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# United States Patent [19]

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Flamm et al.

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[54] **PROCESS OPTIMIZATION IN GAS PHASE DRY ETCHING**

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[21] Appl. No.: **433,623**

[22] Filed: **May 3, 1995**

[51] Int. Cl.<sup>6</sup> ..... **H01L 21/3065**

[52] U.S. Cl. .... **156/643.1**; 156/625.1; 156/346 P; 156/626.1; 156/659.11; 156/646.1; 204/298.31; 204/298.32; 216/58; 216/59

[58] Field of Search ..... 204/298.31, 298.32; 216/39, 58, 74, 79, 246 P, 625.1, 643.1, 626.1, 646.1, 659.1, 662.1, 659.11

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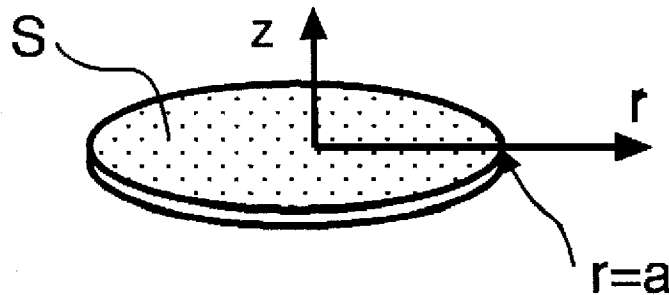
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*Attorney, Agent, or Firm*—Townsend and Townsend and Crew LLP

[57] **ABSTRACT**

A method of designing a reactor 10. The present reactor design method includes steps of providing a first plasma etching apparatus 10 having a substrate 21 therein. The substrate includes a top surface and a film overlying the top surface, and the film having a top film surface. The present reactor design method also includes chemical etching the top film surface to define a profile 27 on the film, and defining etch rate data from the profile region. A step of extracting a reaction rate constant from the etch rate data, and a step of using the reaction rate constant in designing a second plasma etching apparatus is also included.

