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**Fraden et al.**

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(54) **MANIPULATION OF FLUIDS, FLUID COMPONENTS AND REACTIONS IN MICROFLUIDIC SYSTEMS**

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**F17D 1/12** (2006.01)  
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See application file for complete search history.

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(57) **ABSTRACT**

Microfluidic structures and methods for manipulating fluids, fluid components, and reactions are provided. In one aspect, such structures and methods can allow production of droplets of a precise volume, which can be stored/maintained at precise regions of the device. In another aspect, microfluidic structures and methods described herein are designed for containing and positioning components in an arrangement such that the components can be manipulated and then tracked even after manipulation. For example, cells may be constrained in an arrangement in microfluidic structures described herein to facilitate tracking during their growth and/or after they multiply.

**12 Claims, 27 Drawing Sheets**

