(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 019 819**
**A1**

# (12) EUROPEAN PATENT APPLICATION

(21) Application number: **80102744.2**

(22) Date of filing: **17.05.80**

(51) Int. Cl.³: **F 27 D 1/04**, C 04 B 43/02

(30) Priority: **30.05.79 IT 4006779**

(43) Date of publication of application: **10.12.80 Bulletin 80/25**

(84) Designated Contracting States: **AT BE CH DE FR GB IT LI NL SE**

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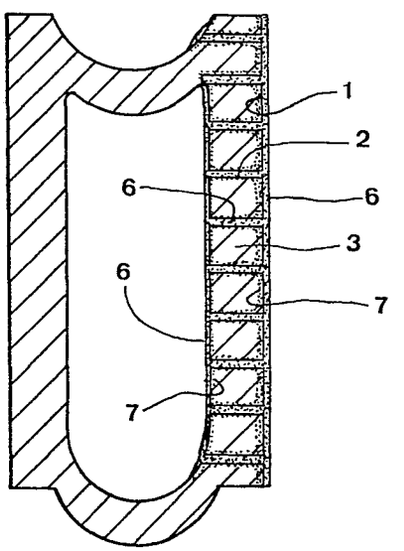
## (54) Improved coating in ceramic fiber material, particularly for the insulation of ceramic kilns.

(57) A coating in ceramic fiber material, particularly for the insulation of ceramic kilns is constituted by panels made of ceramic fiber or metallic-ceramic light insulating material: within the side (1) of the panels turned towards the inside of the kiln some cavities (2) are made, distributed in such a way as to form a grate to fix the layer (6) impregnated by the vapours of the kiln, or to fix a protective film (6) previously applied.

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Improved coating in ceramic fiber material, particularly for the insulation of ceramic kilns

The invention concerns an improved coating in ceramic fiber material, particularly for the insulation of ceramic kilns, that is to say, panels, blocks or structures in general, which may be solid or hollow, made of ceramic fiber or metallic ceramic light insulating material or something similar, used especially but not exclusively to coat the walls of kilns for the baking of glazed ceramic tiles or, in any case, for the insulating coating of structures exposed to fire and to the vapours generated by so-called flux materials like boron or lead (just to give a not limiting example) or by glazes in general.

The state of art comprises prefabricated panels and hollow blocks of ceramic fiber, which are placed one alongside the other and fixed among each other in order to form the insulating coating of the kiln walls, having initially very good insulating features, extremely high resistance to thermal shocks and the property of conferring a low thermal inertia to the walls; on the other hand, the vapours generated in the kiln, attack the surface of ceramic fiber material, penetrating it and modifying the characteristics of the following layers, which come off in flakes, leaving deeper and deeper intact surfaces naked, which are in their turn contaminated and detached up to the complete destruction of the special qualities of the ceramic fiber material and the cancellation of the tasks it has to perform.

In trying to prevent the destruction of the insulating material a method was adopted, which foresees the impregnation and the coating of the surface of the ceramic fiber material with protective substances such as refractory cement, bonding agents for high temperatures, colloidal silica and others; on the other hand the insulating material thus treated has a surface film, which comes off during the working of the kiln making the protection inefficient.

This state of art is liable to improvements concerning the neutralization of the destruction process of the ceramic fiber insulating material or similar resulting from the attack

of the vapours on its naked surface as well as concerning the stabilization of the possible protective film obtained by means of the impregnation process.

The aforesaid makes it necessary to solve the technical problem of finding an insulating ceramic fiber element or something similar, treated or not treated on its surface, of such a nature that it is not subject to the detachment of the layers or of the possible protective film.

The invention solves the above said technical problem by adopting within the side of the panel, or of the hollow block, or of the insulating element in general, turned towards the kiln some cavities distributed in such a way as to form a grate to fix the layer impregnated by vapours generated during the working of the kiln, or to fix the possible protective film applied by prefabrication so that this layer or this film cannot detach: such cavities can be made of hole or slit shape, preferably through holes or slits, or they can be shaped as grooves with a section that widens as it proceeds towards the inside of the insulating coating in order to form the retaining back draft of the vapour absorption layer or of the film, the width of such cavities is generally short, this in order to supply a certain number of fixing points, however, without jeopardizing the mechanical resistance of the insulating element because of the excessive weakening of its mass.

