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United States Patent [19]
Sherstinsky et al.

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[54] **ELECTROSTATIC CHUCK WITH FLUID FLOW REGULATOR**
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[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[57] **ABSTRACT**

An electrostatic chuck **20** of the present invention is capable of maintaining substantially uniform temperatures across a substrate **30**. The chuck **20** comprises an electrostatic member **35** that includes (i) an insulator **45** covering an electrode **40**, (ii) a substantially planar and conformal contact surface **50** capable of conforming to a substrate **30**, and (iii) conduits **105** terminating at the contact surface **50** for providing heat transfer fluid to the contact surface **50**. Application of a voltage to the electrode **40** of the electrostatic member **35** electrostatically holds the substrate **30** on the conformal contact surface **50** to define an outer periphery **110** having (1) leaking portions **115** where heat transfer fluid leaks out, and (2) sealed portions **130** where heat transfer fluid substantially does not leak out. A fluid flow regulator **135** is provided for flowing heat transfer fluid at different flow rates through the conduits **105** in the electrostatic member **35** to provide (i) first flow rates of heat transfer fluid through the conduits **105** adjacent to the sealed portions **130** of the outer periphery **110** of the electrostatic member **35**, and (ii) second flow rates of heat transfer fluid through the conduits **105** adjacent to the leaking portions **115**, the second flow rates being higher than the first flow rates, to maintain substantially uniform temperatures across the substrate **30** held on the chuck **20**.

[21] Appl. No.: **503,790**
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Related U.S. Application Data

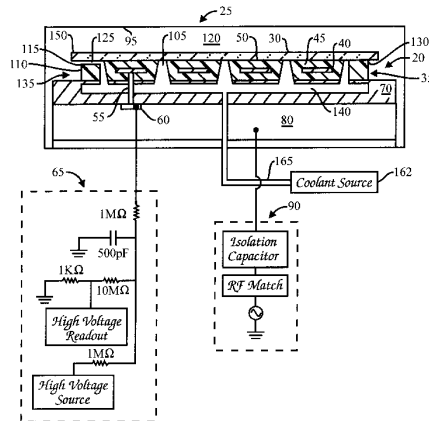
[63] Continuation-in-part of Ser. No. 203,111, Feb. 28, 1994, abandoned.
[51] **Int. Cl.**⁶ **H02N 13/00**
[52] **U.S. Cl.** **361/234; 279/128**
[58] **Field of Search** 361/233, 234; 269/8, 903; 279/128

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25 Claims, 6 Drawing Sheets



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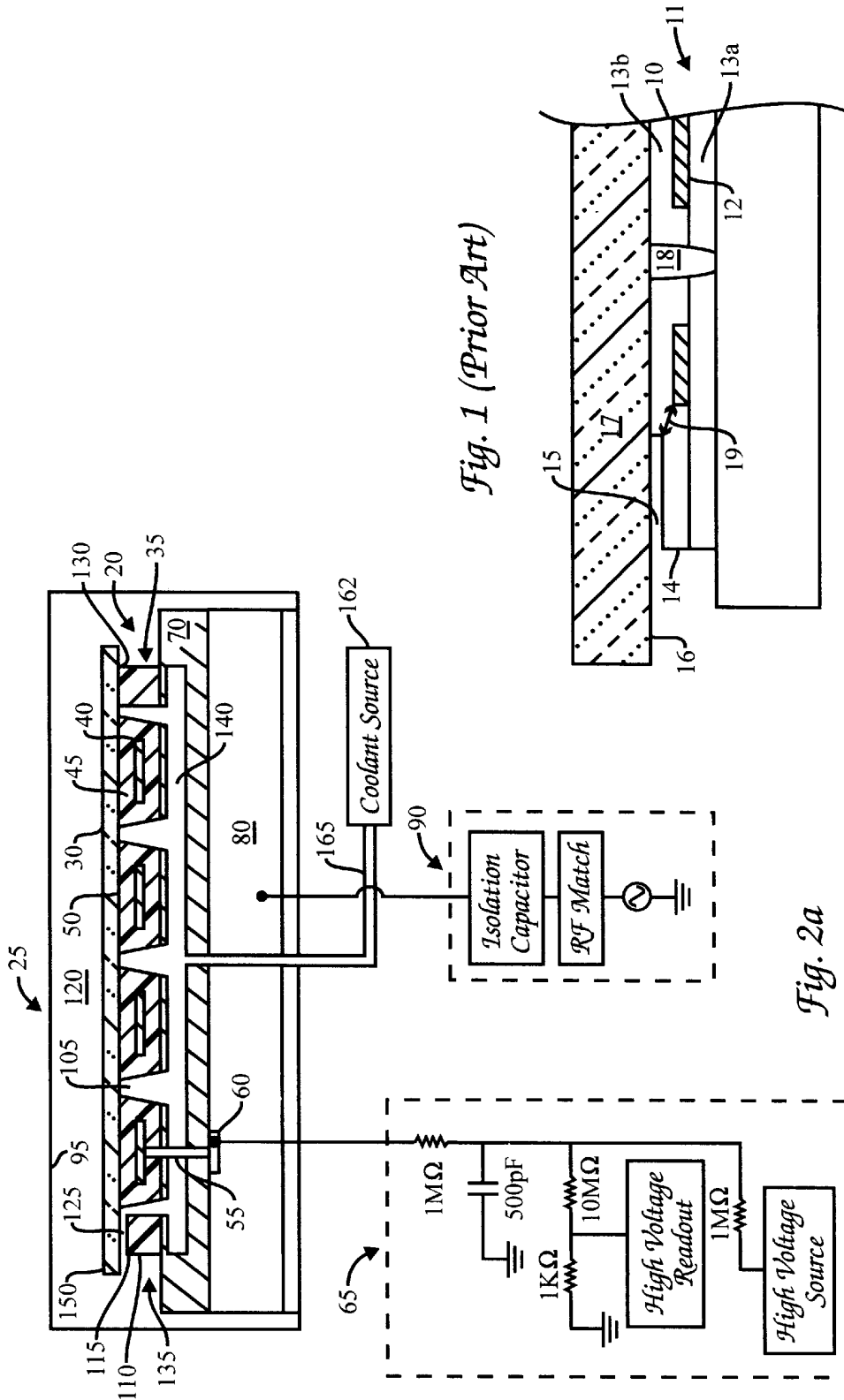


