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**Datasheet for the decision
of 21 October 2010**

Case Number: T 0029/09 - 3.2.07

Application Number: 04028515.7

Publication Number: 1650321

IPC: C23C 14/34

Language of the proceedings: EN

Title of invention:
A sputtering system

Applicant:
Applied Materials, Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 84, 111(1), 123(2)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Allowability of amendments (yes)"
"Novelty (yes)"
"Remittal to department of first instance for further prosecution"

Decisions cited:
G 0010/93

Catchword:
-



Case Number: T 0029/09 - 3.2.07

D E C I S I O N
of the Technical Board of Appeal 3.2.07
of 21 October 2010

Appellant: Applied Materials, Inc.
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Santa Clara
CA 95054 (US)

Representative: Schickedanz, Willi
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 29 July 2008
refusing European application No. 04028515.7
pursuant to Article 97(1) EPC.

Composition of the Board:

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

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. 04 028 515.7.

II. In the present decision the following documents are cited:

D1 = EP-A-1 321 537

D2 = US-B-6 409 897

D3 = WO-A-98 07565

D4 = WO-A-2004 005574

D5 = US-A-4 834 856

III. The Examining Division held that the four independent claims 1, 10, 15 and 20 of the main request, i.e. the claims 1 to 25 of the application as originally filed, contravened Article 84 EPC in combination with Rule 43(2) EPC. Furthermore, the feature "**thermally non-conductive**" was considered to render the independent claims 1, 10 and 20 of the main request unclear, particularly in view of the disclosure of D1, and thus also to contravene Article 84 EPC. The Examining Division further considered that the subject-matter of claims 1, 10 and 20 of the main request lacked novelty over D1. The subject-matter of claims 1 and 18 of the auxiliary request, comprising claims 1-28, dated 14 June 2007 contained the identical feature "thermally non-conductive" and was therefore considered to contravene Article 84 EPC as well. The subject-matter of claims 1 and 18 of the auxiliary request was additionally considered to lack novelty over D1. The subject-matter of the dependent claims 2-3, 5, 7, 11-13

and 23 of the auxiliary request was considered to lack novelty over D1 while the subject-matter of the remaining claims 2-4, 15-16, 19, 20 and 22 was considered to lack inventive step in view of D1 and D4. The subject-matter of claims 8-10 was considered to lack inventive step in view of D1 alone or in combination with D3, the subject-matter of claim 6 was considered obvious in view of either D2 or D3, the subject-matter of claim 14 was obvious in view of D5, while the subject-matter of claims 17 and 21 was considered to lack inventive step taking account of general knowledge of the person skilled in the art.

IV. The appellant requested to set aside the decision under appeal and to grant a patent on the basis of the claims 1-24 of the main request, or auxiliarily on the basis of the claims 1-23 of the auxiliary request, both requests as filed together with the grounds of appeal. As an auxiliary request an oral hearing was requested.

V. With a communication dated 4 May 2010 and annexed to the summons to oral proceedings the Board gave its preliminary and non-binding opinion with respect to the claims of these two requests. The appellant's request for "an oral hearing" was interpreted as a request for oral proceedings.

The Board stated amongst others that the three independent claims 1, 10 and 19 of the main request appeared to contravene Rule 43(2)a) EPC and Article 84 EPC, the latter claim also for being rendered unclear by the feature "thermally non-conductive". The same conclusion appeared to be valid for independent claims 1 and 18 of the auxiliary request.

Furthermore, the subject-matter of claims 1 and 19 of the main request and of claims 1 and 18 of the auxiliary request appeared to lack novelty over D1.

- VI. With letter dated 20 July 2010 the appellant submitted an amended set of claims 1-6 as a new main request in combination with an insertion page 1 for the description, supported by arguments concerning the allowability of the amendments carried out therein.
- VII. With letter dated 18 October 2010 submitted by fax on the same day the appellant submitted an auxiliary request comprising claims 1-8, supported by arguments concerning the basis of the amendments carried out therein.
- VIII. Oral proceedings before the Board were held on 21 October 2010. At the start the appellant withdrew all previous requests except the one filed as auxiliary request with letter dated 18 October 2010. After discussing Article 123(2) EPC issues with the claims in question this single request was replaced by an amended request comprising claims 1-7. In respect of these only the issue of novelty was discussed and the appellant did not raise any objection with respect to the Board's proposal to remit the case to the Examining Division for further prosecution of this request.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the single request filed during the oral proceedings.

At the end of the oral proceedings the Board announced its decision.

IX. Independent claim 1 of the single request reads as follows:

"1. A sputtering system comprising:
a) a rotatable target comprising a plurality of non-bonded target cylinders (215);
b) a target backing tube (205) having an exterior surface,
c) said plurality of target cylinders (215) being located around said target backing tube (205); wherein
d) target spacers (230) are provided which are in contact with the exterior surface of said target backing tube (205); and
e) said cylinders (215) are in contact with said spacers (230) located between the target backing tube (205) and said plurality of cylinders (215); and
f) said spacers (230) include a metallic wire and are electrically conductive."

X. The appellant argued essentially as follows:

Claim 1 of the single request is based on figures 4, 7, page 3, line 30 and page 6, lines 9 to 15 of the application as originally filed. The dependent claims 2-7 correspond to claims 2-4, 9, 14 and 19 as originally filed, respectively.

The sputtering system of claim 1 is novel over the cited prior art since these documents do not disclose any target spacers including a metallic wire.

A remittal to the Examining Division for further prosecution is not objected to.

