United States Patent [19]

Levin

[11] **Patent Number: 4,945,245**

[45] **Date of Patent: Jul. 31, 1990**

[54] **EVANESCENT WAVE BACKGROUND FLUORESCENCE/ABSORBANCE DETECTION**

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[21] Appl. No.: **305,027**

[22] PCT Filed: **Jan. 14, 1987**

[63] Continuation-in-part of Ser. No. 818/721, Jan. 14, 1986, abandoned.

[86] PCT. No.: **PCTUS87/00088**

§ 371 Date: **Jul. 14, 1988**

§ 102(e) Date: **Jul. 14, 1988**

[87] PCT Pub. No.: **WO87/04247**

PCT Pub. Date: **Jul. 16, 1987**

[51] **Int. Cl.**[5] **G01N 21/64;** G01N 33/551

[52] **U.S. Cl.** **250/461.2;** 250/458.1; 250/459.1; 250/461.1; 436/527

[58] **Field of Search** 250/461.2, 461.1, 459.1, 250/458.1; 436/527, 805, 807; 422/57

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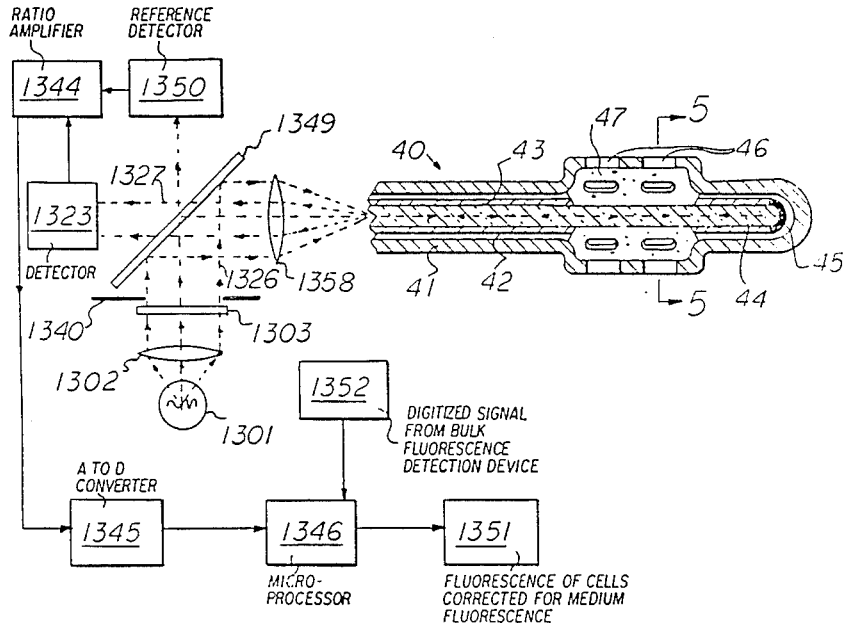
[57] **ABSTRACT**

It is proposed to increase the utility of intracellular fluorescence and absorbance measurements for control of fermentation and cell culture by correcting on-line for background fluorescence of the media, also to be able to measure the fluorescence or absorbance of the fluid media in the presence of suspended cells or particles. The measurements could be extended to measure the optical properties of other fluids which contain suspended particles. This invention uses the characteristics of the evanescent wave at the surface of an optic waveguide. The wave penetrates into the less dense medium only to about the depth of about ½ wavelength. The thickness of media swept by the evanescent wave is much less than the size of a cell, thereby essentially separating the fluorescence or absorbance of the media from that of the cells. Apparatus is disclosed for carrying out the methods taught herein, including the use of an optical fiber to generate the evanescent wave and the use of a flat plate waveguide to generate it. Apparatus that can read both bulk fluorescence and evanescent wave fluorescence employs a flat plate waveguide to generate the evanescent wave and fiber optics to create an alternating dual-beam approach to generating both sets of data.

13 Claims, 7 Drawing Sheets