



[54] METHODS AND APPARATUSES FOR CONTROLLING PHASE DIFFERENCE IN PLASMA PROCESSING SYSTEMS

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[57] ABSTRACT

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[52] U.S. Cl. 438/729; 156/345; 216/60; 216/67; 438/9; 438/14

A method in a plasma processing system for modifying a phase difference between a first radio frequency (RF) signal and a second RF signal. The first RF signal is supplied by a first RF power source to a first electrode and the second RF signal is supplied by a second RF power source to a second electrode of a plasma processing system. The second RF power source is coupled to the first RF power source as a slave RF power source in a master-and-slave configuration. The method includes the step of ascertaining a phase difference between a phase of the first RF signal and a phase of the second RF signal. The method further includes the step of comparing the phase difference with a phase control set point signal to output a control signal to the second RF power source, whereby the second RF power source, responsive to the control signal, modifies the phase of the second RF signal to cause the phase difference to approximate a phase difference value represented by the phase control set point signal.

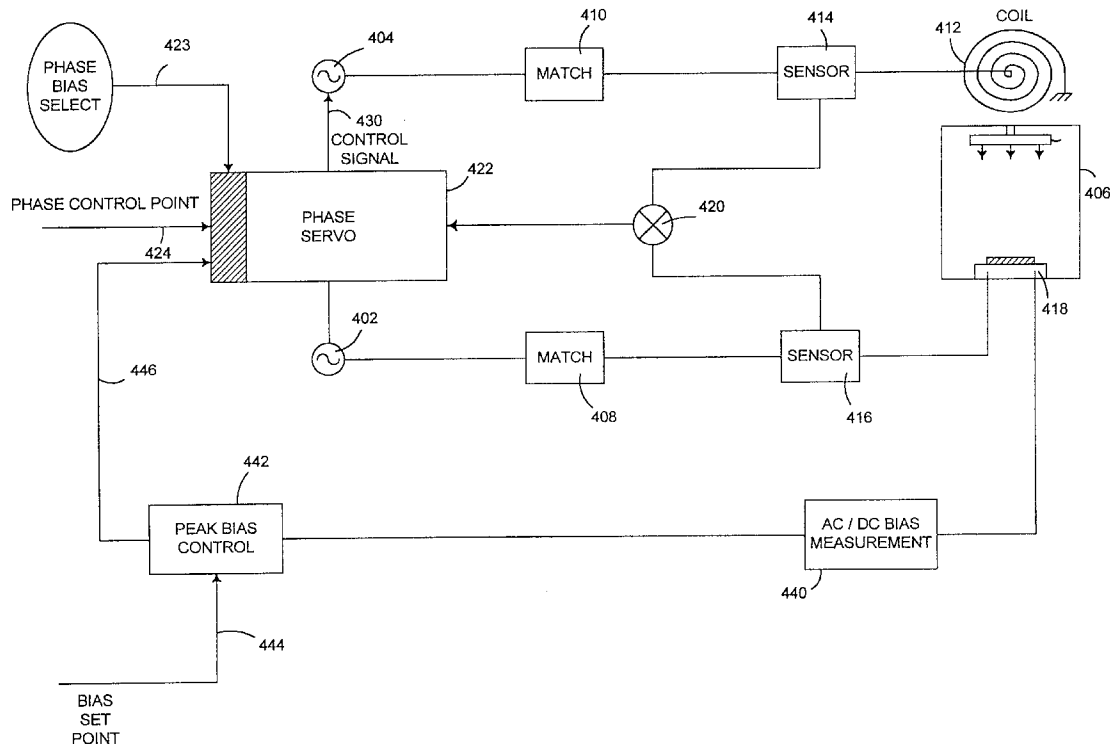
[58] Field of Search 216/67, 59, 60; 156/345 P, 345 C, 345 MT; 118/723 E, 723 ER, 723 I, 723 IR; 204/298.08, 298.34; 438/9, 14, 729

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16 Claims, 11 Drawing Sheets



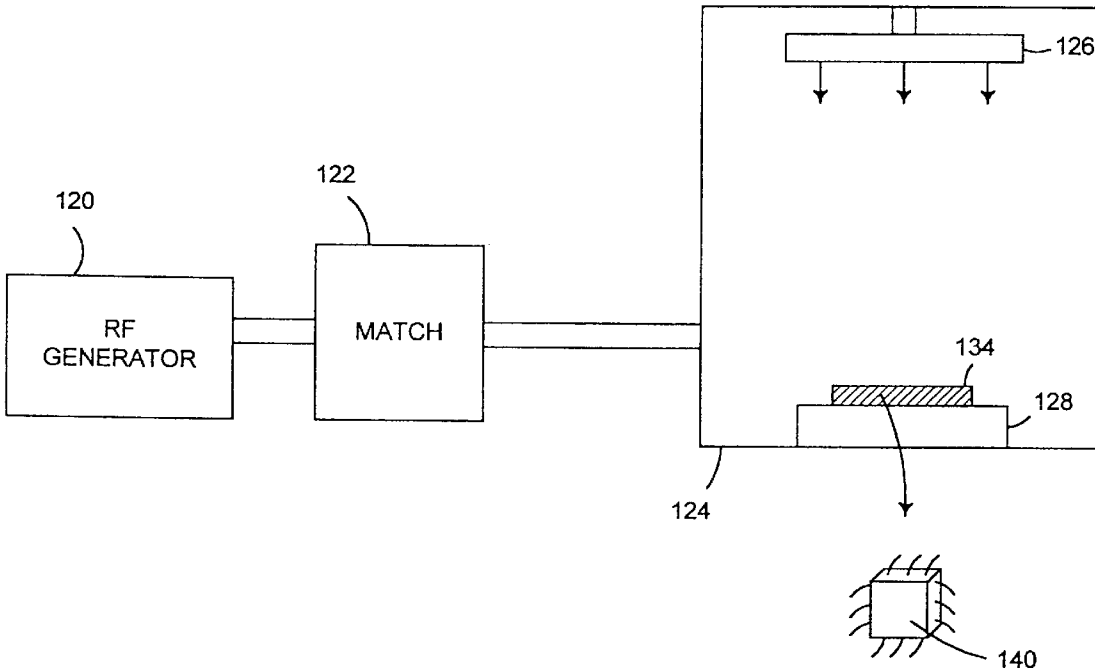
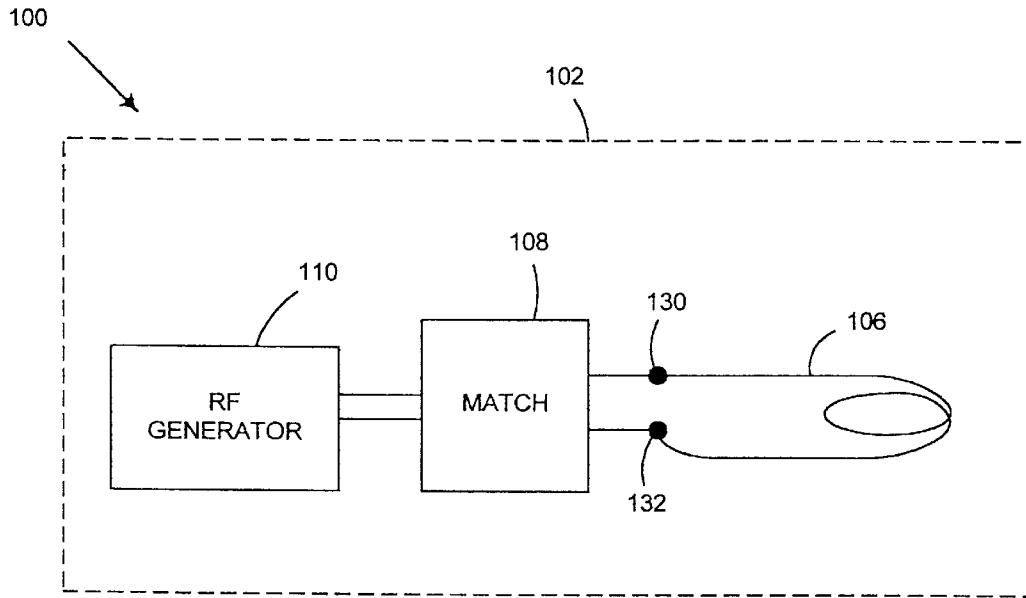