Reasons for the Decision

1. *Allowability of amendments (Articles 84 and 123(2) EPC)*
 - 1.1 Claim 1 of the single request is based on claim 15 as originally filed in combination with page 6, lines 9 to 15 and lines 18 and 19, and figures 4 and 7 of the application as originally filed.
 - 1.1.1 The dependent claims 2-7 correspond to claims 2-4, 9, 14 and 19 as originally filed, respectively and have also a basis at page 5, lines 8 to 27 of the application as originally filed.
 - 1.1.2 Consequently, claims 1-7 meet the requirements of Article 123(2) EPC.
 - 1.2 Since the set of claims 1-7 of the single request only comprises one independent claim, i.e. claim 1, which no longer comprises the objected feature "thermally non-conductive" but instead defines that the target comprises a plurality of non-bonded target cylinders - which by the Board was considered to represent an essential feature (see point 4.2 of its communication) - the claims 1-7 also comply with Article 84 EPC and Rule 43(2) EPC.

2. *Novelty (Article 54 EPC)*

2.1 Apparatus claim 1 now defines a sputtering system comprising a rotatable target comprising a plurality of non-bonded target cylinders located around a target backing tube, and target spacers which are located between said target backing tube and said target cylinders and are in contact with both. These target spacers include a metallic wire and are electrically conductive (compare point IX above).

2.1.1 D1 discloses a magnetron sputtering system which comprises a DC power supply, a drive system for rotating the target, the target including a backing tube surrounded by and in contact with a buffer material, preferably a thermally insulating carbon felt. This preferred carbon felt is in contact with and surrounded by a plurality of non-bonded target material cylinders. Said backing tube comprises a magnet system with three rows of magnets (for increasing the sputtering speed) and a cooling passage for passing a cooling liquid therethrough (see paragraphs [0011] to [0014], [0019] to [0022], [0026], [0027] and [0029], and column 7, lines 12 to 22; examples 1 and 2; claims 1, 3, 4 and 7; and figures 1 to 8).

Although this carbon felt according to D1 is considered to represent an electrically conductive target spacer it does **not** include any metallic wire.

2.1.2 According to the rotatable sputter target of D2 the target material is attached to the backing tube via a layer of thermally and electrically conductive material which usually is a powder or other particulate material,

e.g. graphite powder (see abstract; figures 1 and 2; column 2, line 51 to column 3, line 24; column 5, lines 19 to 23 and lines 58 to 65).

This layer according to D2 thus represents a target spacer which **neither includes** any metallic wire.

2.1.3 D3 relates to bonded targets and thus is **not** relevant for the question of novelty.

2.1.4 D4 discloses rotatable targets for sputtering systems which are slipped on or otherwise attached to a backing tube or backing structure (see page 3, lines 19 to 37). The mechanical joints and seams between the target cylinder segments preferably comprise smooth joints, and preferred embodiments use a locking or compression ring for placement of said segments, an end compression fitting, a lock and key cut, threading said segments onto the backing tube, or use an interference slip fit method (see page 4, line 18 to page 5, line 20). Spaces between said segments may be filled using an adherent or adhesive material (see page 5, lines 22 to 28).

Hence D4 does also **not** disclose target spacers including a metallic wire.

2.1.5 D5 relates to a method for sputter deposition of multicomponent films or coatings over a large area by sputtering in a noble gas or other vapour plasma by ion bombarding the at least one spherical or partially spherical target (see abstract; column 1, lines 13 to 24; figure 2). In order to prevent any sputtering from the connecting lead or holding stem 16 the same is insulated from the plasma 20 by a helically wound

spacer wire 22 located between said connecting lead or holding stem and an insulator tubing 18 (see column 3, line 66 to column 4, line 2 and figure 2). Cooling of the spherical target at high sputter rates is mentioned (see column 4, lines 26 to 43) but nothing is disclosed with respect to any material to be placed between the target material and the cooling means.

Hence D5 **neither** discloses a target spacer including a metallic wire **nor** a rotatable target comprising a plurality of non-bonded target cylinders.

2.2 Consequently, the subject-matter of claim 1 is novel with respect to the sputtering systems according to D1 to D5 (Article 54 EPC).

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

3.1 The Board has come to the conclusion that the subject-matter of the single request meets the formal requirements and of novelty and therefore, overcomes the main reasons for refusing the present application (see point III above).

3.2 Having regard to the fact that the features of claim 1 "target spacers" and "spacers include a metallic wire and are electrically conductive" were not taken from the claims, but from paragraph [0030] of the description of the application as originally filed, the Board has doubts as to whether the European search carried out for the originally filed claims 1-25 actually covered the alternative now claimed in claim 1 of the single request, since a metallic wire basically

has the opposite thermal properties of a thermal insulator, i.e. the metallic wire is thermally conductive, whereas the claims 1-25 as originally filed were principally directed to sputtering systems including either a separator, a mesh or a backing layer being "electrically conductive and **thermally non-conductive**".

3.2.1 In accordance with Article 111(1) second sentence, EPC, the Board has the power to examine whether or not the application and the invention to which it relates meets the requirements of the EPC. This also holds good for requirements the Examining Division has not considered in the examination proceedings or has regarded as fulfilled. Furthermore, the Board shall then, when appropriate, decide either to rule on the case itself or to remit it to the Examining Division for further prosecution (cf. G 10/93, OJ EPO 1995, 172).

3.2.2 The Board therefore considers that it is appropriate to remit the case to the department of first instance for further prosecution in accordance with Article 111(1) EPC so that the Examining Division firstly can decide whether or not an additional search is necessary, and secondly, can proceed to the assessment of inventive step.

Furthermore, the description has not yet been adapted to the present request and therefore contains embodiments which are no longer covered by claim 1.

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.

The Registrar:

The Chairman:

G. Nachtigall

H. Meinders