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Paper 48
Entered: October 1, 2015

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

THE GILLETTE COMPANY, FUJITSU SEMICONDUCTOR LIMITED,
and FUJITSU SEMICONDUCTOR AMERICA, INC.
Petitioners,

v.

ZOND, LLC,
Patent Owner.

Case IPR2014-00580[1]
Patent 6,896,773 B2

Before KEVIN F. TURNER, DEBRA K. STEPHENS, JONI Y. CHANG, SUSAN L.C. MITCHELL, and JENNIFER MEYER CHAGNON, *Administrative Patent Judges*.

Opinion for the Board filed by *Administrative Patent Judge Chang*.

Opinion Dissenting-in-Part filed by *Administrative Patent Judge Stephens*.

CHANG, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
Inter Partes Review
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

[1] Case IPR2014-01479 has been joined with the instant *inter partes* review.

I. INTRODUCTION

The Gillette Company ("Gillette") filed a revised Petition requesting an *inter partes* review of claims 1–20 and 34–39 of U.S. Patent No. 6,896,773 B2 (Ex. 1001, "the '773 patent"). Paper 7 ("Pet."). Patent Owner Zond, LLC ("Zond") filed a Preliminary Response. Paper 10 ("Prelim. Resp."). Upon consideration of the Petition and Preliminary Response, we instituted the instant trial on October 10, 2014, pursuant to 35 U.S.C. § 314. Paper 11 ("Dec.").

Subsequent to institution, we granted the Motion for Joinder filed by Taiwan Semiconductor Manufacturing Company, Ltd., TSMC North America Corp. (collectively, "TSMC"), Fujitsu Semiconductor Limited, and Fujitsu Semiconductor America, Inc. (collectively, "Fujitsu"), joining Case IPR2014-01479 with the instant trial (Paper 20), and also granted a Joint Motion to Terminate with respect to TSMC (Paper 37).[2] Zond filed a Response (Paper 32 ("PO Resp.")), and Gillette filed a Reply (Paper 39 ("Reply")). Oral hearing[3] was held on June 16, 2015, and a transcript of the hearing was entered into the record. Paper 47 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons set forth below, we determine that Gillette has shown, by a preponderance of the evidence, that claims 1–20 and 34–39 of the '773 patent are unpatentable under 35 U.S.C. § 103(a).

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[2] In this Decision, we refer to The Gillette Company (the original Petitioner) and Fujitsu as "Gillette," for efficiency.

[3] The oral arguments for the instant review and Case IPR2014-00726 were consolidated.

A. Related District Court Proceedings

Gillette indicates the ’773 patent was asserted in *Zond, LLC v. The Gillette Co.*, No.1:13-CV-11567-DJC (D. Mass.), and identifies other proceedings in which Zond asserted the claims of the ’773 patent. Pet. 1.

B. The ’773 Patent

The ’773 patent relates to a method and an apparatus for high-deposition sputtering. Ex. 1001, Abs. At the time of the invention, sputtering was a well-known technique for depositing films on semiconductor substrates. *Id*. at 1:5–6. According to the ’773 patent, conventional magnetron sputtering systems deposit films with relatively low uniformity. *Id.* at 1:53–54. Although film uniformity can be increased by mechanically moving the substrate and/or magnetron, the ’773 patent indicates such systems are relatively complex and expensive to implement. *Id.* at 1:54–57. The ’773 patent further states that conventional magnetron sputtering systems also have relatively poor target utilization (how uniformly the target material erodes during sputtering) and a relatively low deposition rate (the amount of material deposited on the substrate per unit of time). *Id.* at 1:57–66. To address these issues, the ’773 patent discloses a plasma sputtering apparatus that creates a strongly-ionized plasma from a weakly-ionized plasma using a pulsed power supply. *Id*. at Abs. According to the ’773 patent, “[t]he strongly-ionized plasma includes a first plurality of ions that impact the sputtering target to generate sufficient thermal energy in the sputtering target to cause a sputtering yield of the sputtering target to be non-linearly related to a temperature of the sputtering target.” *Id.*

C. Illustrative Claim

Of the challenged claims, claims 1 and 34 are independent. Claims 2–20 and 35–39 depend, directly or indirectly, from claims 1 and 34. All of the claims at issue here are directed to a sputtering source. Claim 1, reproduced below, is illustrative:

> 1. A sputtering source comprising:
>
> a cathode assembly that is positioned adjacent to an anode, the cathode assembly including a sputtering target;
>
> an ionization source that generates a weakly-ionized plasma from a feed gas proximate to the anode and the cathode assembly; and
>
> a power supply that generates a voltage pulse between the anode and the cathode assembly that creates a strongly-ionized plasma from the weakly-ionized plasma, an amplitude and a rise time of the voltage pulse being chosen to increase a density of ions in the strongly-ionized plasma enough to generate sufficient thermal energy in the sputtering target to cause a sputtering yield to be non-linearly related to a temperature of the sputtering target.

Ex. 1001, 21:8–24.

D. Prior Art Relied Upon

Gillette relies upon the following prior art references:

Wang	US 6,413,382 B1	July 2, 2002	(Ex. 1003)
Fu	US 6,306,265 B1	Oct. 23, 2001	(Ex. 1007)
Lantsman	US 6,190,512 B1	Feb. 20, 2001	(Ex. 1008)
Kawamata	US 5,958,155	Sept. 28, 1999	(Ex. 1009)
Chiang	US 6,398,929 B1	June 4, 2002	(Ex. 1011)

D.V. Mozgrin, et al., *High-Current Low-Pressure Quasi-Stationary Discharge in a Magnetic Field: Experimental Research*, 21 PLASMA PHYSICS REPORTS 400–409 (1995) (Ex. 1005) (“Mozgrin”).

D.V. Mozgrin, *High-Current Low-Pressure Quasi-Stationary Discharge in a Magnetic Field: Experimental Research*, Thesis at Moscow Engineering Physics Institute (1994) (Ex. 1015) (“Mozgrin Thesis”).[4]

Interaction of Low-Temperature Plasma With Condensed Matter, Gas, and Electromagnetic Field in (III) ENCYCLOPEDIA OF LOW-TEMPERATURE PLASMA (V.E. Fortov ed., 2000) (Ex. 1004) (“Fortov”).[5]

A.A. Kudryavtsev and V.N. Skrebov, *Ionization Relaxation in a Plasma Produced by a Pulsed Inert-Gas Discharge*, 28 SOV. PHYS. TECH. PHYS. 30–35 (Jan. 1983) (Ex. 1006) (“Kudryavtsev”).

Yuri P. Raizer, GAS DISCHARGE PHYSICS, 1–35, Springer 1997 (Ex. 1012) (“Raizer”).

W. Ehrenberg and D.J. Gibbons, ELECTRON BOMBARDMENT INDUCED CONDUCTIVITY AND ITS APPLICATIONS, 80–122, (1981) (Ex. 1026) (“Ehrenberg”).

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[4] Mozgrin Thesis is a Russian-language reference (Ex. 1016). The citations to Mozgrin Thesis are to the certified English-language translation submitted by Gillette (Ex. 1015).

[5] Fortov is a Russian-language reference (Ex. 1010). The citations to Fortov are to the certified English-language translation submitted by Gillette (Ex. 1004).

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