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(12) **United States Patent**
Hirose

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(54) **PLASMA PROCESSING APPARATUS**

FOREIGN PATENT DOCUMENTS

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JP 2001-7086 1/2001

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* cited by examiner

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **09/906,731**

(57) **ABSTRACT**

(22) Filed: **Jul. 18, 2001**

The present invention concerns a plasma processing apparatus for processing a processing object by applying two types of high-frequency power with different frequencies to generate plasma. A first high-frequency line is provided with a first filter circuit for attenuating a high-frequency current from a second high-frequency power supply. A second high-frequency line is provided with a second filter circuit for attenuating a high-frequency current from a first high-frequency power supply. The first filter circuit is provided with a variable capacitor for changing a circuit constant. For changing the circuit constant, the variable capacitor is varied so that a resonance point becomes greater than an optimum resonance point most attenuating a high frequency in the second high-frequency power supply. Doing so decreases a sputter rate of the generated plasma affected on a wall surface of the processing chamber.

(65) **Prior Publication Data**

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(30) **Foreign Application Priority Data**

Jul. 19, 2000 (JP) 2000-219783

(51) **Int. Cl.**⁷ **H01L 21/00**

(52) **U.S. Cl.** **156/345.44; 156/345.47; 118/723 E**

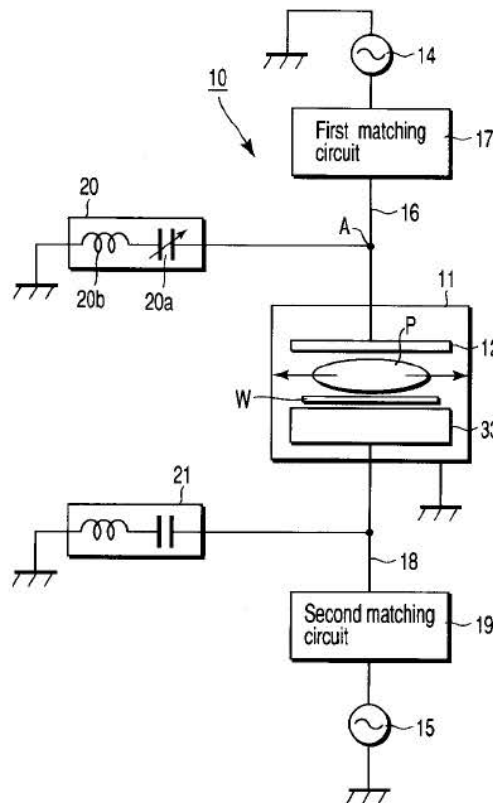
(58) **Field of Search** 156/345.44, 345.43, 156/345.47; 118/723 E; 204/298.08, 298.34