The advantages obtained with this invention consist in the fact that the insulating element is provided with the possibility of a stable self-protection of the inner layers by means of impregnation by the vapours during the working of the kiln or with a stabilization of the possible film obtained by means of preventive impregnation; the cost can be negligible, choosing cavity shapes like holes or slits, practically those most suitable to be realized during the forming process without requiring the intervention of machine tools; the fixing of the protection allows to maintain the integrity of the thickness of the insulating material with consequent long life.

Some embodiments of the invention are illustrated, just to give an example, in the enclosed three drawing tables, where:

Figure 1 is a front elevation of a hollow block of ceramic fiber material, in which the fixing grate consists of through holes;

Figure 2 is the section II-II of Figure 1 with indication of the fixing of the vapour impregnation layer or of the protective film in general;

Figure 3 is a view like that of Figure 1, in a case where the fixing grate consists of grooves as back draft;

Figure 4 is the section IV-IV of Figure 3 with indication of the above fixing;

Figure 5 is a front - elevation like that of Figure 1, but with the fixing grate consisting of through slits;

Figure 6 is the section VI-VI of Figure 5 with indication of the fixing.

The indications are as follows: 1 indicates the face of the insulating material element exposed to the vapours; 2 indicates the through holes of wall 3 of the element; 4 indicates dovetail grooves made in the wall 3; 5 indicates through slits of the wall 3; 6 is a film of the surface 1 of the insulating element, penetrating into the holes 2, into the grooves 4, and into the slits 5 as well as along the inner surface 7; the film 6 obtained either by means of a preliminary treatment or by the deposit of vapours during the working of the kiln diffuses because of impregnation also towards the inside of the thickness 3.

The fixing cavities in the insulating elements can be made during or after the forming as well as during the installation and finally also after the beginning of the operation of the kiln: in the latter two cases the fixing cavities economically most convenient are those consisting of holes 2; the stability of the surface 1 of the insulating element being assured by the continuity of the applied film and/or of the layer deposited by the vapours on the surface with the fixing surfaces of the holes 2, or the grooves 4 or the slits 5; continuity, which allows to consolidate the whole avoiding the detachment, the flaking off and the crumbling.

In those cases, where the surface 1 is previously impregnated with protective substances, the protection itself with the

forming of the relative film extends to the fixing cavities 2, 4, 5 even up to a point where the inner surface 7 is involved: the closing of the cavities 2, 4, 5 might happen during the process of preventive impregnation or subsequently during the working by accumulation caused by the vapours of the kiln.

In the practical realization the materials, the dimensions, the execution details, the shapes of the insulating elements, those of the holes, grooves and slits, their distribution and combination, their unions, the delivery angles, their distances, big compared to their dimensions, in a measure depending on the type of insulating material, may be different from those indicated but technically equivalent to them, without leaving the juridical dominion of this invention.

CLAIMS

1. Coating of ceramic fiber material, particularly for the insulation of kilns, comprising panels, blocks or elements in general of light insulating ceramic fiber or ceramic material or similar, having a surface in contact with the kiln, characterized by the fact, that into the wall of the insulating element adjacent with the kiln cavities are made, which are shaped and distributed in such a way that they form a fixing grate for the layer of natural impregnation generated by the vapours of the kiln or for the protective film applied previously.

2. Coating according to claim 1, characterized by the fact that said cavities are formed by holes made in the wall of the element, starting from the surface in contact with the kiln towards the inside of the element itself over the whole thickness or part of it: these holes being of small diameter and being distributed in an offset manner over the whole surface at a distance from each other big compared to their dimension in a measure dependent on the insulating material.

3. Coating according to claim 1, characterized by the fact that said cavities consist of narrow parallel or crossing grooves made in the wall of the element, starting from its surface in contact with the kiln towards the inside of the element itself, having a section, which widens proceeding towards the inside after a parallel lead-in in order to form a back draft, having a depth limited to a fraction of the thickness of said wall, inferior by the half of it, the center distance of which is, moreover, big compared to the width of the grooves, depending on the insulating material.

4. Coating according to claim 1, characterized by the fact that said cavities are formed by narrow slits, which are parallel, offset or crossing, made in the wall of the element, beginning from its surface in contact with the kiln towards the inside of the element itself over the whole thickness or part of it; the center distance of the rows of said slits being bigger than their length and the distance between two consecutive slits of the same row being similar to the di-

mensions of the slit or bigger depending on the material.

