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**Datasheet for the decision
of 1 August 2024**

Case Number: T 0370/22 - 3.2.08

Application Number: 17721495.4

Publication Number: 3448302

IPC: A61C13/00, A61C13/083,
A61K6/02, C04B35/486, A61C5/77

Language of the proceedings: EN

Title of invention:
A METHOD OF MAKING A DENTAL RESTORATION

Patent Proprietor:
Solventum Intellectual Properties Company

Opponent:
Ivoclar Vivadent AG

Relevant legal provisions:
EPC Art. 54, 56
RPBA 2020 Art. 11

Keyword:
Main request - novelty - (yes)
Main request - inventive step - (no)
Remittal - (yes)



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Case Number: T 0370/22 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 1 August 2024

Appellant:

(Opponent)

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Decision under appeal:

**Decision of the Opposition Division of the
European Patent Office posted on 14 December
2021 rejecting the opposition filed against
European patent No. 3448302 pursuant to Article
101(2) EPC.**

Composition of the Board:

Chairwoman P. Acton
Members: C. Vetter
 C. Schmidt

Summary of Facts and Submissions

- I. The appeal was filed by the opponent (appellant) against the decision of the opposition division to reject the opposition filed against the patent in suit.
- II. The opposition division had decided that the subject-matter of the claims as granted was novel and involved an inventive step.
- III. Oral proceedings were held by videoconference before the Board.
- IV. The appellant (opponent) requested that the decision under appeal be set aside and that the patent in suit be revoked.

The respondent requested that the appeal be dismissed, i.e. that the patent be maintained as granted - or that the patent be maintained on the basis of one of the auxiliary requests 1 to 11, all filed on 17 August 2022 with the respondent's reply to the grounds of appeal.

- V. Claim 1 of the main request reads as follows (feature designation added by the Board):

M1 A method of making a monolithic dental restoration, comprising the steps of:

M1.1 providing a monolithic precursor of a dental restoration

M1.2 being made of zirconia material

M1.3 having a relative density of greater than 98% of the theoretic density of the zirconia material;

M1.4 firing the monolithic dental restoration precursor

- M1.5** at a temperature of at least 800 °C
- M1.6** for a duration of at least 10 seconds
- M1.7** to provide the monolithic dental restoration.

VI. In the present decision, reference is made to the following documents:

- D1: Ivoclar Vivadent AG, IPS e.max ZirCAD
Instructions for use (02/2010)
- D3: H. Schubert et al., "Einfluß der
intergranularen Glasphase auf die
Umwandlungsfähigkeit von TZP" in: J.
Kriegesmann, Keramische Werkstoffe, 3. Erg.-
Lfg. 1990, Chapter 5.1.3.1
- D4: WO 2015/084931 A1

VII. The arguments of the parties relevant to the decision are set out below in the reasons for the decision.

Reasons for the Decision

1. Main request - novelty

1.1 Novelty over D1

1.1.1 It can be left open whether document D1 constitutes prior art within the meaning of Article 54(2) EPC, since it does not anticipate the subject-matter of claim 1 for the following reasons.

1.1.2 D1 discloses on page 4, left column, lines 1 to 4 under "Material", and right column under "Indications" a method of making a dental restoration which involves

M1.1 providing a monolithic precursor of a dental restoration

M1.2 being made of zirconia material.

1.1.3 Regarding the density of the monolithic precursor, D1 discloses on page 4, left column, lines 21 to 23 under "Material":

During the sintering procedure, the final, material-specific properties of the TZP are achieved. In the process, a structure that is densified to more than 99% is created.

Hence, D1 also discloses feature **M1.3**, i.e. the monolithic precursor

M1.3 having a relative density of greater than 98% of the theoretic density of the zirconia material.

1.1.4 D1 further discloses on page 25 that the monolithic precursor can be subject to a regeneration firing. According to the table on page 25 of D1, the firing parameters involve a temperature T1 of 1050°C and a duration H1 of 15 minutes, which anticipates

M1.4 firing the monolithic dental restoration precursor

M1.5 at a temperature of at least 800 °C

M1.6 for a duration of at least 10 seconds.

