

Exhibit 11

**(12) United States Patent
Hirose**

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(45) Date of Patent: Nov. 26, 2002

(54) PLASMA PROCESSING APPARATUS

FOREIGN PATENT DOCUMENTS

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(73) Assignee: Tokyo Electron Limited, Tokyo (JP)
(*) 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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* cited by examiner

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(21) Appl. No.: 09/906,731
(22) Filed: Jul. 18, 2001
(65) Prior Publication Data
US 2002/0007915 A1 Jan. 24, 2002

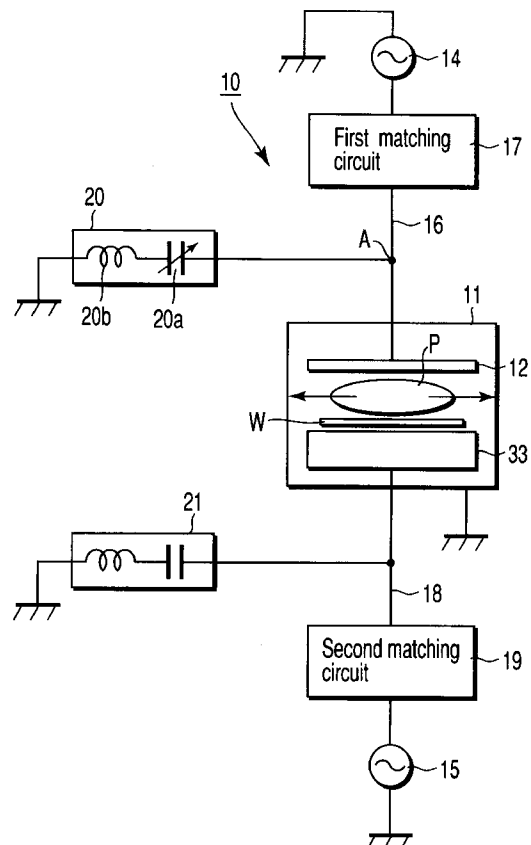
(57) ABSTRACT

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.

