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(54) **MULTIPLE LAMINAR FLOW-BASED PARTICLE AND CELLULAR SEPARATION WITH LASER STEERING**

(75) Inventors: **Daniel Mueth**, Chigago, IL (US);
             Joseph Plewa, Park Ridge, IL (US);
             Jessica Shireman, Kansas City, MO
             (US); **Amy Anderson**, Prospect Heights,
             IL (US); **Lewis Gruber**, Chicago, IL
             (US); **Neil Harris Rosenbaum**, Chicago,
             IL (US)

(73) Assignee: **Arryx, Inc.**, Chicago, IL (US)

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Related U.S. Application Data

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    B04B 7/08   (2006.01)
(52) **U.S. Cl.** **494/36**; 494/45

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    See application file for complete search history.

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Primary Examiner—Kiet T Nguyen
(74) *Attorney, Agent, or Firm*—Jean C. Edwards, Esq.; Akerman Senterfitt

(57) **ABSTRACT**

The invention provides a method, apparatus and system for separating blood and other types of cellular components, and can be combined with holographic optical trapping manipulation or other forms of optical tweezing. One of the exemplary methods includes providing a first flow having a plurality of blood components; providing a second flow; contacting the first flow with the second flow to provide a first separation region; and differentially sedimenting a first blood cellular component of the plurality of blood components into the second flow while concurrently maintaining a second blood cellular component of the plurality of blood components in the first flow. The second flow having the first blood cellular component is then differentially removed from the first flow having the second blood cellular component. Holographic optical traps may also be utilized in conjunction with the various flows to move selected components from one flow to another, as part of or in addition to a separation stage.

