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Moslehi

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[54] **LAMP-HEATED CHUCK FOR UNIFORM WAFER PROCESSING**

[75] Inventor: **Mehrdad M. Moslehi, Dallas, Tex.**

[73] Assignee: **Texas Instruments, Dallas, Tex.**

[21] Appl. No.: **63,110**

[22] Filed: **May 17, 1993**

Related U.S. Application Data

[63] Continuation of Ser. No. 774,677, Oct. 11, 1991, abandoned.

[51] Int. Cl.⁶ **H05B 3/00; H01L 21/027; F27D 11/00**

[52] U.S. Cl. **392/416; 118/724; 118/50.1**

[58] Field of Search **392/416-418; 219/405, 411, 390; 118/724, 725, 728, 730, 50.1; 250/492.1; 427/55, 50, 51, 585, 586, 592, 557, 569**

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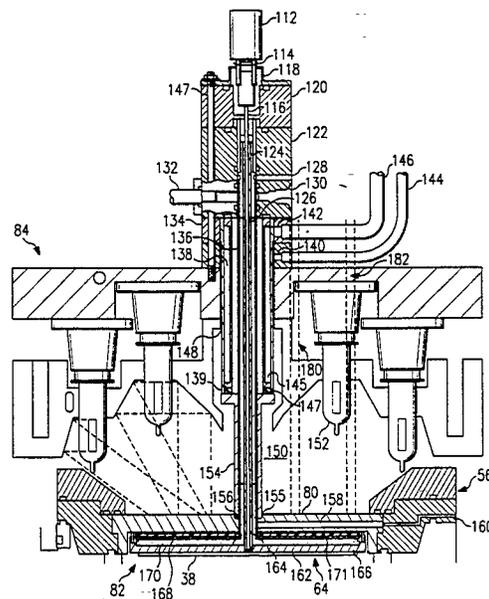
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Primary Examiner—John A. Jeffery
Attorney, Agent, or Firm—Gary Honeycutt; Renie' Grossman; Richard Donaldson

[57] ABSTRACT

A chuck (82) for lamp-heated thermal and plasma semiconductor wafer (38) processing comprises an absorbing surface (171) for absorbing optical energy from an illuminator module (84) that transforms the electrical energy into radiant optical energy. Chuck (82) includes an absorbing surface (171) that absorbs optical energy and distributes the resultant thermal energy. From the absorbing surface, a contact surface (168) conducts the heat energy to semiconductor wafer (38) and uniformly heats the semiconductor wafer (38) with the distributed thermal energy. Chuck (82) not only provides significantly improved process temperature uniformity, but also allows for the generation of RF plasma for plasma-enhanced fabrication processes as well as for in-situ chamber cleaning and etching. Additionally, chuck (82) provides at least two methods of determining semiconductor wafer temperature; a direct reading thermocouple (112) and association with the pyrometry sensor of illuminator module (84). Other features of chuck (82) are that it is thermally decoupled from the thermal mass of fabrication reactor (50) and establishes an environment for purging optical quartz window (80) surface and semiconductor wafer (38) backside in order to prevent deposition on wafer backside and the quartz window.

