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Paper 13
Entered: October 15, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

THE GILLETTE COMPANY,
Petitioner,

v.

ZOND, LLC,
Patent Owner.

Case IPR2014-00578
Patent 6,896,775 B2

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

TURNER, *Administrative Patent Judge.*

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

The Gillette Company ("Gillette") filed a Petition requesting *inter partes* review of claims 1–29 of U.S. Patent No. 6,896,775 B2 ("the '775 Patent"). Paper 9 ("Pet.")[1]. Zond, LLC ("Zond") filed a Preliminary Response. Paper 11 ("Prelim. Resp."). We have jurisdiction under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted "unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition."

Upon consideration of Gillette's Petition and Zond's Preliminary Response, we conclude that the information presented in the Petition demonstrates that there is a reasonable likelihood that Gillette would prevail in challenging claims 1–29 as unpatentable under 35 U.S.C. § 103(a). Pursuant to 35 U.S.C. § 314, we hereby authorize an *inter partes* review to be instituted as to claims 1–29 of the '775 Patent.

A. Related Matters

Gillette indicates that the '775 Patent was asserted in *Zond, Inc. v. The Gillette Co.*, No.1:13-cv-11567-DJC (D. Mass.). Pet. 1. Gillette also identifies other matters where Zond asserted the claims of the '775 Patent against third parties, as well as other Petitions for *inter partes* review that are related to this proceeding. *Id*.

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[1] We refer generally to the Revised Petition filed in response to defects noted in the Notice of Filing Date Accorded the Petition (Paper 4).

B. The '775 Patent

The '775 Patent relates to methods and apparatus for generating magnetically enhanced plasma. Ex. 1001, Abs. At the time of the invention, sputtering was a well-known technique for depositing films on semiconductor substrates. *Id*. at 1:14–25. The '775 Patent indicates that prior art magnetron sputtering systems deposit films having low uniformity and poor target utilization (the target material erodes in a non-uniform manner). *Id*. at 3:34–44. To address these problems, the '775 Patent discloses that increasing the power applied between the target and anode can increase the uniformity and density in the plasma. *Id*. at 3:45–56. However, increasing the power also "can increase the probability of generating an electrical breakdown condition leading to an undesirable electrical discharge (an electrical arc) in the chamber 104." *Id*.

According to the '775 Patent, forming a weakly-ionized plasma substantially eliminates the probability of establishing a breakdown condition in the chamber when high-power pulses are applied between the cathode and anode. *Id*. at 7:4–15. Once the weakly-ionized plasma is formed, high-power pulses are applied between the cathode and anode to generate a strongly-ionized plasma from the weakly-ionized plasma. *Id*. at 7:16–24. The '775 Patent also discloses that the provision of the feed gas to the plasma allows for homogeneous diffusion of the feed gas in the weakly-ionized plasma and allows for the creation of a highly uniform strongly-ionized plasma. *Id*. at 5:59–67.

C. Illustrative Claims

Of the challenged claims, claims 1 and 15 are the only independent claims. Claims 2–14 and 16–29 depend, directly or indirectly, from claims 1 or 15. Claims 1 and 15, reproduced below, are illustrative:

> 1. A magnetically enhanced plasma processing apparatus comprising:
>
> an anode;
>
> a cathode that is positioned adjacent to the anode and forming a gap there between;
>
> an ionization source that generates a weakly-ionized plasma proximate to the cathode;
>
> a magnet that is positioned to generate a magnetic field proximate to the weakly-ionized plasma, the magnetic field substantially trapping electrons in the weakly-ionized plasma proximate to the cathode;
>
> a power supply that produces an electric field across the gap, the electric field generating excited atoms in the weakly-ionized plasma and generating secondary electrons from the cathode, the secondary electrons ionizing the excited atoms, thereby creating a strongly-ionized plasma comprising a plurality of ions; and
>
> a voltage supply that applies a bias voltage to a substrate that is positioned proximate to the cathode, the bias voltage causing ions in the plurality of ions to impact a surface of the substrate in a manner that causes etching of the surface of the substrate.
>
> 15. A method of magnetically enhanced plasma processing, the method comprising:
>
> ionizing a feed gas to generate a weakly-ionized plasma proximate to a cathode;

generating a magnetic field proximate to the weakly-ionized plasma, the magnetic field substantially trapping electrons in the weakly-ionized plasma proximate to the cathode;

applying an electric field across the weakly-ionized plasma that excites atoms in the weakly-ionized plasma and that generates secondary electrons from the cathode, the secondary electrons ionizing the excited atoms, thereby creating a strongly-ionized plasma comprising a plurality of ions; and

applying a bias voltage to a substrate that is positioned proximate to the cathode, the bias voltage causing ions in the plurality of ions to impact a surface of the substrate in a manner that causes etching of the surface of the substrate.

Ex. 1001, 21:45–67, 22:46–64.

D. Prior Art Relied Upon

Gillette relies upon the following prior art references:

Lantsman	US 6,190,512	Feb. 20, 2001	(Ex. 1025)
Wang	US 6,413,382	July 2, 2002	(Ex. 1008)
Kouznetsov	US 2005/0092596	May 5, 2005	(Ex. 1004)
Fu	US 6,306,265	Oct. 23, 2001	(Ex. 1014)

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. 1002) (hereinafter "Mozgrin").

A. A. Kudryavtsev and V.N. Skrebov, *Ionization Relaxation in a Plasma Produced by a Pulsed Inert-Gas Discharge*, 28(1) SOV. PHYS. TECH. PHYS. 30–35 (Jan. 1983) (Ex. 1003) (hereinafter "Kudryavtsev").

D.V. Mozgrin, *High-Current Low-Pressure Quasi-Stationary Discharge in a Magnetic Field: Experimental Research*, Thesis at

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