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**Datasheet for the decision
of 6 May 2011**

Case Number: T 0237/10 - 3.2.07

Application Number: 06253301.3

Publication Number: 1739202

IPC: C23C 8/20

Language of the proceedings: EN

Title of invention:

Titanium treatment to minimize fretting

Patentee:

GENERAL ELECTRIC COMPANY

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 109(1), 111(1)
EPC R. 103(1)(a), 111(2)
RPBA Art. 11

Relevant legal provisions (EPC 1973):

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Keyword:

"Substantial procedural violation: decision on the state of
the file: not reasoned"

"Interlocutory revision should have been granted"

"Remittal to the department of first instance (yes)"

Reimbursement of the appeal fee (yes)"

Decisions cited:

T 0897/03, T 1356/05, T 2133/09

Catchword:

-



Case Number: T 0237/10 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 6 May 2011

Appellant: GENERAL ELECTRIC COMPANY
1 River Road
Schenectady
NY 12345 (US)

Representative: Pedder, James Cuthbert
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 9 September 2009
refusing European application No. 06253301.3
pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: H. Meinders
Members: H. Hahn
I. Beckedorf

Summary of Facts and Submissions

I. The applicant lodged an appeal against the decision of the Examining Division to refuse the European patent application No. 06 253 301.3 with a decision according to the state of the file.

II. With its grounds of appeal dated 19 January 2010 the appellant requested to set aside the decision and to grant a patent on the basis of the claims 1-10 of the single request filed with letter dated 29 April 2008. Furthermore, it requested to incorporate the replacement description pages 3, 4, 13, 17, 18, 20 and 21 as filed with letter of 25 August 2009 into the description. As an auxiliary request oral proceedings were requested.

III. In the present decision the following documents of the examination proceedings are cited:

D1 = JP-A-08 260127

D2 = JP-A-07 090541

D3 = JP-A-09 323191

D4 = JP-A-2002 371348

D5 = JP-A-2003 041359

D6 = US-A-5 891 267

D7 = GB-A-2 053 744

IV. In the course of the examination proceedings the appellant, in response to the first substantive communication of the Examining Division dated 19 October 2007, filed with its letter dated 29 April 2008 an amended set of claims 1-10, explained the

amendments carried out and submitted arguments concerning inventive step and with respect to clarity.

A summons dated 13 May 2009 to oral proceedings to be held on 10 September 2009 was issued by the Examining Division. In the second substantive communication that was annexed to that summons the Examining Division set out its opinion regarding the amended claims 1 and 9 as filed with letter of 19 June 2008 and claims 2-8 and 10 as originally filed.

With letter dated 25 August 2009 the appellant submitted replacement pages 3, 4, 13, 17, 18, 20 and 21 of the description. Furthermore, it submitted arguments concerning inventive step with respect to D1-D5 and the examples and it specified the passage in the description of the application which provided support for claims 9 and 10. Finally it stated that "applicants do not intend to be represented at the oral proceedings and it is requested that a decision be issued based on the written proceedings".

V. The grounds of the decision of the Examining Division are as follows:

"In the communication(s) dated 19.10.2007, 13.05.2009 the applicant was informed that the application does not meet the requirements of the European Patent Convention. The applicant was also informed of the reasons therein.

The applicant filed no comments or amendments in reply to the latest communication but requested a decision

according to the state of the file by a letter received in due time on 25.08.2009.

The European patent application is therefore refused on the basis of Article 97(2) EPC."

VI. In the grounds of appeal dated 19 January 2010 the appellant remarked that the Examining Division apparently has not considered its latest arguments submitted with letter of 25 August 2009 concerning inventive step, clarity and the required conversion of non-SI units and that these arguments were therefore reiterated.

On 1 February 2010 the Examining Division decided not to rectify its decision (see EPO Form 2701), with the result that the appeal was submitted to the Board.

VII. With a communication dated 10 February 2011 the Board gave its preliminary and non-binding opinion and expressed the view that the decision of the Examining Division was deficient in that it was not reasoned as required by Rule 111(2) EPC and that it intended to remit the case to that department of first instance for further prosecution and to reimburse the appeal fee. The appellant was asked whether or not it maintains its request for oral proceedings.

VIII. With letter dated 15 March 2011 the appellant withdrew its request for oral proceedings "*as the Appeal Board has indicated that it intends to remit the case back to the Examining Division for further prosecution*".

