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**Datasheet for the decision
of 14 February 2014**

Case Number: T 1048/13 - 3.2.03

Application Number: 03768446.1

Publication Number: 1583627

IPC: B22F3/105

Language of the proceedings: EN

Title of invention:

ARRANGEMENT AND METHOD FOR PRODUCING A THREE-DIMENSIONAL
PRODUCT

Applicant:

ARCAM AB

Headword:

Relevant legal provisions:

EPC Art. 123(2), 113(1), 111
EPC R. 103

Keyword:

Amendments - broadening of claim (no)
Right to be heard - substantial procedural violation (no)
Reimbursement of appeal fee - (no)
Appeal decision - remittal to the department of first instance
(yes)

Decisions cited:

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 1048/13 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 14 February 2014

Appellant: ARCAM AB
(Applicant) Krokslätts Fabriker 30
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Representative: Ekwall, Peter
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 9 November 2012
refusing European patent application No.
03768446.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman: Y. Jest
Members: G. Ashley
E. Kossonakou

Summary of Facts and Submissions

- I. This appeal lies from the decision of the examining division to refuse European patent application EP-A-03 768 446.1 for failing to meet the requirements of Article 123(2) EPC.
- II. The decision was posted on 9 November 2012. The appellant (the applicant) filed notice of appeal on 20 December 2012, paying the appeal fee on the same day; a statement containing the grounds of appeal was filed on 19 March 2013.
- III. In accordance with Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA), the Board issued a preliminary opinion of the case, together with a summons to attend oral proceedings. In a response dated 16 January 2014, the appellant filed first and second additional auxiliary requests, and in the letter of 27 January 2014 stated that the first additional auxiliary request was to be considered as the appellant's main request.
- IV. Requests

The appellant requested that the above decision be set aside, and that the case be remitted to the examining division for further examination on the basis of the set of claims filed as the main request (formerly the "first additional auxiliary request") with the letter dated 27 January 2014.

Oral proceedings were requested, should the Board be considering an adverse decision on this matter.

The appellant also alleged a substantial procedural violation, and requested a reimbursement of the appeal fee.

V. Claims

Claim 1 of the main request reads as follows:

"1. A method for production of three-dimensional bodies by successive fusing together of selected areas of a powder bed, which areas correspond to successive cross sections of the three-dimensional body, which method comprises the following method steps:

application of powder layers to a work table,

supplying energy from a radiation gun according to an operating scheme determined for the powder layer to said selected area within the powder layer, fusing together that area of the powder layer selected according to said operating scheme for forming a cross section of said three-dimensional body, a three-dimensional body being formed by successive fusing together of successively formed cross sections from successively applied powder layers,

characterized in that

an energy balance is calculated for said selected area according to $E^{in}(i) = E^{out}(i) + E^{heat}(i)$, where $E^{in}(i)$ represents energy fed into the selected area, $E^{out}(i)$ represents energy losses through dissipation and radiation from the part area, and $E^{heat}(i)$ represents energy stored in the selected area,

and where it is assumed that the temperature in an X and Y direction is constant, that the temperature in the z direction varies with jLt where j is the layer number and Lt is the layer thickness, and that the temperature distribution during fusion is stationary,

it being determined in the calculation whether energy radiated into the selected area from the surroundings of the selected area, before energy has been supplied via the radiation gun, is sufficient to maintain a defined working temperature of the selected area, and in addition to said energy for fusing together the selected area, energy for heating the selected area is supplied if the result of the energy balance calculation is that sufficient energy for maintaining an intended working temperature of the selected area is not present, a defined working temperature of the selected area then being achieved."

Independent claim 4 is directed to an arrangement:

"4. An arrangement for producing a three-dimensional product, which arrangement comprises a work table on which said three-dimensional product is to be built up, a powder dispenser which is arranged so as to distribute a thin layer of powder on the work table for forming a powder bed, a radiation gun for delivering energy to the powder, fusing together of the powder then taking place, means for guiding the beam emitted by the radiation gun over said powder bed for forming a cross section of said three-dimensional product by fusing together parts of said powder bed, and a control computer in which information about successive cross sections of the three-dimensional product is stored, which cross sections build up the three-dimensional product, where the control computer is intended to

control said means for guiding the radiation gun over the powder bed according to an operating scheme forming a cross section of said three-dimensional body, said three-dimensional product being formed by successive fusing together of successively formed cross sections from by (*sic*) the powder dispenser,

characterized in that

the control computer is also arranged so as to calculate an energy balance for at least one part area within each powder layer, the control computer is arranged so as to calculate the energy balance for each powder layer according to $E^{in}(i) = E^{out}(i) + E^{heat}(i)$, where $E^{in}(i)$ represents energy fed into the part area, $E^{out}(i)$ represents energy losses through dissipation and radiation from the part area, and $E^{heat}(i)$ represents energy stored in the part area,

and where it is assumed that the temperature in an X and Y direction is constant, that the temperature in the z direction varies with jLt where j is the layer number and Lt is the layer thickness, and that the temperature distribution during fusion is stationary, it being determined in the calculation whether energy radiated into the part area from the surroundings of the part area, before energy has been supplied via the radiation gun, is sufficient to maintain a defined working temperature of the part area,

the control computer is arranged so as to control said operating scheme for supply of, in addition to said energy for fusing together powder layers, energy for heating the powder layer if the result of the energy balance calculation is that the operating scheme is not providing sufficient energy for maintaining an intended

working temperature of the part area, a defined working temperature of the selected area then being maintained."

