Exhibit 9

US005603816A

United States Patent [19]

Demaray et al.

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[54] **SPUTTERING DEVICE AND TARGET WITH COVER TO HOLD COOLING FLUID**

[75] Inventors: **Richard E. Demaray**, Portola Valley; **Manuel Herrera**, San Mateo; **David E. Berkstresser**, Los Gatos, all of Calif.

[73] Assignee: **Applied Materials, Inc.**, Santa Clara, Calif.

[21] Appl. No.: **461,822**

[22] Filed: **Jun. 5, 1995**

Related U.S. Application Data

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[51] **Int. Cl.**[6] **C23C 14/34**

[52] **U.S. Cl.** **204/298.07**; 204/298.08

[58] **Field of Search** 204/298.07, 298.08, 204/298.09

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Primary Examiner—Aaron Weisstuch
Attorney, Agent, or Firm—Janis Biksa

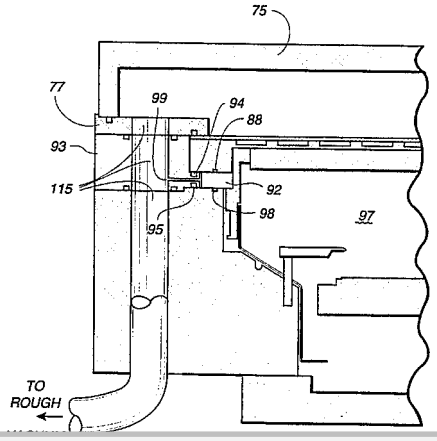
[57] **ABSTRACT**

A target, target backing plate, and cover plate form a target plate assembly. The sputtering target assembly includes an integral cooling passage. A series of grooves are constructed in either the target backing plate or the target backing cooling cover plate, which are then securely bonded to one another. The sputtering target can be a single monolith with a target backing plate or can be securely attached to the target backing plate by one of any number of conventional bonding methods. Tantalum to titanium, titanium to titanium and aluminum to titanium, diffusion bonding can be used.

The target plate assembly completely covers and seals against a top opening of a sputtering processing chamber. Cooling liquid connections are provided only from the perimeter of the target assembly. When a top vacuum chamber seals the side opposite the pressure chamber, the pressure on both sides of the target assembly is nearly equalized. Large thin target assemblies, such as large flat plates used for flat panel displays can be sputtered effectively and uniformly without adverse sputtering effects due to target deflection or cooling deficiencies.

The energized target assembly is protected from adjacent components by overlapping insulators to prevent accidents and isolate the target assembly from other components. An electrical connection to the target assembly remains unconnected until a vacuum is produced in the top chamber.

2 Claims, 18 Drawing Sheets



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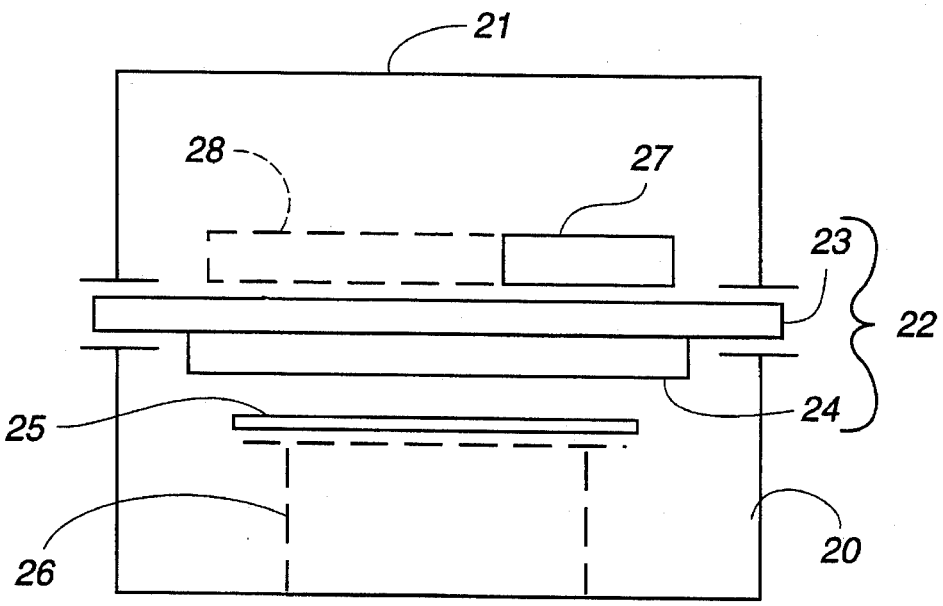

Fig. 1 (PRIOR ART)

