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Datasheet for the decision of 9 July 2014

Case Number: T 0141/12 - 3.3.05

Application Number: 01902426.4

Publication Number: 1357094

IPC: C04B35/18, C04B35/66

Language of the proceedings: EN

Title of invention:
REFRACTORY MATERIAL FOR CEMENT INDUSTRY KILNS AND USE THEREOF

Patent Proprietor:
Fajardo Sola, Pedro

Opponent:
Refratechnik Holding GmbH

Headword:
Refractory materials/PEDRO FAJARDO SOLA

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step (no) - reformulation of the technical problem - obvious alternative

Decisions cited:

Catchword:

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Case Number: T 0141/12 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 9 July 2014

Appellant: (Patent Proprietor)	Fajardo Sola, Pedro Calle Marqués del Turia, 1 46930 Quart de Poblet, Valencia (ES)
Representative:	Elzaburu Marquez, Alberto Elzaburu, S.L.P. C/ Miguel Ángel, 21 28010 Madrid (ES)
Respondent: (Opponent)	Refratechnik Holding GmbH Adalperostrasse 82 85737 Ismaning (DE)
Representative:	Solf, Alexander Patentanwälte Dr. Solf & Zapf Candidplatz 15 81543 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 23 November 2011 revoking European patent No. 1357094 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	G. Raths
Members:	H. Engl
	D. Prietzel-Funk

Summary of Facts and Submissions

I. European patent EP-B-1 357 094 was granted with three claims which read as follows:

"1. Refractory material for cement industry kilns with resistance to thermal, physical and chemical deformation, characterised by a chemical composition containing a percentage by weight of andalusite Al_2SiO_5 of 10-80%, a percentage by weight of silicon carbide SiC of 10-80% and a percentage by weight of clay of 10-15%."

"2. Refractory material for cement industry kilns with resistance to thermal, physical and chemical deformation, characterised by a chemical composition containing a percentage by weight of kaolinite $Al_2Si_2O_5(OH)_4$ of 10-80%, a percentage by weight of silicon carbide SiC of 10-80% and a percentage by weight of clay of 10-15%."

"3. Use of the refractory material as claimed under Claim 1 or claim 2, characterized by the use thereof to line the inside of cement industry kilns in the calcination areas (2), in the safety area (3), in the outlet area (6) and in the coolers (7)."

II. This appeal lies from the decision of the opposition division revoking the European patent.

III. The following documents were *inter alia* cited in the opposition proceedings:

D1 to D9: Documents relating to prior uses

D10: DE-A-2 217 271

D11: Affidavit by H. Wirsing dated 30 March 2010

D12: G. Routschka and H. Wuthnow, Taschenbuch "Feuerfeste Werkstoffe", 4th edition, pages 36 and 37

D13: Römpps Chemie Lexikon, 8th edition, page 4295

IV. With the statement of grounds of appeal, filed by letter dated 30 March 2012, the patentee (henceforth: the appellant) submitted its arguments, an auxiliary request and four new documents:

Report 1: "Kaolinite" (12 pages), itc (Istituto de Technologia Ceramica), 2012

Report 2: "Differences between kaolinite and andalusite" (6 pages), itc (Istituto de Technologia Ceramica), 2012

Report 3: "Commercial clays for the manufacture of refractories" (4 pages), itc (Istituto de Technologia Ceramica), 2012

Statement of the inventor, dated 12 March 2012, and 6 pages of photographs of refractory kiln linings (A) to (D) installed at Heidelberger Zement AG, DE.

V. The submissions of the opponent (respondent) were received by letters dated 4 October 2012 and 11 October 2012. The respondent re-submitted several documents filed during opposition proceedings, *inter alia*:

Test Report 176/12 by Refratechnik, dated 21 September 2012; and

Test Report 213/12 by Refratechnik, dated 5 December 2012.

VI. The board in its communication dated 8 May 2014 gave a preliminary and non-binding opinion on certain issues in dispute, namely the alleged prior use, a novelty objection based on D10 and inventive step.

VII. Oral proceedings took place on 9 July 2014 in the absence of the appellant who had announced that it would not attend.

VIII. The appellant essentially argued as follows:

The opposition division's positive finding on novelty of the subject-matter of claim 2 as granted and of sufficiency of disclosure of the opposed patent had become "legally valid" after the lapse of the appeal period.

