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**Datasheet for the decision
of 2 October 2012**

Case Number: T 1808/10 - 3.2.07

Application Number: 03731194.1

Publication Number: 1506325

IPC: C23C 14/34, C23C 14/54,
C23C 14/35, H01J 37/32,
H01J 37/34

Language of the proceedings: EN

Title of invention:
System and apparatus for control of sputter deposition process

Applicant:
Applied Materials, Inc.

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)
EPC R. 115(2)
RPBA Art. 15(3)

Keyword:
"Oral proceedings held in the absence of the appellant"
"Amendments extend beyond content of the application as
originally filed (all requests - yes)"

Decisions cited:
T 1704/06

Catchword:
-



Case Number: T 1808/10 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 2 October 2012

Appellant: Applied Materials, Inc.
(Applicant) 3050 Bowers Avenue
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Representative: Patentanwalt
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 27 April 2010
refusing European patent application
No. 03731194.1 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: H. Meinders
Members: H. Hahn
E. Kossonakou

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. 03 731 194.1.

The Examining Division held that the independent method claims 1 and 2 of the single request dated 16 June 2009 (comprising claims 1-38) contravene Article 84 in combination with Rule 43(2) EPC and that claims 7, 9, 11 to 15, 26 to 31, and 37 additionally do not comply with Article 84 EPC.

- II. With its statement of grounds of appeal the appellant requested to set aside the decision and to grant a patent on the basis of claims 1-37 of the main request, alternatively on the basis of claims 1-33 of the first auxiliary request, claims 1-36 of the second auxiliary request, claims 1-32 of the third auxiliary request, claims 1-30 of the fourth auxiliary request or claims 1-22 of the fifth auxiliary request, all requests as filed together with the statement of grounds of appeal. In case that the Board should consider a decision other than according to the aforementioned requests, oral proceedings were requested.

- III. The independent claims 1, 2 and 16 and dependent claim 6 of the **main request** read as follows (emphasis added by the Board):

"1. A method of performing magnetron sputter deposition using a Radio Frequency (RF) power system comprising an RF power supply having a frequency of at least 1 MHz and not greater than 100 MHz, a tuner, and a DC bias

detection circuit; and a pulsed DC power system comprising a pulsed DC power supply having a frequency of at least 0.1 MHz and not greater than 20 MHz, a duty cycle of at least 0.1% and not greater than 99.9%, a filter unit; and a sensor; the method comprising the steps of:

applying RF power for performing the sputter deposition to at least one target from the RF power system;

applying pulsed DC voltage power for performing the sputter deposition to the at least one target from the pulsed DC power system; and

controlling the RF power supply by sending a signal from the DC bias detection circuit to the RF power supply if the pulsed DC voltage to the target is below a predetermined threshold."

"2. A method of suppressing arcing on a target during a magnetron sputter deposition process using a pulsed DC power system comprising a pulsed DC power supply and a filter unit; and an RF power system comprising an RF power supply, a tuner; and a DC bias detection circuit that monitors the DC voltage at the target; the method comprising the steps of:

applying pulsed DC power to the target from the pulsed DC power system;

applying RF electrical power to the target from the RF power system;

monitoring the electrical power at the target to detect an electrical arc on a surface of the target;

shutting down the pulsed DC power supply when an electrical arc is detected on the surface of the target;

monitoring the DC voltage at the target by means of a DC bias detection circuit to detect when the pulsed

DC voltage power to the target falls below a predefined threshold voltage; and

when the DC bias detection circuit detects the reduction in power to the target, sending a signal to the RF power supply to shut down."

"6. A method according to claim 2 wherein the method further comprises the step of:

providing feedback to the RF power system from the pulsed DC power system."

"16. An apparatus for suppressing arcs on a target in a vacuum sputter deposition system, the apparatus comprising:

a pulsed DC power system comprising at least:

a pulsed DC power supply;

a filter unit; and

a sensor;

an RF power system comprising at least:

an RF power supply;

a tuner; and

a DC bias detection circuit;

a target that is electrically connected to the pulsed DC power system and the RF power system;

the sensor in the pulsed DC power system monitoring a surface of the target ~~mechanism~~ to detect an electrical arc, sending a signal to the pulsed DC power supply to shut down when an electrical arc is detected on the surface of the target; and

a DC bias detection circuit for detecting when the pulsed DC power to the target falls below a predefined threshold and sending a signal to the RF power supply to shut down."

IV. With a communication dated 25 June 2012 and annexed to summons for oral proceedings set for 2 October 2012 the Board presented its preliminary and non-binding opinion with respect to the claims of all requests.

The Board stated amongst others that none of the requests complied with the requirements of Article 123(2) EPC, as follows:

" 3. *Admissibility of amendments (Article 123(2) EPC)*

In the following, as the basis of specific features in the application as originally filed, the published WO-A-03 097892 (which corresponds to the former) is quoted.

