



US005294778A

United States Patent [19]

[11] Patent Number: **5,294,778**

Carman et al.

[45] Date of Patent: **Mar. 15, 1994**

[54] CVD PLATEN HEATER SYSTEM UTILIZING CONCENTRIC ELECTRIC HEATING ELEMENTS

[75] Inventors: **Justice Carman, Valley Center; Mark A. Logan, Pleasanton; Joseph Monkowski, Danville, all of Calif.**

[73] Assignee: **Lam Research Corporation, Fremont, Calif.**

[21] Appl. No.: **757,921**

[22] Filed: **Sep. 11, 1991**

[51] Int. Cl.⁵ **H01L 21/306; H01L 21/31**

[52] U.S. Cl. **219/385; 219/445; 219/448; 392/418; 338/217; 118/725**

[58] Field of Search **219/385, 445-450, 219/455, 466; 392/416, 418; 338/285, 287, 283, 217, 218; 118/724, 725, 730**

[56] References Cited

U.S. PATENT DOCUMENTS

1,975,410	10/1934	Simpson	338/217
2,093,939	9/1937	Strack	219/445
2,330,867	10/1943	Challet	219/446
3,381,114	4/1968	Nakanuma	338/217
4,511,789	4/1985	Goessler et al.	219/446

FOREIGN PATENT DOCUMENTS

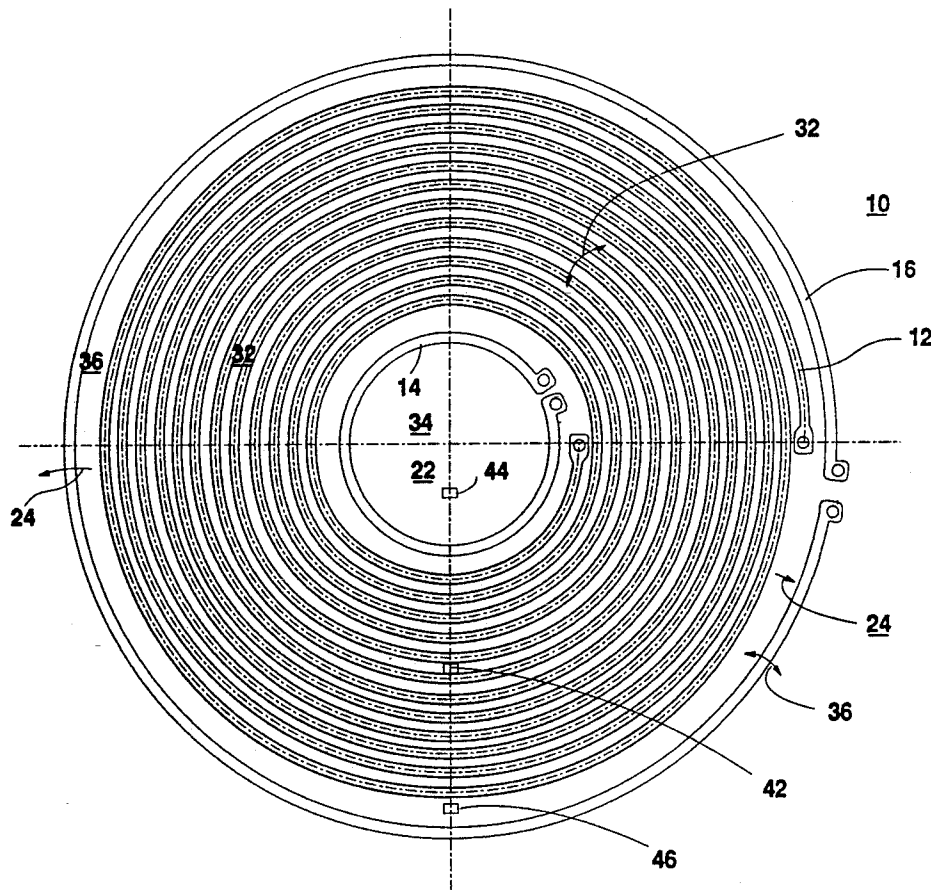
3545443	6/1987	Fed. Rep. of Germany	219/445
59-44819	3/1984	Japan	118/728
61-142743	6/1986	Japan .	
63-196033	8/1988	Japan .	
2-27715	1/1990	Japan .	
3-80530	4/1991	Japan	118/725

