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(12) **United States Patent Sill**

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(54) **METHOD AND APPARATUS FOR RADIO FREQUENCY ISOLATION OF LIQUID HEAT TRANSFER MEDIUM SUPPLY AND DISCHARGE LINES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(21) Appl. No.: **09/291,890**

(22) Filed: **Apr. 14, 1999**

(57) **ABSTRACT**

(51) **Int. Cl.**⁷ **C23C 14/34**

(52) **U.S. Cl.** **204/298.09**; 118/58; 156/345; 165/177; 165/181; 165/184

(58) **Field of Search** 204/298.09; 118/58; 156/345; 165/181, 184

A passive first-order band reject, or notch, filter characteristic is introduced into a supply and/or return line (18, 20) of a heat transfer system (12) that uses electrically conductive liquid heat transfer medium in contact with radio frequency electrified components (14) typical in sputtering or etching manufacturing equipment. The heat transfer medium line (20) is coiled to create an inherent inductance (L2). A capacitive element (C2) is operatively connected across the coil (29) in the heat transfer medium line (20), the amount of capacitance chosen so that the resonant frequency is at the RF frequency of the components (14) being thermally conditioned. Thus, a high impedance is created for that frequency. The coil (29) and capacitor (C2) combination is protected from physical and electromagnetic interference by an enclosure (44).

