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Datasheet for the decision of 3 November 2009

Case Number: T 1092/08 - 3.2.06

Application Number: 02252606.5

Publication Number: 1249300

IPC: B23K 26/34

Language of the proceedings: EN

Title of invention:
Laser repair method for nickel base superalloys with high gamma prime content

Patentee:
GENERAL ELECTRIC COMPANY

Opponents:
SIEMENS AKTIENGESELLSCHAFT
Alstom Technology Ltd

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)
RPBA Art. 13(1)

Relevant legal provisions (EPC 1973):
EPC Art. 54(2)

Keyword:
"Late-filed requests - not admitted"

Decisions cited:
G 0001/03, T 0201/83, T 0714/00

Catchword:
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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1092/08 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 3 November 2009

Appellant: (Patent Proprietor)	GENERAL ELECTRIC COMPANY 1 River Road Schenectady, NY 12345 (US)
Representative:	Goode, Ian Roy London Patent Operation General Electric International, Inc. 15 John Adam Street London WC2N 6LU (GB)
Respondent I: (Opponent I)	SIEMENS AKTIENGESELLSCHAFT Postfach 22 16 34 D-80506 München (DE)
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Respondent II: (Opponent II)	Alstom Technology Ltd Brown Boveri Strasse 7 CH-5400 Baden (CH)
Representative:	Pöpper, Evamaria ALSTOM Technologies AG CHTI Intellectual Property Brown Boveri Strasse 7/688/5 CH-5400 Baden (CH)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted 2 April 2008 rejecting the opposition filed against European patent No. 1249300 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: M. Harrison
Members: G. Pricolo
W. Sekretaruk

Summary of Facts and Submissions

I. The appeal is from the decision of the Opposition Division posted on 2 April 2008 revoking European patent No. 1 249 300.

II. Claim 1 of the patent as granted reads as follows:

"1. A method of laser repairing a Ni base superalloy substrate surface (12) having a gamma prime content of at least about 30 volume % characterized by the steps of: providing and maintaining the substrate surface (12) at ambient temperature; providing a laser with a laser beam (14) that operates in a power range of about 50 - 10000 watts per square centimeter; disposing the laser in juxtaposition with the substrate surface (12); focusing the laser beam (14) at a point (18) away from the substrate surface (12) to provide a laser spot (20) on the substrate surface (12) in the size range of about 0.76 - 5.1 mm (0.03 - 0.2"); providing a relative movement (30) between the substrate surface (12) and the laser spot (20) so as to provide an interaction time of no greater than about 10 seconds between the laser beam (14) and the substrate surface (12) while concurrently operating the laser beam (14) in the power range and concurrently depositing a repair alloy powder (22) in the laser beam (14) to melt and fuse the repair alloy powder (22) into a molten repair alloy and deposit the molten repair alloy on the substrate surface (12); and, cooling the molten repair alloy to provide a weld bead."

III. The opposition division considered that the subject-matter of claim 1 was not novel having regard to the disclosure of

D27 : Matthias Gäumann: "Epitaxial laser metal forming of a single crystal superalloy", Thesis nr. 1907 (1999), École Polytechnique Fédérale de Lausanne.

IV. The appellant (patent proprietor) filed an appeal, received at the EPO on 10 June 2008, against this decision and paid the appeal fee on the same day. In the statement setting out the grounds of appeal, received at the EPO on 11 August 2008, the appellant essentially submitted that at least the features relating to maintaining a substrate surface at ambient temperature and focusing a laser beam at a point away from a substrate surface were not disclosed by D27.

V. In a communication accompanying the summons to oral proceedings pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal, the Board expressed a preliminary view contrary to that of the appellant and explained why these features were known from D27.

VI. By letter dated 2 October 2009 the appellant filed three sets of claims as first to third auxiliary requests.

VII. Oral proceedings, at the end of which the decision of the Board was announced, took place on 3 November 2009.

The appellant withdrew its main request for maintenance of the patent as granted and also its third auxiliary request. It requested that the decision under appeal be

set aside and the European patent be maintained in an amended form on the basis of one of the first or second auxiliary requests filed on 2 October 2009.

The respondents (opponents I and II) requested that the appeal be dismissed.

