



US006017221A

United States Patent [19]

[11] **Patent Number:** **6,017,221**

Flamm

[45] **Date of Patent:** **Jan. 25, 2000**

[54] **PROCESS DEPENDING ON PLASMA DISCHARGES SUSTAINED BY INDUCTIVE COUPLING**

5,431,968 7/1995 Miller et al. .
5,534,231 7/1996 Savas .
5,637,961 6/1997 Ishii et al. .

[76] Inventor: **Daniel L. Flamm**, 476 Green View Dr., Walnut Creek, Calif. 94596

[21] Appl. No.: **08/866,040**

[22] Filed: **May 30, 1997**

Related U.S. Application Data

[63] Continuation-in-part of application No. 08/736,315, Oct. 23, 1996, abandoned, which is a continuation of application No. 08/567,224, Dec. 4, 1995, abandoned.

[51] **Int. Cl.⁷** **H01L 21/00**

[52] **U.S. Cl.** **437/225**; 437/228; 437/233;
156/643; 156/192.25; 204/192.32

[58] **Field of Search** 118/50.1; 156/643,
156/345, 646, 659.1; 219/121.41, 121.44;
204/192.1, 192.12, 192.25; 427/12; 216/2;
437/225, 228, 233

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,873,884 3/1975 Gabriel .
4,368,092 1/1983 Steinberg et al. .
4,918,031 4/1990 Flamm et al. .
4,943,345 7/1990 Asmussen et al. 156/643
5,234,529 8/1993 Johnson .
5,241,245 8/1993 Barnes et al. .
5,304,282 4/1994 Flamm .
5,361,016 11/1994 Ohkawa et al. 315/111.41

OTHER PUBLICATIONS

Asmussen et al., "The Design of a Microwave Plasma Cavity," *Proc. of IEEE*, 62(1):109-117 (Jan. 1974).
Eckert, "The Hundred Year History of Induction Discharges," *2nd Ann. Int'l Conf. Plasma Chem. Tech.*, (1984).
Fossheim et al., "Broadband tuning of helical resonant cavities," *J. Phys. E. Sci. Instrum.*, 11:892-893 (1978).
Niazi et al. "Operation of a helical resonator plasma source," *Plasma Sources Sci. Technol.*, 3:482-495 (1994).
Roppel et al., "Low temperature oxidation of silicon using a microwave plasma disk source," *J. Vac. sci. Technol.*, B4(1):295-298 (Jan./Feb. 1986).
Zverev et al., "Realization of a Filter with Helical Components," *IRE Trans. on Component Parts*, pp. 99-110, (Sep. 1961).

Primary Examiner—Laurie Scheiner
Attorney, Agent, or Firm—Townsend and Townsend and Crew LLP

[57] **ABSTRACT**

A process for fabricating a product **28, 119**. The process comprises the steps of subjecting a substrate to a composition of entities, at least one of the entities emanating from a species generated by a gaseous discharge excited by a high frequency field in which the vector sum of phase and anti-phase capacitive coupled voltages from the inductive coupling structure substantially balances.

