 7 are completely full of small fragments of material or other aggregates, these can overflow, therefore not providing resistance to the expanding movement of the sections of floor.

[0023] To make these joints 7 easier to clean by aspiration, the upper edges 10 of the individual sections 2 of the floor 1 are bevelled, whereby the width of these joints 7 between said sections increases towards the upper surface thereof.

[0024] Figs. 2 and 3 also show that the lateral walls 8 of the individual sections 2 of the floor 1 which face the sealing elements 3, 3' are at an angle to the vertical, whereby the sections 2 narrow slightly towards their base. Said characteristic favours the transversal movement of the individual sections 2 and helps adjacent sections to move towards one another as a result of the expansion.

[0025] To prevent residual solid particles 6 from passing onto the supporting surface of the floor through the joints between the different sealing elements 3 and 3', it is anticipated that at least the joining areas between the sealing elements 3, 3' that form the bidirectional frame 4 are covered by one or more thin sheets 9, which are positioned between said sealing elements 3, 3' and the overhanging upper edges 5 of the individual sections 2 of the floor 1. These sheets 9 are preferably made from ceramic fibre paper, optionally hardened on their surface.

[0026] In the example shown in Fig. 1, each set of linearly positioned sealing elements 3' is covered by the same sheet 9, shown by broken lines in Fig. 1, which covers the joining areas between these sealing elements 3' with the continuous longer sealing elements 3 that cross the section of floor 1 from one end to the other.

[0027] Naturally, it is possible for the parallelepipedic strips 3 and 3' to have different widths, whereby the separation between individual sections 2 or between continuous sections of floor would differ in one direction or the other.

[0028] The distance that separates the adjacent individual sections 2 laid in two adjoining enclosures can vary according to requirements and to the surface of the floor, it being possible for it to measure between 6 and 400 mm.

Claims

1. System for the formation of a floor (1), of the type that comprises a plurality of individual sections (2) of floor that are particularly designed to rest on a supporting surface in a tunnel kiln car or on the floor of a fixed kiln to serve as support for the blocks of an over-floor layer or for the pieces being manufac-

tured, **characterised in that** the individual sections of floor have an overhanging upper edge (5) projecting outwards and **in that** a number of sealing elements (3, 3') are positioned on the supporting surface, forming a bidirectional frame (4) which essentially configures a plurality of adjoining parallelepipedic enclosures wherein one or more adjoining individual sections of floor are laid, forming respective continuous sections of floor, with a closed quadrangular outline that is similar to that of the enclosures and separated from one another, so that, when the pieces being manufactured are loaded onto the floor, due to the weight, the overhanging edges around the outside of each continuous section of floor press downwards and slightly deform the sealing elements, producing a sealed closure and closing off the passage to the residual solid particles (6) that could fall through the joints (7) between the continuous sections of floor.

2. System according to claim 1, **characterised in that** the sealing elements (3) are made of ceramic fibre.

3. System according to claim 1, **characterised in that** the sealing elements (3) have elastic properties.

4. System according to claim 1, **characterised in that** the lateral walls (8) of the individual sections (2) that form the floor (1) which face the sealing elements (3, 3') are at an angle to the vertical, said sections narrowing towards their base.

5. System according to the previous claims, **characterised in that** at least the joining areas between the sealing elements (3, 3') that form the bidirectional frame (4) are covered by a thin sheet (9) which is adapted to retain the solid particles (6) that could fall through the joints (7) between the continuous sections of floor (1), these sheets being positioned between said sealing elements and the overhanging upper edges (5) of the sections of floor.

6. System according to the previous claims, **characterised in that** the upper edge (10) of at least two parallel sides of the individual sections (2) of the floor (1) are bevelled, the width of the joints (7) between said continuous sections thereby increasing progressively towards the upper surface thereof.

