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- (54) **ACOUSTIC DETECTION OF STRESS-INDUCED MECHANICAL DAMAGE IN A BOREHOLE WALL**
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- (52) U.S. Cl. **702/6; 703/5; 367/27**
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(57) **ABSTRACT**

A method provides for locating and measuring mechanical damage in rock surrounding a borehole by detecting one or both of reductions in ultrasonic compressional wave velocity in the rock as a function of azimuth, and by detecting focused acoustic energy in the rock from local increases in ultrasonic compressional wave amplitude resulting from velocity gradients. A first preferred embodiment uses a combination of azimuthal ultrasonic compressional wave velocity data and azimuthal ultrasonic compressional wave energy data. A second embodiment uses azimuthal ultrasonic compressional wave velocity data and omnidirectional sonic velocity data, with a comparison test or a curve fitting test. A third embodiment uses azimuthal ultrasonic compressional wave energy data.

17 Claims, 11 Drawing Sheets