Reasons for the Decision

Lack of reasoning in the decision - substantial procedural violation

1. As pointed out by the appellant in its grounds of appeal the Examining Division failed to take account of its arguments submitted with letter dated 25 August 2009.

1.1 In the reasoning of the impugned decision the Examining Division stated "**The applicant filed no comments or amendments in reply to the latest communication**". This is factually incorrect. In fact, in its letter dated 25 August 2009 the appellant filed a four-page response to the second communication as annexed to the summons to oral proceedings. In addition it filed the replacement pages 3, 4, 13, 17, 18, 20 and 21 of the description, i.e. containing amendments in order to overcome the non-SI unit objections.

In that letter the appellant responded in substance to the objections of the Examining Division under Articles 56, 83 and 84 EPC and replied to those under Rule 49(1) EPC by submitting the said replacement pages. In other words, it dealt with **all** the objections raised by the Examining Division in that second, its latest, communication.

1.2 The Board can only establish that the Examining Division did **not** deal with the substantive response of 25 August 2009 in its decision.

For the present appeal proceedings this means that the Board is not put in a position to examine the reasons why the Examining Division did not accept this response of the appellant. The decision is therefore deficient in that it is not reasoned as required by Rule 111(2) EPC.

This view of the Board is in line with the case law of the Boards of Appeal (see e.g. decisions T 897/03, T 1356/05 and T 2133/09, all not published in OJ EPO).

1.3 This lack of reasoning represents a substantial procedural violation since it results in that the Board is unable to deal with the case and in the appellant being deprived of any reasoning on its latest submission, which it can address in appeal.

2. The Board further considers that this decision according to the state of the file is also **not** reasoned for the following reasons:

2.1 The first substantive communication of the Examining Division dated 19 October 2007 referred to in the impugned decision was based on claims 1-10 as originally filed and cited D1-D7.

Independent claim 1 as originally filed reads as follows:

"1. A method for surface treating a titanium gas turbine engine component comprising:

 providing a gas turbine engine component having a surface comprising titanium;

 heating the component to a temperature sufficient

to diffuse carbon into the titanium and below 1000°F;

contacting the surface with a carbon-containing gas for a period of time sufficient to diffuse carbon into the surface;

coating the carbide-containing surface with a lubricant coating comprising a binder and a friction modifier; and

wherein the coefficient of friction between the surface and another titanium-containing surface is less than about 0.6 in high altitude atmospheres."

- 2.2 In points 2 and 2.1 of this communication the Examining Division raised a lack of inventive step objection with respect to claim 1 in view of D1 by stating "*Document D1 discloses a method of reducing the coefficient of friction and wear by subjecting the surface of screw [sic] parts made of titanium metal to sliding treatment, comprising plasma carburizing the parts in an atmosphere contg [sic] gaseous hydrocarbons such as methane homologues shown by C_nH_{2n+2} under the vacuum heating conditions of 0.5 to 15 Torr and 700 to 1100°C and coating the obtd. screw parts with a lubricating material cont. polytetrafluoroethylene*" and in point 2.2: "*The difference between D1 and the application is that the carburizing temperature is below 538°C and that the lubricating material comprises a binder and a friction modifier.*"

In points 2.3 to 2.5 of this communication it stated that "*Document D2 discloses a method for modifying the surface of e.g. titanium and titanium alloys and attaining stable surface properties such as wear resistance, heat resistance and corrosion resistance, comprising charging the metal into a penetration*

modifying chamber, arising the temperature of a furnace casing evacuated to 10⁻² to 8x10⁻¹ mb before filled with a gaseous [sic] mixture or either one of N₂, Ar, He, H₂ to 1-100 bar, introducing an introducing gas composed of single gas such as NH₃, N₂, CO₂, H₂, O₂, Ar, C₃H₆, C₃H₈, CH₄ or a gaseous mixture selected from at least two kinds of these gases at the pressure of 1-200 bar and heating and keeping the metal at 300-1200°C in the introducing gas." and continued with *"Document D3 discloses a lubricant coating for reducing the friction resistance of a steel wire comprising 5-50% one kind or two kinds among molybdenum disulfide and tungsten disulfide and 1-15% titanium oxide."* It ended with *"Apparently the skilled person would obviously combine the closely related teachings of D1-D3 and thereby arriving directly to the method for minimize fretting of titanium components as proposed in claim 1."*

The Examining Division further considered in point 3 *"Dependent claims 2-10 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the EPC with respect to inventive step, the reasons being as follows: the features are known from D1-D7."*

In point 4 it stated *"The term "component having a surface comprising titanium" used in claim 1 is vague unclear and so broad and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the definition of the subject-matter of said claim unclear (Article 84 EPC)."* and in point 5 it objected to the use of the non-SI units in claims 1 and 9.