7 Claims, 13 Drawing Sheets

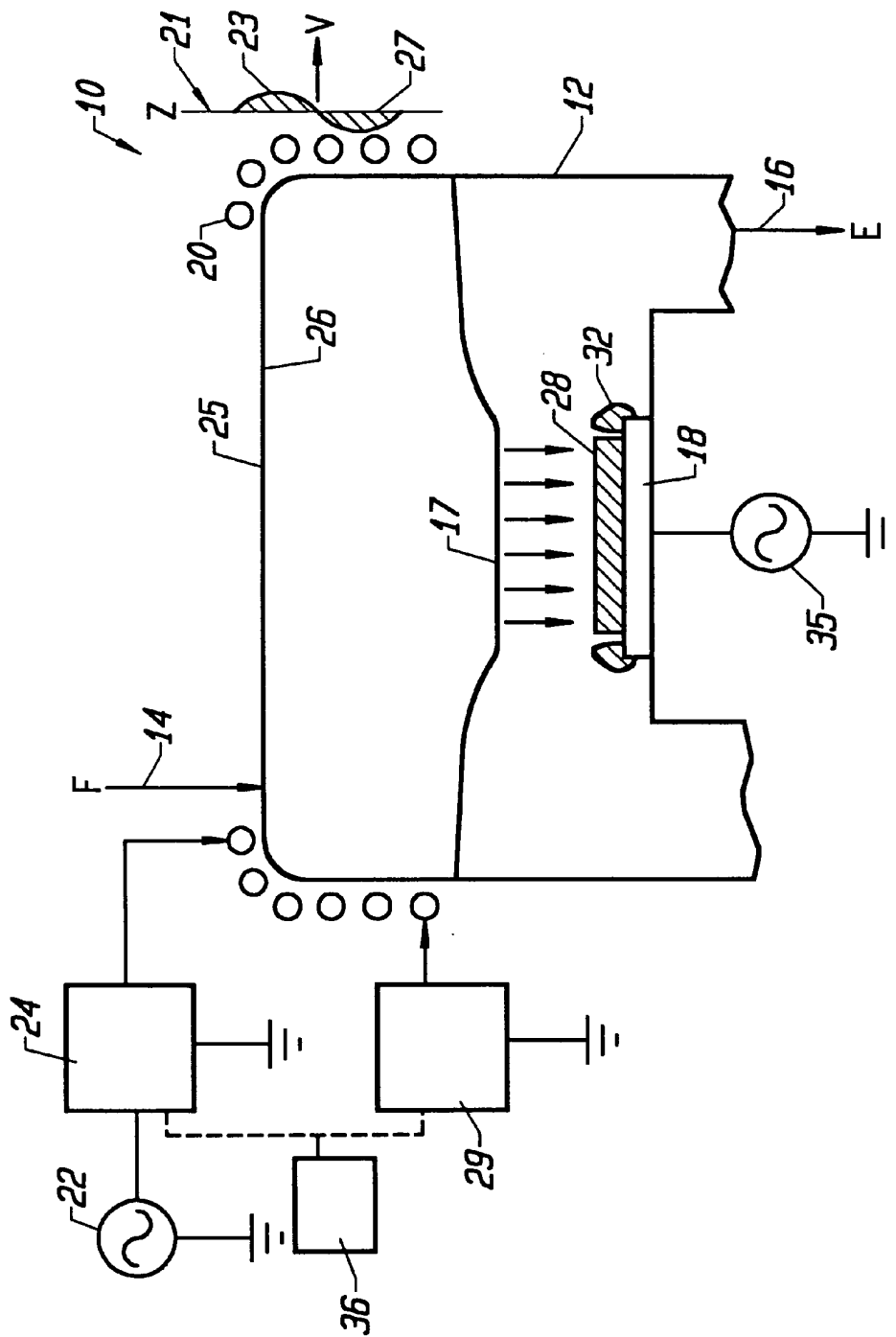


FIG. 1

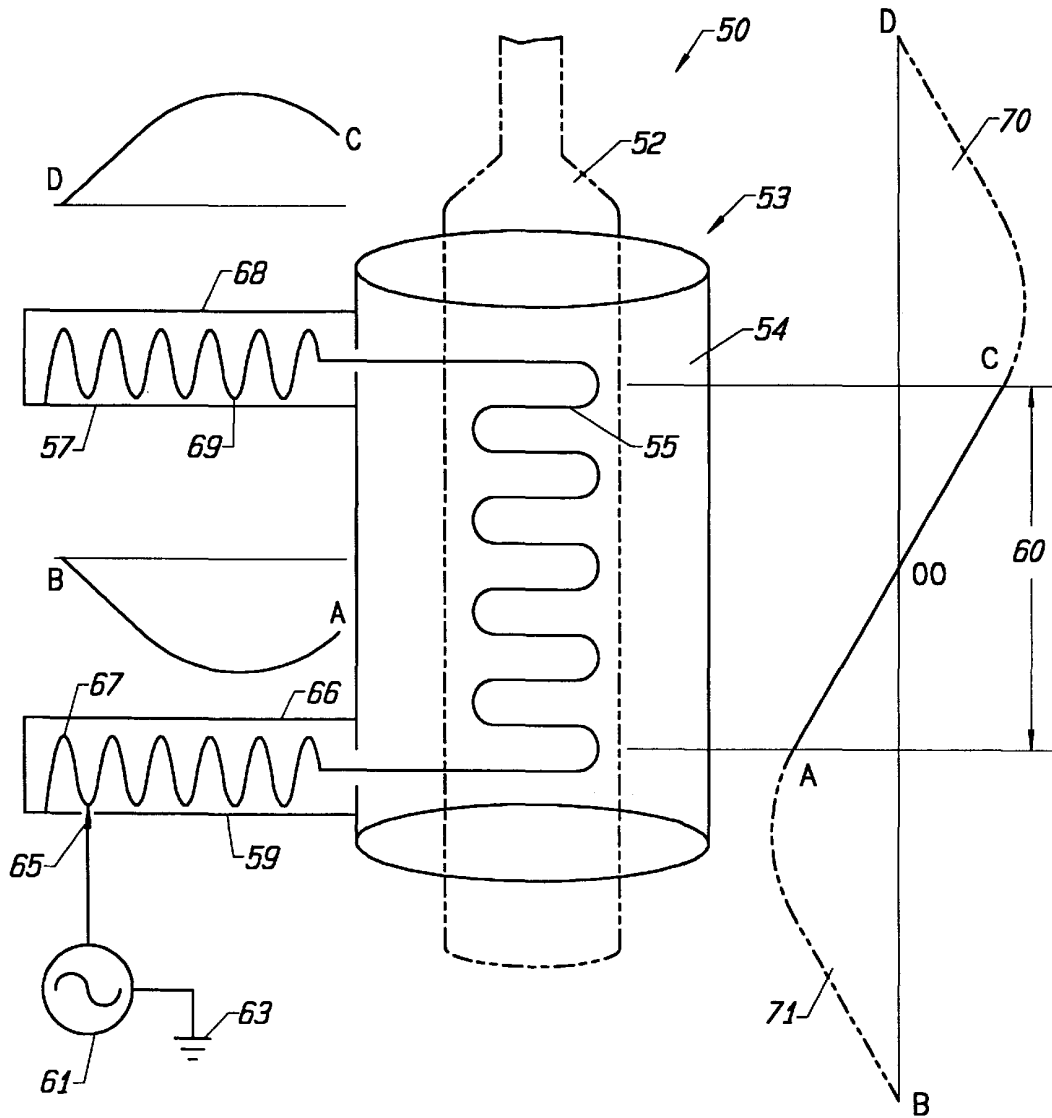


