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(54) **SYSTEM AND METHOD FOR DETERMINING DENSITY OF A MEDIUM IN A TANK**

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**G01F 23/284** (2006.01)

(57) **ABSTRACT**

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CPC ..... **G01N 22/00** (2013.01); **G01F 23/284** (2013.01); **G01N 9/24** (2013.01)

A system and method for determining a density of a non-conducting medium in a tank is disclosed where the relationship between a dielectric constant and a density of the medium is known. The system comprises a transceiver, and a waveguide, the waveguide extends towards and into the medium. The system further comprises a first microwave resonator located along the waveguide. The first microwave resonator has a resonance frequency, which depends on a dielectric constant of a medium surrounding the resonator according to a known relationship, and is arranged to reflect a portion in the frequency domain of a signal being guided along the waveguide. The system further comprises processing circuitry connected to the transceiver and configured to determine the resonance frequency based on a received reflected signal, and to determine a density of the medium at the location of the first microwave resonator based on the resonance frequency.

(58) **Field of Classification Search**  
CPC ..... E21B 17/028; E21B 47/12; E21B 17/003; E21B 41/0085  
USPC ..... 324/642, 27, 51, 44  
See application file for complete search history.

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**29 Claims, 8 Drawing Sheets**