(56) **References Cited**

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7 Claims, 7 Drawing Sheets



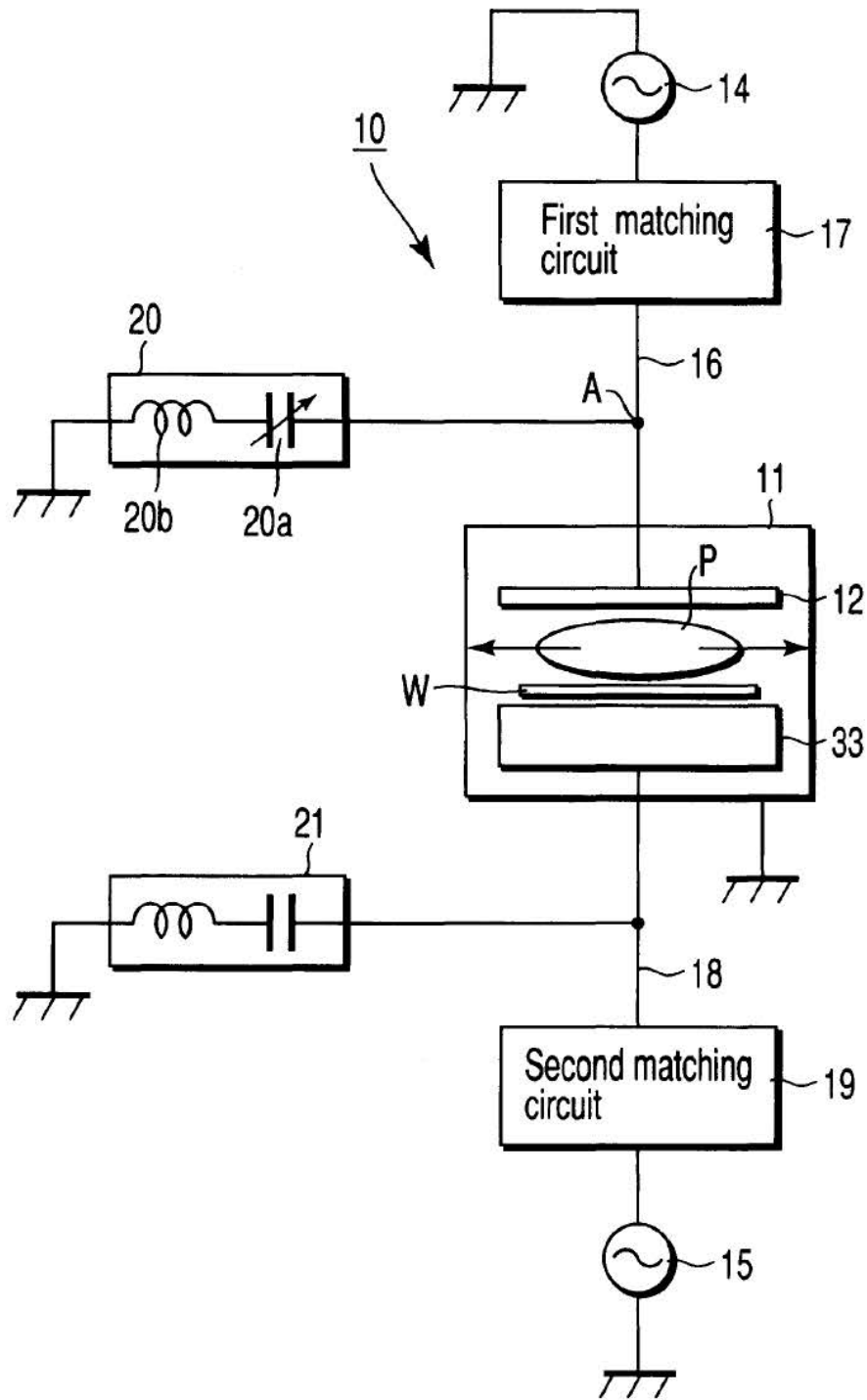


FIG. 1

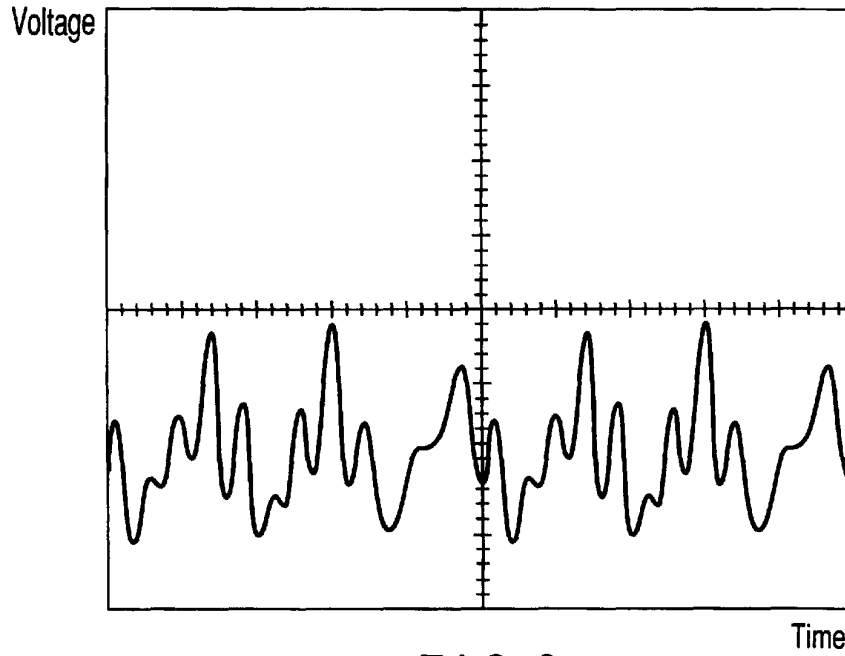


FIG. 2

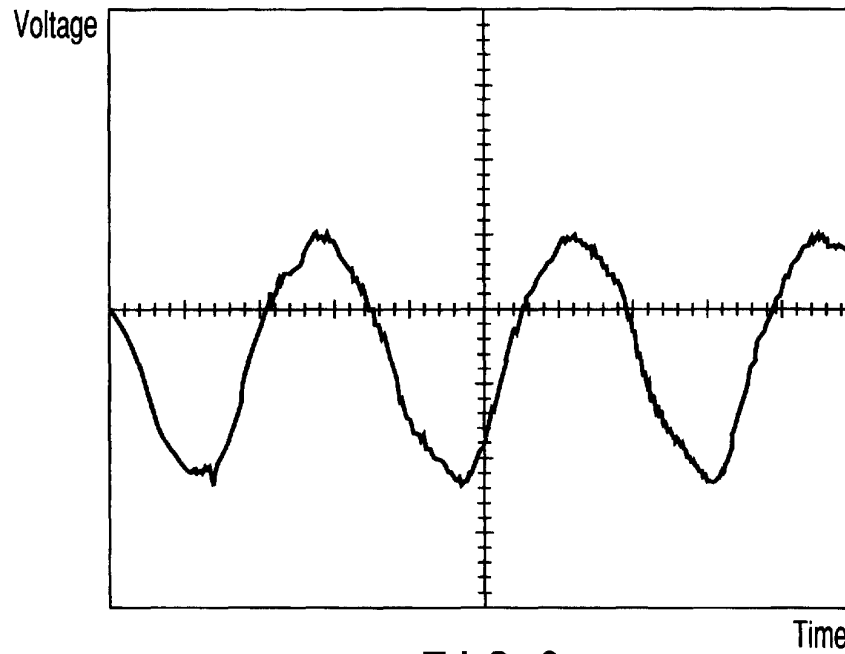