2.3 A comparison of the wording of claim 1 as originally filed (see point 2.1 above) with the statements made in points 2 to 2.5 of the first communication (see point 2.2 above) shows that this communication contains only allegations without giving any reasoning for the lack of inventive step, e.g. as to why the person skilled in the art would combine the teachings of the **carburizing** method of D1, the **surface modifying** method of D2, or the **lubricant coating** method of D3 with one of the other of these three methods. In particular no objective technical problem is determined that should be solved by the person skilled in the art in order to arrive at the subject-matter claimed. The general objection of lack of inventive step made in point 3 also remains an allegation as it does not give any references in any of the cited documents D1 to D7 for the features of the dependent claims considered known therefrom.

3. As a response to the first communication the appellant filed with its letter dated 29 April 2008 an amended set of claims **1-10** and it stated that claims 1 and 9 have been amended by supplementing the temperature in SI-units. It argued in substance in favour of inventive step for claim 1 as follows:

"The difference between D1 and the present application is that the carburizing temperature is below 538°C and that the lubricating material comprises a binder and a friction modifier. D1 teaches away from the present invention in teaching that the titanium metal or titanium alloy is subjected to plasma carburizing in an atmosphere containing gaseous hydrocarbons under vacuum

heating conditions of 0.5 to 15 Torr and 700 to 1100°C and further lubricating with a coating material containing polytetrafluoroethylene. The process disclosed in D1 is carried out at a much higher temperature than that of the present invention and does not disclose subsequently coating the carbide containing surface with a lubricant coating comprising a binder and a friction modifier.

D2 discloses surface modifying a highly alloyed steel, a super heat resistant alloy, titanium or a titanium alloy by hardening in a chamber subsequently filled with one or more of nitrogen, argon, helium or hydrogen at a pressure of from 1 to 100 bar and subsequently introducing a gas consisting of one or more of ammonia, nitrogen, carbon dioxide, hydrogen, oxygen, argon, propene, propane or methane and keeping the metal at 300-1200°C. There is no teaching in document D2 of heating below 538°C and contacting with a carbon containing gas to diffuse carbon into the surface and subsequently coating with a lubricant comprising a binder and a friction modifier.

D3 discloses a lubricant comprising from 5 to 50% of one or more of molybdenum disulfide and from 1 to 15% of titanium oxide applied to the surface of a steel wire. The particle size of the molybdenum sulfide and the tungsten disulfide is less than or equal to 15 micrometres and of the titanium oxide is less than or equal to 1 micrometre.

Applicants consider that the man skilled in the art would not combine the teaching of documents D1, D2 and D3 and even were he to combine the teaching of these

documents then he would not arrive at the present invention."

With respect to the clarity objection it stated that *"The Examiner's objection to the wording "component having a surface comprising titanium" in claim 1 is not understood. It is considered that the man skilled in the art would have no difficulty in understanding what is meant by this wording, which includes pure titanium, a titanium alloy or other titanium containing composition suitable for use as a gas turbine engine component".*

- 3.1 Independent claim 1 of this set of claims read as follows (amendments as compared to claim 1 as originally filed are in bold; emphasis added by the Board):

*"1. A method for surface treating a titanium gas turbine engine component comprising:
providing a gas turbine engine component having a surface comprising titanium;
heating the component to a temperature sufficient to diffuse carbon into the titanium and below **538°C** (1000°F);
contacting the surface with a carbon-containing gas for a period of time sufficient to diffuse carbon into the surface;
coating the carbide-containing surface with a lubricant coating comprising a binder and a friction modifier;
and
wherein the coefficient of friction between the surface and another titanium-containing surface is less than about 0.6 in high altitude atmospheres."*

3.2 The second substantive communication dated 13 May 2009 annexed to the summons to oral proceedings dealt with claims **1 and 9 as filed with letter of 29.04.2008** and claims 2-8 and 10 as originally filed even though the applicant had filed a complete set of amended claims **1-10**.

To start, it stated in point 1 *"The applicant's explanations submitted with his letter of 29.04.2008 have been carefully considered. However it is the preliminary opinion of the Examining Division that the new claims submitted on 29.04.2008 do not comply with the requirements of the EPC and the application should be refused."* and then referred to documents D1-D6 in point 2.

