BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen
(D) [ ] No distribution

Datasheet for the decision of 29 January 2009

Case Number: T 0065/07 - 3.3.05

Application Number: 04758776.1

Publication Number: 1613566

IPC: C04B 35/64

Language of the proceedings: EN

Title of invention:
Method for producing ceramic objects

Applicant:
SIEMENS AKTIENGESELLSCHAFT

Opponent:
-

Headword:
Selective laser sintering/SIEMENS AG

Relevant legal provisions:
EPC Art. 83, 84

Relevant legal provisions (EPC 1973):
-

Keyword:
"Clarity, support of claims: yes - after amendment"
"Sufficiency of disclosure: yes - after amendment"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0065/07 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 29 January 2009

Appellant: SIEMENS AKTIENGESELLSCHAFT
Patent Department
Postfach 22 16 34
D-80506 München (DE)

Representative: -

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 6 November 2006 refusing European application No. 04758776.1 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: G. Raths
Members: H. Engl
H. Preglau

Summary of Facts and Submissions

I. This appeal lies against the decision of the examining division refusing European patent application Nr. 04758776.1.

II. The examining division held that the claims on file did not fulfil the requirement of clarity (Article 84 EPC) and that the claimed invention was not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC).

III. The decision of the examining division was reached during oral proceedings after a discussion of the process of laser beam densification and its relevance for the claimed subject matter, as disclosed in document

D1: US-A-5 837 960.

During the said discussion, the applicant (appellant) declared that the process claimed in the present application, in contrast with D1, did not require moving of the laser head over the ceramic powder bed. As to the claimed laser densification process, the applicant referred to the skilled person's general knowledge of laser sintering which was a standard procedure. The appellant also stated that according to the application laser densification did not necessarily take place in a manner of a layer-by-layer process.

The examining division observed that the notions of a fixed laser head and of a sintering and densification

process not effected in a layer-by-layer manner were in contrast with the description disclosing laser scanning, *i.e.*, a movement of the laser head. Since the prior art was also silent as to how a process as now submitted by the appellant could be put into practice, the application did not sufficiently disclose how a shaped object could be obtained from a ceramic powder bed by sintering without layer-by-layer scanning and laser sintering.

IV. The appeal was filed with letter dated 10 November 2006. In an annex to said letter, the appellant filed a new set of claims 1 to 15 and documents A to D as annexes.

A: R.-J. Ahlers and G. Reinhart, *"Rapid Prototyping and Flexible Manufacturing"*, Proceedings of SPIE, Vol. 3102, Munich, Germany, 1997, pages 112 to 119;

B: A. Gebhardt, *"Rapid Prototyping"*, 1996, pages 48, 62 to 67, 115 to 133;

C: R. M German, *"Sintering Theory and Practice"*, John Wiley & Sons, New York, USA, pages 73 to 75;

D: Salmann, Schulze, *"Keramik"*, Part 1, Springer Verlag, Berlin, Germany, pages 150 to 183.

V. The independent claims of the new set of claims read as follows:

"1. A process for producing a ceramic shaped object from ceramic powder,
providing a powder bed and a laser,
scanning the laser over the powder bed
and laser sintering the powder bed in such a way that the geometry of the component is produced from raw material powder bed,

said process comprising forming a first region of the shaped object by laser sintering of a first ceramic powder and further comprising forming a second region of the shaped object integral with said first region by laser sintering of a second ceramic powder,
wherein the forming of at least one of the first and second regions comprises controlling at least one parameter selected to provide a different material property in the first and second regions of the shaped object,
the material property is selected from the group consisting of densification, porosity, surface roughness and any combination thereof,
wherein additional layers of powder and additional steps of laser heating maybe added to form a ceramic shape in accordance with a shaped object."

"11. A ceramic mold formed by the process of claim 1 wherein the first ceramic powder comprises a first material and the second ceramic powder comprises a 30 second material different than the first material."

"12. A ceramic mold formed by the process of claim 1 wherein the first region comprises a first porosity and the second region comprises a second porosity different than the first porosity."

"13. A ceramic mold formed by the process of claim 1 wherein the first region comprises a first density and the second region comprises a second density different than the first density."

"14. A ceramic mold formed by the process of claim 1 wherein the first region comprises a first surface roughness and the second region comprises a second surface roughness different than the first surface roughness."

"15. A ceramic mold formed by the process of claim 1 wherein the first ceramic powder comprises a first average grain size and the second ceramic powder comprises a second 20 average grain size."

VI. The appellant essentially argued as follows:

The term "laser sintering" was well-known in the art before the priority date of the application. It was evident that the laser beam must be **scanned** across the surface, because the laser spot was small compared with the size of the objects to be sintered. Therefore, in the process termed "laser sintering", the laser beam must be scanned across the bed of powder which is to be sintered. This was disclosed on page 4 of the description.

