

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 IPR2014-00578  
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

## 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.”)<sup>1</sup>. 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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<sup>1</sup> 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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