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**Datasheet for the decision
of 27 April 2018**

Case Number: T 1709/14 - 3.3.05

Application Number: 09157374.1

Publication Number: 2100861

IPC: C04B28/02

Language of the proceedings: EN

Title of invention:

Use of a hydraulic binder containing photocatalyst particles

Patent Proprietor:

ITALCEMENTI S.p.A.

Opponents:

Dyckerhoff AG
crenox GmbH

Headword:

Binder containing photocatalyst/ITALCEMENTI

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - main request (yes)

Decisions cited:

T 1513/11

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 1709/14 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 27 April 2018

Appellant: Dyckerhoff AG
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
7 July 2014 concerning maintenance of the
European Patent No. 2100861 in amended form.**

Composition of the Board:

Chairman E. Bendl
Members: A. Haderlein
 O. Loizou

Summary of Facts and Submissions

I. The present appeal of opponent 1 (appellant) lies from the opposition division's interlocutory decision finding that European patent No. 2 100 861 as amended according to the main request underlying the impugned decision and the invention to which it relates meet the requirements of the EPC. Opponent 2 (Crenox GmbH) withdrew its opposition in the course of the proceedings before the opposition division.

II. The two independent claims of this request read as follows (amendments with respect to the corresponding claims as granted struck through or underlined):

"1. Use of an hydraulic binder to form a cement composition with water and fine or coarse aggregates to make architectural concrete, to preserve over time the original appearance of architectural concrete made therefrom and at the same time to decrease pollution in the environment in contact with the said architectural concrete, said hydraulic binder containing particles of titanium dioxide, or a precursor thereof, in the form of anatase for at least 5% as a photocatalyst ~~able to oxidize~~ oxidizing polluting substances in the said environment in the presence of light, air and environmental humidity, said photocatalyst particles being distributed in bulk throughout the mass of the hydraulic binder in amount from 0.01 to 10% by weight of the hydraulic binder.

14. Use of a dry premix to form a cement composition with water and fine or coarse aggregates to make architectural concrete, to preserve over time the original appearance of architectural concrete made therefrom and at the same time to decrease pollution in

the environment in contact with the said architectural concrete, said dry premix comprising an hydraulic binder containing particles of titanium dioxide, or a precursor thereof, in the form of anatase for at least 5% as a photocatalyst ~~able to oxidize~~ oxidizing polluting substances in the said environment in the presence of light, air and environmental humidity, said photocatalyst particles being distributed in bulk throughout the mass of the binder in amount from 0.01 to 10% b.w. of the hydraulic binder."

The dependent claims 2 to 13 and 15 are directed to particular embodiments of the independent claims they depend upon.

III. In the impugned decision, the opposition division held that the proprietor's (now respondent's) main request complied with the requirements of Articles 76(1) and 123(2) and (3) EPC. The claims were also considered to be clear in the sense of Article 84 EPC, and the requirement of sufficiency of disclosure set forth in Article 83 EPC was equally held to be complied with. The claimed subject-matter was held to be novel and to involve an inventive step.

IV. The following documents were cited *inter alia* in the course of the proceedings before the opposition division:

D2: Kronos Leitfaden, Grundlagen und Anwendung von Kronos Titandioxid, Kronos Titanfabriken, 1967; 69-76, 108-114, 212-217, 401-404

D10: US-A-3 102 039

D13: ES-A6-2018744 and translation thereof (D13A)

D17: Könneker, K., Titandioxid in Sichtbetonfertigteilen, Betonwerk +

Fertigteiltechnik, 7/1979, 429-431 (referred to by the respondent as D19).

V. With its grounds of appeal, the appellant filed the following documents:

BF1: Diagram

BF2: Hoffmann, M.R., et al., Environmental Applications of Semiconductor Photocatalysis, Chem. Rev., 1995, 95, 69-96

BF3: Declaration by Prof. Dr. Detlef Bahnemann dated 16 September 2011

BF4: Declaration by Prof. Dr. Detlef Bahnemann dated 19 November 2012.

BF5: Diagram "Mixtures"

VI. With its reply to the grounds appeal, the respondent maintained the claims forming the basis for the impugned decision as its main request and additionally filed an auxiliary request.

VII. With its submission of 10 October 2017 the appellant withdrew its request for oral proceedings by announcing that it would not attend the then scheduled oral proceedings. The board then cancelled the oral proceedings.

VIII. The appellant's arguments, as far as relevant for the present decision, can be summarised as follows:

The subject-matter of the independent claims lacked inventive step starting from common general knowledge as evidenced in particular by BF1 to BF4 in combination with D2, D10, D13 or D17. BF5 also showed that the prior art taught to add titanium dioxide to components

of concrete compositions.

- IX. The respondent's arguments, as far as relevant for the present decision, can be summarised as follows:

It was highlighted several times in the patent in suit that the photocatalytic reaction of titanium dioxide was well known in the art. However, the use of the claimed hydraulic binder to preserve over time the original appearance of architectural concrete made therefrom could not be derived in an obvious manner from the combinations of the prior art cited by the appellant.

- X. Requests

The appellant requested that the impugned decision be set aside and that the patent be revoked.

The respondent requested that the appeal be dismissed or that the patent be maintained in amended form based on the auxiliary request filed with the reply to the grounds of appeal.

Reasons for the Decision

1. Objections raised

In its grounds for appeal the appellant referred in general to "[d]as bisherige Vorbringen der Einsprechenden (Anträge und Argumentationen)" (translation by the board: "[t]he submissions of the opponent hitherto brought forward (requests and arguments)" as being part of the appeal procedure.