In points 3 to 4 it followed with *"The problem to be solved by the present application is directed to an inexpensive method for surface treating titanium and titanium alloys, in particular gas turbine engine components, to minimize fretting of the titanium or titanium alloys which slide against each other. This problem is solved by a process of claim 1 comprising gas carburizing the titanium component at a temperature below 538 °C and coating the carburized surface with a lubricant coating comprising a binder and a friction modifier, reducing so the coefficient of friction between the sliding titanium surfaces of the components", "D4 discloses the gas carburizing at temperatures of 350- 950°C of titanium parts, used for e.g. screws, a sliding member of a gas turbine engine... ,for improving their abraison [sic] resistance. Although it is known that a coefficient of friction can*

generally be lowered by using a lubricant, it is required to carry out hardening processing on the surface of a titanium alloy (see abstract; page 1, §0003; page §§ 0053, 0054)." followed by "The only difference between D4 and the application is that the carburized titanium is coated with a lubricant coating comprising a binder and a friction modifier", "D1 discloses a process for reducing the coefficient of friction and wear of sliding titanium screw parts comprising gas carburizing the titanium screw parts and then coating them with a lubricating paint containing polytetrafluoroethylene" and "The skilled person would obviously [sic] combine the closely related teachings of D4 and D1 and thereby directly arrive to an inexpensive method to minimize fretting of sliding titanium components." It additionally stated "Furthermore D2 discloses a cheap method for gas carburizing e.g. titanium or titanium alloys at a temperature of 300°-1200°C (see page 2, §0004). It is evident and known by the skilled person that carburizing temperature and carburizing time are linked up for the carburizing depth to be achieved (moreover see application page 14, lin. 12, and D2, page 3, §0012) and D5 discloses the gas carburizing of titanium alloys used for screws, sliding members [sic] ... at temperatures of 350-700°C."

Subsequently it stated in point 5 that "Dependent claims 2-10 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the EPC with respect to inventive step, the reasons being as follows:

5.1 Claim 2

The use of the titanium-containing alloy is known from D1 (see §0011 and 0044).

5.2 Claims 3-6

D3 discloses a lubricant coating for reducing the friction resistance of a metallic wire comprising 5-50% of one kind or two kinds among molybdenum disulfide and tungsten disulfide and 1.15% titanium oxide (see abstract). A person skilled in the art trying to solve the problem of friction for a Ti-containing surface would consider the application of this lubricant as an obvious alternative".

In point 6 of this communication the Examining Division raised an objection under Article 83 EPC with respect to claims 7-10 because:

"-a temperature of 427°C (claim 9) is not a high altitude atmosphere temperature

-no example with an atmosphere devoid of water vapor(claim 10) has been disclosed

-absence of more particular test specifications, especially high altitude atmosphere and atmosphere devoid of water vapor are lacking throughout the description

-COF in Table 1 is even not less than 0.6 at temperatures between room temperature and 399°C for at least some of the examples falling within the scope of the invention

-furthermore the use of a COF- average on the basis of multiple COF-values at different temperatures can not be considered as a valid basis for defining s [sic] coefficient of friction. In addition, the difference

between "initial" and "room temperature" COF in Table 1 is not clear.",

while in point 7 it repeated its clarity objection under Article 84 EPC of the first substantive communication with respect to claim 1 (lines 11-13) and added *"A surface comprising titanium can be e.g. zinc with 1 % titanium."*

In point 8 it objected to the non-SI-units used in the description and in point 9 it finally stated *"The subject of the Oral Proceedings will be whether the claimed subject-matter of claims 1-10 involves an inventive step in the sense of Article 56 EPC"*.

3.3 The Board can only conclude that this second communication clearly does **not** contain anything dealing with the arguments submitted by the appellant, particularly not as to why they cannot be accepted.

Furthermore, also this second communication contains only allegations without giving any comprehensible reasoning for the lack of inventive step objection with respect to the subject-matter of claim 1 in view of the combination of the teachings of D4 and D1, e.g. as to why the person skilled in the art would modify the carburizing method of D4 in order to arrive at the subject-matter claimed in claim 1 and why it should be combined with the teaching of D1. The Examining Division has not applied the problem-solution approach and has not explained which objective technical problem should be solved by the person skilled in the art. It is also not clear from point 4 as to how or whether the teachings of D2 and/or D5 should be incorporated into

the teachings of D4 and/or D1, or how they should otherwise be considered for the issue of inventive step.