(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

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7 Claims, 7 Drawing Sheets



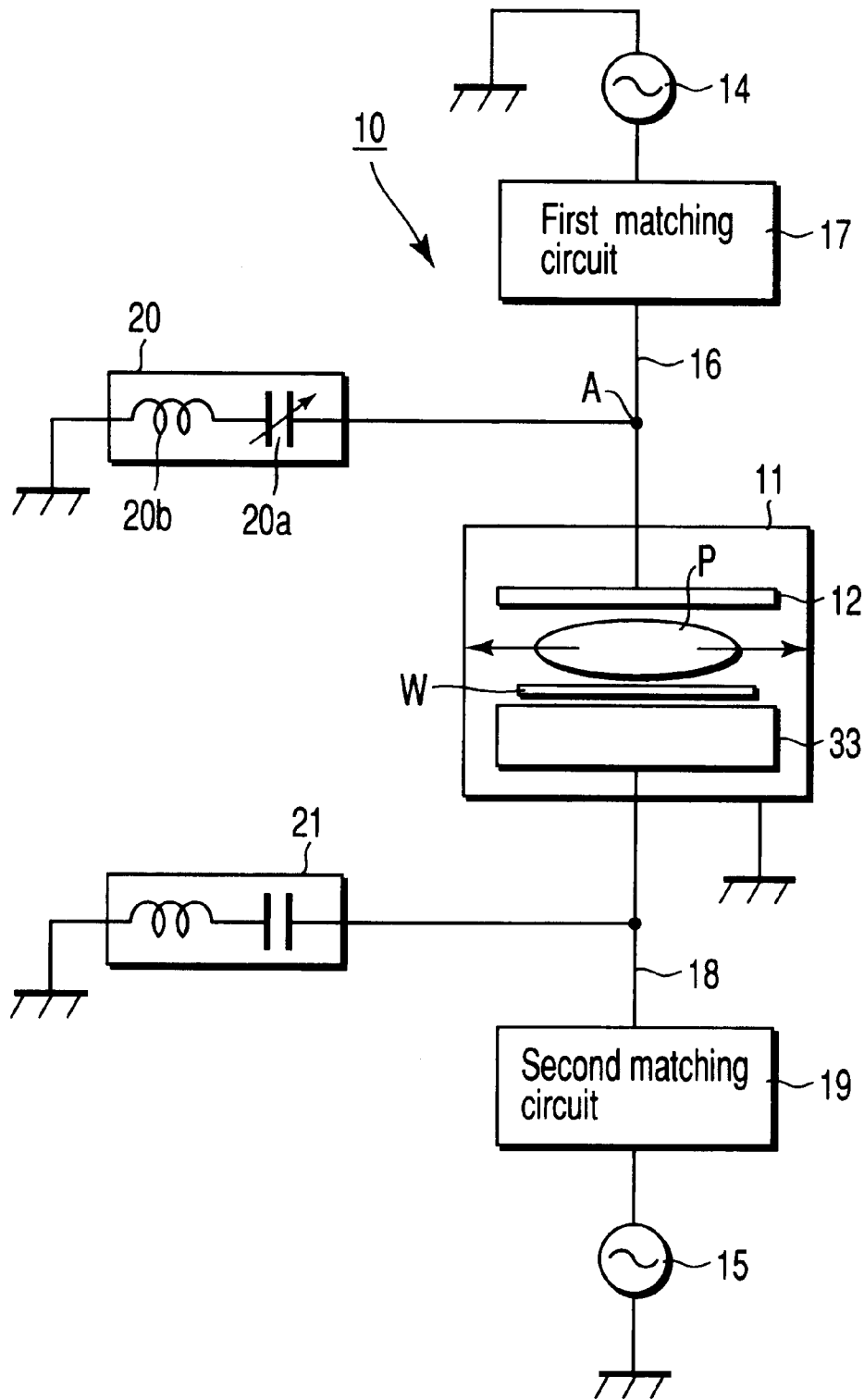


FIG. 1

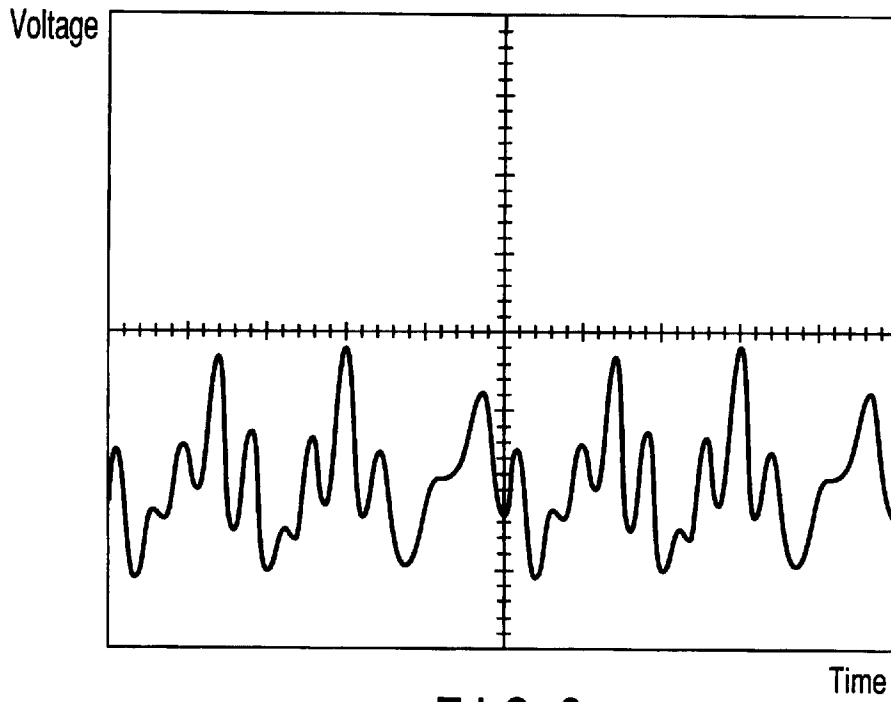


FIG. 2