FIG. 2A

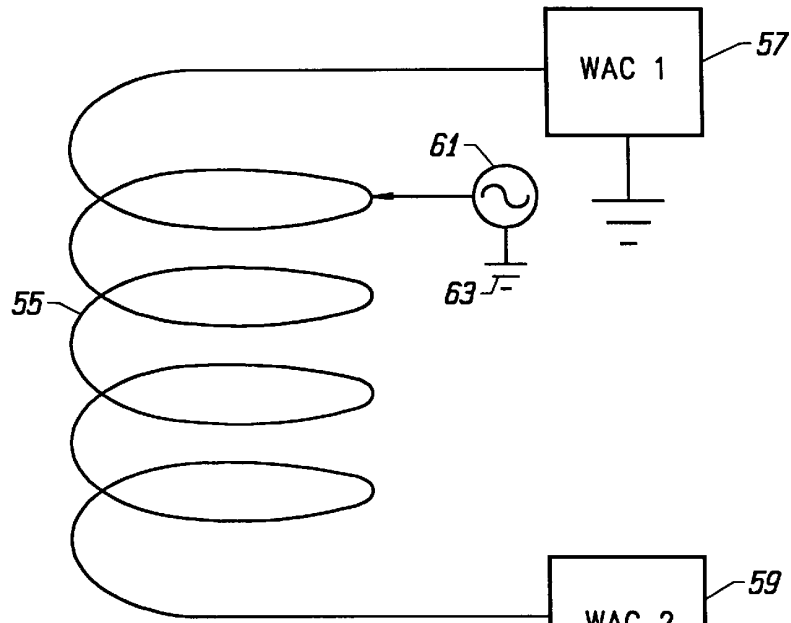


FIG. 2B

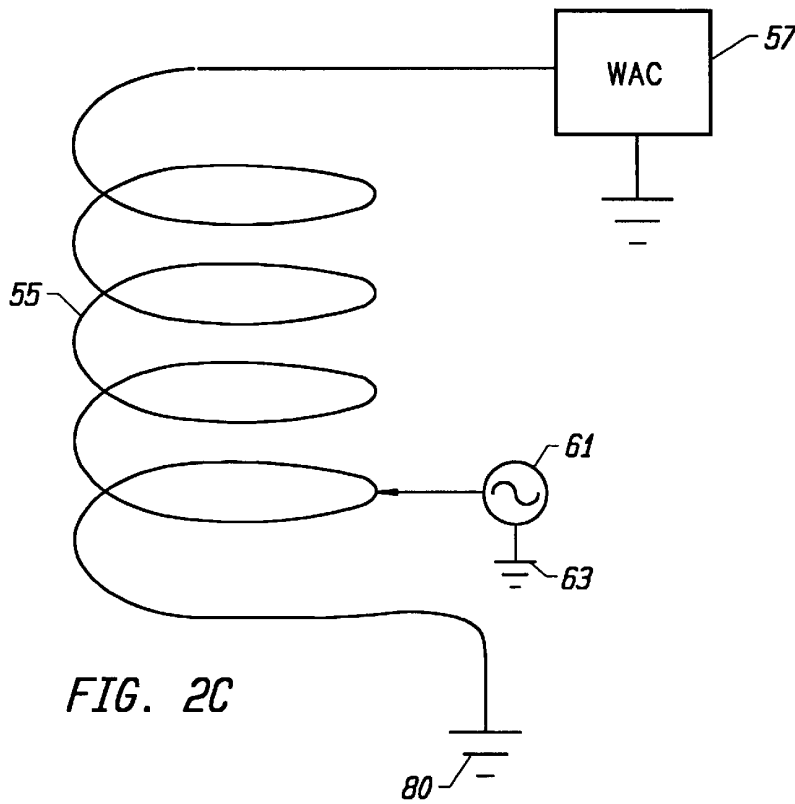