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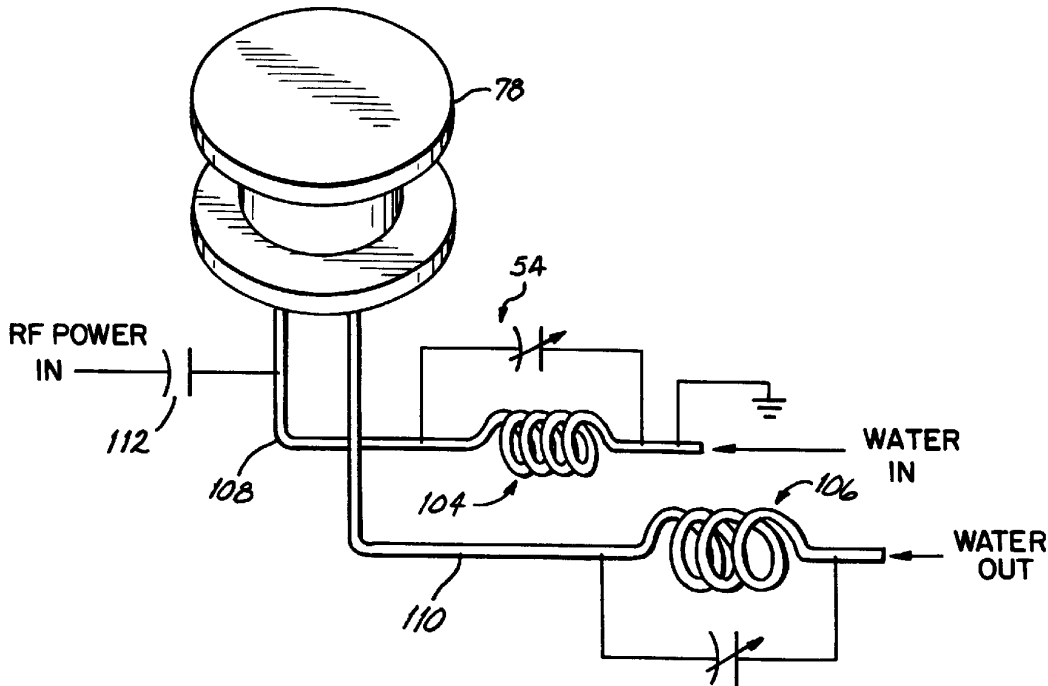
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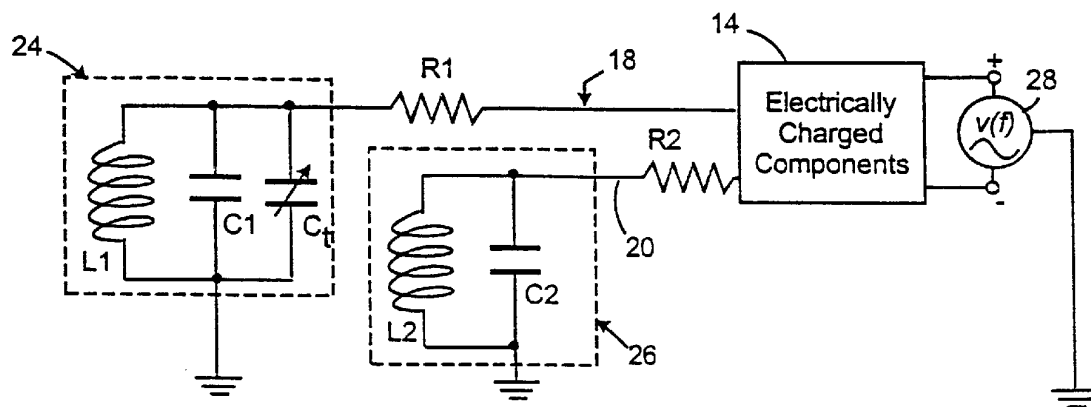
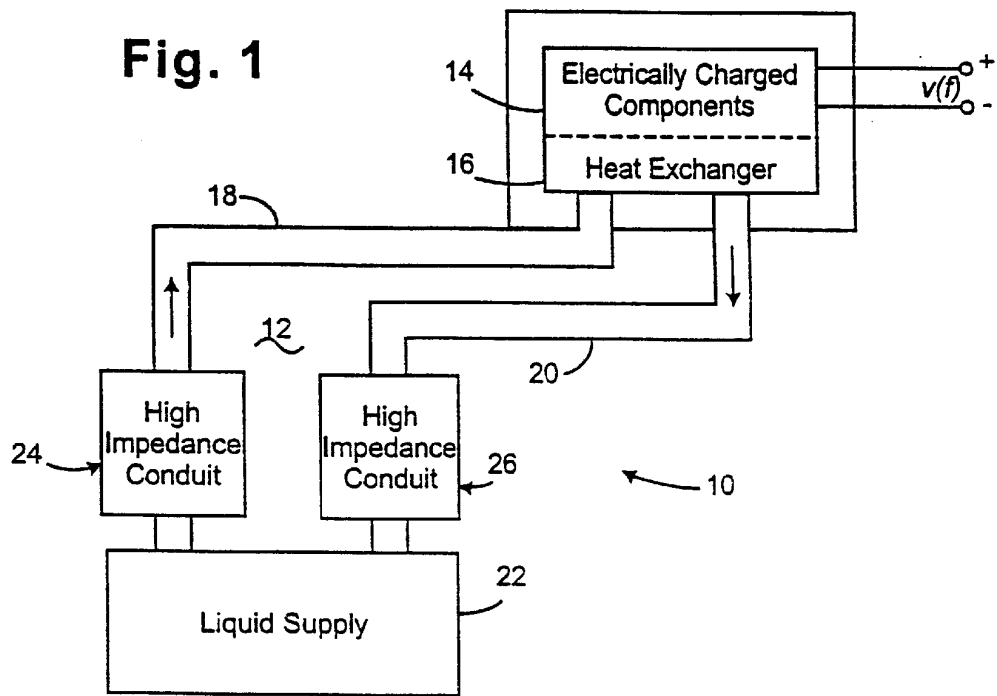
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16 Claims, 5 Drawing Sheets





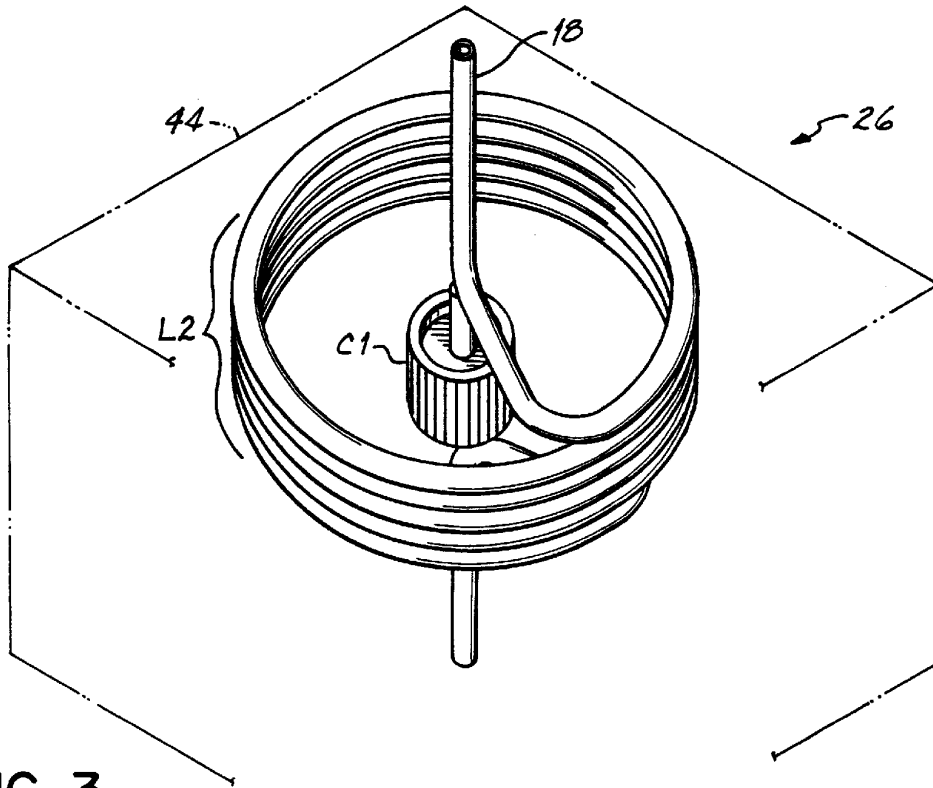


FIG. 3

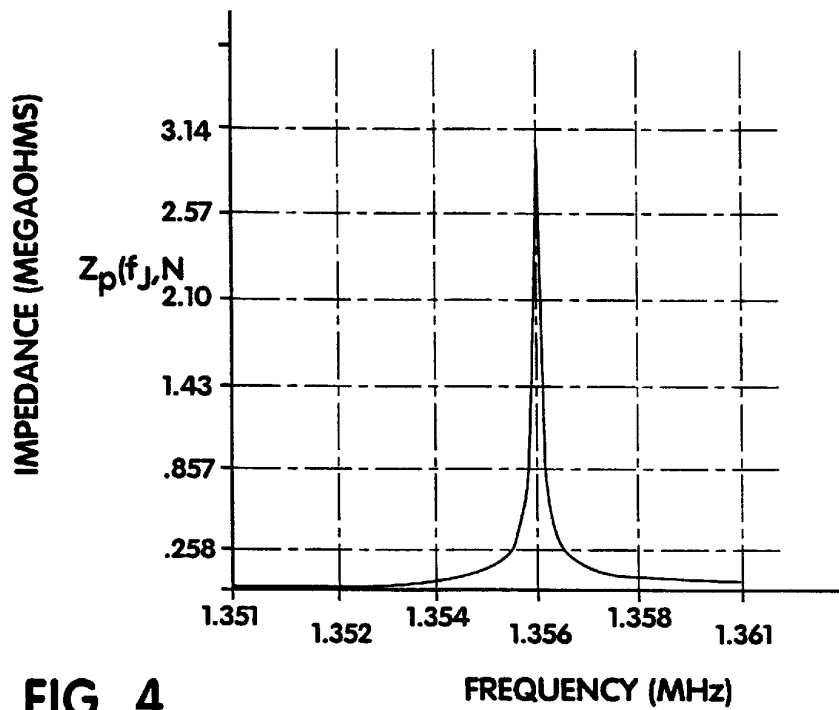


FIG. 4

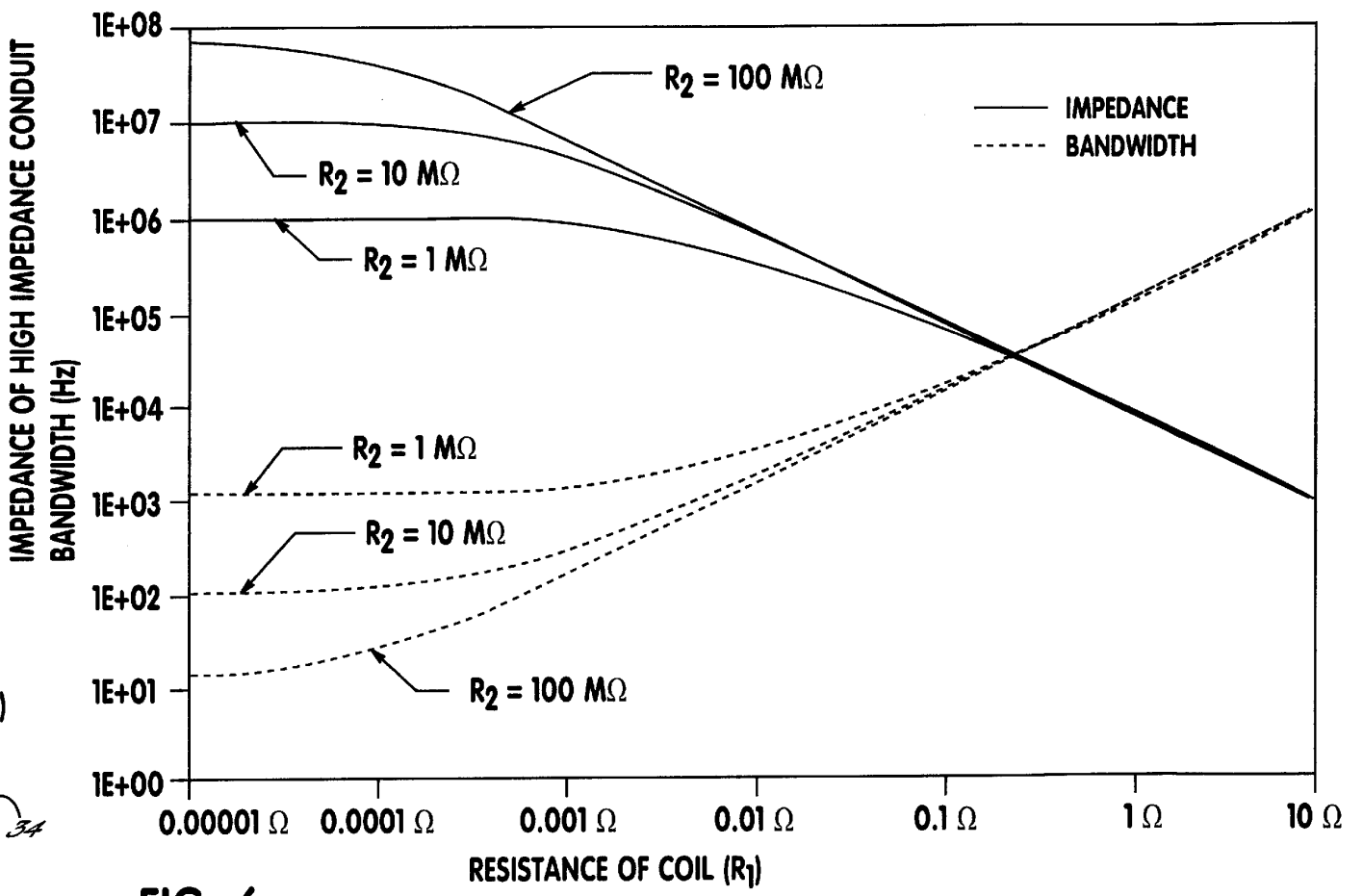


FIG. 6

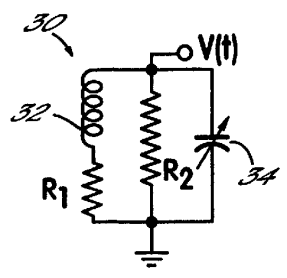


FIG. 5

