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**Datasheet for the decision
of 19 June 2007**

Case Number: T 1179/05 - 3.2.07

Application Number: 99309897.9

Publication Number: 1008669

IPC: C23C 14/30

Language of the proceedings: EN

Title of invention:

Apparatus for electron beam physical vapor deposition

Applicant:

GENERAL ELECTRIC COMPANY

Opponent:

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Headword:

-

Relevant legal provisions:

EPC Art. 84, 56

Keyword:

"Decision on the state of the file"

"Clarity (no)"

"Inventive step (no - arbitrary selection of range)"

Decisions cited:

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Catchword:

-



Case Number: T 1179/05 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 19 June 2007

Appellant: GENERAL ELECTRIC COMPANY
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Representative: Pedder, James Cuthbert
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 15 March 2005
refusing European application No. 99309897.9
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: H. Meinders
Members: H. Hahn
C. Holtz

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. 99 309 897.9.

The Examining Division held that the technical problem alleged to be solved by the subject-matter of claim 1 of the single request (comprising claims 1 to 8) as filed during the oral proceedings of 3 March 2005 is already solved by the apparatus of document D2 (= US-A-5 792 521) with the additional percentage range mentioned in claim 1 being considered as a non inventive selection because it has no technical effect.

- II. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims as filed on 3 March 2005, or on the basis of amended claims which might be submitted in the course of the proceedings. In case the Board should intend to confirm the impugned decision oral proceedings were requested.

- III. Claim 1 reads as follows:

"1. A deposition apparatus comprising:
a coating chamber (22);
means (28) for generating an electron beam (26) within the coating chamber (22);
a ceramic material (10) within the coating chamber (22), the ceramic material (10) having an upper end with a cross-sectional area; and
a crucible (112) surrounding the upper end of the ceramic material (10), the crucible (112) defining a

reservoir (118) having a cross-sectional area between 10 and 50 percent larger than the cross-sectional area of the ceramic material (10)."

IV. With a communication dated 30 January 2007 and annexed to the summons for oral proceedings the Board presented its preliminary opinion with respect to claims 1 to 8 of the single request as filed during the oral proceedings of 3 March 2005 before the Examining Division, no amended claims having been filed since.

First of all, the Board remarked that it has the power to examine whether or not the application and the invention to which it relates meets the requirements of the EPC and that this also holds good for requirements the Examining Division has not considered in the examination proceedings or has regarded as fulfilled.

The Board then stated that in the scheduled oral proceedings the questions of clarity (Article 84 EPC) and inventive step of the apparatus claim 1 with respect to the prior art D2 (Article 56 EPC) would be discussed. The Board gave its preliminary and non-binding opinion that the subject-matter of claim 1 was not clear and did not involve an inventive step:

"2. Clarity and consistency (Article 84 EPC)

The application as originally filed discloses a preferred range of cross-sectional areas of "about 10% to about 50% larger" in dependent claim 2 which has a counterpart at page 6, lines 20 to 24 of the description as originally filed. The adjacent passage at page 6, line 24 to page 7, line 2 of the description

then, however, specifies that "a preferred cross-sectional area of the reservoir 118 is about 38 to about 70 cm² for standard ingot diameters of about 6.3 cm (about 31 cm²)".

From these cross-sectional areas for the preferred standard ingot diameter and for the reservoir 118 another - differing - preferred ratio can be calculated, namely a range of "44.3-125.8% larger" (i.e. 38:31 cm² results in a difference of 7 cm² corresponding to 44.3% larger while 70:31 cm² results in a difference of 39 cm² corresponding to 125.8% larger) which range clearly does **not** fit to the aforementioned range of from "about 10 to about 50% larger". However, taking account of the specification as originally filed it is unclear which of these two ranges might be erroneous, or whether both ranges can be utilized.

Hence the description as originally filed appears to be inconsistent in itself and to be inconsistent with claim 1."

and:

"3. Inventive step (Article 56 EPC)

Starting from the closest prior art document D2 and taking account of the technical problem to be solved - which will be based on the distinguishing feature that the apparatus according to claim 1 differs from that according to D2 in that a specific ratio for the cross-sectional area of the reservoir (118) relative to the cross-sectional area of the ceramic material (10) is defined to be about 10 to about 50% larger - it will be

discussed whether or not the available prior art renders the subject-matter claimed obvious.