5 Claims, 8 Drawing Sheets



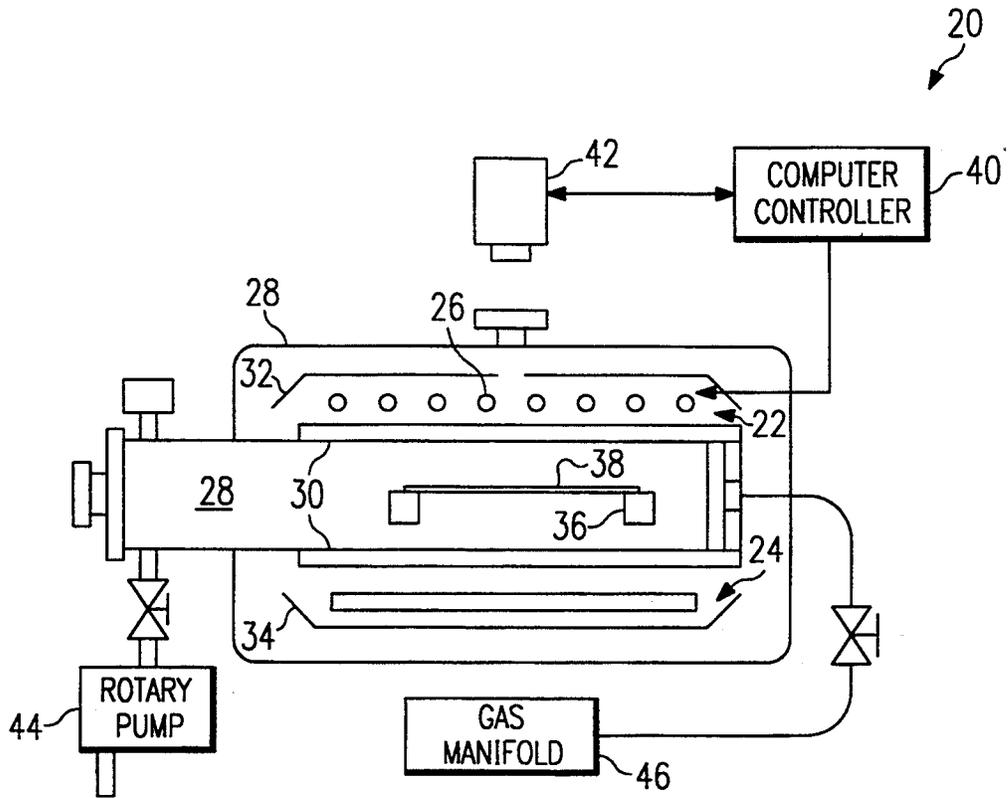


FIG. 1
(PRIOR ART)

