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# United States Patent [19]

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Sellers

[45] Date of Patent: **Jul. 29, 1997**

[54] **PREFERENTIAL SPUTTERING OF INSULATORS FROM CONDUCTIVE TARGETS**

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[75] Inventor: **Jeff C. Sellers**, Palmyra, N.Y.

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[73] Assignee: **ENI**, Rochester, N.Y.

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[21] Appl. No.: **261,988**

*Primary Examiner*—Nam Nguyen  
*Attorney, Agent, or Firm*—Trapani & Moldrem

[22] Filed: **Jun. 17, 1994**

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

[57] **ABSTRACT**

[52] U.S. Cl. .... **204/192.13**; 204/192.12;  
204/298.03; 204/298.08

Pulses of positive voltage are applied to the target of a dc sputtering process to create a reverse bias. This charges insulating deposits on the target to the reverse bias level, so that when negative sputtering voltage is reapplied to the target, the deposits will be preferentially sputtered away. The reverse bias pulses are provided at a low duty cycle, i.e., with a pulse width of 0.25–3 microseconds at a pulse rate of about 40–100 KHz. This technique reduces sources for arcing during a reactive sputtering process.

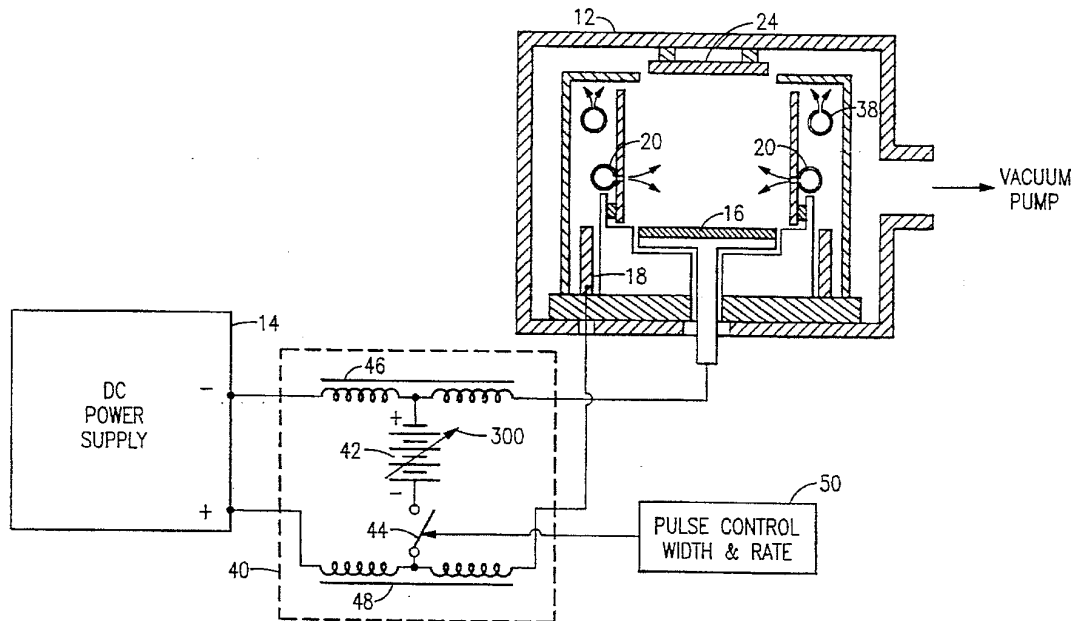
[58] **Field of Search** ..... 204/192.12, 192.13,  
204/298.03, 298.08

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**5 Claims, 4 Drawing Sheets**



