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Ferran

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[54] RESIDUAL GAS SENSOR UTILIZING A MINIATURE QUADRUPOLE ARRAY

OTHER PUBLICATIONS

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German article entitled "Das elektrische Massenfilter als Massenspektrometer und Isotopentrenner," by W. Paul, H.P. Reinhard and U. von Zahn, Apr. 21, 1958.

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Brochure for QX2000® Residual Gas Analyzers "Residual Gas Analysis, PPM Analysis, Multiplexing," from Leybold Inficon, Inc.

[21] Appl. No.: **822,325**

[22] Filed: **Mar. 21, 1997**

Related U.S. Application Data

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[60] Continuation of Ser. No. 410,083, Mar. 25, 1995, Pat. No. 5,613,294, which is a division of Ser. No. 76,161, Jun. 14, 1993, Pat. No. 5,401,962.

[57] ABSTRACT

[51] **Int. Cl.**⁶ **H01J 49/42**

[52] **U.S. Cl.** **445/67**

[58] **Field of Search** 445/66, 67

A residual gas sensor, suitable for mounting within an low pressure chamber, includes an array of quadrupoles formed from a plurality of parallel rods mounted in a cantilevered fashion in a glass seal. Sixteen parallel rods form an array of nine quadrupoles with adjacent quadrupoles sharing adjacent rods. A filament emitting electrons ionize gas molecules present in the low pressure chamber. These ions enter channels in the center of each quadrupole and are accelerated towards a collector having a surface mounted within each channel of each quadrupole. Voltages are applied to the rods thereby creating an identical electric field within the channels of each quadrupoles of the array. By varying the voltages applied to the rods, the electric field within the channels can be tuned to permit only ions having a specific mass-to-charge ratio to make contact with the collector. By analyzing the current generated by the ions making contact with the collector at different voltages, the presence and quantity of gases present in the low pressure chamber can be determined.

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6 Claims, 10 Drawing Sheets