**29 Claims, 8 Drawing Sheets**



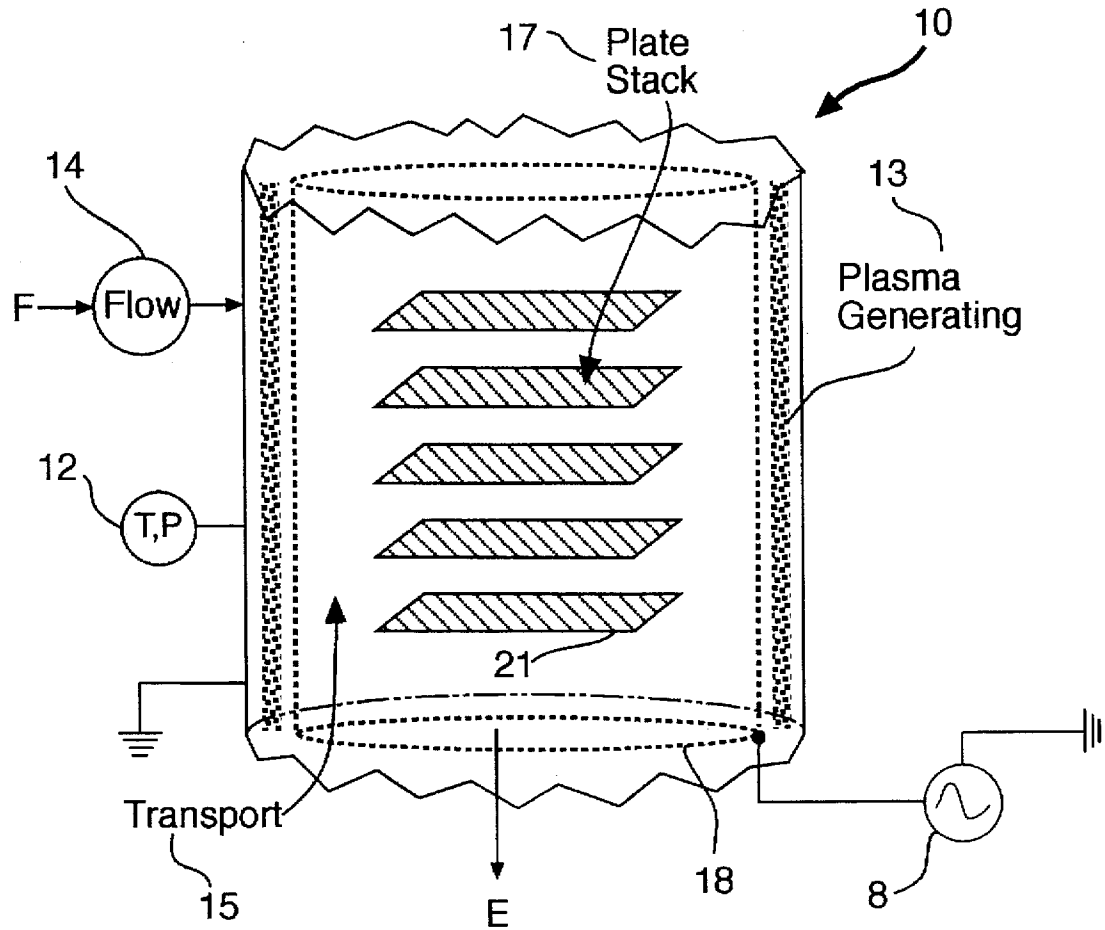


FIG. 1