Even though documents from the opposition procedure were attached to these grounds, and taking into account that in the opposition procedure objections other than those relating to inventive step were raised, the mere and unsubstantiated reference to first-instance objections (with or without attachment of the corresponding documents) cannot be considered a sufficient reasoning with regard to these objections (see the case law of the Boards of Appeal, 8th ed., IV.E.2.6.4 a)).

Therefore only the objection with regard to lack of inventive step is considered to be sufficiently substantiated in the appeal procedure.

2. Inventive step - main request
- 2.1 The invention concerns a hydraulic binder containing photocatalyst particles.
- 2.2 According to the appellant, the closest prior art was represented by the common general knowledge. It was commonly known that titanium dioxide in anatase form was effective in photocatalytic activity, i.e. in oxidising or reducing processes and in eliminating processes of organic and inorganic substances at or in the area of the surface of titanium dioxide particles. It was also known that such titanium dioxide particles were hydrophilic and that they could be used as white pigment.

This common general knowledge as evidenced in particular by BF1 to BF5 is uncontested. It is also uncontested that the closest prior art does not disclose these features in combination with titanium

dioxide or a precursor thereof in the form of anatase for at least 5% contained in an amount from 0.01 to 10% by weight in a hydraulic binder.

The board concludes from the appellant's submissions that the closest prior art is represented by the commonly known use of titanium dioxide in anatase form for oxidising substances in the presence of light air and environmental humidity.

- 2.3 According to the patent in suit, the problem to be solved involves the constant maintenance with time of the original appearance of architectural concrete (paragraph [0009]).
- 2.4 According to claim 1 of the main request, it is proposed to solve this problem by the use of titanium dioxide in the form of anatase as a photocatalyst characterised in particular in that it is used in a hydraulic binder and to form a cement composition in an amount from 0.01 to 10% by weight of the hydraulic binder and in that the hydraulic binder is used to preserve over time the original appearance of architectural concrete made therefrom.
- 2.5 It is uncontested that the problem is solved. Moreover, it is also credible for the board that the problem is effectively solved in view of the data contained in the patent in suit (see for instance example 1). Thus, the problem does not need to be reformulated.
- 2.6 As to obviousness, the appellant refers to D2, D10, D13 and D17.
- 2.6.1 D2 teaches to use 2.5 to 5% by weight KRONOS A (based on the amount of cement - page 401, penultimate

paragraph; page 402, Table 20) which uncontestedly is photocatalytically active titanium dioxide in anatase form. D2 also teaches that titanium dioxide increases the whiteness of the concrete (page 401, penultimate paragraph). While it is uncontested that D2 addresses the photocatalytic activity of titanium dioxide, this document rather teaches away from using titanium dioxide in order to preserve over time the original appearance of architectural concrete, as submitted by the respondent, because it teaches that the presence of titanium dioxide in some pigment systems can lead to a grayish appearance of the surface containing them (see in particular page 70, second paragraph). In any event D2 fails to teach the use of titanium dioxide as a means of preserving over time the original appearance of architectural concrete.

2.6.2 D10 discloses titanium dioxide in anatase form in an amount of 20% per weight of the hydraulic binder (i.e. Portland cement; see example III; column 4, lines 9 and 10), the concentrations in the order of 3 to 7.5% disclosed therein referring to the overall suspension or the aggregate (column 2, lines 34 *et seq.* and column 4, lines 18 *et seq.*). Thus, D10 fails to teach the proposed solution. In this respect, the appellant's argument according to which the amount added would be a routine task for the skilled person cannot be accepted because it amounts to a mere allegation and in particular D10 shows that the skilled person would not necessarily have used concentrations of 10% and below, based on the weight of the hydraulic binder.

2.6.3 Concerning D13 (reference is made to the translation D13A thereof), this document teaches to use titanium dioxide in order to adjust the brightness of the concrete when producing it (page 2, lines 16 to 24,

page 3, lines 7 to 15) but is silent about its effects in the long run, i.e. does not contain any teaching with respect to preserving over time the original appearance of architectural concrete. Therefore, although D13 discloses a concrete composition containing 0.1 wt.% titanium dioxide, D13 fails to teach the proposed solution, i.e. *inter alia* to use a hydraulic binder containing titanium dioxide in anatase form in order to preserve over time the original appearance of architectural concrete.

- 2.6.4 Contrary to the appellant's opinion, D17 relates to the aesthetic appearance of exposed surface concrete ("Sichtbeton") by the addition of titanium dioxide (anatase or rutile) as a pigment (p. 429, left-hand column, second paragraph; page 430, left-hand column, first paragraph) and does not address the problem of preserving over time the original appearance of architectural concrete and thus fails to suggest the proposed solution. Reference is also made in this context to T 1513/11, point 4.2 of the Reasons, where reference is made to the same document as "D1".
- 2.6.5 Finally, the board also notes that in the grounds of appeal (see item 7), the appellant very briefly argues that the prior art taught to add titanium dioxide to various components of the concrete composition and, therefore, it was obvious to use titanium dioxide as a component of a concrete composition.

This argument must however fail, in particular as it lacks any submission as to why the skilled person would have added titanium dioxide to a concrete composition in order to preserve over time the original appearance of architectural concrete.

2.6.6 The board thus concludes that it was not obvious to arrive at the subject-matter of independent claim 1. The same holds true for independent claim 14 and for the dependent claims 2 to 13 and 15.

2.7 The requirement of inventive step set forth in Article 56 EPC is therefore met for the main request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated