

United States

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- [54] **SINGLE TRANSDUCER LIQUID LEVEL DETECTOR**
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- [52] U.S. Cl. .... **340/1 L; 73/290 V; 73/599**
- [58] Field of Search ..... **340/1 L, 244 R; 73/290 V, 599, 600**

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[57] **ABSTRACT**

The presence or absence of liquid at a particular location of a tank or pipe is sensed through the wall of the container by a single ultrasonic transducer which may be secured to the outer surface of the container by hand pressure, by clamping, or by cementing. Detection is obtained through the damping effect of either liquid or air within the container on multiple interface reflections of a longitudinal sonic beam in the container wall. The first return signal amplitude adjusts the gain of the monitoring circuit and allows the measurement of the percentage decay of the return signal and the comparison of the decay to the known decay rate if the container was either empty or full at the point of measurement. Output circuits are provided to give a full or empty output signal, or to provide output control signals in response to the fluid level measurement. A fault alarm signal is also produced to indicate that the transducer is not properly coupled to the container or that the circuit is working improperly.

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

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Primary Examiner—Richard A. Farley

20 Claims, 8 Drawing Figures

