



US005488336A

# United States Patent [19]

Rivera et al.

[11] Patent Number: **5,488,336**

[45] Date of Patent: **Jan. 30, 1996**

- [54] **BROADBAND WAVEGUIDE PRESSURE WINDOW**
- [75] Inventors: **David F. Rivera**, Westerly, R.I.;  
**Thomas R. Floyd**, Waterford; **Michael J. Josypenko**, Norwich, both of Conn.
- [73] Assignee: **The United States of America as represented by the Secretary of the Navy**, Washington, D.C.
- [21] Appl. No.: **287,026**
- [22] Filed: **Aug. 8, 1994**
- [51] Int. Cl.<sup>6</sup> ..... **H01P 1/08**
- [52] U.S. Cl. .... **333/252; 333/33**
- [58] Field of Search ..... **333/33, 252**

*Attorney, Agent, or Firm*—Michael J. McGowan; Prithvi C. Lall; Michael F. Oglo

## [57] ABSTRACT

A broad passband pressure barrier arrangement is provided for insertion in a circular waveguide between a source and a receiver of radio frequency (RF) energy with a spatially circumferential electric field characteristic of the TE<sub>01</sub> mode. At least two cylindrical barrier regions are coaxially aligned and arranged symmetrically in mirror image fashion about a radial plane of the circular waveguide. The cylindrical barrier regions include at least one solid cylindrical plug region sealed in a cross-section of the circular waveguide and having a longitudinal thickness sufficient to withstand a predetermined pressure load. Each of the cylindrical barrier regions are defined by a characteristic impedance at opposing end faces thereof and a by characteristic impedance between the opposing end faces. A region-by-region impedance analysis process begins with an end face of the arrangement that is furthest from the source and is completed with an end face of the arrangement that is nearest the source. The permittivities of the barrier regions and the longitudinal thicknesses of barrier regions are optimized across the passband of interest.

- [56] **References Cited**
- U.S. PATENT DOCUMENTS**
- 4,688,009 8/1987 Ferguson et al. .... 333/252
- FOREIGN PATENT DOCUMENTS**
- 203001 10/1985 Japan ..... 333/252
- 295501 11/1989 Japan ..... 333/252

*Primary Examiner*—Paul Gensler

**3 Claims, 2 Drawing Sheets**