References A and B were cited in order to illustrate the skilled person's knowledge of selective laser sintering of a ceramic powder bed and its use in "Rapid Prototyping". More generally available information was disclosed in the application itself, in particular in the chapter on the background to the invention citing US-A-4 863 538 and US-A-5 132 143. The application, page 4, last paragraph, also taught that the laser is controlled as it is scanned across the powder bed, with the laser power being adapted (*i.e.*, increased or

lowered) in order to achieve the desired degree of densification in the various regions.

The skilled person was therefore fully instructed how to perform the process of selective laser sintering.

VII. *Requests*

The appellant requested that the contested decision be set aside and that the application be remitted to the examining division for grant.

Reasons for the Decision

1. *Amendments*

Claim 1 is based on claims 1 and 3 and the description, page 3, lines 14 - 16, page 4, lines 19, 31 and 32, of the original application documents published as WO-A-2004/089851.

Claims 2 to 15 correspond to original claims 2 and 4 to 16, respectively.

The requirements of Article 123(2) EPC are thus met.

2. *Clarity, sufficiency of disclosure*

2.1 The examining division has acknowledged in its decision (see page 3, second paragraph, of the reasons) that the terms *"laser sintering"* and *"laser prototyping",* as used in the context of the application, were well known in the art. Laser sintering, for instance, is described

in US-A-4 863 538, a document cited as background art in the application under appeal. Therefore, the examiner entrusted with examination of the case initially had no doubts that the laser sintering process of the application involved a layer-by-layer additive process in which the laser beam scans each successive layer of the ceramic powder bed and selectively densifies the respective areas according to the horizontal section of the desired object. This is in fact what is disclosed in the application as filed (page 4, line 19 to page 5, line 3).

Confusion apparently arose only during oral proceedings, when the applicant declared, upon questions from the first examiner, that the invention did **not** necessarily comprise such a layer-to-layer densification step and that the laser head was **not moved** (or, in other words not scanned) over the ceramic powder bed, these statements being in clear contrast with the disclosure at page 4 of the description. Subsequent additional explanations of the claimed process given by an expert accompanying the representative at the oral proceedings were deleted from the Minutes at the request of the representative. This information is therefore not available to the board. See Minutes of the oral proceedings, points 4 and 5.

Since no clarification was forthcoming, the examining division decided to refuse the application on grounds of insufficiency of disclosure and lack of clarity.

2.2 In view of the misleading statements of the appellant during oral proceedings the examining division had no other choice than to refuse the application.

2.3 For the board, it is pointless to speculate about the appellant's reasoning at the oral proceedings before the examining division because, in its statement of grounds of appeal, pages 2 and 3, the appellant has now unmistakably clarified that the claimed process in fact **does** involve scanning of a laser beam over the powder bed. In accordance with the well known principles of rapid prototyping by laser sintering, this is done selectively and repeatedly, in a layer-by-layer fashion, by scanning the laser beam over the ceramic powder bed in order to sinter it locally. The appellant referred to Annexes A and B (pages 115, 119) in order to demonstrate that processes and apparatuses for rapid prototyping by laser sintering were well-known to the skilled person. Further reference was made to the passage of the application as filed (page 1, line 25 to page 2, line 8) discussing prior art on selective laser sintering and rapid prototyping.

The board finds these explanations plausible. They are also in complete conformity with the disclosure of the application under appeal, in particular with the embodiment of the application described on page 4, last paragraph to page 5, line 3. The board has also no doubts, in view of the evidence and arguments presented, that the process of selective laser sintering of a powder bed was sufficiently well known to the skilled person, so that it is not necessary to disclose it in further and fuller detail in the application. The board finds itself here in agreement with the examining division (see the contested decision, page 3, paragraphs 2 and 3).

Process claim 1 as amended now specifically mentions that the laser is scanned over the powder bed and that additional layers of powder and additional steps of laser heating may be added to form a ceramic shape in accordance with a shaped object. The claim is thus supported by the description (in particular by page 4, lines 19 to 33).

2.4 In view of the above, the reasons for refusing the application have been rendered moot. The requirements of Articles 83 and 84 EPC are met.

3. Since the main request of the appellant is fully allowable, the auxiliary request for oral proceedings need not be considered.

4. *Remittal*

The contested decision was based solely on the grounds of lack of clarity (Article 84 EPC) and insufficiency of disclosure (Article 83 EPC). The claims now on file are clear and concise and supported by the description, and the application fulfils the requirements of Article 83 EPC. The board finds it appropriate in these circumstances to exercise its discretionary power pursuant to Article 111(1) EPC and to remit the case to the department of first instance 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 department of first instance for further prosecution.

The Registrar The Chairman

C. Vodz G. Raths