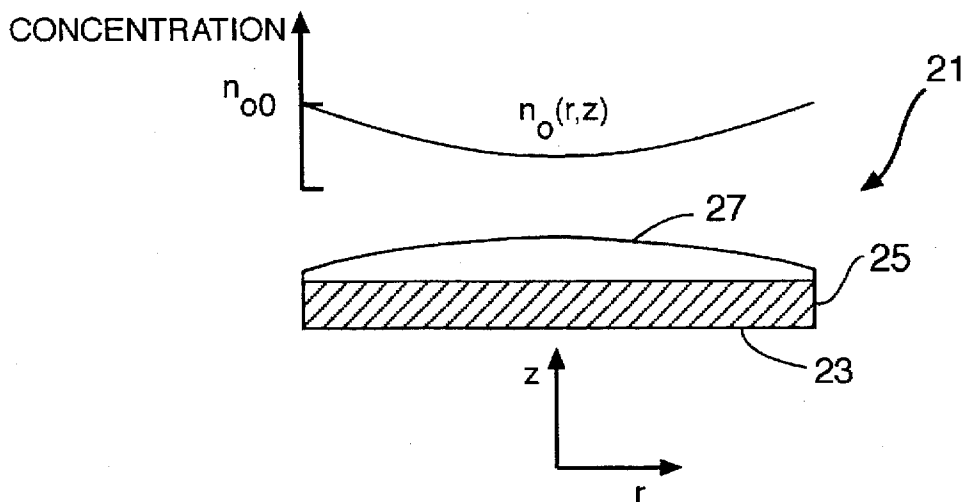


FIG. 1A

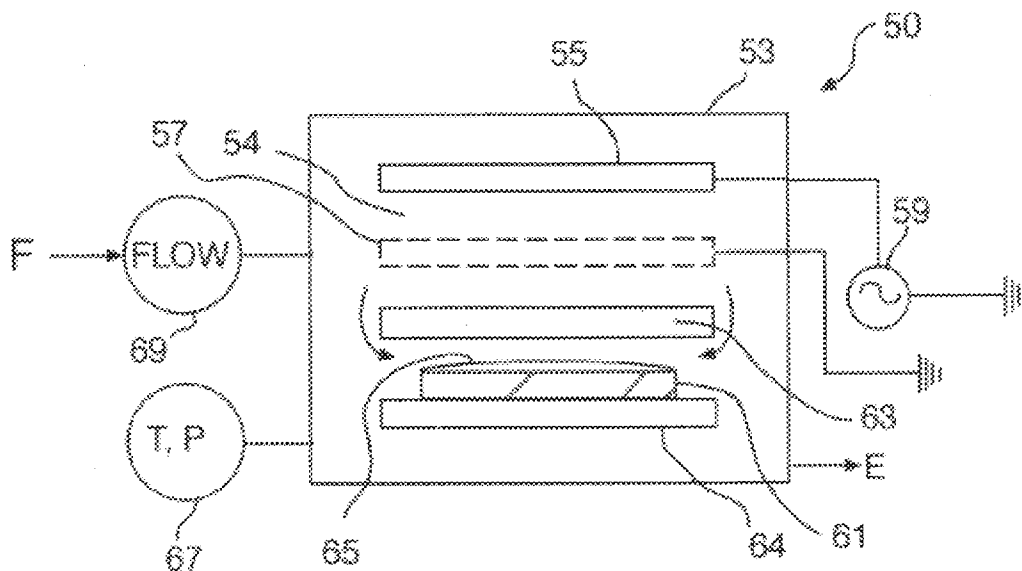


FIG. 2