Regarding inventive step: Starting from D10 as the closest prior art, the problem underlying the patent in suit was to avoid the need for coating the bricks of D10 with a protective coating. Said coating was in the appellant's view a mandatory feature and nothing in D10 suggested that it could be dispensed with. There was also no hint at adding kaolinite to the refractory compositions of D10 in the expectation of solving said problem.

Also, according to the invention, the SiC particles need not have a particle size of not greater than 0.1

mm.

Report 3 explained the differences between andalusite and kaolinite.

The statement of the inventor explained the advantageous effects of the claimed refractory materials containing kaolinite or andalusite and SiC. Photographs of test materials placed in the kilns of Heidelberger Zement AG in Germany showed, after 6 months of use, a noticeable deterioration for bricks (A) (a conventional high-alumina lining), whereas no wear could be detected for the linings mad in accordance with the invention (C and D).

IX. The respondent essentially argued as follows:

D10 anticipated the subject-matter of claim 2 of the main request. The respondent contested that the bricks disclosed in D10 had a mandatory protective coating.

Referring to submissions made in opposition proceedings, the respondent also maintained its novelty objections on the basis of a prior use (D1 to D9, D11) to which no reply in substance had been received from the appellant.

Test report 176/12 demonstrated that refractory bricks made in accordance with D10 exhibited a better abrasion resistance than those prepared in accordance with the opposed patent, even without a protective coating.

Test report 213/12 demonstrated that using andalusite instead of kaolinite did not result in any improvement of the abrasion resistance, compared with the

refractory compositions disclosed in D10.

X. Requests

The appellant requested in writing that the contested decision be set aside and the patent be maintained as granted. As an auxiliary request, it requested that the case be remitted to the opposition division for further discussion [quote] *"inasmuch as the prior use objections now argued by the respondent were never discussed before the opposition division and the appellant did not allow for discussion of this matter before the board of appeal"* [end of quote].

The respondent requested that the appeal be dismissed, or, alternatively, that the case be remitted to the department of first instance for the taking of evidence in case the appellant contested the prior uses and the patent was not revoked on the basis of the written submissions.

Reasons for the Decision

1. Novelty

The board is satisfied that the requirements of Article 54 EPC are met.

Since the appeal fails for other reasons, there is no need to give further details.

2. Inventive step

2.1 Invention

The patent in suit is concerned with refractory materials containing SiC, andalusite or kaolinite, and clay, useful for lining kilns in the cement industry.

2.2 Closest prior art

D10 represents the closest prior art. Said document discloses SiC/mullite refractory bricks for coke ovens or muffle ovens. The document aims at providing bricks having a higher thermal conductivity than conventional fired-clay or silica bricks, due to their high content of SiC (25% to 95% according to claim 1 and 75% in the example, page 9). The mullitic binders of D10 have already been discussed (see point 1.1). For increased abrasion resistance and density a protective coating of zirconium silicate and/or corundum (alumina) may be applied to the fired bricks (see page 5, second paragraph; page 6, second paragraph; and claim 2).

2.3 Problem

According to the patent in suit (see paragraph [0012]), the problem was to provide refractory materials having greater resistance to deformation caused by heat and chemical reactions that occur in cement kilns.

2.4 Solution

As a solution to this problem, the opposed patent proposes a refractory material according to claim 2, characterised by a chemical composition containing a percentage by weight of kaolinite $Al_2Si_2O_5(OH)_4$ of 10-80%, a percentage by weight of silicon carbide SiC of 10-80% and a percentage by weight of clay of 10-15%.

The opposed patent also proposes as a solution to the

above problem a refractory material according to claim 1, characterised by a chemical composition containing a percentage by weight of andalusite Al_2SiO_5 of 10-80%, a percentage by weight of silicon carbide SiC of 10-80% and a percentage by weight of clay of 10-15%.

2.5 Success of the solution

2.5.1 As to the success of the proposed solution, according to the test reports 176/12 and 213/12, the refractory bricks of the patent in suit, containing andalusite or kaolinite in addition to SiC and clay, have a lower abrasion resistance than bricks prepared in accordance with D10.

2.5.2 The test report submitted by the appellant (statement dated 12 March 2012) and the accompanying photographs demonstrate an improved abrasion resistance in a cement rotary kiln, compared with a conventional high-alumina lining. However, no comparison was made with respect to the closest prior art of D10.