1.1.5 With respect to the question, whether the dental restoration disclosed in D1 is a *monolithic* dental restoration as required by feature **M1**, the appellant referred to page 3, third paragraph of D1, which reads as follows (emphasis added):

After that [sintering], IPS e.max ZirCAD frameworks are conventionally veneered using the IPS e.max Ceram layering ceramic or pressed over using the IPS e.max ZirPress fluorapatite ingots.

The appellant argued that "conventionally" meant "üblicherweise, aber nicht zwingend" ("usually, but not mandatory"), so that the veneering or pressing-over step was optional. Therefore, according to the appellant, the monolithic precursor - without a veneer or press-over applied on it - constituted a monolithic dental restoration within the meaning of feature **M1**.

1.1.6 However, D1 does not contain a direct and unambiguous disclosure that the monolithic precursor without a veneer or press-over applied on it can actually be used to restore a tooth. The term "conventionally" in the quoted context is at least ambiguous in this regard, as it could (and most probably would) be understood to

mean "in a conventional manner". This is all the more so as the entire disclosure of D1 takes it for granted that either a veneer or a press-over is applied on the monolithic precursor (see, e.g. D1, page 3, left column, last sentence).

1.1.7 A monolithic precursor having a veneer or press-over applied to it, in turn, is not a *monolithic* entity, since it is not made of a single piece.

1.1.8 Hence, D1 does not disclose a *monolithic* dental restoration as required by feature **M1**, so that the subject-matter of claim 1 of the main request is new over the disclosure of D1.

1.2 Novelty over D3

1.2.1 It can be left open whether document D3 constitutes prior art within the meaning of Article 54(2) EPC, since it does not anticipate the subject-matter of claim 1 for the following reasons.

1.2.2 D3 is a publication about ZrO₂ ceramics in general and describes processing of powders into green bodies and making samples of these. The samples discussed in D3 are test sticks with the dimensions 2.5 * 2.5 * 30 mm³ (D3, page 3, point 2.5).

1.2.3 The appellant argued that the expression "monolithic dental restoration" as used in claim 1 of the patent in suit did not imply any limitation regarding the composition, structure or geometry. Moreover, according to the appellant, dental restorations often involved the use of abutments which were stick-shaped, just as the test sticks disclosed in D3.

1.2.4 However, a stick of 30 mm in length and 2.5 mm in width is not suitable for the restoration of a tooth as it does not have the right shape. It can also not be used as an abutment as it is too large. In addition, an abutment is only a connecting element between a dental implant and a prosthetic restoration such as a dental crown. Therefore, an abutment alone does not restore a tooth.

1.2.5 Therefore, D3 does not disclose a method of making a monolithic *dental restoration* within the meaning of feature **M1**, so that the subject-matter of claim 1 of the main request is also new over the disclosure of D3.

2. Main request - inventive step

2.1 Claim construction

2.1.1 The respondent argued that the skilled person, who ruled out meaningless interpretations of a claim, understood claim 1 of the patent in suit as requiring two *separate* steps or actions. According to the respondent, the first step or action, i.e. the step of providing a monolithic precursor of a dental restoration according to features **M1.1** to **M1.3**, implied that the precursor - at the end of the step - was outside a furnace, because only then was the precursor effectively "provided" and its characteristics were determinable. The step of firing the monolithic dental restoration precursor according to features **M1.4** to **M1.7** was a separate second step or action, in particular since the term "firing" implied a (separate) heating phase, steady state phase and cooling phase. The respondent concluded that a *single* heat treatment in a furnace would not anticipate the method as claimed.

2.1.2 However, claim 1 does not require that the firing step according to features **M1.4** to **M1.7** is an *additional* firing step or a *separate* step or action, or that the firing step comprises a heating phase, a steady state phase and a cooling phase.

Claim 1 does also not exclude that the monolithic precursor is provided in a hot state. In fact, a monolithic precursor located in a furnace that can be opened and closed at will by the operator is effectively provided to the operator, since the monolithic precursor at this stage can be handled, analysed or further processed by the operator as desired.