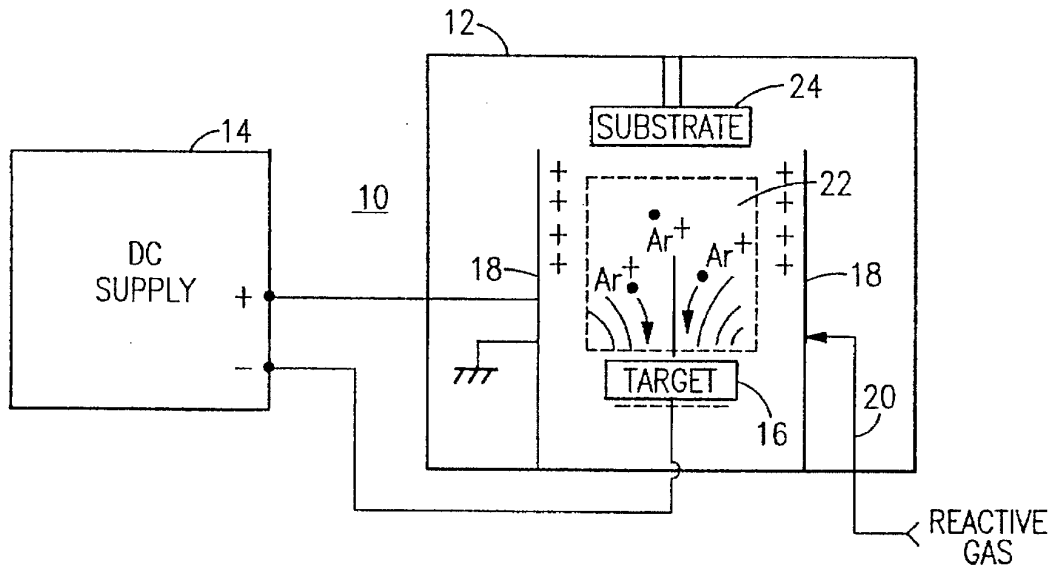
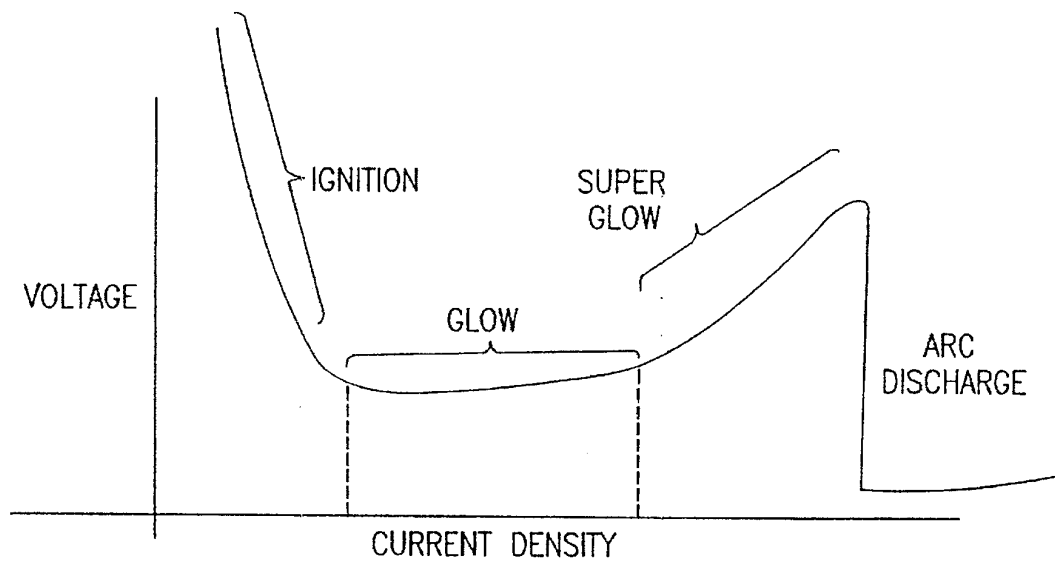


