

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ZHENG XU, FUSEN CHEN, and JAIM NULMAN

Appeal No. 1999-2202
Application No. 08/733,620

ON BRIEF

Before GARRIS, WARREN, and TIMM, Administrative Patent Judges.
GARRIS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal that involves claims 1-21 which are all of the claims in the application.

The subject matter on appeal relates to a method and apparatus for sputter depositing a target material on a workpiece via a plasma generated by a coil wherein an arrangement of magnetic fields originating externally of the coil reduce sputter

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from the coil onto the workpiece and/or reduce deposition of sputtered material from the target onto the coil. This appealed subject matter is adequately illustrated by independent claim 1 which reads as follows:

1. An apparatus for energizing a plasma within a semiconductor fabrication system to deposit material onto a workpiece, the apparatus comprising:

a semiconductor fabrication chamber having a plasma generation area within said chamber;

a coil carried internally by said chamber and positioned to couple energy into said plasma generation area to ionize said deposition material;

a source of sputtered deposition material positioned to provide a stream of sputtered deposition material through said coil into said plasma generation area; and

an arrangement of magnetic fields originating externally of said coil and positioned to reduce sputtering from said coil onto said workpiece.

The references set forth below are relied upon by the examiner in the rejections before us:

Mintz	4,865,712	Sep. 12, 1989
Ohno et al. (Ohno)	4,716,491	Dec. 29, 1987
Barnes et al. (Barnes)	5,178,739	Jan. 12, 1993

Claims 1, 5, 12, 13 and 15-17 are rejected under 35 U.S.C. § 102(b) as being anticipated by Barnes.

Under 35 U.S.C. § 103(a), claims 1-5 and 12-17 are rejected as being unpatentable over Barnes alone, claims 6, 7 and 18-21

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are rejected as being unpatentable over Barnes in view of Ohno, and claims 8-11 are rejected as being unpatentable over Barnes in view of Mintz.¹

OPINION

The rejections which the examiner has formulated and advanced on this appeal cannot be sustained for the reasons which follow.

Concerning the section 102 rejection, the examiner contends that Barnes teaches "positioning magnetic fields externally of an RF coil" and that "the magnetic means in Barnes while utilized to create magnetron discharges also will confine the plasma such that the coil is reduced in sputtering" (answer, page 11; emphasis deleted). The deficiency of the examiner's position is apparent. As revealed by a comparison of appellants' Figure 8 with Barnes' Figure 3 (to which the examiner refers in support of his position), appellants' magnetic fields encompass their coil (which is located in the peripheral area of the chamber) whereas Barnes' magnetic fields do not even approach his coil (which is located in the central area of the chamber). Viewed from this

¹ Because they depend from claim 6, claims 8-11 clearly should have been rejected over Barnes in view of Ohno and further in view of Mintz. The examiner's error in this matter is harmless in light of our disposition of the subject appeal.

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perspective, it is clear that no basis exists for the examiner's viewpoint that patentee's magnetic fields would be capable of performing the coil-affecting function required by the here rejected claims.

Under these circumstances, the section 102 rejection of claims 1, 5, 12, 13 and 15-17 as being anticipated by Barnes cannot be sustained.

The only claim distinctions acknowledged and addressed by the examiner in his section 103 rejection based on Barnes alone relate to "electromagnetic coils for generating the magnetic fields" and to "the target materials" (answer, page 5). As a consequence, even assuming it would have been obvious to modify Barnes so as to account for such distinctions, the rejection still would be improper since the above discussed deficiency would remain outstanding. It follows that the examiner's section 103 rejection of claims 1-5 and 12-17 as being unpatentable over Barnes alone also cannot be sustained.

In rejecting claims 6, 7 and 18-21 over Barnes in view of Ohno, the examiner designates "the use of first and second [electromagnet] coils to generate a magnetic field" (answer, page 6) as the sole distinction of these claims over Barnes and concludes that it would have been obvious to provide Barnes with

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such first and second electromagnet coils in view of Ohno.² As a consequence, for reasons analogous to those discussed previously, even if Barnes were provided with first and second electromagnet coils, the earlier mentioned deficiency of Barnes would remain outstanding and the rejection still would be improper. Thus, the section 103 rejection of claims 6, 7 and 18-21 as being unpatentable over Barnes in view of Ohno likewise cannot be sustained.

For similar reasons, we also cannot sustain the examiner's section 103 rejection of claims 8-11 as being unpatentable over Barnes in view of Mintz. That is, even if Barnes were modified in the manner proposed by the examiner, the above discussed deficiency of Barnes would remain outstanding and thus the rejection still would be improper.

² We observe that Ohno clearly discloses (e.g., see Figures 3-5 and the disclosure relating thereto) the previously discussed magnetic fields/RF coil arrangement which is so clearly absent from Barnes. However, since the examiner has not relied on this specific aspect of Ohno's disclosure in the rejection under consideration, neither shall we.

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The decision of the examiner is reversed.

REVERSED

Bradley R. Garris)	
Administrative Patent Judge)	
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Charles F. Warren)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
)	
)	
Catherine Timm)	
Administrative Patent Judge)	

BRG:tdl

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