FIG. 2C

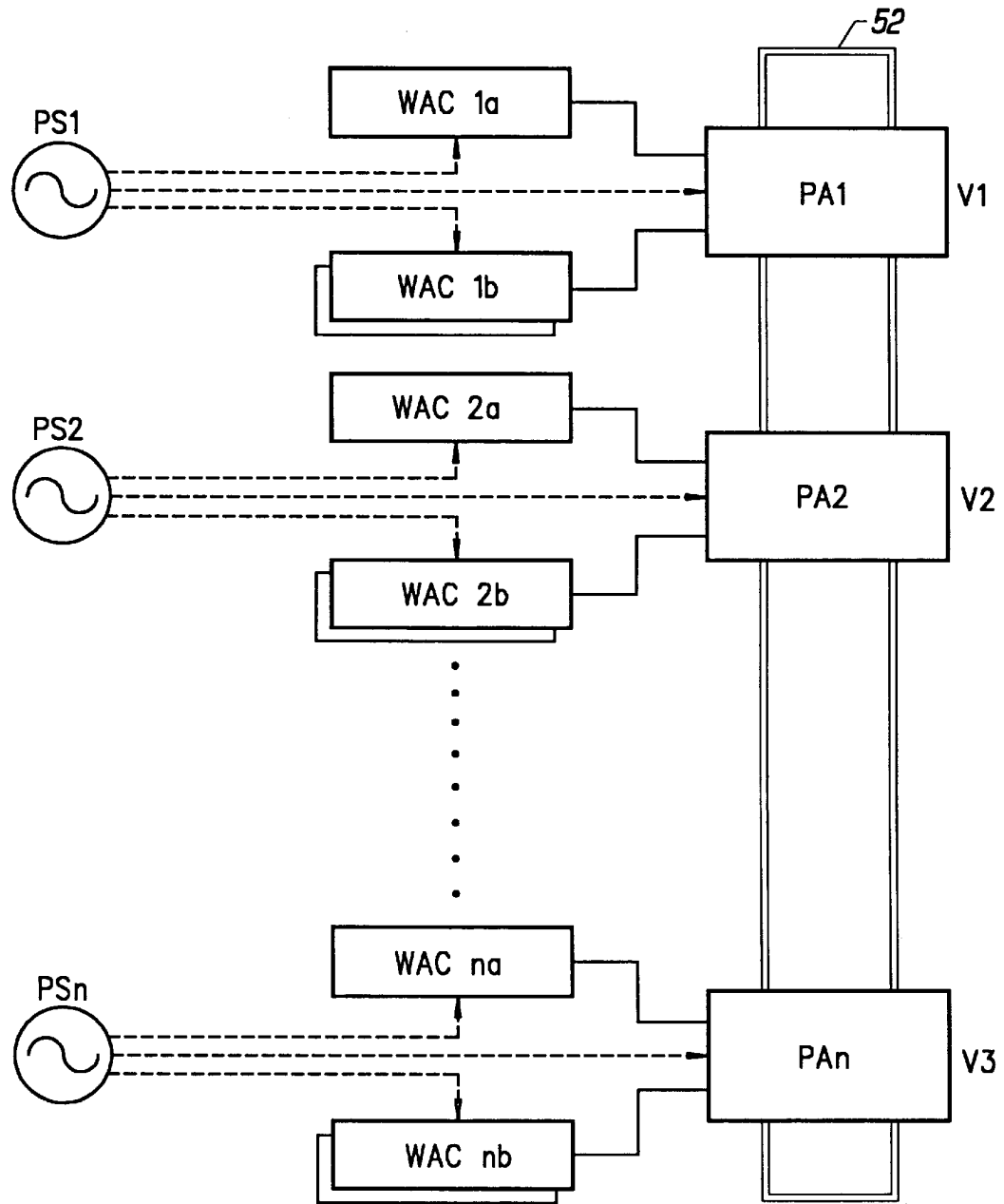


FIG. 2D

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.