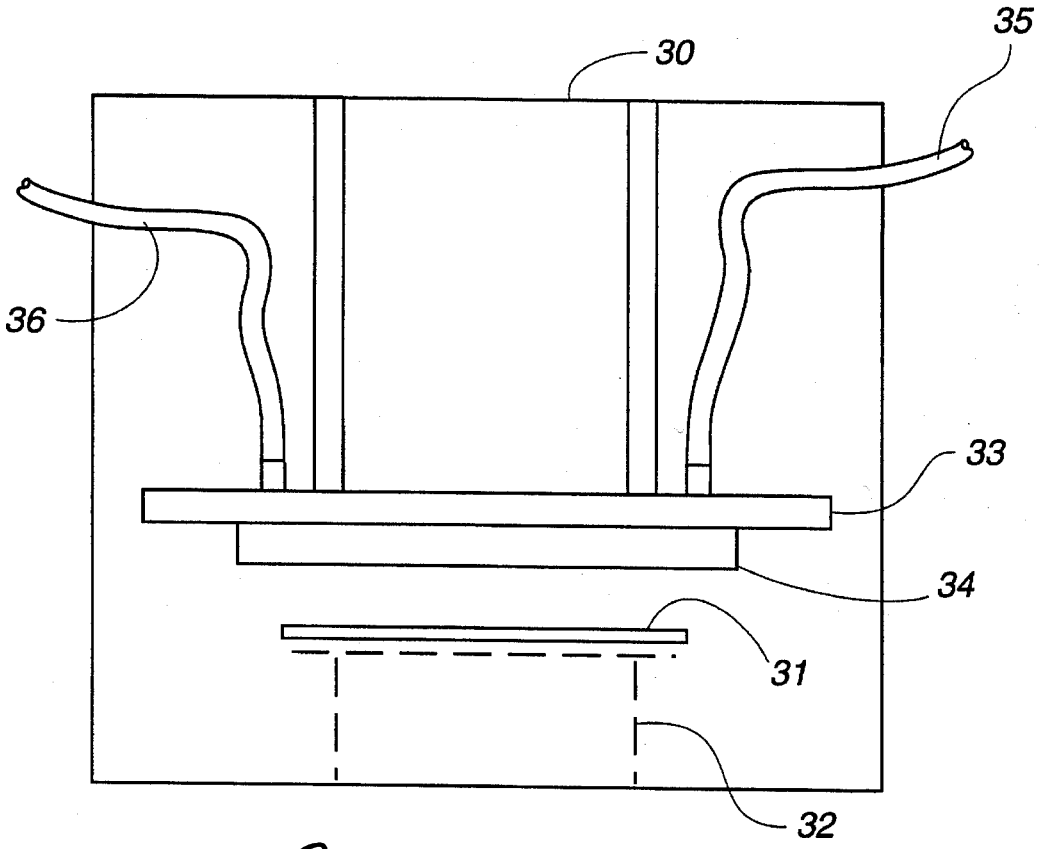

Fig. 2 (PRIOR ART)

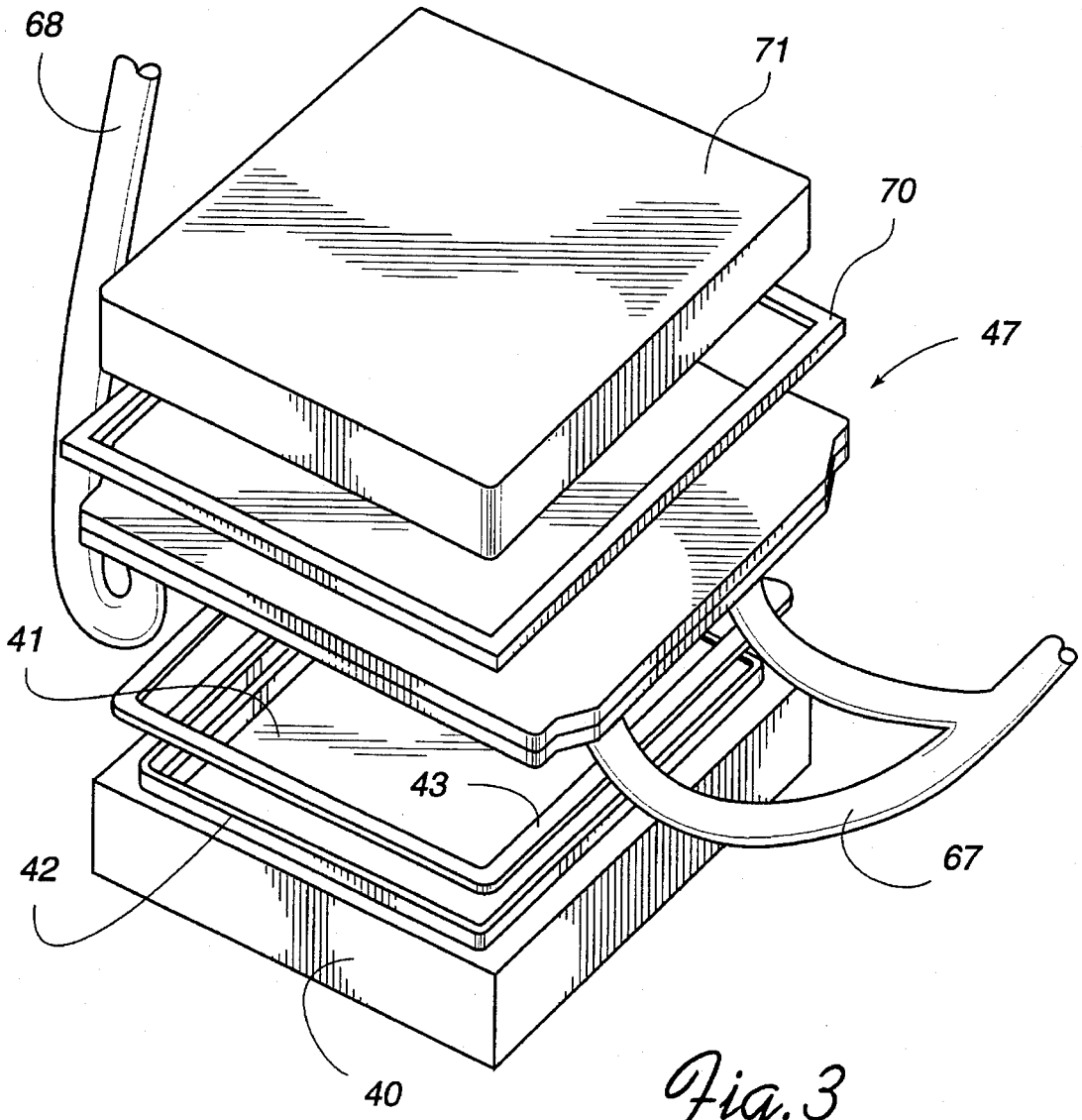

Fig. 3

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