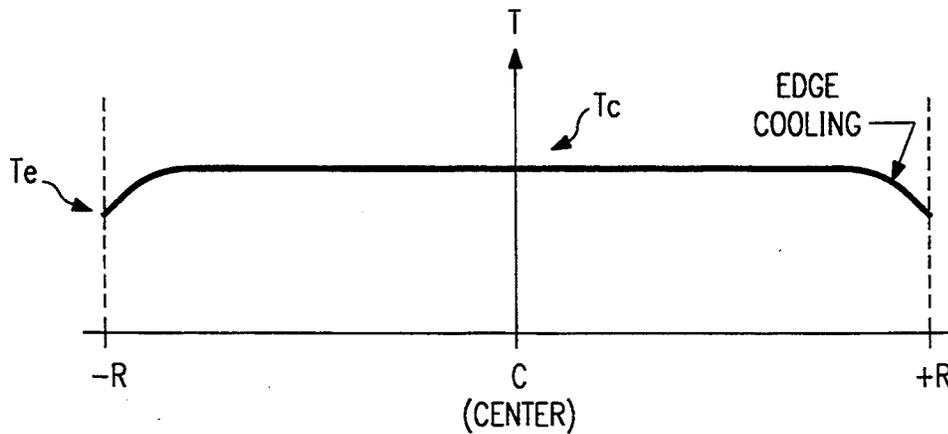
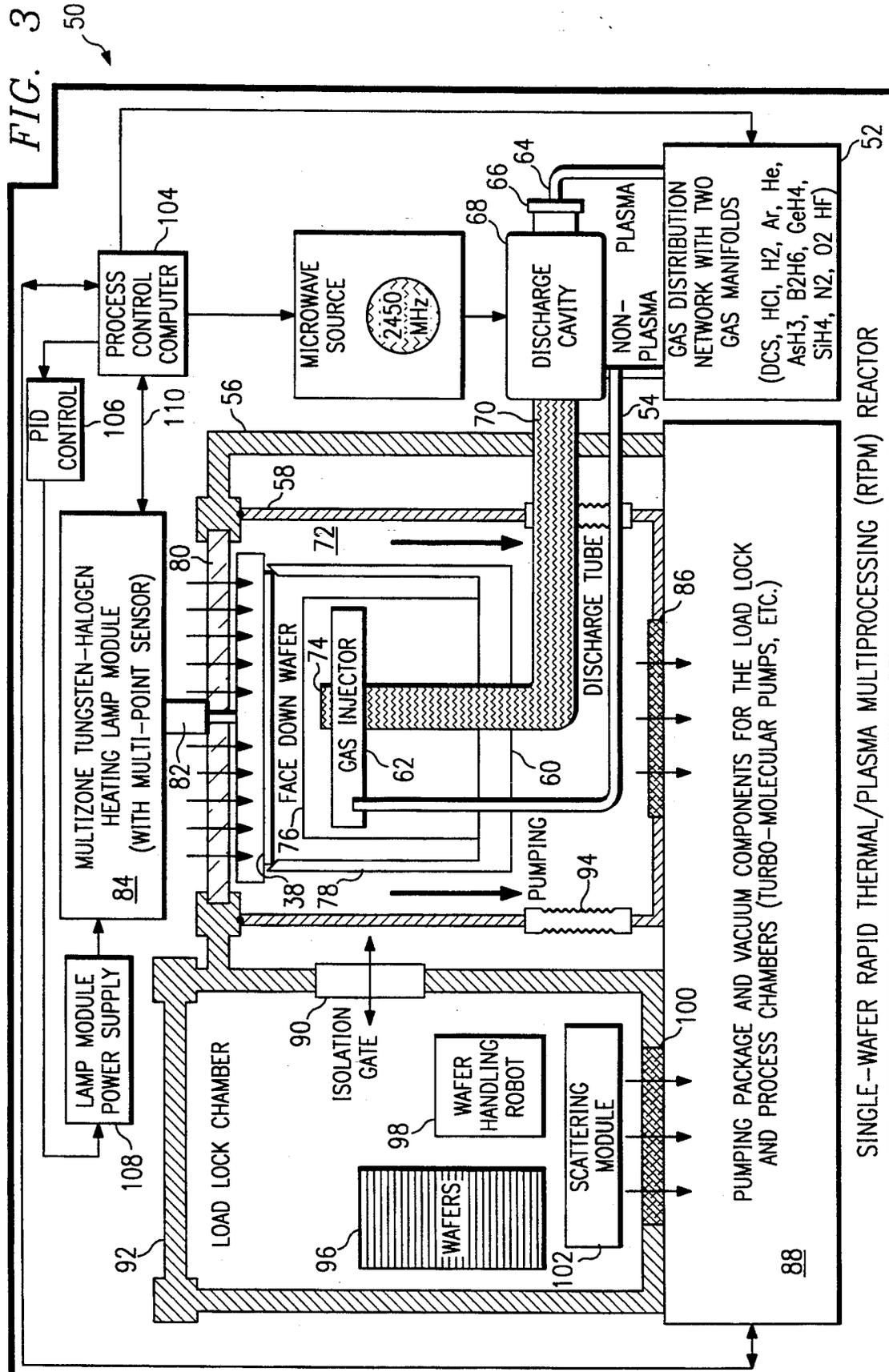