Main request

*3.1. The passage in the detailed description quoted by the applicant, i.e. page 12, lines 5 to 28, **neither explicitly nor implicitly discloses "controlling the RF power supply by sending a signal from a DC bias detection circuit to the RF power supply ..."**. The same holds true even when considering the passages on pages 10, lines 1 to 11 or page 11, lines 3 to 15 which actually relate to a DC bias arc detection circuit which sends a signal to shut down the RF power supply when an arc has occurred so that the DC pulsed power supply has been shut off as a response to said arc. There exists a distinct difference between "shutting down the RF power supply" and "**controlling the RF power supply**" as now claimed, the latter definition representing a broad generalisation of the first one which appears not to be directly and unambiguously*

derivable therefrom and thus to contravene Article 123(2) EPC.

Furthermore, by taking this feature from the specific embodiment according to figure 1 which requires that RF power and pulsed DC power are applied simultaneously (compare also page 5, line 16 to page 6, line 14) and combining it with another preferred embodiment as defined in claim 1 as originally filed - claim 1 of the main request does **not** require the simultaneous application of RF and pulsed DC power and its frequency and duty cycle ranges are additionally not supported by the rest of the description of the application as originally filed - an embodiment of an intermediate generalisation has been created which appears **not** to have a basis in the application as originally filed. Claim 1 of the main request therefore appears **not** to comply with Article 123(2) EPC.

3.2. Independent claims 2 and 16 of the main request correspond to original claims 3 and 27, respectively, with claim 2 not having been amended. The deletion of the term "mechanism" from the subject-matter of claim 16 appears not to be objectionable (it is clear that the arcs occur only at the target surface).

3.3. Claim 6 appears to be based on independent claim 14 as originally filed which, however, required an RF controller, a match network and a feedback control mechanism that provides input to the RF power system from the pulsed DC power system. Additionally, there appears to be no basis in the WO-A-03 097892 for making the generalisation "**providing feedback** to the RF power system" from the feature of original claim 14 "a

feedback control mechanism that provides input to the RF power system from the pulsed DC power system". Hence claim 6 appears to contravene Article 123(2) EPC.

Claim 7 appears to be based on claims 2 or claim 15 as originally filed which referred to independent claims 1 and 14 as originally filed, respectively. Its present wording is considered to be obscure and should actually read "said pulsed DC power supply reverses the polarity of the voltage supplied to the target during at least a portion of the power application".

Claim 8 appears to correspond to original claim 7 which only referred to original claim 3. Hence the present reference to "claims 2 or 6" appears to contravene Article 123(2) EPC.

Claims 9 and 10 appear to be based on original claims 20 and 21, respectively, which referred to independent claim 14 as originally filed which, however, required an RF controller, a match network and a feedback control mechanism that provides input to the RF power system from the pulsed DC power system. Hence claims 9 and 10 appear to contravene Article 123(2) EPC.

Claims 11-13 appear to correspond to original claims 11 to 13 but the reference of claim 11 "according to claims 2 and 6" has been amended but claim 11 should actually only refer to claim 8 since original claim 11 referred to original claim 7 (which now corresponds to claim 8). Hence claims 11-13 (claims 12 and 13 refer to claim 11) appear to contravene Article 123(2) EPC.

Claims 14 and 15 are based on original claims 25 and 26, respectively, which referred to independent claim 14 which, however, required an RF controller, a match network and a feedback control mechanism that provides input to the RF power system from the pulsed DC power system. Hence claims 14 and 15 appear to contravene Article 123(2) EPC.

Claims 17 to 30 correspond to original claims 28 to 42 and thus appear to comply with Article 123(2) EPC.

Claim 31 appears to be based on original claim 59 which via claims 58 and 56 referred to independent claim 44 which instead of the tuner defined an RF control and a match network which are **not** defined in present independent apparatus claim 16. Furthermore, by replacing "... for a greater multiple of **the** predefined time period" by the present definition "for a greater multiple of a predefined time period ..." claim 31 has been extended since now a second, different predefined time period is meant. Hence claim 31 appears to contravene Article 123(2) EPC.

Claim 32 appears to be based on original claim 41 which only referred to original claims 39 or 40 (corresponding to present claims 28 and 29) so that the present reference to "claims 16, 28, 29 or 31" appears to contravene Article 123(2) EPC for **not** having any basis in the WO-A-03 097892.

Claim 33 appears to be based on a single feature of original independent claim 44 so that it appears that the intermediate generalisation of an apparatus having the features of independent claim 16 with a match

network has **no** basis in the WO-A-03 097892. Hence claim 33 appears to contravene Article 123(2) EPC.

Claims 34 to 36 correspond to original claims 53, 61 and 62, respectively, which referred only to original independent claim 44 which instead of the tuner defined an RF control and a match network but now refers to claim 33 which represents an intermediate generalisation **not** having any basis in the WO-A-03 097892. Claims 34 to 36 therefore contravene Article 123(2) EPC, either.

Claim 37 corresponds to original claims 43 or 64 which referred to original claims 27 or 44 (corresponding to present claims 16 and 33), respectively. Since claim 33 represents an intermediate generalisation which contravenes Article 123(2) EPC the same holds true for claim 37 when referring to it.