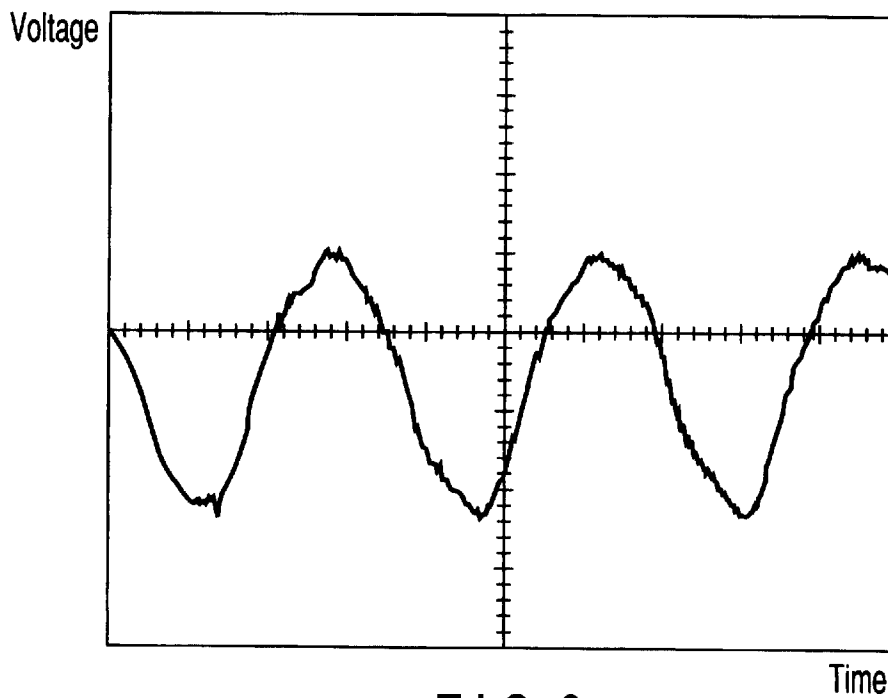


FIG. 3

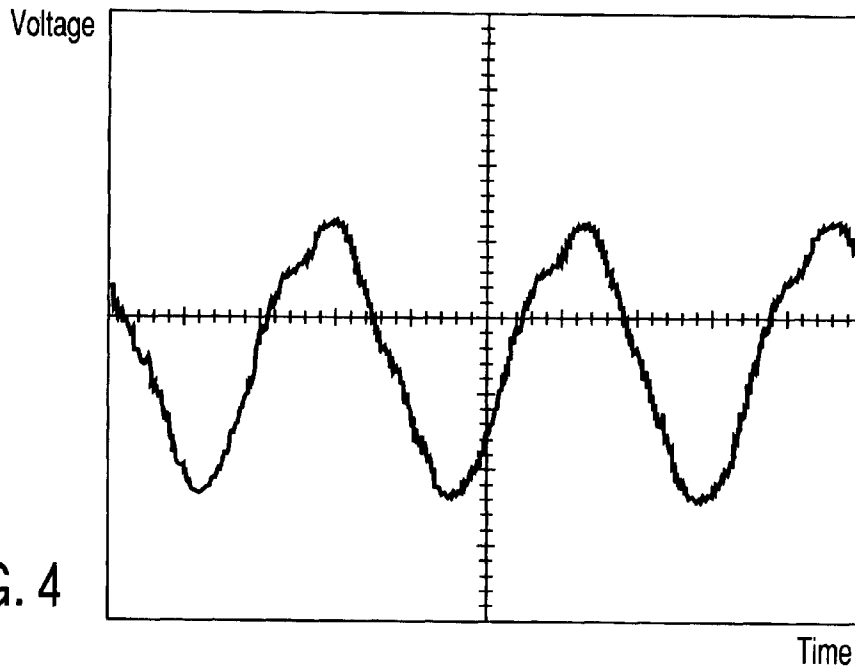


FIG. 4

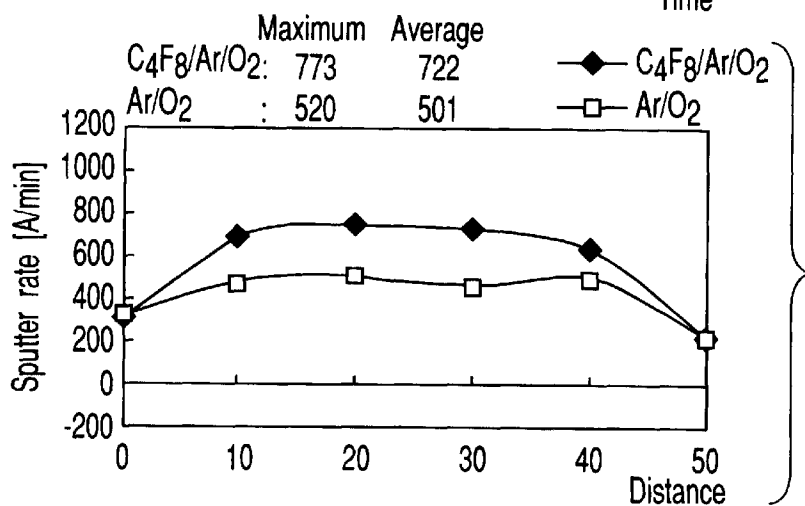


FIG. 5A

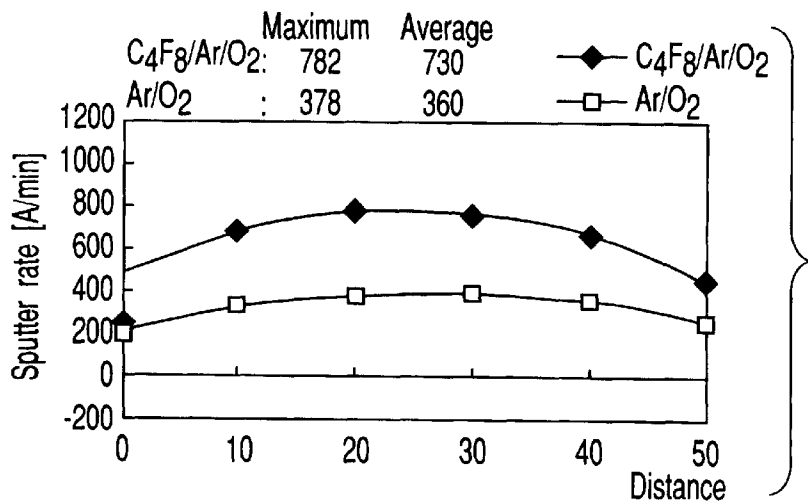


FIG. 5B

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