29 Claims, 22 Drawing Sheets
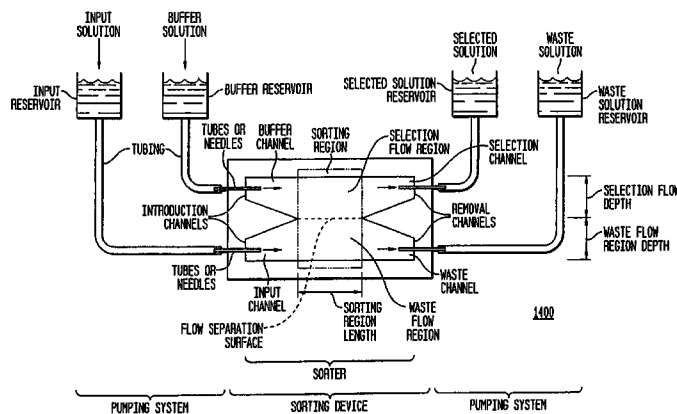
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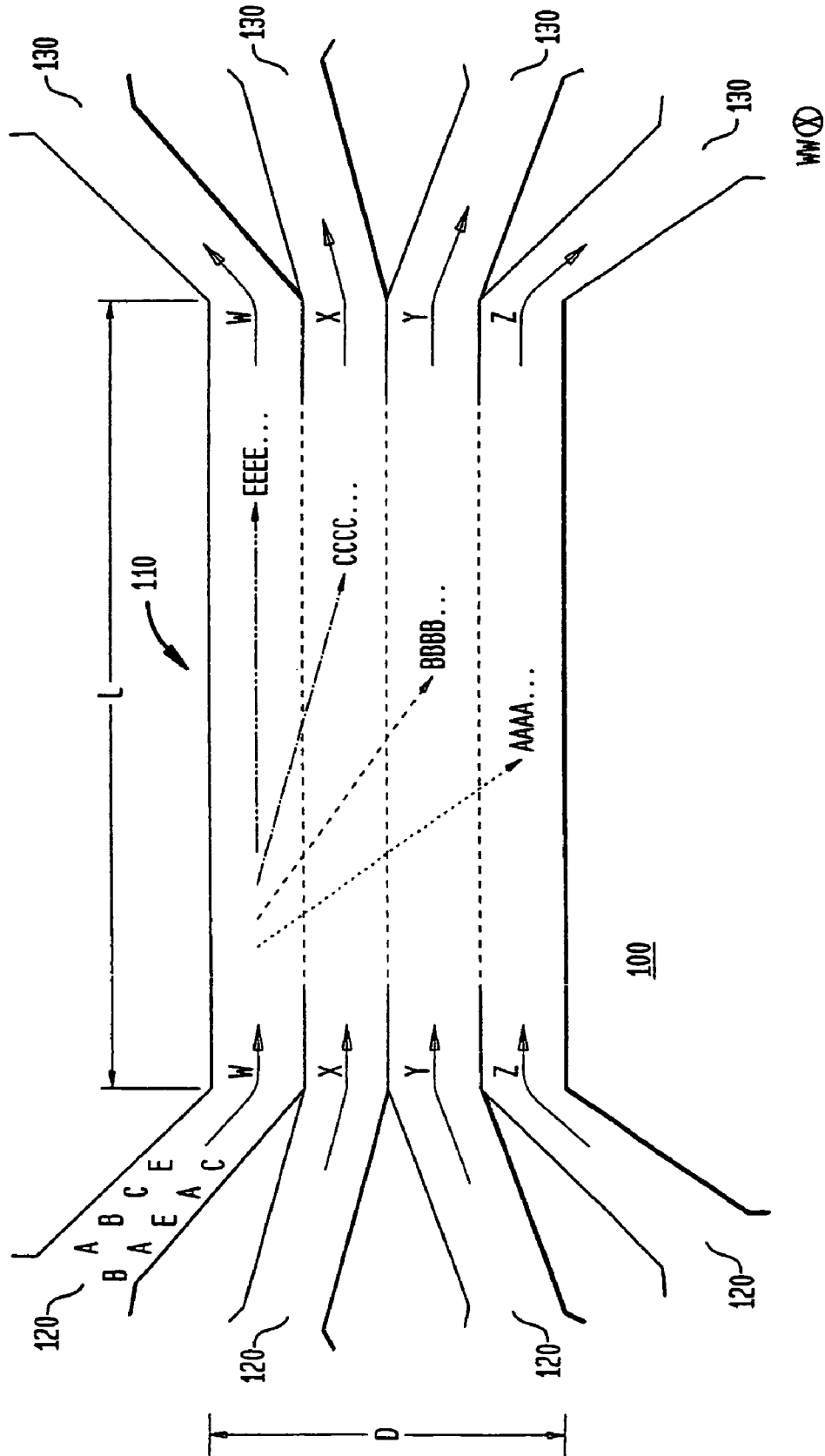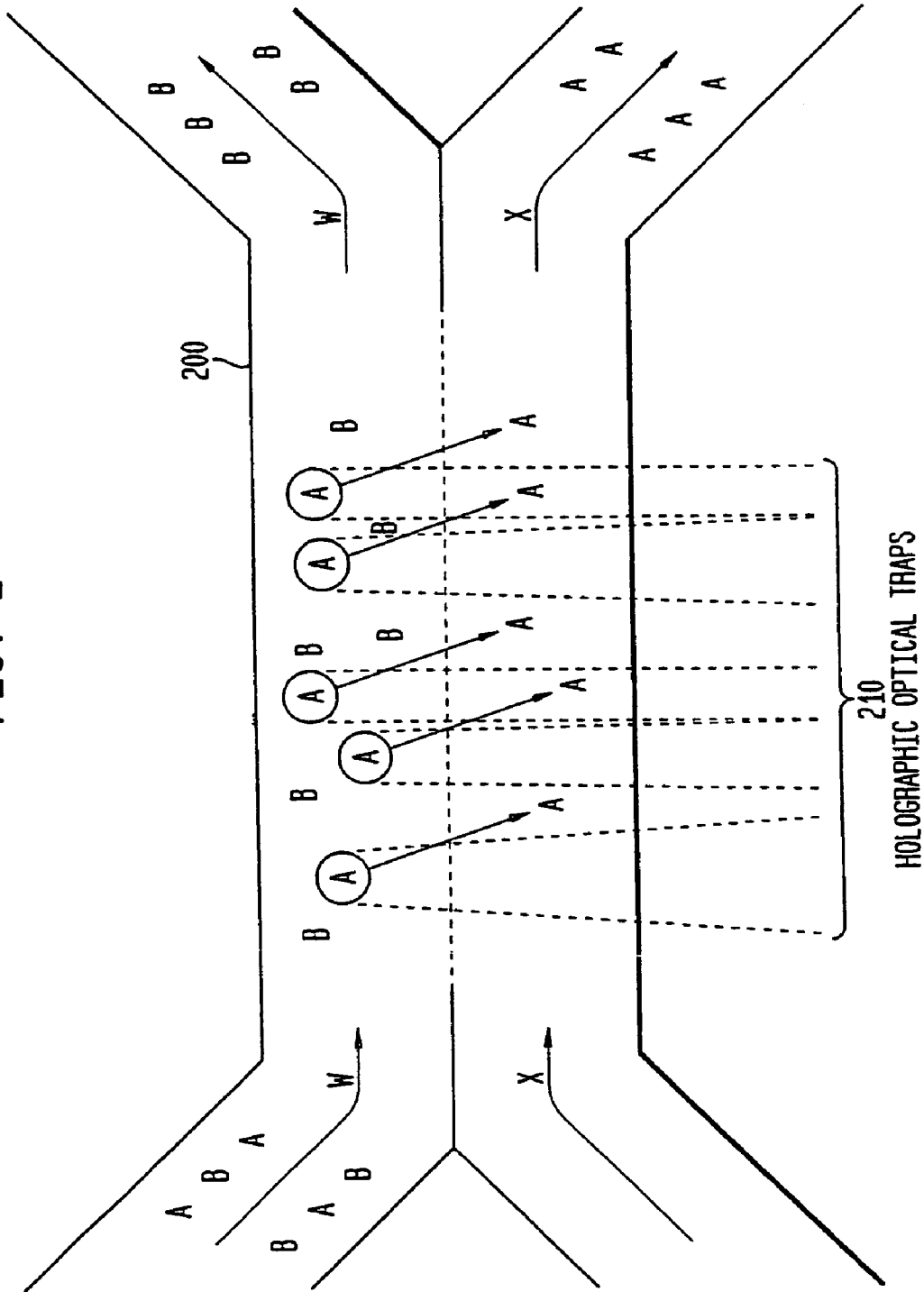