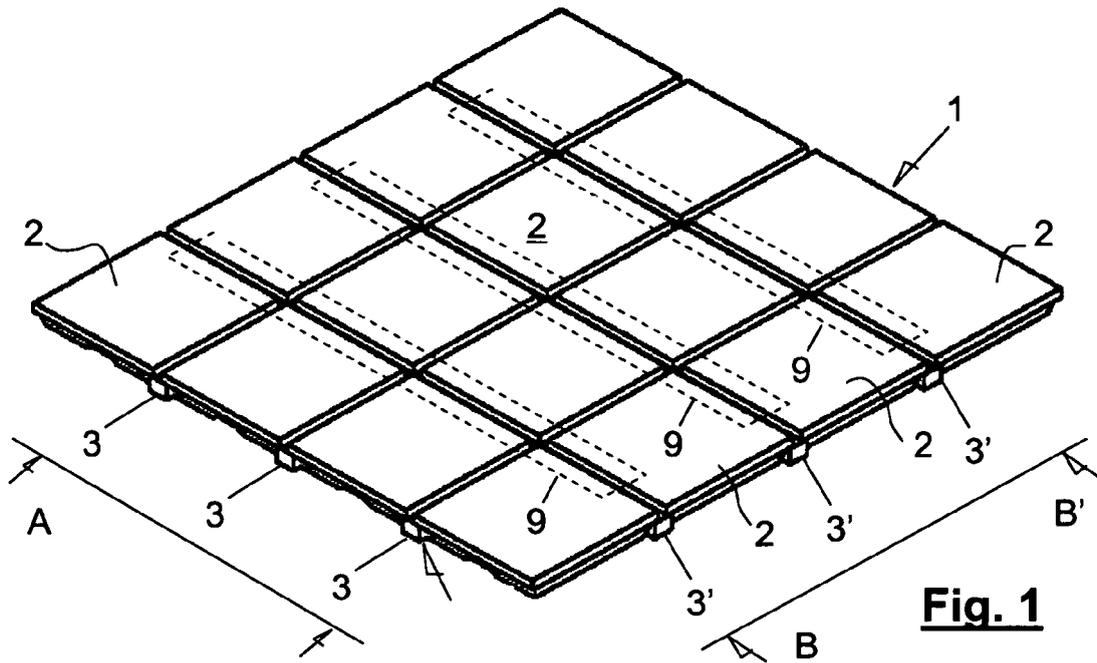


Fig. 1

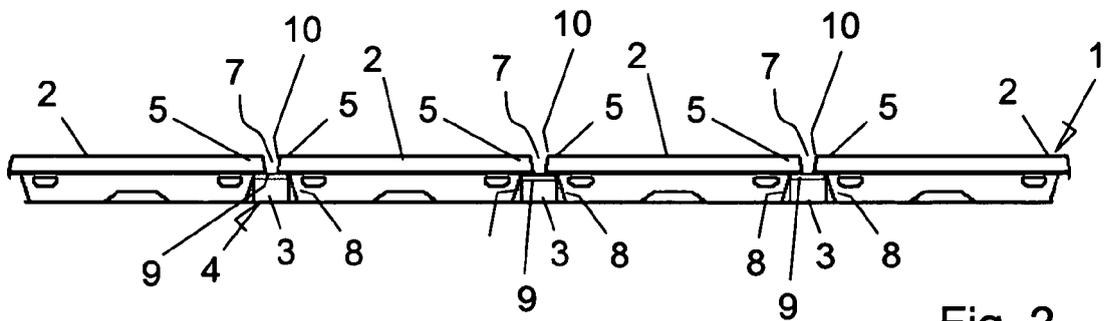


Fig. 2

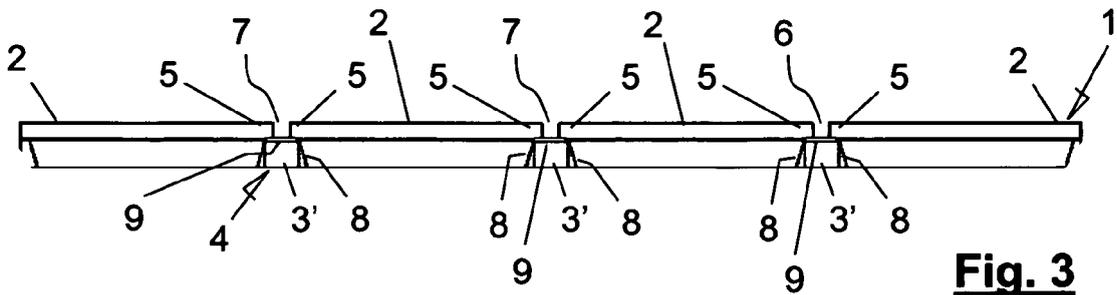


Fig. 3

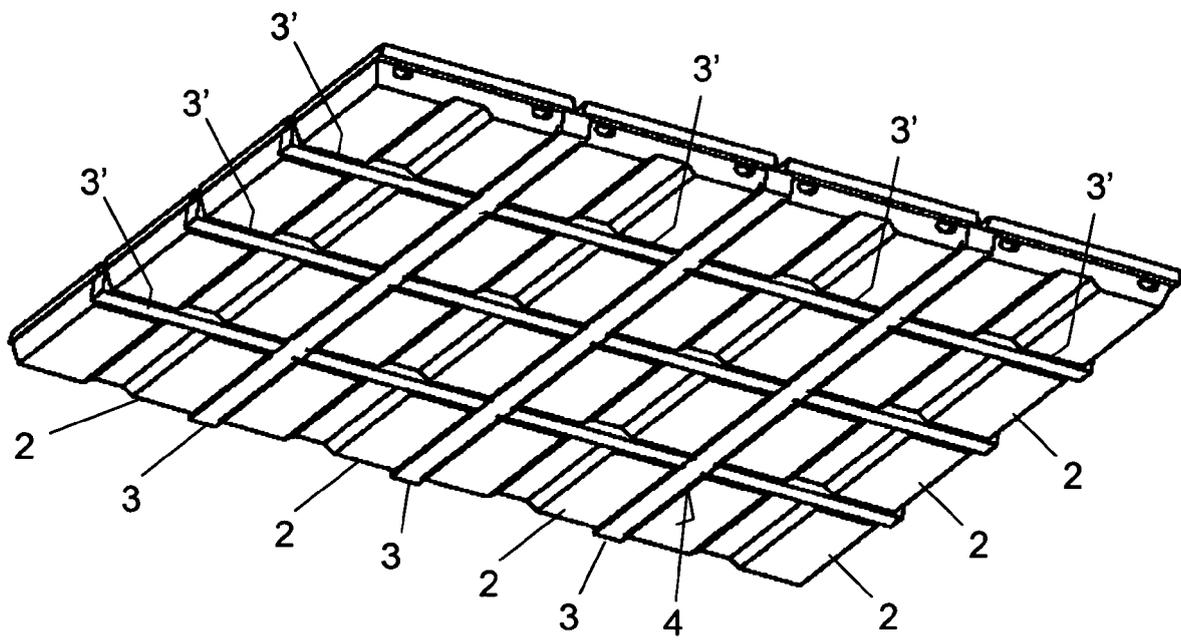


Fig. 4



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 4 218 213 A (CSAPO, MICHAEL A) 19 August 1980 (1980-08-19) * the whole document * -----	1	INV. F27D1/00 F27D1/14 F27B9/00
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			F27D F27B
Place of search		Date of completion of the search	Examiner
Munich		23 August 2006	Baumgartner, R
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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23-08-2006

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