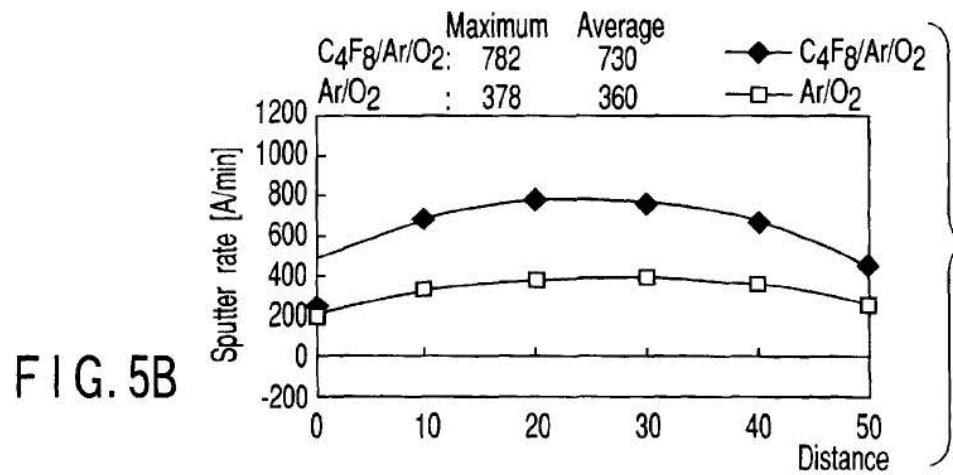
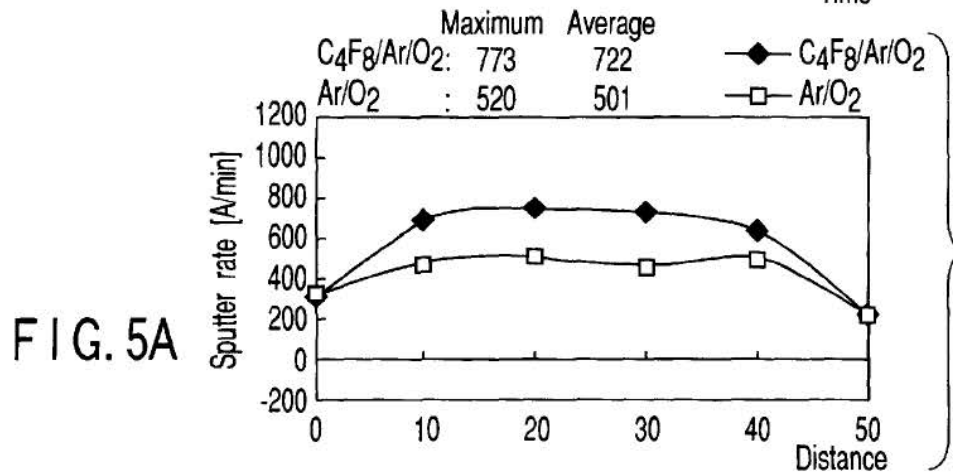
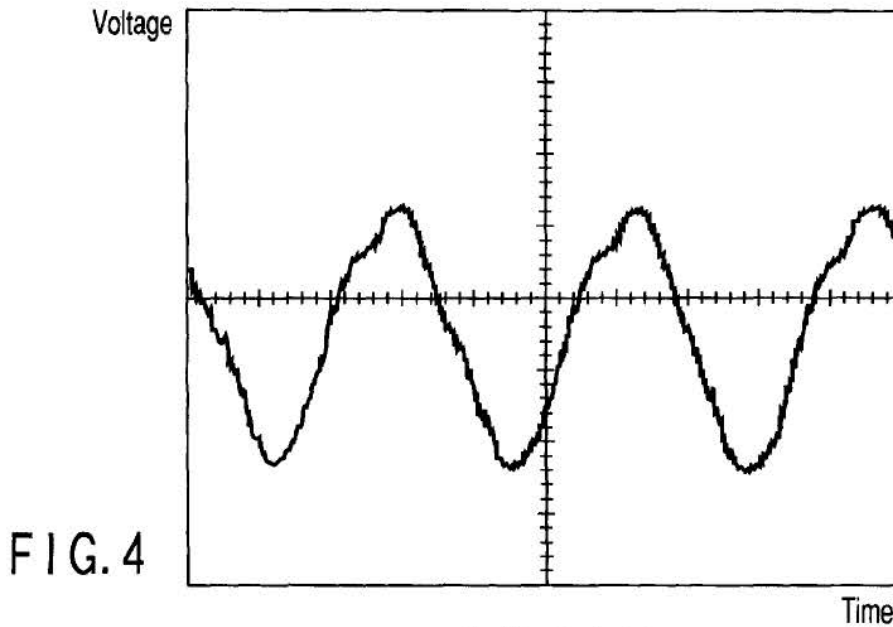


