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Paper 9
Entered: October 15, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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THE GILLETTE COMPANY,
Petitioner,

v.

ZOND, LLC,
Patent Owner.

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Case IPR2014-00604
Patent 6,896,775 B2

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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*

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# I. INTRODUCTION

The Gillette Company (“Gillette”) filed a Petition requesting *inter partes* review of claims 30–37 of U.S. Patent No. 6,896,775 B2 (“the ’775 Patent”). Paper 3 (“Pet.”). Zond, LLC (“Zond”) filed a Preliminary Response. Paper 7 (“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 30–37 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 30–37 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. 2013). 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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*B. The ’775 Patent*

The ’775 Patent relates to methods and apparatus for generating magnetically enhanced plasma. Ex. 1101, 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.



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*C. Illustrative Claims*

Of the challenged claims, claims 30, 36, and 37 are independent claims. Claims 31–35 depend from claim 30. Claims 30 and 37, reproduced below, are illustrative:

> 30. A method of magnetically enhanced plasma processing, the method comprising:
>
> ionizing a volume of feed gas to form 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 electrical pulse across the weakly-ionized plasma to generate a strongly-ionized plasma comprising a first plurality of ions;
>
> exchanging the strongly-ionized plasma with a second volume of feed gas while applying the electrical pulse across the second volume of feed gas to generate a strongly-ionized plasma comprising a second 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 first and the second plurality of ions to impact a surface of the substrate in a manner that causes etching of the surface of the substrate.

> 37. A magnetically enhanced plasma processing apparatus comprising:
>
> means for ionizing a volume of feed gas to form a weakly-ionized plasma proximate to a cathode;
>
> means for 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;



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> means for applying an electrical pulse across the weakly-ionized plasma to generate a strongly-ionized plasma comprising a first plurality of ions;
>
> means for exchanging the strongly-ionized plasma with a second volume of feed gas while applying the electrical pulse across the second volume of feed gas to generate a strongly-ionized plasma comprising a second plurality of ions; and
>
> means for applying a bias voltage to a substrate that is positioned proximate to the cathode, the bias voltage causing ions in the first and the second plurality of ions to impact a surface of the substrate in a manner that causes etching of the surface of the substrate.

Ex. 1101, 23:46–67, 24:45–65.

*D. Prior Art Relied Upon*

Gillette relies upon the following prior art references:

| | | | |
|---|---|---|---|
| Lantsman | US 6,190,512 B1 | Feb. 20, 2001 | (Ex. 1104) |
| Wang | US 6,413,382 B1 | July 2, 2002 | (Ex. 1108) |

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. 1102) (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. 1103) (hereinafter “Kudryavtsev”).

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



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