4. As a response to this second communication the appellant with its letter dated 25 August 2009 submitted substitute pages of the description where the non-SI units have been supplemented with the equivalent SI units.

With respect to inventive step the applicant argued further in substance on the merits of the invention. It submitted arguments with respect to the support for claims 9 and 10 in the description and explained the "initial COF" and the "room temperature COF" and that - as derivable from page 21 of the application - the temperature relates to that of the operating range of the gas turbine engine.

Finally it stated that it did not intend to be represented at the oral proceedings and that it requested an appealable decision in writing based on the current state of the file.

5. The impugned decision according to the state of the file merely refers to "the communication(s) dated 19.10.2007, 13.05.2009" and states that "the applicant was informed that the application does not meet the requirements of the European Patent Convention. **The applicant was also informed of the reasons therein**" (emphasis added by the Board) and that the applicant filed no comments or amendments in reply to the latest communication.

5.1 From the above analysis and discussion of the content of the two substantive communications, the Board, however, has to conclude that the impugned decision falls short of revealing the reasons which led the department of first instance to conclude lack of inventive step, or lack of clarity or insufficiency of disclosure for that matter.

5.2 Furthermore, contrary to what is stated in the second communication ("the applicant's explanations ... have been carefully considered") the communication shows that the Examining Division ignored all the appellant's arguments since this communication and therefore the decision do not treat them. Consequently, the impugned decision is also not reasoned in that respect.

Taking account of the above, the Board can only establish that the Examining Division, when issuing the impugned decision, did not follow the Guidelines for Examination in the European Patent Office, according to which the reasoning must contain in logical sequence those arguments which justify the order. Furthermore, the reasoning should be complete and independently comprehensible and the reasoning should contain the important facts and arguments which speak against the decision (see the Guidelines, Chapter E-X, 5). The latter means that the decision should address the arguments of the losing party (not in the least to also comply with the right to be heard) and should make sure that it deals sufficiently with the counterarguments put forward and provides reasoned support for what it concludes.

- 5.3 The lack of reasoning in the impugned decision is a substantial procedural violation since it results in the appellant being deprived of any reasoning which it can properly address in appeal and the Board being unable to properly examine the reasons why the Examining Division came to its conclusions of lack of inventive step, lack of clarity and sufficiency of disclosure.

Interlocutory revision (Article 109(1) EPC)

6. As already considered by the Board, the impugned decision according to the state of the file incorrectly states that "**the applicant filed no comments or amendments in reply to the latest communication**" (see point V and points 1 to 1.3 above), as the applicant did file both comments and amendments.

- 6.1 In its grounds of appeal the appellant mentions that because of this statement it is unclear whether its arguments and replacement pages of the description have actually been considered by the Examining Division (see point VI above).

These replacement pages 3, 4, 13, 17, 18, 20 and 21 of the description clearly meet the objection raised in point 8 of the second communication since the requested SI units have been incorporated (see point 3.2 above). The appellant therefore performed the acts to the absence of which the Examining Division had objected and on which the refusal of the application was partly based.

6.2 A simple comparison of appellant's statement in the grounds of appeal referring to its comments and amendments presented with its letter dated 25 August 2009, and the quoted statement of the decision, namely that no comments or amendments had been filed by the appellant, further should have taught the Examining Division that it had failed to consider the appellant's last submission. To avoid at least that procedural violation the Examining Division should have rectified its decision and continued the examination proceedings.

6.3 Since the Examining Division did not rectify its decision it also did **not** apply the practice indicated in the Guidelines for Examination in the European Patent Office which state that one example of a well founded appeal for which rectification must be given, is one where "the department failed to take due account of some of the material available to it at the time the decision was made" (see the Guidelines, Chapter E-XI, 7.1(i)).

Remittal to the department of first instance (Article 111(1) EPC)

7. In view of the aforesaid substantial procedural violations the Board considers that it is appropriate to set aside the decision under appeal for this reason alone, in application of Article 11 RPBA, and to remit the case to the department of first instance for further prosecution in accordance with Article 111(1) EPC.

As the request for oral proceedings was only auxiliary in this respect, the present decision could be taken in written proceedings.

Reimbursement of the appeal fee (Rule 103(1)(a) EPC)

For the above reasons it is also equitable to reimburse the appeal fee pursuant to Rule 103(1)(a) EPC.

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.
3. The appeal fee is to be reimbursed.

The Registrar:

The Chairman:

K. Boelicke

H. Meinders