Dependent claims 2 to 3 and 5 to 8 concern preferred embodiments of the method of claim 1 and the arrangement of claim 4 respectively.

Independent claims 1 and 4 of the set of claims considered by the examining division are similar to those of the present main request, but the only assumption defined in the claims is that

"...it is assumed that the temperature in an X and Y direction is constant...".

VI. Submissions of the Appellant

a) Article 123(2) EPC

Independent claims 1 and 4 of the main request refused by the examining division contained the feature:

"... and where it is assumed that the temperature in an X and Y direction is constant,..."

The examining division argued that this assumption is only the first step of a calculation routine containing further assumptions, parameter definitions and equations, and cannot be seen in isolation.

Consequently, it was concluded that inclusion of this assumption in the claims without including the rest of the definition of the calculation was contrary to Article 123(2) EPC.

The appellant argued that the amendment relates to the assumption that the power is constant over the entire surface (page 9, lines 16 to 19 of the application). This assumption, along with the other two set out in the application, are general assumptions not coupled to any specific embodiment, and consequently can be considered independently of the detailed calculation routine set out in the application. The present independent claims define all three assumptions, hence the requirements of Article 123(2) are met.

b) Substantial Procedural Violation

Although the appellant had been invited by the examining division to explain why the claims submitted on 14 June 2012 were novel over D1, there was no reasoned statement in the decision under appeal as to why the examining division considered there to be a lack of novelty; consequently the appellant had not been given an opportunity to comment, contrary to Article 113(1) EPC. The appellant considered this to be a substantial procedural violation, and hence requested a reimbursement of the appeal fee and the remittal of the case back to the examining division.

Reasons for the Decision

1. The appeal is admissible.
2. Article 123(2) EPC
 - 2.1 The purpose of the invention is to provide a better control of the energy supplied from the radiation gun for fusing the layers of powder. This is achieved by calculating an energy balance that takes into account

energy losses and energy stored in a selected area of powder. The calculation is summarized in amended claims 1 and 4 of the main request dated 27 January 2014, and is set out in detail in the description of the application.

- 2.2 In order to enable the calculation to be performed in real time, it is necessary to make simplifications, and three assumptions are listed in the application (page 9, line 25 to page 10, line 2). The aforementioned disputed feature concerns the first assumption, namely that the temperature is constant in the X and Y directions and varies only in the z direction.
- 2.3 Although the detailed calculation on pages 10 to 15 is based on these assumptions, it cannot be said that the reverse is true, ie the assumptions are based on or derived from the calculation. The argument of the appellant that such assumptions are general and not coupled to any specific embodiment of the invention appears to be sound. Hence, contrary to the conclusion of the examining division (page 4 of the decision), the assumptions can be considered independently of definitions of parameters and equations making up the calculation routine.
- 2.4 However, the application teaches that all three assumptions are required in order for it to be possible to calculate the power in real time (page 9, line 25 to page 10, line 2). There is no disclosure of taking only one or two of the three assumptions and disregarding the other(s). Thus, while it is not necessary to define the entire calculation itself, all three assumptions need to be included in the independent claims in order for them to meet the requirements of Article 123(2) EPC. Since this is the case for the claims of the main

request, there is no longer an objection under Article 123(2) EPC.

3. Reimbursement of the Appeal Fee (Rule 103 EPC)

The appellant submitted that the failure of the examining division to explain in its decision why the claims lacked novelty over D1 amounted to a substantial procedural violation, since it had not had the opportunity to comment, contrary to Article 113(1) EPC. Consequently, a reimbursement of the appeal fee in accordance with Rule 103 EPC was requested.

The issue of novelty was not considered at all by the examining division; the decision under appeal is not based on novelty, but on Article 123(2) EPC. Since the issue of novelty had no bearing on the outcome of the decision under appeal, there has been no substantial procedural violation and the board does not see a reason for reimbursing the appeal fee.

4. Remittal (Article 111(1) EPC)

The decision of the examining division was based solely on Article 123(2) EPC. It is therefore necessary to remit the case back to the department of first instance for further examination, in particular of novelty and inventive step.

5. Oral Proceedings

Given that the claims of the main request have been found to meet the requirements of Article 123(2) EPC and the case is to be remitted to examining division, it is not necessary to hold oral proceedings.

Order

For these reasons it is decided that:

The decision under appeal is set aside.

The case is remitted to the examining division for further examination.

The Registrar:

The Chairman:



C. Spira

Y. Jest

Decision electronically authenticated