VIII. Claim 1 according to the first auxiliary request reads as follows:

"1. A method of laser repairing a Ni base superalloy substrate surface (12) having a gamma prime content of 40-75 volume % comprising the steps of: providing and maintaining the substrate surface (12) at ambient temperature; providing a laser with a laser beam (14) that operates in a power range of 50 - 10000 watts.cm^{-2}; disposing the laser in juxtaposition with the substrate surface (12); focusing the laser beam (14) at a point (18) away from the substrate surface (12) to provide a laser spot (20) on the substrate surface (12) in the size range of about 0.76 - 5.1 mm (0.03 - 0.2"); providing a relative movement (30) between the substrate surface (12) and the laser spot (20) in the range of 25-635 mm.min^{-1} (1 -25 inches per minute) so as to provide an interaction time of no greater than about 10 seconds between the laser beam (14) and the substrate surface (12) while concurrently operating the laser beam (14) in the power range, and concurrently depositing in the laser beam (14) a repair alloy powder (22) comprising a Ni base superalloy matched with the Ni base superalloy substrate surface (12), with a powder feed rate in the range of 0.4 - 15 g.min^{-1}, to melt and fuse the repair alloy powder (22) into a molten repair alloy and deposit the molten repair alloy

on the substrate surface (12), wherein deposition of the repair alloy powder (22) is assisted by a non-oxidizing gas comprising argon flowing at a rate of 0.85 - 2.83 $m^3.min^{-1}$ (30 - 100 cubic feet per minute); and cooling the molten repair alloy to provide a weld bead."

Claim 1 according to the second auxiliary request differs from claim 1 according to the first auxiliary request in that the feature "comprising argon flowing at a rate of 0.85 - 2.83 $m^3.min^{-1}$" has been removed and the following feature (disclaimer) has been added:

"said method excluding a method having the following operating parameters: a laser beam power of 450 w; a laser spot on the substrate surface having a size of 2.5 mm; a relative movement between the substrate surface and the laser spot of 1.3 $mm.s^{-1}$; and a powder feeding rate of 2.0 $g.min^{-1}$".

IX. The appellant's arguments concerning the admissibility of the first and second auxiliary requests may be summarised as follows:

Claim 1 according to the first auxiliary request consisted of the combination of claims 1 to 3 of the patent as granted and further included the features taken from the description according to which the non-oxidizing gas was argon and the flow rate of argon was 0.85 - 2.83 $m^3.min^{-1}$. These features were disclosed in the description in combination with all the other ranges recited in claim 1. The amendments made did not substantially change the claimed subject-matter; in particular, the technical problem still remained the

same, namely to avoid cracking. Argon was the gas of choice in many of the prior art documents cited during the opposition proceedings, and therefore specifying argon as the non-oxidizing gas could not have come as a surprise to the respondents.

The disclaimer added to claim 1 according to the second auxiliary request met the criteria set out in decision G 1/03. The disclaimer served the purpose of restoring novelty by delimiting claim 1 with respect to an accidental anticipation under Article 54(2) EPC. The accidental anticipation was sample L disclosed in D27. D27 did not relate, as did the patent in suit, to providing high gamma prime content in the repair alloy. It was mainly concerned with formation of single crystal deposits. Sample L was described as unsuited for that purpose. Moreover, it was the only sample for which a relatively low laser power of 450 W was used. Accordingly, the skilled person would not select sample L as a starting point.

X. The respondents submitted a number of reasons why the auxiliary requests should not be admitted into the proceedings. In particular, claim 1 according to the first auxiliary request included amendments taken from the description which defined that the non-oxidizing gas was argon and that its flow rate was 0.85 - 2.83 $m^3.min^{-1}$. These features were disclosed only in a specific embodiment comprising other features, such as the kind of laser used (a CO_2 laser) and the manner in which the powder was deposited in the laser beam. Moreover, claim 1 did not specify that the non-oxidizing gas was argon, as did the description, but merely that the non-oxidizing gas comprised argon.

These amendments were therefore not allowable under Article 123(2) EPC. As regards claim 1 according to the second auxiliary request, sample L did not represent an accidental anticipation. D27 was in the same technical field of the patent in suit and likewise related to a method of laser repairing Ni-based superalloy substrates having a high gamma prime content, namely 70 volume %. Sample L according to D27 was a workable example; undesirable properties of sample L were described as being due to defects already present in the substrate and not to the manner in which the weld repair according to sample L was made.

Reasons for the Decision

1. The appeal is admissible.

2. With its statement of grounds of appeal, the appellant contested the finding of the Opposition Division according to which the subject-matter of claim 1 as granted was found not novel over D27 but did not file any amendments. In the communication accompanying the summons to oral proceedings, the Board expressed a negative opinion on the sole request of the appellant. The Board thus provisionally confirmed the view expressed by the Opposition Division in the decision under appeal. The first and second auxiliary requests were filed after the Board issued this communication. These requests represent an amendment to the appellant's case as set out in the statement of grounds of appeal, which pursuant to Article 13(1) of the Rules of Procedure of the Boards of Appeal ("RPBA") may be admitted and considered at the Board's discretion.