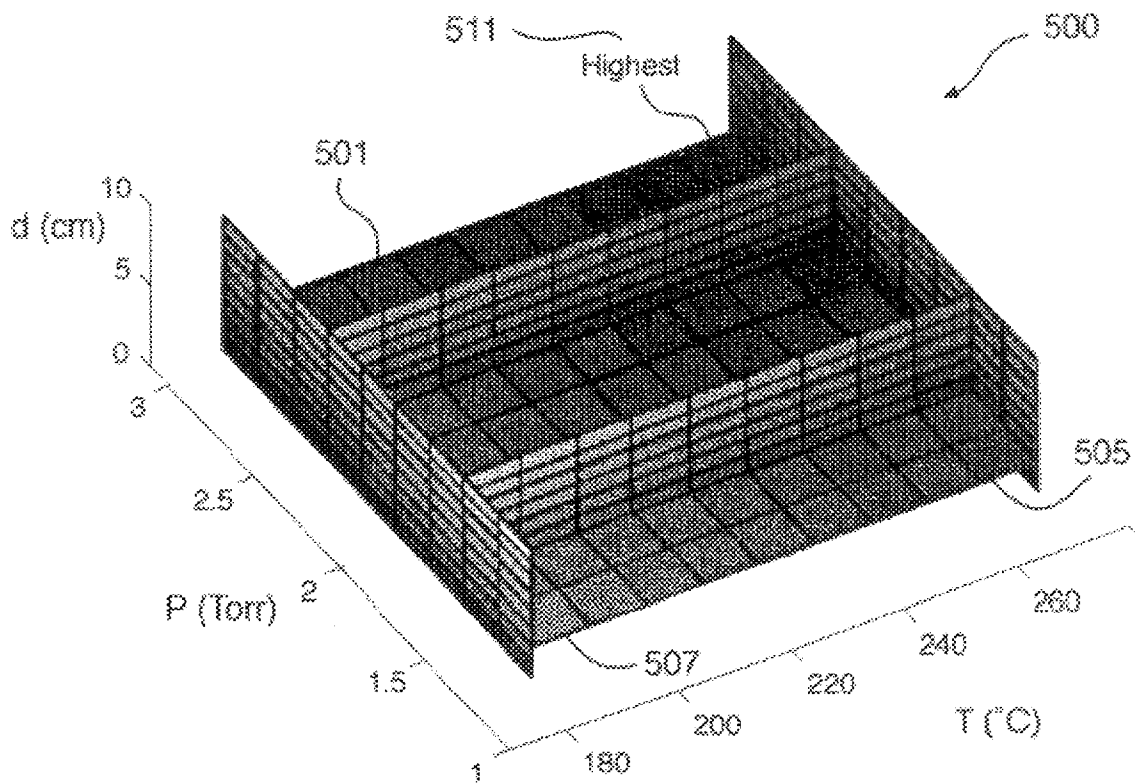


FIG. 5A

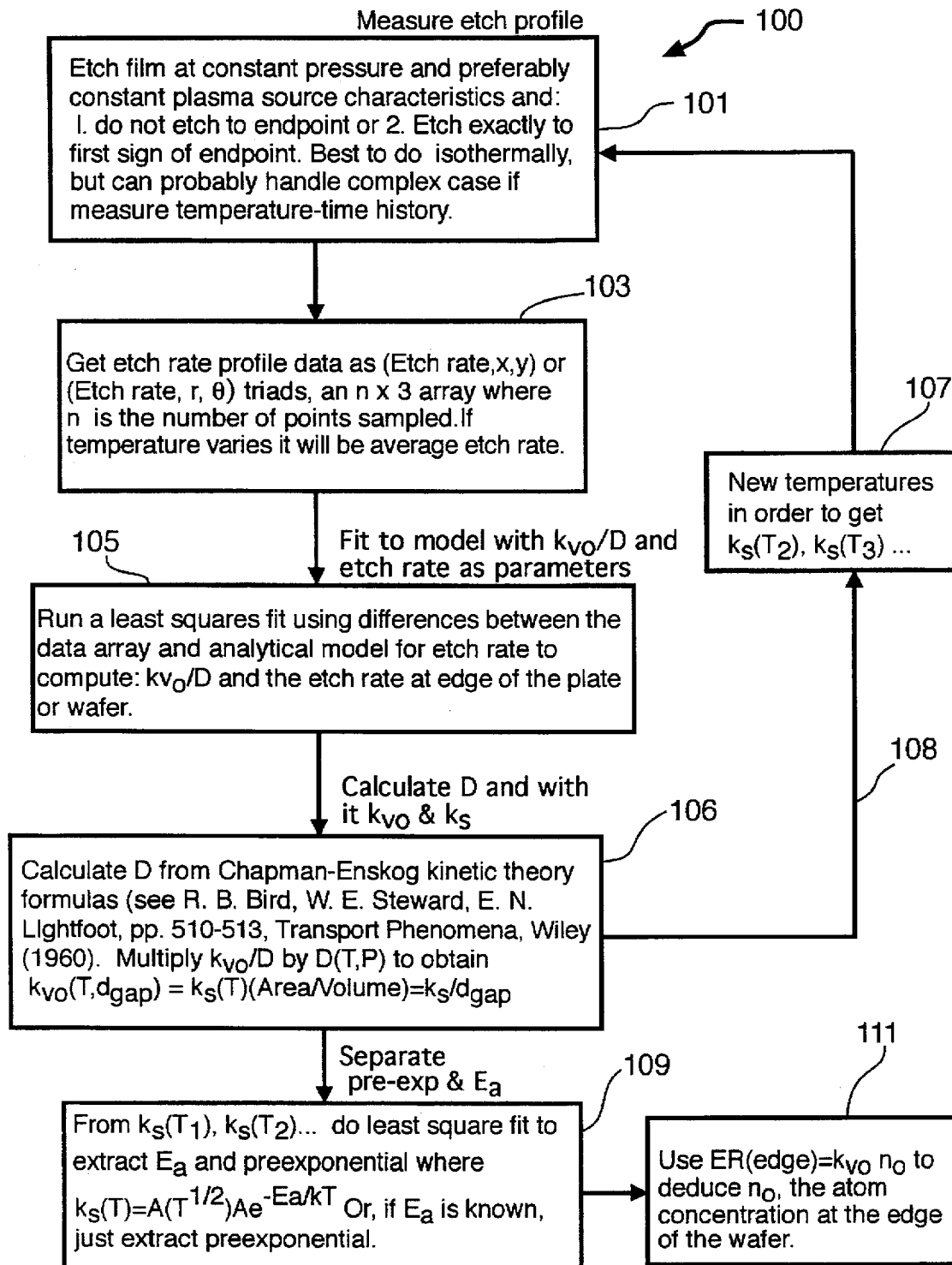


FIG. 3

