

[54] CAPACITANCE MANOMETER HAVING STRESS RELIEF FOR FIXED ELECTRODE

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[21] Appl. No.: 189,780

[22] Filed: May 3, 1988

[51] Int. Cl.<sup>4</sup> ..... G01L 7/08; G01L 9/12

[52] U.S. Cl. .... 73/724; 73/708; 361/283

[58] Field of Search ..... 73/718, 724, 708; 361/283

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[57] ABSTRACT

An improved capacitance manometer includes a thin, electrically conductive diaphragm fixedly mounted to a

housing. The diaphragm separates a first chamber that is subjected to a reference pressure from a second chamber that is subjected to a pressure that is to be measured relative to the reference pressure. The diaphragm flexes in response to a pressure differential between the two chambers. The diaphragm comprises one electrode of a variable capacitor. A second electrode of the variable capacitor is provided by a fixed electrically conductive area mounted on a ceramic disc or other fixed electrode support. The ceramic disc is mounted within the housing so that the electrically conductive area on the ceramic disc is proximate to and spaced apart from the diaphragm in generally parallel relationship to the diaphragm when the diaphragm is in a substantially relaxed condition (i.e., not flexed by a pressure differential). In order to prevent the ceramic disc and its associated conductive area from bending as the temperature changes, the ceramic disc is mechanically isolated from the housing by a roller bearing structure that preferably is a spherical or cylindrical electrical insulator. The roller bearing structure allows the ceramic disc to move with respect to the housing to prevent temperature induced forces that would otherwise cause bending. The roller bearing structure provides the additional advantage of significantly reducing leakage current through the ceramic disc that would otherwise affect the accuracy of measurements made with the capacitance manometer.

17 Claims, 5 Drawing Sheets

