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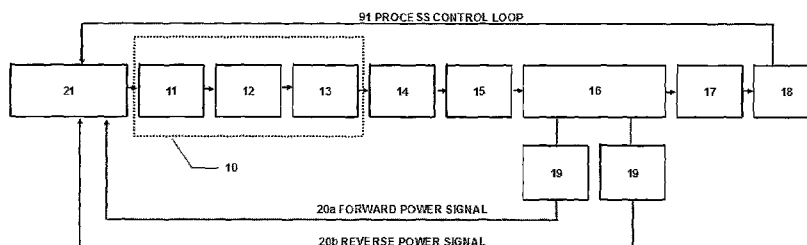


FIGURE 1
PRIOR ART

(57) **Abstract:** A materials processing system comprises a thermal processing chamber and a broadband microwave power source. The power source includes an ovenized small-signal RF circuit, a high power microwave amplifier, and forward and reflected power detectors separated from one another by an isolator. The power detectors are also preferably ovenized. A control system provides control signals to the thermally stabilized VCO and VCA in the small-signal circuit to control output power based on detected forward power compared to demanded forward power. The system may be run in either open-loop or closed-loop modes.