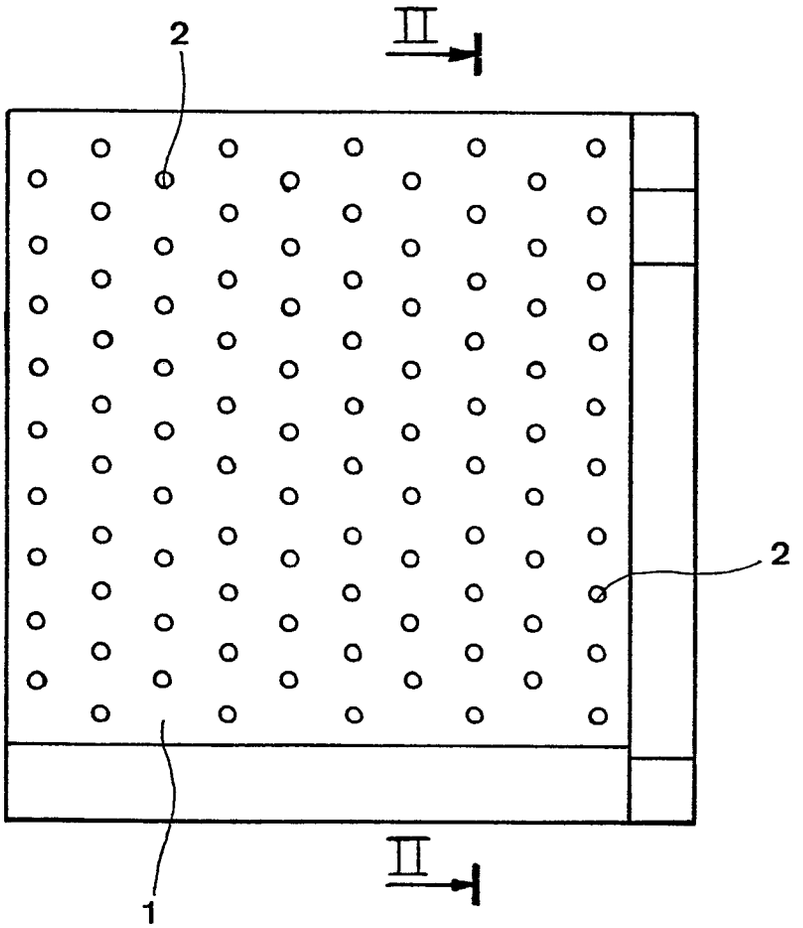


Fig.1

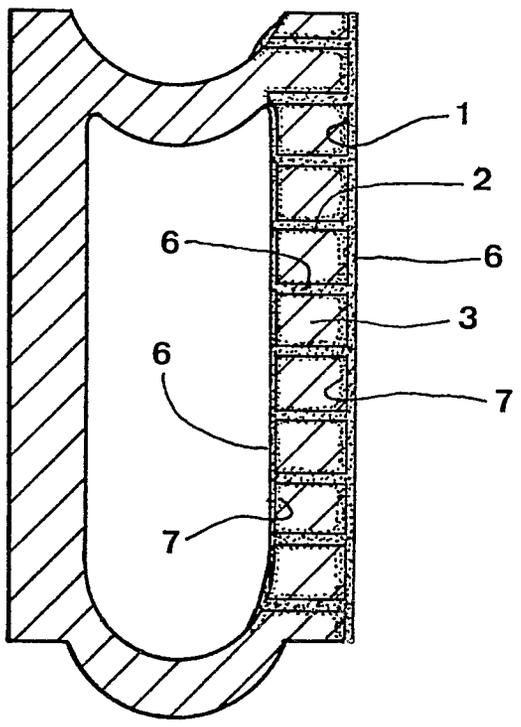


Fig.2

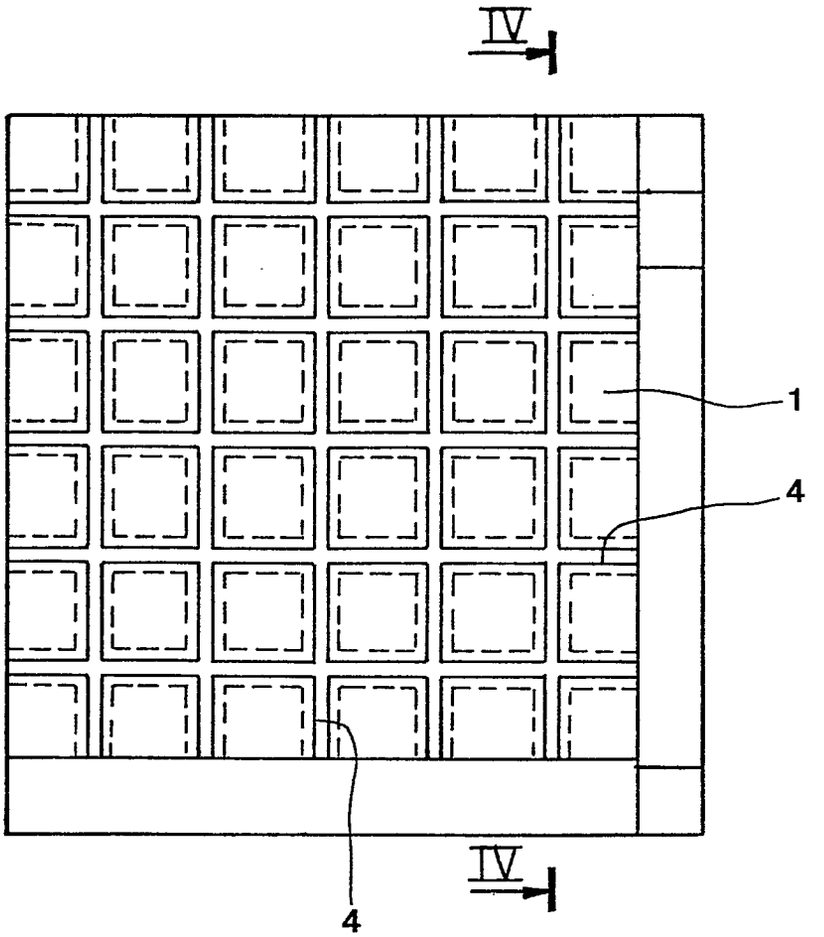


Fig.3

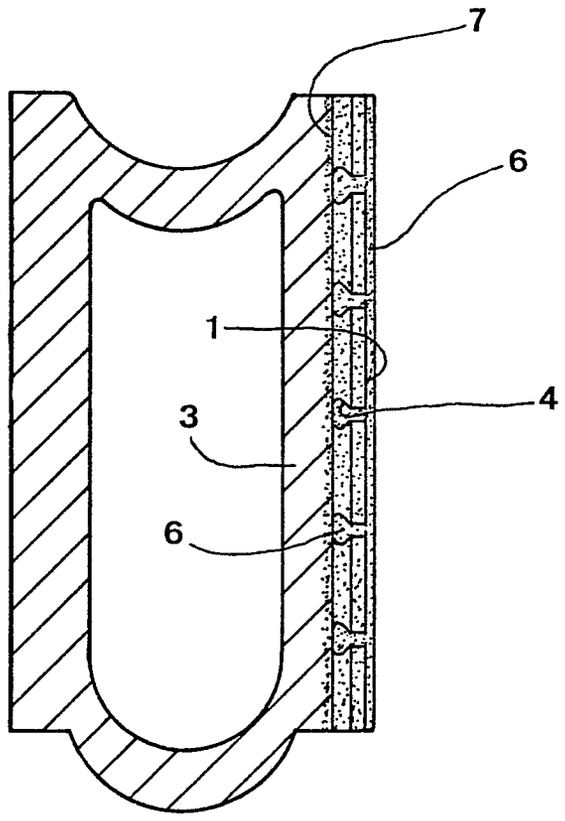


Fig.4

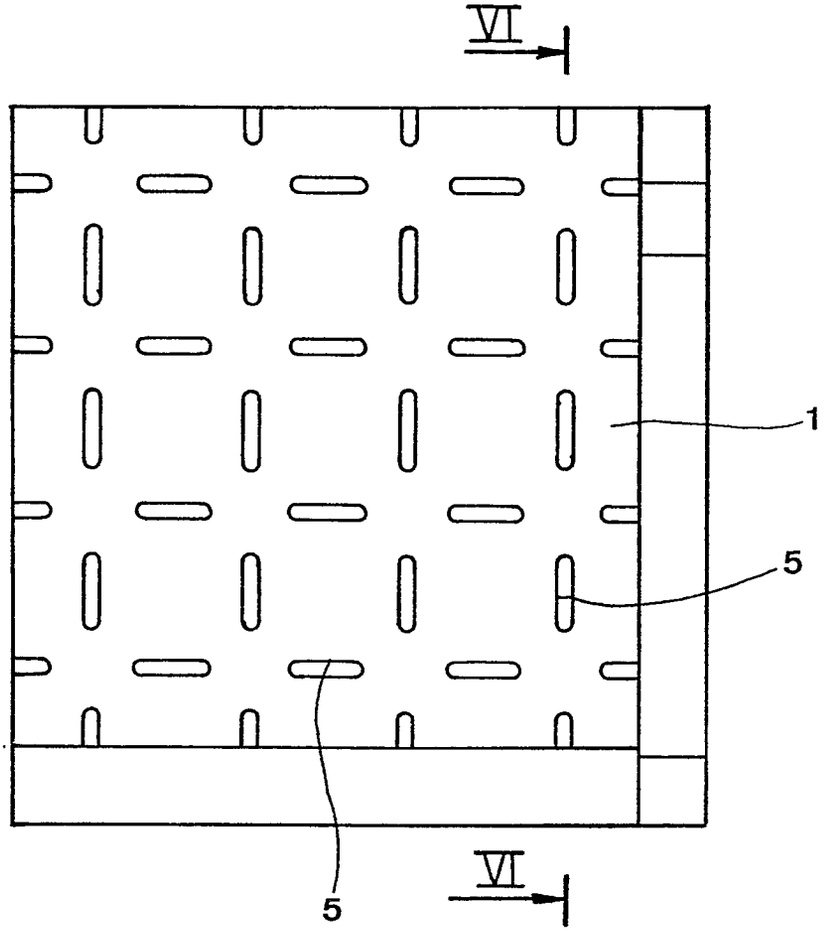


Fig.5

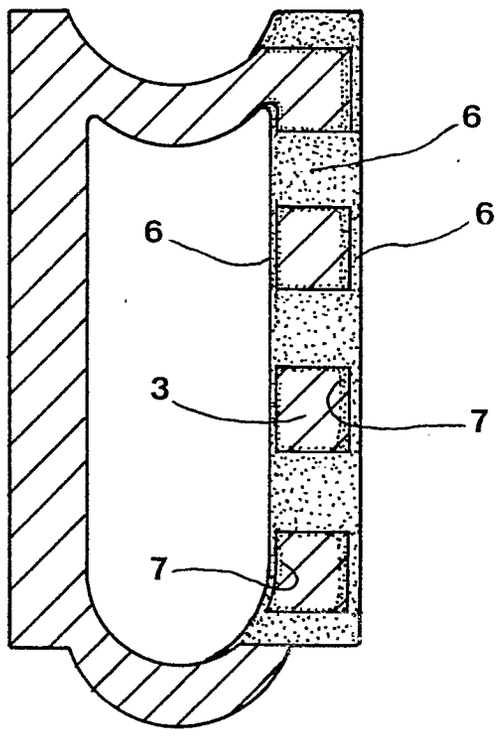


Fig.6

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# EUROPEAN SEARCH REPORT

0019819
Application number

EP 80 10 2744.2

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl.³) |
|---|---|---|---|
| | DE - U - 1 850 514 (ILSEDER HÜTTE)<br>* claim *<br>-- | 1-4 | F 27 D 1/04<br>C 04 B 43/02 |
| P | DE - A1 - 2 831 151 (BULTEN-KANTHAL)<br>* claims; fig. 3, 4 *<br>-- | 1,2,4 | |
| A | DE - A1 - 2 542 585 (AMF MINERAL-FASERPLATTEN GMBH)<br>-- | | TECHNICAL FIELDS SEARCHED (Int.Cl.³) |
| A | AU - B - 453 030 (V. LINDENTHAL)<br>-- | | |
| A | GB -A - 1 500 720 (F.H.D. FURNACES LTD.)<br>-- | | C 04 B 31/00<br>C 04 B 41/00<br>C 04 B 43/00<br>F 27 D 1/00 |
| A | DE - A1 - 2 646 960 (STUDICERAM)<br>---- | | |

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Berlin | 05-09-1980 | HÖRNER |

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