



**United States Patent** [19]  
Izbicki et al.

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- [54] **WELL FLOWMETER AND DOWN-HOLE SAMPLER** 4,972,704 11/1990 Wellington et al. .... 73/152.18  
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- [\*] **Notice:** This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).
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[58] **Field of Search** ..... 73/152.18, 152.29

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[57] **ABSTRACT**

An apparatus for and a process of evaluating well bore flow of water and for sampling of water within a well. A hose is inserted into the well to a known depth. To evaluate the water, a tracer fluid is introduced into the hose until the pressure within the hose exceeds the hydrostatic pressure at the known depth by a preset amount. The tracer fluid is then rapidly released into the well. The tracer fluid is detected in water pumped from the well, and the elapsed time between release of the tracer fluid into the well and detection of the tracer fluid in the water pumped from the well is determined. The process is repeated at a second known depth, and the tracer fluid travel time between the two depths is determined. From this and the cross-sectional area of the well, the incremental volumetric well bore inflow to the well between the two depths is calculated. The process can be repeated at several depths within the well to permit construction of a velocity profile of water movement within the well. To obtain a water sample from the well, the hose is inserted to the desired depth, and an inert gas is introduced into the hose. The gas is then vented from the hose, and water from the well enters the hose to replace the vented gas. The hose is then withdrawn from the well, and gas is again introduced into the hose, causing the water sample to be discharged. Appropriate valves are provided to control the apparatus.

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13 Claims, 3 Drawing Sheets