FIG. 3



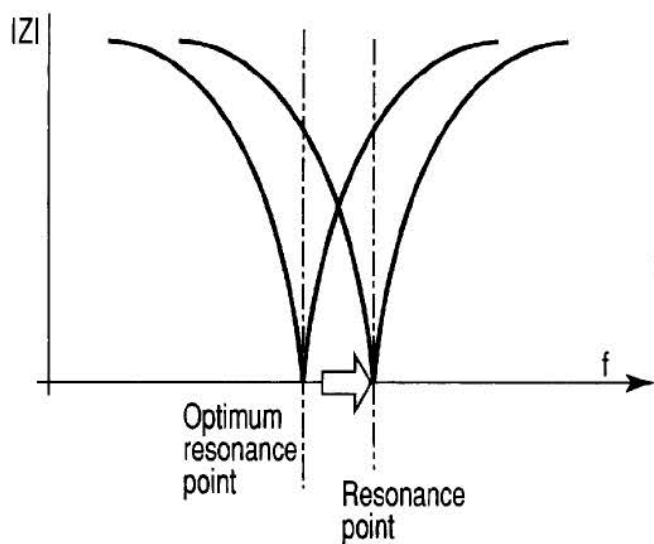


FIG. 6

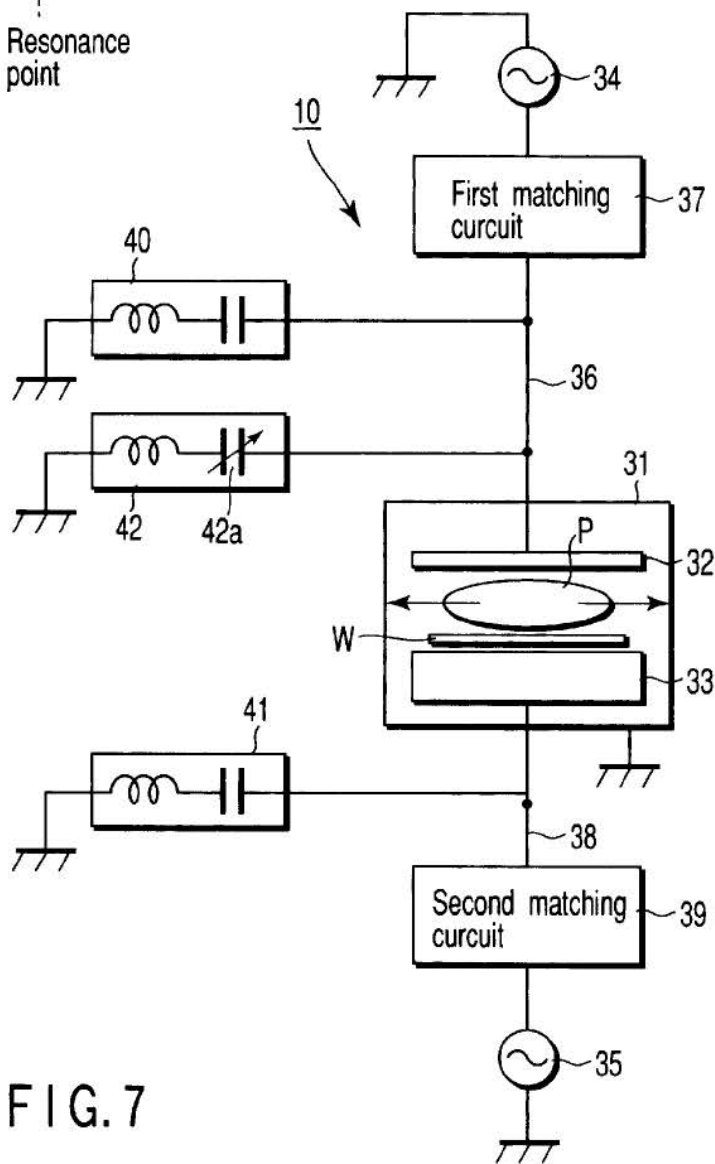


FIG. 7

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