FIG. 1

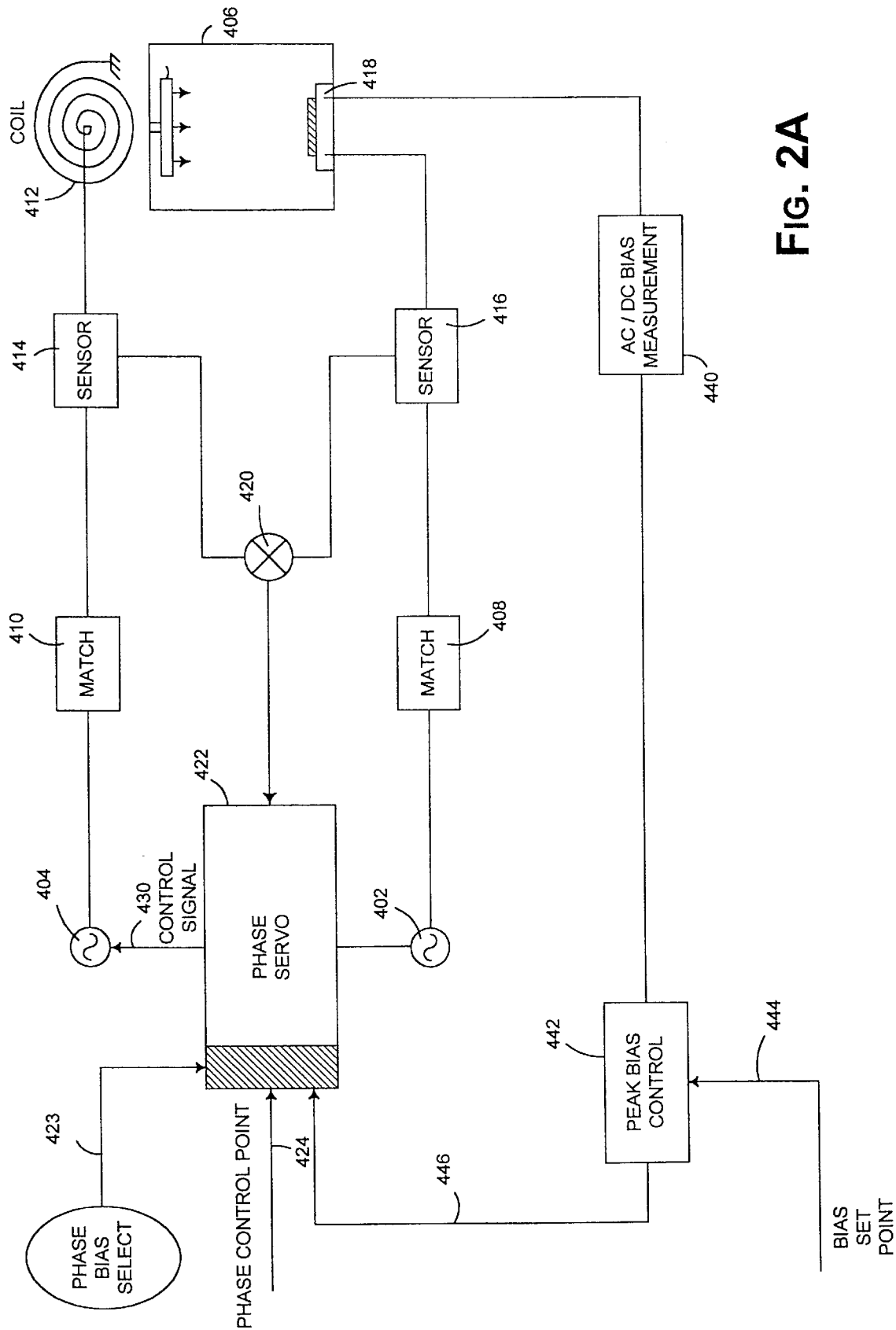


FIG. 2A

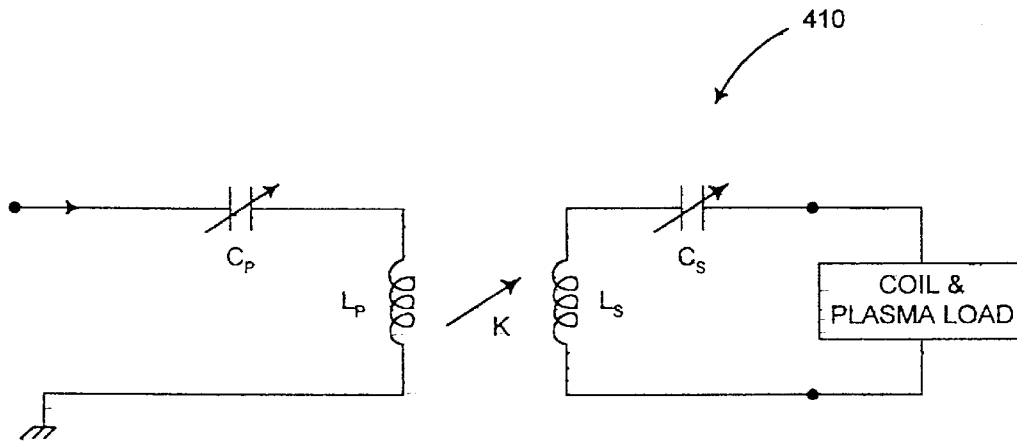


FIG. 2B

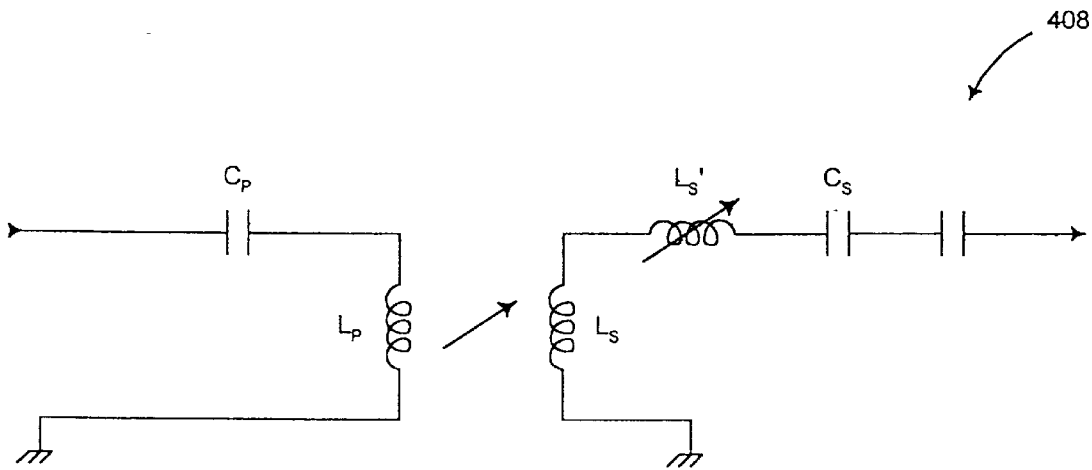