It follows that if the step of providing the monolithic precursor according to features **M1.1** to **M1.3** is effected by sintering a dental mill blank made of zirconia material in a furnace, the step is completed once the density required by feature **M1.3** is achieved. Any further treatment of the - then existing - monolithic precursor, which includes further heat treatment, can in principle be regarded as a further firing step within the meaning of feature **1.3**.

This interpretation of the claim makes sense, since it is technically reasonable to logically divide the sintering process into separate phases, in particular in view of the progressive densification of the article during sintering.

2.2 Inventive step over D4

2.2.1 D4 discloses on page 32, lines 13 to 16 and 25 to 28 a process of producing a zirconia ceramic dental article:

The process of producing the zirconia ceramic dental article comprises the steps of

- a) providing the dental mill blank comprising the porous zirconia material,
- b) placing the dental mill blank in a machining device,
- c) machining the porous zirconia material to obtain a machined porous zirconia dental article.

The process of producing the zirconia dental article may further comprise the step of sintering the article obtained by machining the porous zirconia dental mill blank.

Sintering will result in a zirconia dental article.

D4 continues on page 33, lines 24 to 26:

Generally, the sintering or firing conditions are adjusted such that the sintered dental ceramic article has a density of equal or greater than about 98 % compared with the theoretically achievable density.

Sintering in D4 takes place in a furnace (D4, page 33, line 12). It follows that once the monolithic precursor with the required density *exists*, i.e. once the monolithic precursor in the furnace has reached the density required by feature **M1.3**, it is also effectively *provided* to the operator.

Consequently, D4 discloses a step of

M1.1 providing a monolithic precursor of a dental restoration

M1.2 being made of zirconia material

M1.3 having a relative density of greater than 98% of the theoretic density of the zirconia material.

2.2.2 According to D4, the sintering may be performed until an even higher density is achieved. D4 discloses in this regard on page 34, lines 1 to 4:

The ceramic dental article after a sintering step can usually be characterized by at least one or more of the following features:

- density: fully sintered density of at least about 98.5 (in some embodiments, 99, 99.5, 99.9, or even at least 99.99) percent of theoretical density.

2.2.3 The respondent argued that D4 only mentioned "the step of sintering" or "a sintering step" in singular. Therefore, according to the respondent, D4 did not disclose *two* steps as required by claim 1.

2.2.4 It is true that D4 does not disclose such sintering for achieving an even higher density as a *separate* step. However, continued sintering to a higher density *constitutes* a firing step within the meaning of claim 1 of the patent in suit, since the step of providing the monolithic precursor ends when the density required by feature **M1.3** is achieved (see above point 2.1.2).

Therefore, D4 also discloses a step of

M1.4 firing the monolithic dental restoration precursor

M1.5 at a temperature of at least 800 °C

M1.6 for a duration of at least 10 seconds

M1.7 to provide the monolithic dental restoration.

2.2.5 It was undisputed that the result of the method disclosed in D4 is a monolithic dental restoration within the meaning of feature **M1**.

2.2.6 It follows that claim 1 has no distinguishing features over the disclosure of D4.

2.2.7 The subject-matter of claim 1 of the main request is therefore rendered obvious by the disclosure of D4 alone.

3. Remittal

3.1 Pursuant to Article 11 RPBA 2020, the Board may remit the case to the department whose decision was appealed for further prosecution if there are special reasons for doing so.

3.2 In the present case, auxiliary requests 1 to 11 are requests that the opposition division has not yet dealt with. Since the primary object of the appeal proceedings is to review the decision under appeal (Article 12(2) RPBA 2020), and since there is no decision of the opposition division on auxiliary requests 1 to 11 that could be reviewed, there are special reasons for remittal.

3.3 The Board's intention to remit the case concerning auxiliary requests 1 to 11 to the opposition division was communicated to the parties at the oral proceedings. None of the parties objected to this.

3.4 The matter is therefore remitted to the opposition division for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division for further prosecution.

The Registrar:

The Chairwoman:



T. Buschek

P. Acton

Decision electronically authenticated