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**Stone et al.**

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(54) **FLUIDIC SYSTEM FOR REAGENT DELIVERY TO A FLOW CELL**

B01L 2400/02; G01N 35/1002; G01N 35/1097; G01N 35/1016; G01N 35/1065; G01N 2035/00237; C12Q 1/6874

See application file for complete search history.

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(56) **References Cited**

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 49 days.

U.S. PATENT DOCUMENTS

5,641,658 A 6/1997 Adams et al.  
5,891,734 A \* 4/1999 Gill ..... B01F 5/0453 422/63

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(Continued)

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FOREIGN PATENT DOCUMENTS

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OTHER PUBLICATIONS

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**B01L 3/00** (2006.01)  
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Bentley, et al., "Accurate whole human genome sequencing using reversible terminator chemistry," Nature, vol. 456, No. 7218, Nov. 6, 2008, 53-59.

(Continued)

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(52) **U.S. Cl.**  
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(57) **ABSTRACT**

(Continued)

A fluidic system that includes a reagent manifold comprising a plurality of channels configured for fluid communication between a reagent cartridge and an inlet of a flow cell; a plurality of reagent sippers extending downward from ports in the manifold, each of the reagent sippers configured to be placed into a reagent reservoir in a reagent cartridge so that liquid reagent can be drawn from the reagent reservoir into the sipper; at least one valve configured to mediate fluid communication between the reservoirs and the inlet of the flow cell. The reagent manifold can also include cache reservoirs for reagent re-use.

(58) **Field of Classification Search**  
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**23 Claims, 11 Drawing Sheets**