In this context the Board makes the following remarks:

3.1 Claim 1 as it stands neither excludes a second crucible - as admitted by the appellant - nor excludes a crucible having a reservoir with the shape as shown in figure 1 of D2.

3.2 As already mentioned in point 2 above a different preferred cross-sectional ratio range of "about 44.3-125.8% larger" can be calculated which does **not** fit to the aforementioned range of from "about 10 to about 50% larger". Taking account of this inconsistency it could thus be concluded that the range "of about 10 to 50% larger" is not particularly critical for carrying out the EB-PVD process since the other range of from "about 44.3-125.8% larger" can also be used.

3.3 Furthermore, it has to be considered that the application does not disclose any examples which would support the appellant's alleged advantages (which are generally stated in the context of the use of a larger cross-sectional area but starting from a different prior art than D2; see page 4, lines 16 to page 5, line 10; compare figure 1) and specifically that the claimed area range of from 10-50% larger is actually critical.

According to the minutes of the oral proceedings before the Examining Division (see page 1, penultimate paragraph to page 2, first paragraph) the applicant argued with respect to an inventive selection while the

Examining Division argued that in the light of D2 no technical effect of selecting specific ratios of cross-sectional areas is derivable. The latter fact was a part of the impugned decision but the appellant, however, has not submitted any evidence proving the opposite.

In this context the Board considers that the prior art reflected in the present application in the context of its figure 1 is more remote from the subject-matter of claim 1 than D2 - which stems from the same applicant and was filed on 18 April 1996. The applicant should have been aware of its own prior art when filing the priority application of the present application on 11 December 1998 or when filing the European application on 9 December 1999.

3.4 Furthermore, it appears that D2 does not teach the enhancement of the deposition rate by doubling the deposition area as suggested by the appellant. The actual purpose of the two crucibles according to D2 appears to be the possibility to deposit two different materials to form discrete and homogenous successive layers, each individual layer having a thickness of less than one μm , with ceramic layers of about 0.2 μm and less being readily and reliably attainable (see D2, column 1, lines 4 to 12; column 3, lines 12 to 28 and line 57 to column 4, line 6; column 5, lines 1 to 25; column 6, lines 38 to 46).

In this context it should further be considered that the purpose of the cross-sectional area configuration according to the present application is to maintain the deposited coating thicknesses within the acceptable

variation requirements, i.e. provide a more uniform thickness in the order of about $\pm 10\%$ over larger surfaces (see application, page 1, lines 6 to 11; page 4, lines 16 to 22).

Since the apparatus according to D2 using an EB-PVD process provides ceramic coatings on the same substrates such as turbine parts, as the application, and since thicknesses of about $0.2 \mu\text{m}$ are reliably and readily attainable it appears to be derivable that also the apparatus according to D2 fulfils such an acceptable variation requirement. Consequently, it appears that D2 already solves the problem underlying the present invention.

3.5 Thus it seems that no inventive step can be acknowledged, particularly as no effect which would be related to the claimed range of cross-sectional areas has been made credible by the appellant."

- V. The appellant was given the opportunity to file observations to the communication which should be filed well in advance, i.e. at least one month, before the date of the oral proceedings in order to give sufficient time to the Board to prepare for the oral proceedings.

With fax of 5 June 2007 the appellant stated that it did not intend to attend the oral proceedings.

- VI. At the end of the oral proceedings held on 19 June 2007 in the absence of the appellant, the Board announced its decision.

Reasons for the Decision

1. The Board interprets the appellant's reply according to the fax of 5 June 2007 as a request for a decision "according to the state of the file".
2. In the communication accompanying the summons for oral proceedings the Board raised objections under Articles 84 and 56 EPC, explaining why in the Board's opinion the subject-matter claimed in claim 1 of the single request was held to lack clarity and an inventive step over the disclosure of D2.
3. The appellant did not reply in substance to these objections nor did it attend the oral proceedings which were scheduled for and held on 19 June 2007. Since there has been no attempt by the appellant to refute or overcome the objections raised in the above communication, the Board has no reason to depart from its preliminary opinion expressed therein.

With regard to the above, the Board concludes - for the reasons set out in the communication (compare points 2 and 3 to 3.5 above) - that claim 1 is not allowable under Article 84 EPC and that the subject-matter of claim 1 lacks an inventive step over the disclosure of D2 (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Nachtigall

H. Meinders