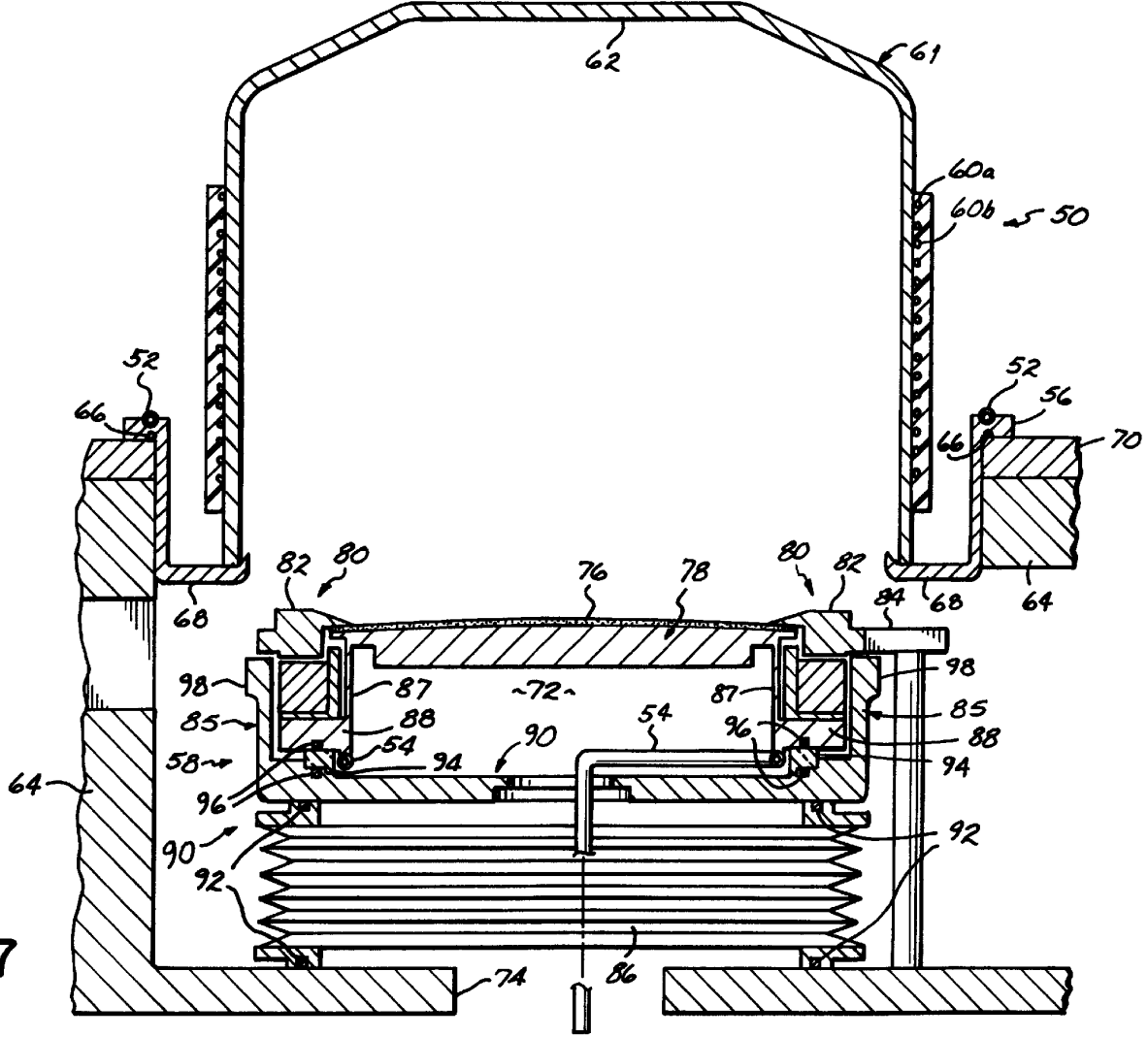


FIG. 7

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