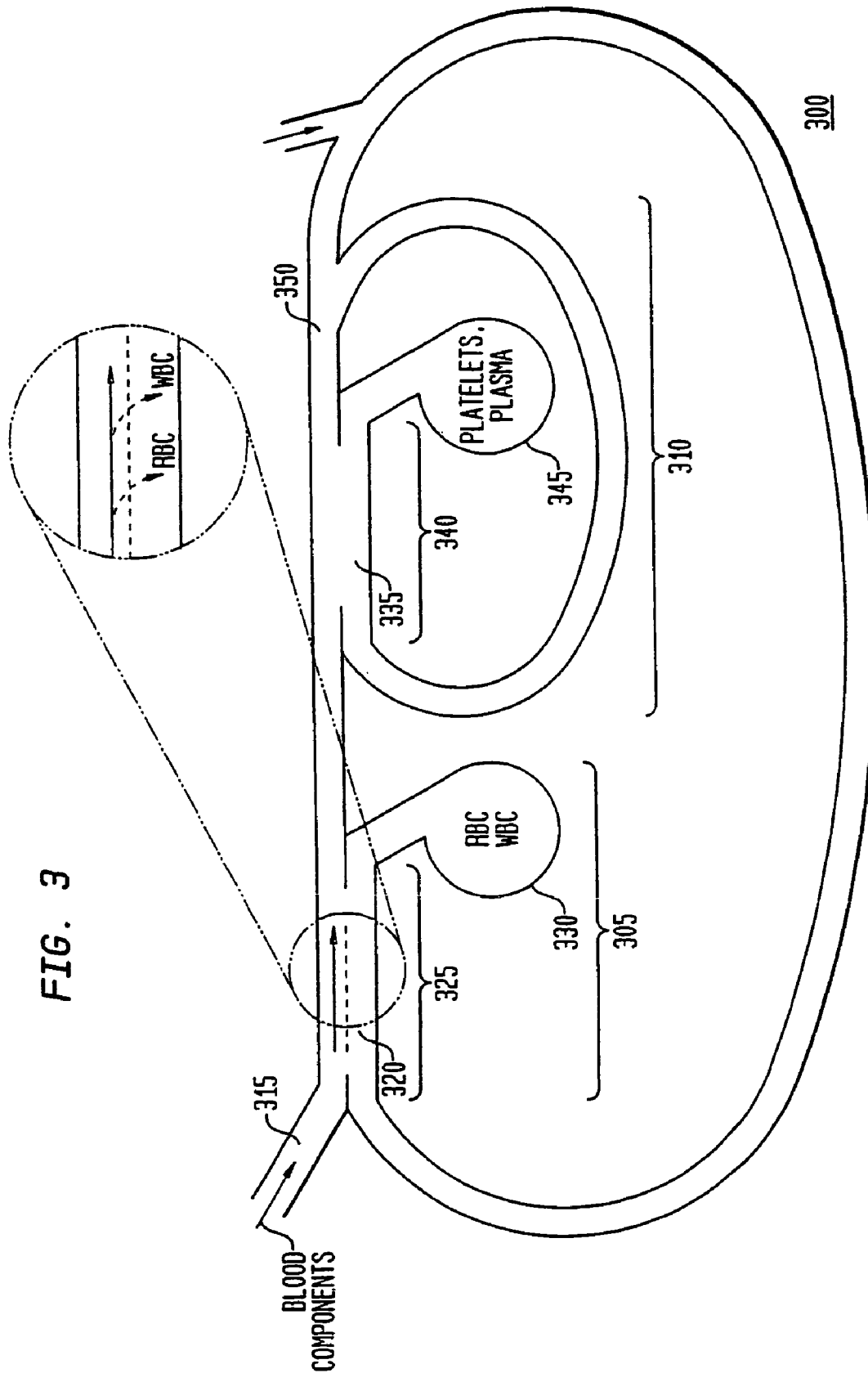
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FIG. 1

FIG. 2

FIG. 3

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