3. Article 13(1) RPBA makes clear that in exercising that discretion, the Board must consider a range of factors including inter alia the need for procedural economy. Admitting late requests that are not clearly allowable, for example because they do not immediately overcome existing objections or give rise to fresh issues that seriously appear to prejudice their allowability, would adversely affect procedural economy.

4. Claim 1 according to the first auxiliary request (which, after withdrawal of the previous main request becomes the appellant's main request) defines that deposition of the repair alloy powder is assisted by a non-oxidizing gas comprising argon flowing at a rate of 0.85 - 2.83 $m^3.min^{-1}$. Claim 3 as granted, corresponding to claim 3 as originally filed, only specifies a non-oxidizing gas; the features whereby the non-oxidizing gas is argon and the gas flow rate is within the range of 0.85 - 2.83 $m^3.min^{-1}$ are only disclosed in the description of the application as filed. There, however, they are only disclosed in combination with other features of a specific embodiment. In particular, in this embodiment (see par. [0017] and [0018] of the patent in suit), a specific base superalloy and a specific alloy powder (Rene' 142) are used, a specific laser (CO_2) is used, and a particular powder deposition (concentrically in the laser beam) is adopted. The case law of the Boards of Appeal of the EPO only exceptionally justifies the isolated extraction of a feature from a set of features and this on the basis of the specific condition that the skilled person could have readily recognised the absence of any functional or structural relationship among said features (see e.g.

T 201/83 OJ EPO 1984, 481 or T 714/00). In the present case however, the above-mentioned features of the embodiment would be regarded by a skilled person as being in functional relationship with the features extracted from the embodiment and introduced into claim 1.

Furthermore, the description discloses that the non-oxidizing gas is argon, i.e. that it comprises exclusively argon, whilst claim 1 defines that the non-oxidizing gas comprises argon, i.e. that it contains argon but possibly also other gases.

Therefore, for at least these reasons, the amendment consisting of introducing into claim 1 the features that the non-oxidizing gas comprises argon and that it has a flow rate of 0.85 - 2.83 $m^3.min^{-1}$ is clearly not allowable under Article 123(2) EPC.

5. Claim 1 according to the second auxiliary request (this being the sole auxiliary request of the appellant) includes a disclaimer intended to exclude from the scope of claim 1 a method in accordance with sample L disclosed in Table 5.2 on page 71 of D27, this method allegedly being a mere accidental anticipation under Article 54(2) EPC.

According to decision G 1/03 of the Enlarged Board of Appeal, a disclaimer is indeed allowable for restoring novelty by delimiting a claim against an accidental anticipation under Article 54(2) EPC. Further according to this decision, an anticipation is considered to be accidental if it is so unrelated to and remote from the claimed invention that the person skilled in the art

would never have taken it into consideration when making the invention (see Headnote of G 1/03). However, the method according to sample L of D27 can hardly be regarded as an accidental anticipation. It is, as all the other sample methods disclosed in D27, a method having the same purpose of the method according to the invention, namely of laser repairing a Ni base superalloy substrate surface having a high gamma prime content. D27 namely discloses that the gamma prime content of the superalloys used is of about 70% (see page 10, 3rd paragraph), which value falls within the claimed range of 40-75%. Moreover, D27 criticizes sample L (see the paragraph bridging pages 71 and 72) because it shows grain boundaries; this however, as explained in D27, is due to the fact that grains are already apparent on the starting substrate. In D27 it is then concluded (page 73, first paragraph) that an important condition for obtaining a single crystal deposit is to start with a single crystal substrate. Accordingly, the skilled person would indeed consider the method according to sample L when making the invention; he would only be careful to select a single crystal substrate. Also, the fact that sample L is the only example using a relatively low laser power of 450 W, as compared to the other samples using a laser power of 600 W or more, does not represent a reason justifying the exclusion of sample L as a starting point.

Therefore, sample L of D27 cannot be regarded as an accidental anticipation under Article 54(2) EPC, as the disclaimer, if allowed, would seemingly become relevant for the assessment of inventive step. As a consequence, the disclaimer does not meet the criteria of G 1/03.

6. None of the appellant's requests being clearly allowable, the Board exercised its discretion under Article 13(1) RPBA not to admit the first and second auxiliary requests into the proceedings.

In the absence of any admissible request submitted or agreed by the appellant, the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Patin M. Harrison