FIG. 1



PASSIONE CURVE

FIG. 2

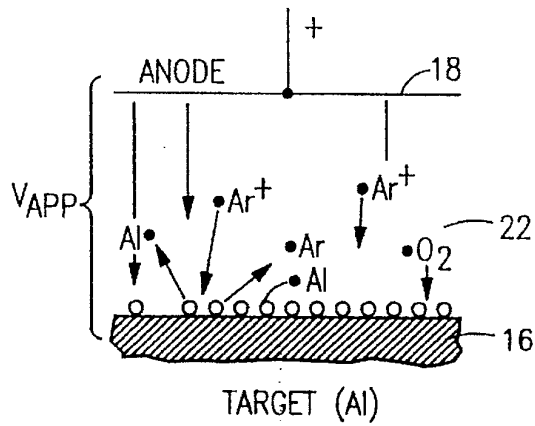


FIG. 3

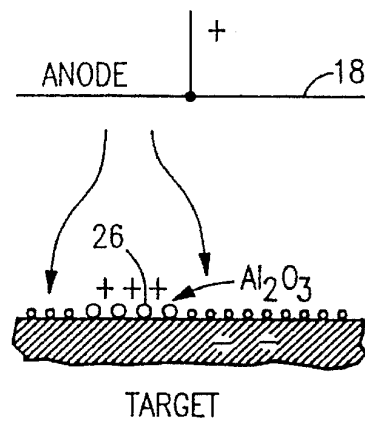


FIG. 4

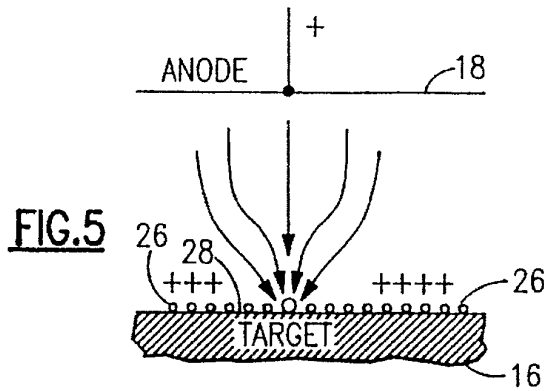


FIG. 5

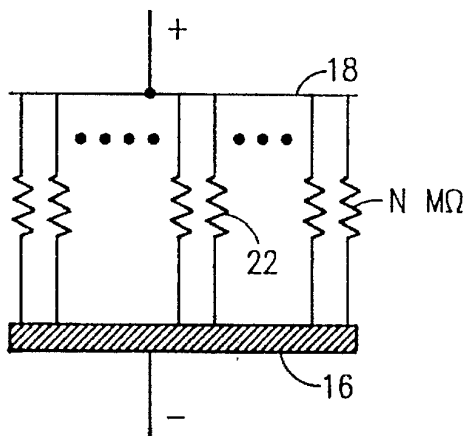


FIG. 6

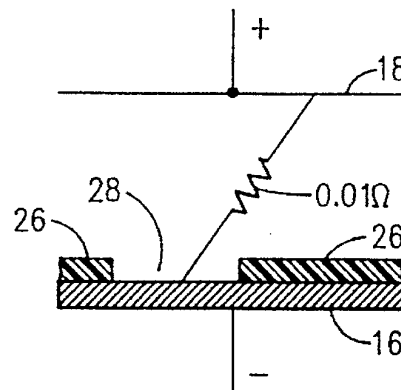
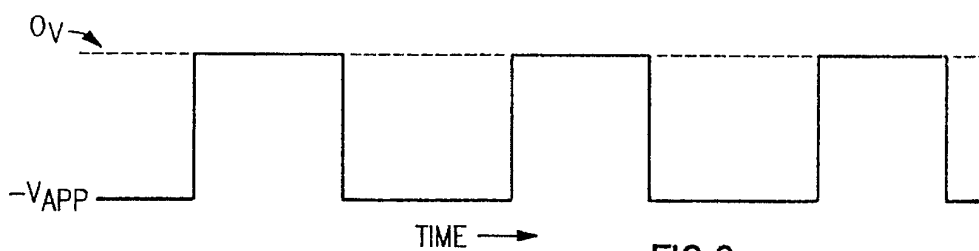
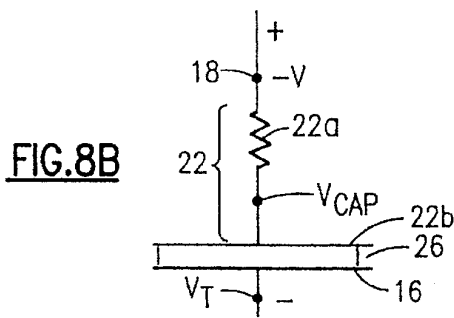
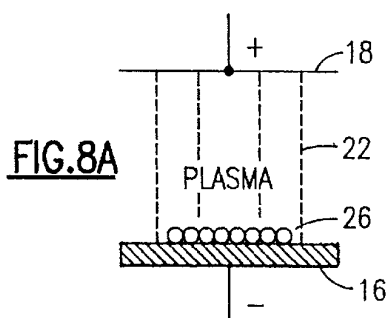
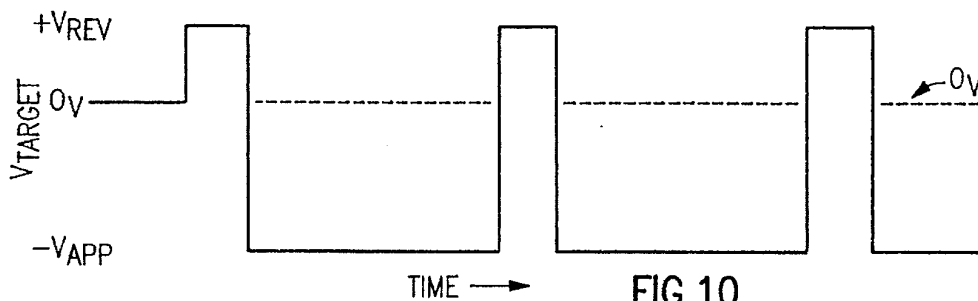