FIG. 2C

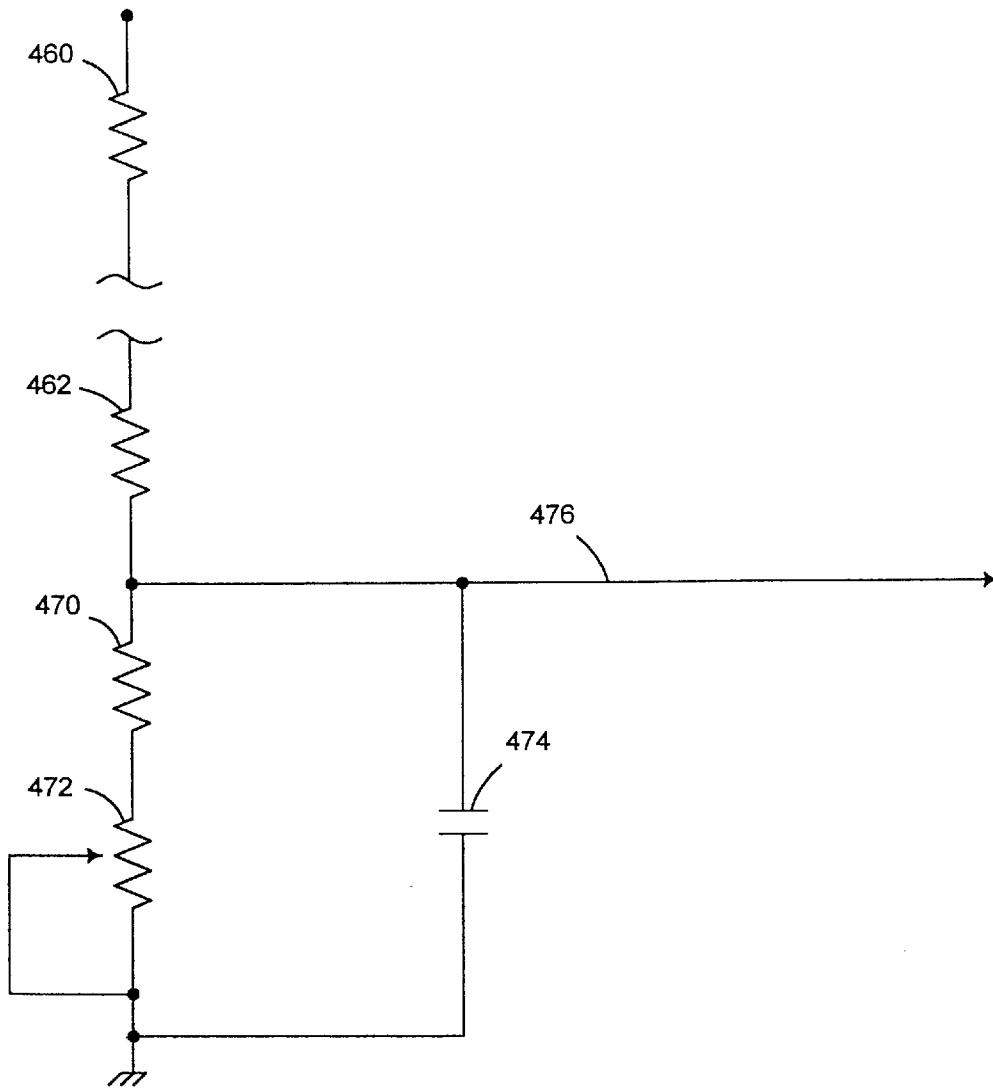


FIG. 2D

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