3.4. Hence the main request appears not to be allowable because claims 1, 6, 8-15, and 31-37 appear to contravene Article 123(2) EPC.

First auxiliary request

3.5. Claims 1-33 of the first auxiliary request correspond to claims 1-13, 16-25, and 28-37 of the main request (claims 14, 15, 26 and 27 have been deleted while the features of claim 26 have been incorporated into independent apparatus claim 16 of the main request [= new claim 14]), respectively, with the dependencies being amended accordingly.

Thus the objections under Article 123(2) EPC with respect to claims 1, 6, 8-13, and 31-37 of the main request apply mutatis mutandis to claims 1, 6, 8-13, and 27-33 of the first auxiliary request.

Second auxiliary request

3.6. Claims 1-36 of the second auxiliary request correspond to claims 2-37 of the main request with the dependencies being amended accordingly.

Thus the objections under Article 123(2) EPC with respect to claims 6, 8-15, and 31-37 of the main request apply mutatis mutandis to claims 5, 7-14, and 30-36 of the second auxiliary request.

Third auxiliary request

3.7. Claims 1-32 of the third auxiliary request correspond to claims 2-33 of the first auxiliary request (i.e. claims 1, 14, 15, 26 and 27 of the main request have been deleted while the features of claim 26 have been incorporated into independent apparatus claim 16 of the main request) with the dependencies being amended accordingly.

Thus the objections under Article 123(2) EPC with respect to claims 6, 8-13, and 27-33 of the first auxiliary request apply mutatis mutandis to claims 5, 7-12, and 26-32 of the third auxiliary request.

Fourth auxiliary request

3.8. Claims 1-30 of the fourth auxiliary request correspond to claims 1-12, 15-24 and 29-36 of the second auxiliary request (claims 13, 14, and 25-28 have been deleted), respectively, with the dependencies being amended accordingly.

Thus the objections under Article 123(2) EPC with respect to claims 5, 7-14, and 30-36 of the second auxiliary request apply mutatis mutandis to claims 5, 7-12, and 24-30 of the fourth auxiliary request.

Fifth auxiliary request

3.9. Claims 1-22 of the fifth auxiliary request correspond to claims 1, 7, 16-25 and 28-37 of the main request (claims 2-6, 8-15, and 26-27 of the main request have been deleted), respectively, with the dependencies being amended accordingly.

Thus the objections under Article 123(2) EPC with respect to claims 1 and 31-37 of the main request apply mutatis mutandis to claims 1 and 16-22 of the fifth auxiliary request."

The appellant was given the opportunity to file observations to the communication provided they were filed at least one month before the date of the oral proceedings.

- V. With letter of 30 August 2012 submitted by fax on the same date the appellant stated that "the applicant

herewith informs the Board that they do not plan to attend the oral proceedings on 2 October 2012".

This letter did **not** contain any further arguments concerning the objections raised in the above mentioned Board's communication dated 25 June 2012.

- VI. Oral proceedings before the Board were held on 2 October 2012. As announced with their fax dated 30 August 2012 the appellant did not attend so that the oral proceedings took place in its absence in accordance with Rule 115(2) EPC and Article 15(3) RPBA. At the end of the oral proceedings the Board announced its decision.

Reasons for the Decision

1. The statement of the appellant in its fax dated 30 August 2012 that they will not attend the oral proceedings (see point V above) is considered by the Board as a withdrawal of the auxiliary request for oral proceedings, as is constant jurisprudence (see Case Law of the Boards of Appeal, 6th edition 2006, VI.C.2.2), the appellant thereby relying on its written submissions.

Although the appellant was not represented at the oral proceedings, which were held in accordance with Rule 115(2) EPC and Article 15(3) RPBA in its absence, the principle of the right to be heard pursuant to Article 113(1) EPC is observed since it only affords the opportunity to be heard and, by absenting itself from the oral proceedings, a party gives up that

- opportunity (see the explanatory note to Article 15(3) RPBA cited in T 1704/06, not published in OJ EPO; see also the Case Law of the Boards of Appeal, 6th edition 2006, VI.B.3 to VI.B.3.2).
2. In the communication accompanying the summons for oral proceedings the Board, taking account of the submissions of the appellant, amongst others raised objections under Article 123(2) EPC against all requests, explaining why in the Board's opinion the amendments carried out in the claims of these requests resulted in subject-matter extending beyond the content of the application as originally filed (see point IV above).
 3. The appellant did not reply in substance to these objections (see point V above). 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.
 4. With regard to the above, the Board concludes - for the reasons already set out in the communication dated 25 June 2012 (see point IV above) - that the subject-matter of claims 1, 6, 8-15, and 31-37 of the main request, of claims 1, 6, 8-13, and 27-33 of the first auxiliary request, of claims 5, 7-14, and 30-36 of the second auxiliary request, of claims 5, 7-12, and 26-32 of the third auxiliary request, of claims 5, 7-12, and 24-30 of the fourth auxiliary request and of claims 1 and 16-22 of the fifth auxiliary request contravene Article 123(2) EPC.

5. Consequently, none of the requests is allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Nachtigall

H. Meinders