Fig. 1 (Prior Art)

Fig. 2a

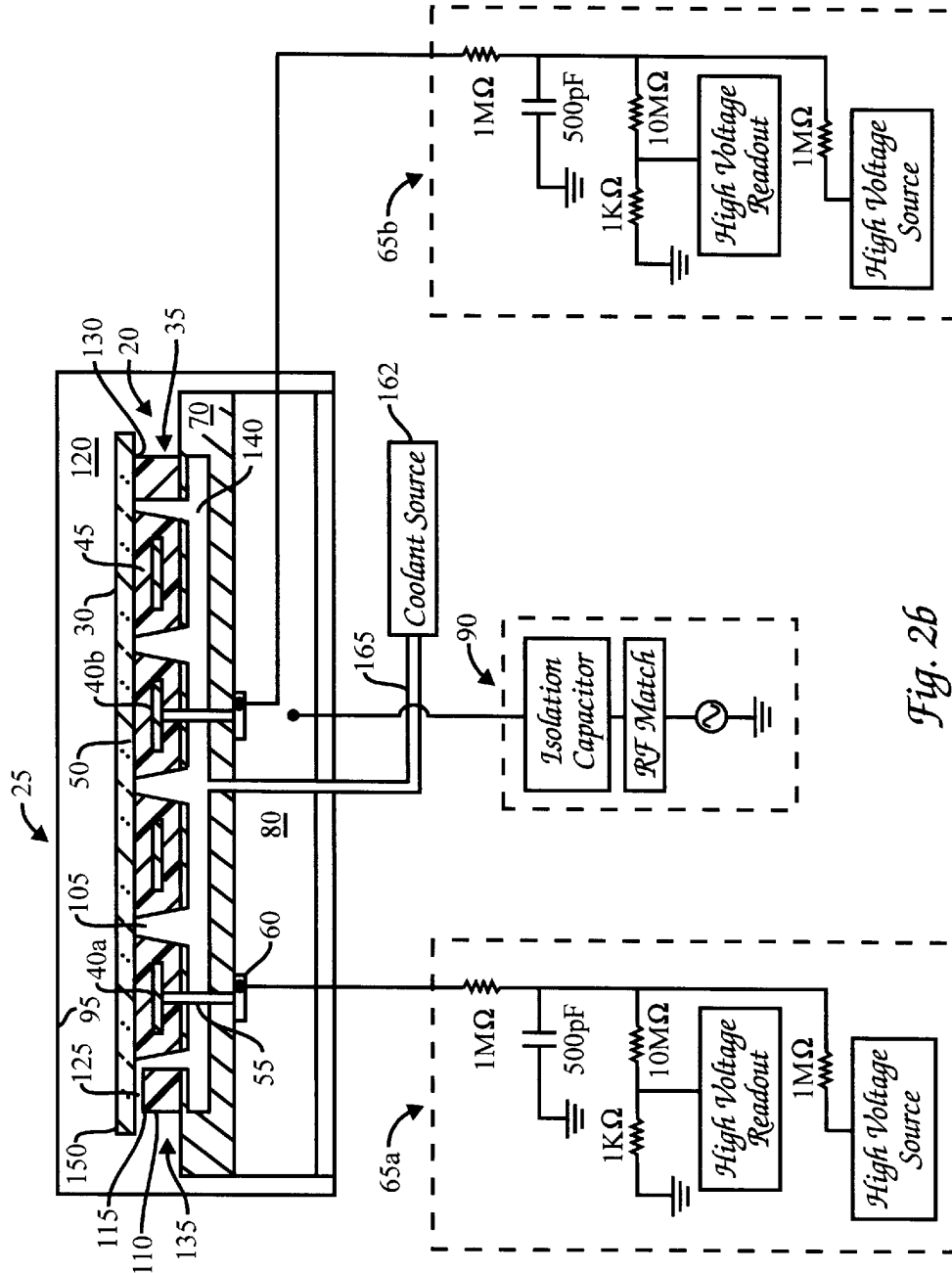


Fig. 2b

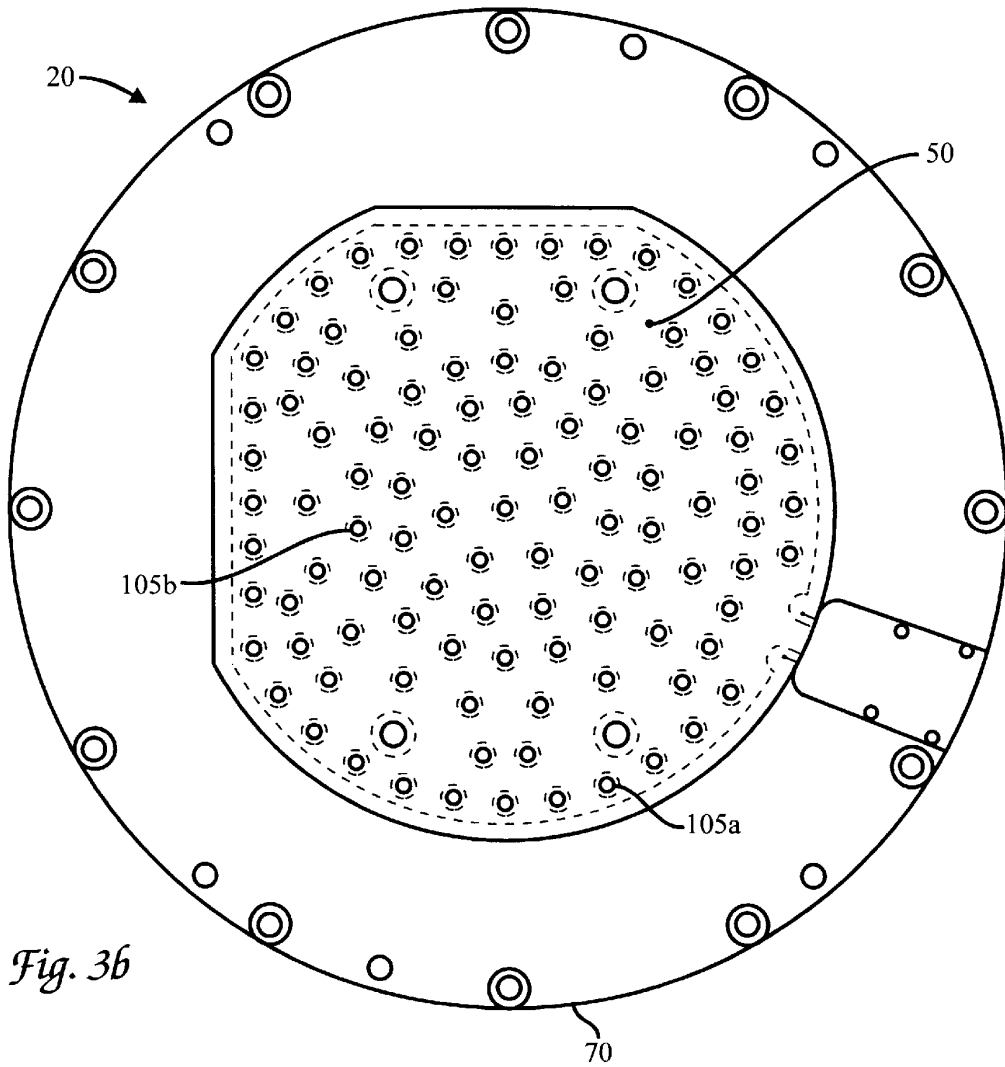


Fig. 3b

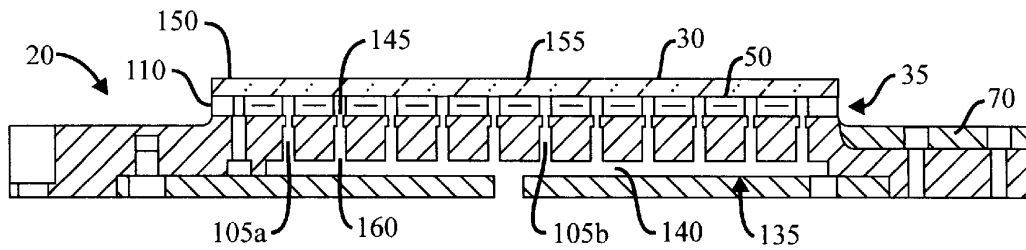


Fig. 3a

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