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(54) **3D BOREHOLE IMAGER**
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See application file for complete search history.

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(57) **ABSTRACT**

Logging tools and methods for obtaining a three-dimensional (3D) image of the region around a borehole. In at least some embodiments, a 3D imaging tool rotates, transmitting pulses that are approximately a nanosecond long and measuring the time it takes to receive reflections of these pulses. Multiple receivers are employed to provide accurate triangulation of the reflectors. In some cases, multiple transmitters are employed to obtain compensated measurements, i.e., measurements that compensate for variations in the receiver electronics. Because reflections occur at boundaries between materials having different dielectric constants, the 3D imaging tool can map out such boundaries in the neighborhood of the borehole. Such boundaries can include: the borehole wall itself, boundaries between different formation materials, faults or other discontinuities in a formation, and boundaries between fluids in a formation. Depending on various factors, the size of the borehole neighborhood mapped out can be as large as 1 meter.

18 Claims, 4 Drawing Sheets