Primary Examiner—Geoffrey S. Evans
Assistant Examiner—John A. Jeffery
Attorney, Agent, or Firm—James P. Hillman

[57] ABSTRACT

A wafer support platen heating system for low pressure chemical vapor deposition of apparatus includes multiple resistance heaters for individual heating of multiple portions of the platen to provide a predetermined uniform or non-uniform temperature gradient/profile across the platen. The multiple graphite resistance heaters of the preferred embodiment include a spiral shaped main resistance heater and two single turn edge loss graphite resistance heaters located within the inner diameter and along the periphery of the outer diameter respectively of the main spiral shaped resistance heater.

9 Claims, 6 Drawing Sheets



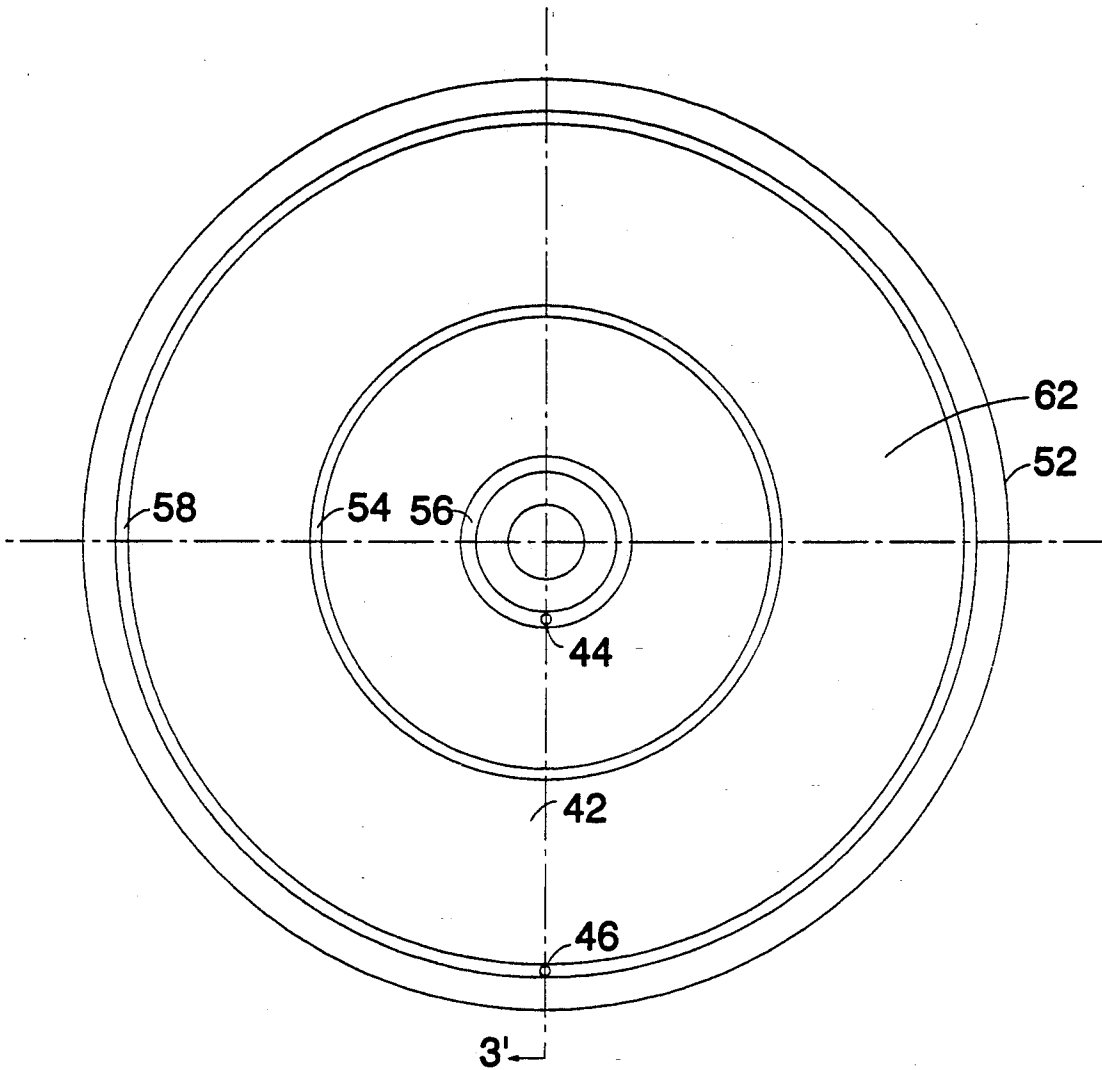


FIG 2

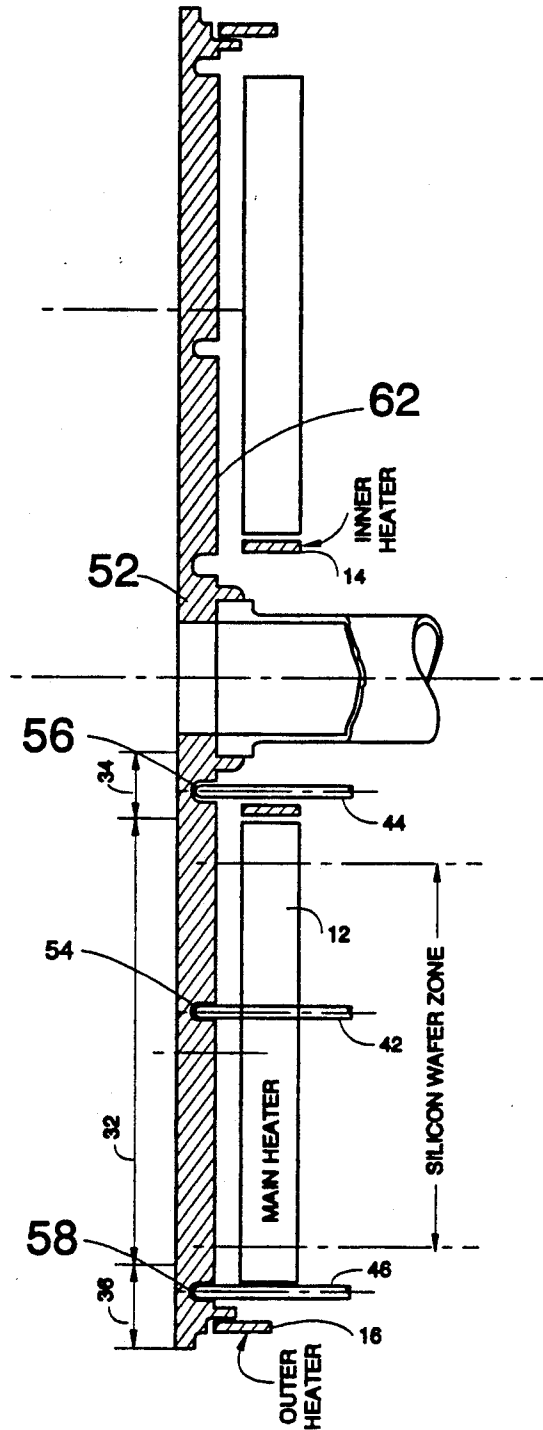
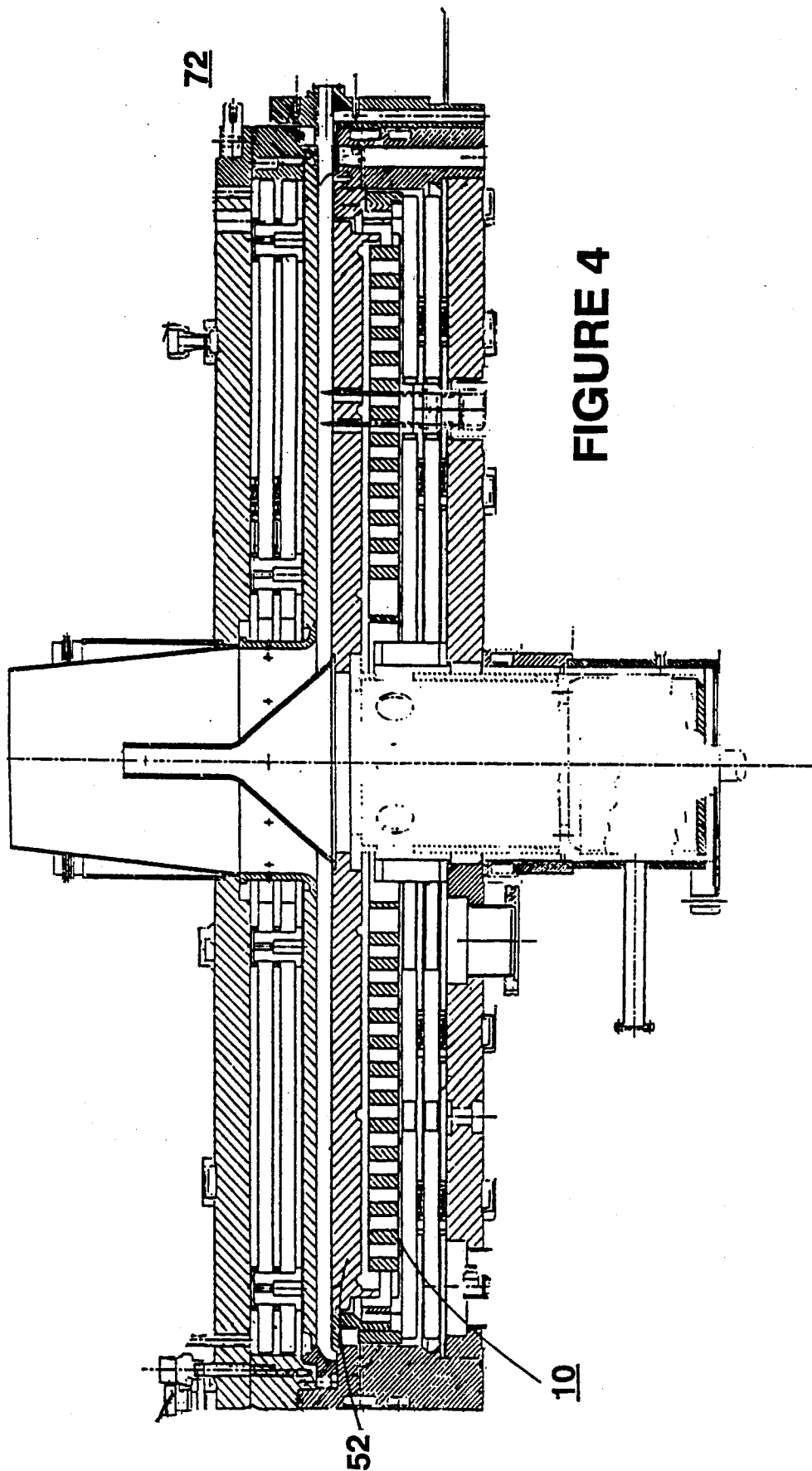


FIG 3



Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.