Therefore, the board cannot acknowledge that the refractory materials in accordance with the contested patent provide an improvement over those of D10.

2.5.3 The board can however accept that the proposed compositions, after firing, give refractory materials having a resistance to thermal, physical and chemical deformation.

This implies a reformulation of the problem.

2.6 Reformulation of the problem

Starting from D10 as the closest prior art, the

appellant defined the technical problem as to how to avoid the need of having to coat the refractory bricks of D10 with a protective coating which was, in the appellant's view, a mandatory feature of D10.

This formulation of the problem is based on the interpretation of D10 disclosing (only) bricks with a protective coating. In view of the description, page 5, second paragraph, and in view of claim 1 of D10, the protective coating is, however, clearly optional. Therefore, the board cannot accept the appellant's formulation of the problem.

Starting from D10, the board reformulates the problem in providing further refractory materials.

This above reformulated problem is indeed successfully solved.

2.7 Obviousness

It remains to be decided whether the claimed solution is obvious having regard to the prior art, in other words whether it was obvious to add clay (component c) to andalusite (component a1) and silicon carbide (component b) (see claim 1) or to add clay (component c) to kaolinite (component a2) and silicon carbide (component b) (see claim 2).

2.7.1 Component b, i.e. silicon carbide (melting point 2730°C) was known as a fire-resistant component (see D10, page 1, lines 5 to 6; page 2, lines 1 to 4).

2.7.2 As to component a2, kaolinite (the fundamental constituent of most kaolins and clays used in the ceramic and refractory sector; see Report 1, page 2,

Chapter 3 "Kaolinite") is known to transform upon thermal treatment into primary and secondary mullite and a glassy phase (see Report 1, page 5, Chapter 3.3.2.1; D12, page 36, Table 3.1).

Therefore, kaolinite belongs to the group of mullitic binders which are proposed in D10 as a constituent for refractory SiC bricks.

2.7.3 As to component a1, andalusite is an alumosilicate which above 1250°C transforms into mullite and a glassy phase (D12, page 37, Table 3.1).

According to Report 2 (page 5, chapter 3.3.2.2), the structure of andalusite begins to break down at temperatures of 1350°C and transforms into mullite above 1550°C. Insofar andalusite behaves similar to kaolinite. D10 mentions andalusite as a natural rock forming mullite upon thermal treatment and is thus among the mullitic binders for the SiC refractory bricks (see page 6, last line, to page 7, line 7).

2.7.4 As to component c, certain clays (so-called fire clays and flint clays) are also highly refractory. No prejudice can be seen against adding such clays to a refractory composition based on SiC and andalusite and/or kaolinite (see D12, Table 3.1; Report 2, page 1, Chapter 2 ("Summary", Table 1) and page 5 (chapter 3.2.2).

According to the respondent, a certain proportion of clay in the green mixture (the "Versatz") was needed for plasticity. This is confirmed by the patent in suit (paragraph [0010]). Further, clay is used as a bonding-melting agent (see D10, page 6, lines 7 to 10).

Clays are also known to harden during firing by forming mullite (see D13, page 4295, right-hand column, last paragraph).

Therefore, in the board's conclusion, the addition of clay to a refractory composition which contains SiC and kaolinite or andalusite in the relatively broad proportions as claimed, was obvious and in any event known from and suggested by D10.

2.7.5 According to one argument of the appellant, the claimed refractory materials differed from those of D10 - besides the protective coating (see point 2.6) - additionally and advantageously in that the SiC need not have a particle size of not greater than 0.1 mm.

However, the board cannot recognise a distinction or advantage in this respect as the particle size of the SiC to be used in accordance with the opposed patent is neither specified in the claims nor mentioned in the specification.

2.8 In summary, the subject-matter of claims 1 and 2 does not involve an inventive step (Article 56 EPC).

3. Auxiliary request

The appellant requested, as an auxiliary measure, that the case be remitted to the opposition division for further discussion *"inasmuch as the prior use objections now argued by the respondent were never discussed before said Division and the appellant did not allow for discussion of this matter before the board of appeal"* [end of quote].

As the issue of prior uses is not material for the

board's decision, the appellant's auxiliary request is irrelevant and invalid.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz G. Raths

Decision electronically authenticated