FIG. 2

FIG. 3



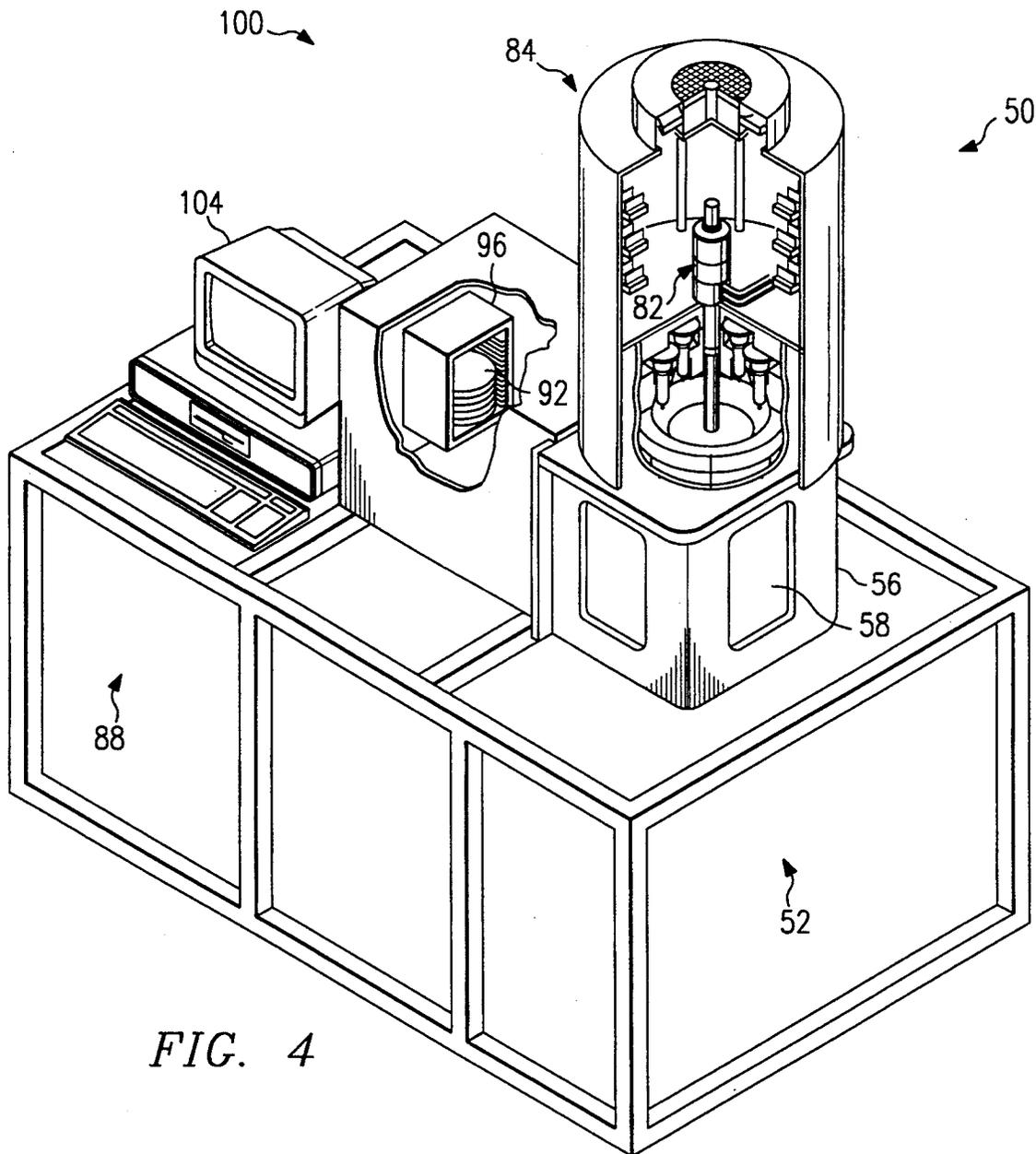


FIG. 4

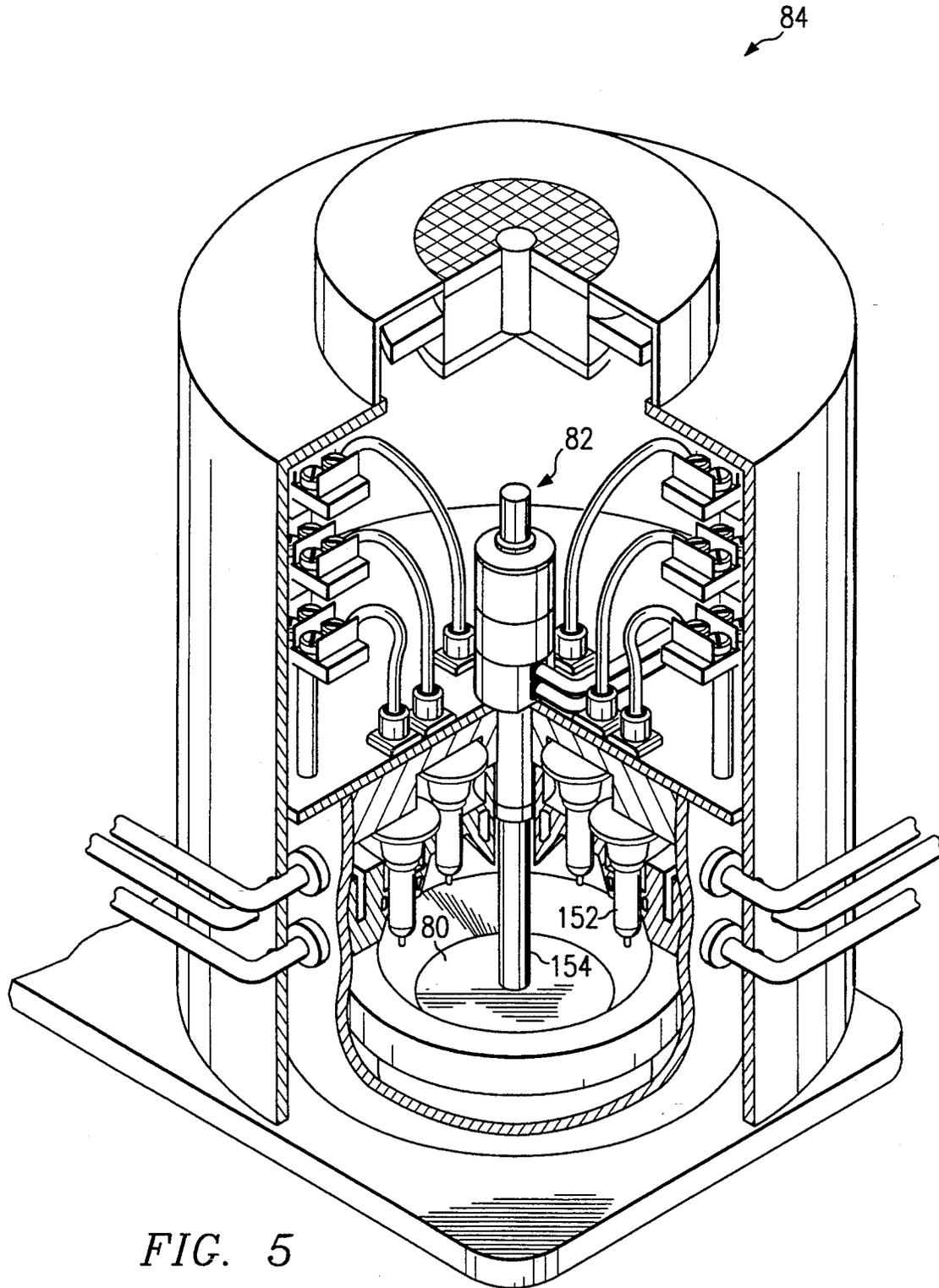


FIG. 5

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