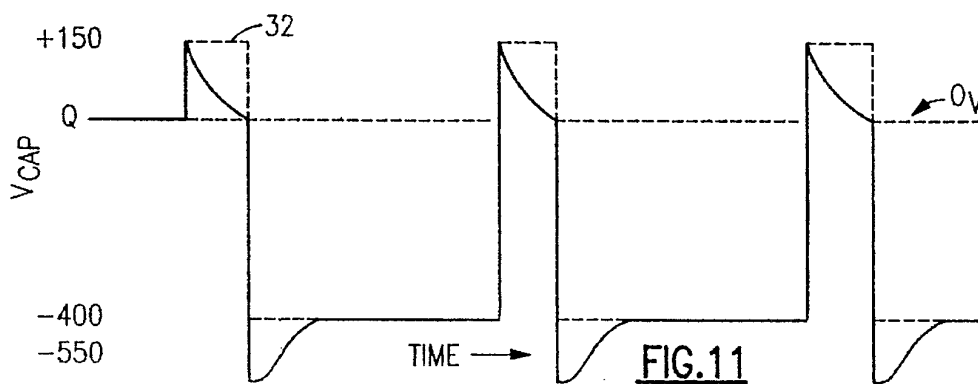
FIG. 7



**FIG. 9**  
Prior Art.



**FIG. 10**



**FIG. 11**

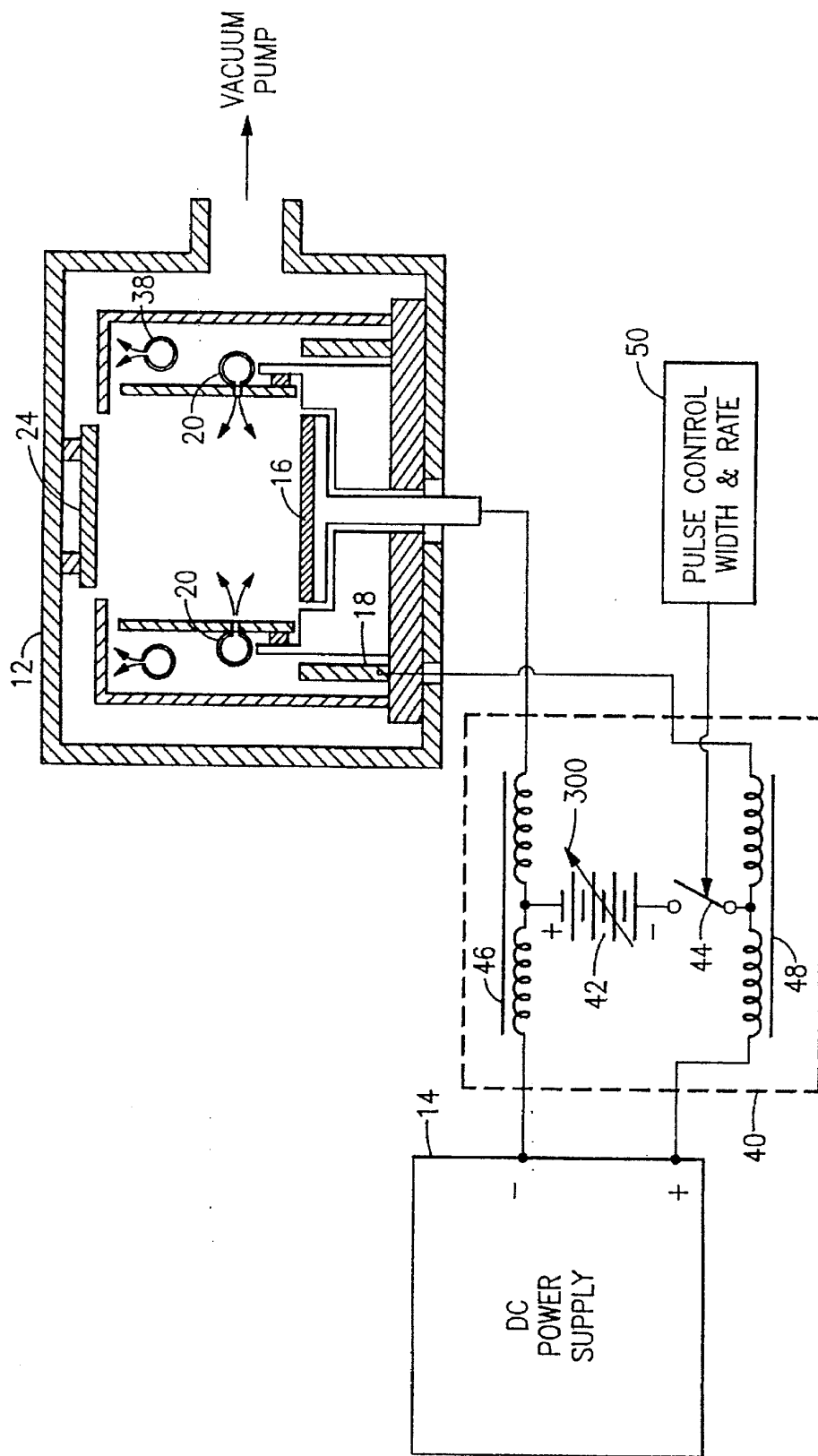


FIG.12

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