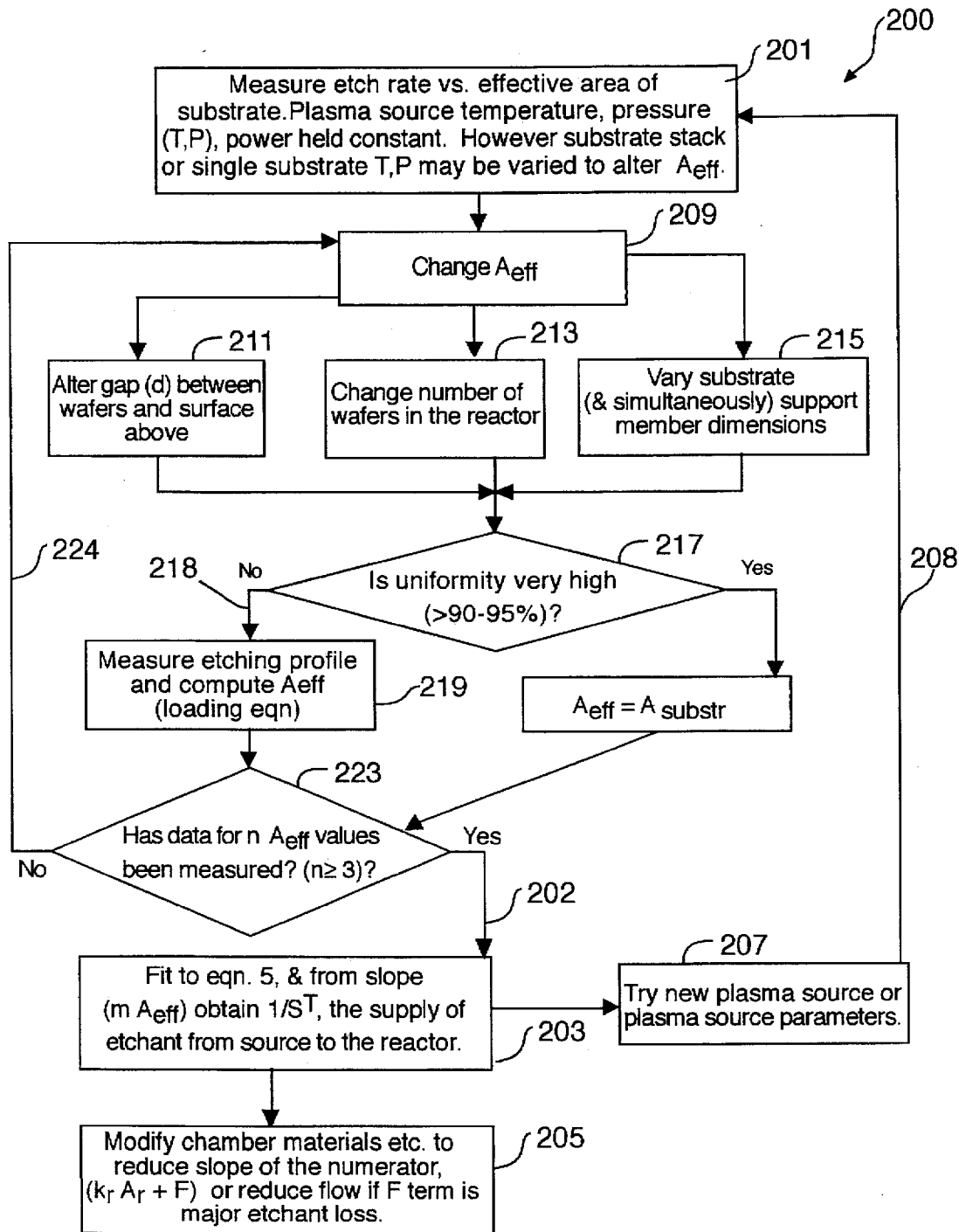


FIG. 4

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