



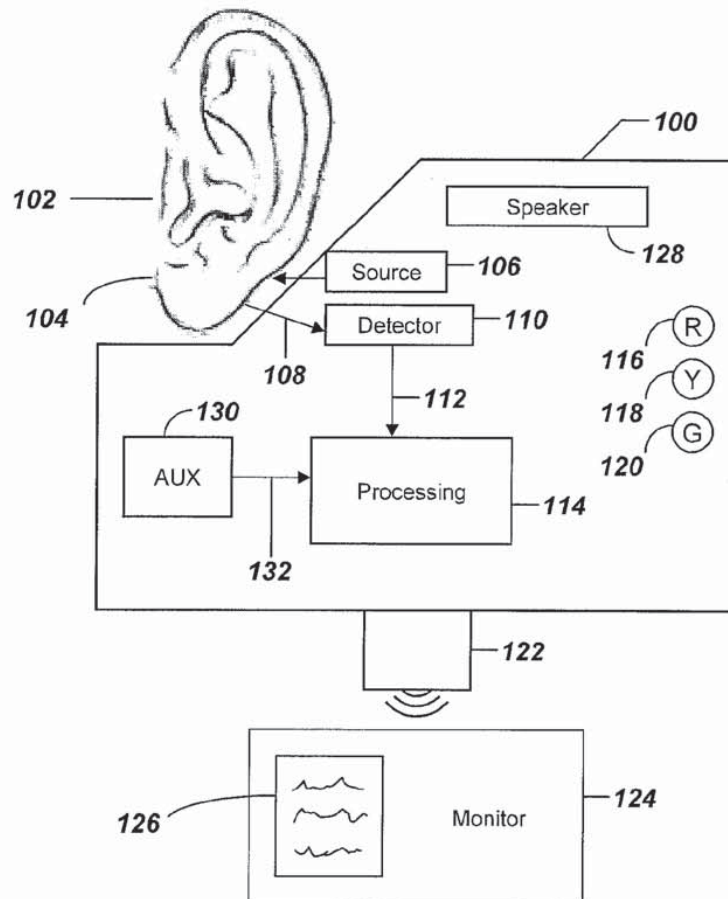
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(19) **United States**(12) **Patent Application Publication****Fricke et al.**(10) **Pub. No.: US 2009/0105556 A1**(43) **Pub. Date: Apr. 23, 2009**(54) **MEASUREMENT OF PHYSIOLOGICAL SIGNALS**(75) Inventors: **John Robert Fricke**, Lexington, MA (US); **Matthew Corbin Wiggins**, Concord, MA (US)Correspondence Address:
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CAMBRIDGE, MA 02138 (US)(73) Assignee: **Tiix LLC**, Cambridge, MA (US)(21) Appl. No.: **12/240,651**(22) Filed: **Sep. 29, 2008****Related U.S. Application Data**

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(52) **U.S. Cl.** **600/301; 600/310**
(57) **ABSTRACT**

A system includes an optical sensor and a signal processing module. The optical sensor is configured to be positioned on an area of skin of a patient. The optical sensor includes a light source for illuminating a capillary bed in the area of skin and a photodetector. The photodetector is configured to receive an optical signal from the capillary bed resulting from the illumination and to convert the optical signal into an electrical signal, the optical signal characterizing a fluctuation in a level of blood in the capillary bed. The signal processing module is configured to process the electric signal using a nonstationary frequency estimation method to obtain a processed signal related to at least one of a heart rate and a respiration rate of the patient. Another aspect relates to obtaining a quantity related to the blood pressure of the patient in addition to or instead of obtaining a processed signal related to at least one of the heart rate and the respiration rate of the patient.

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APL1016

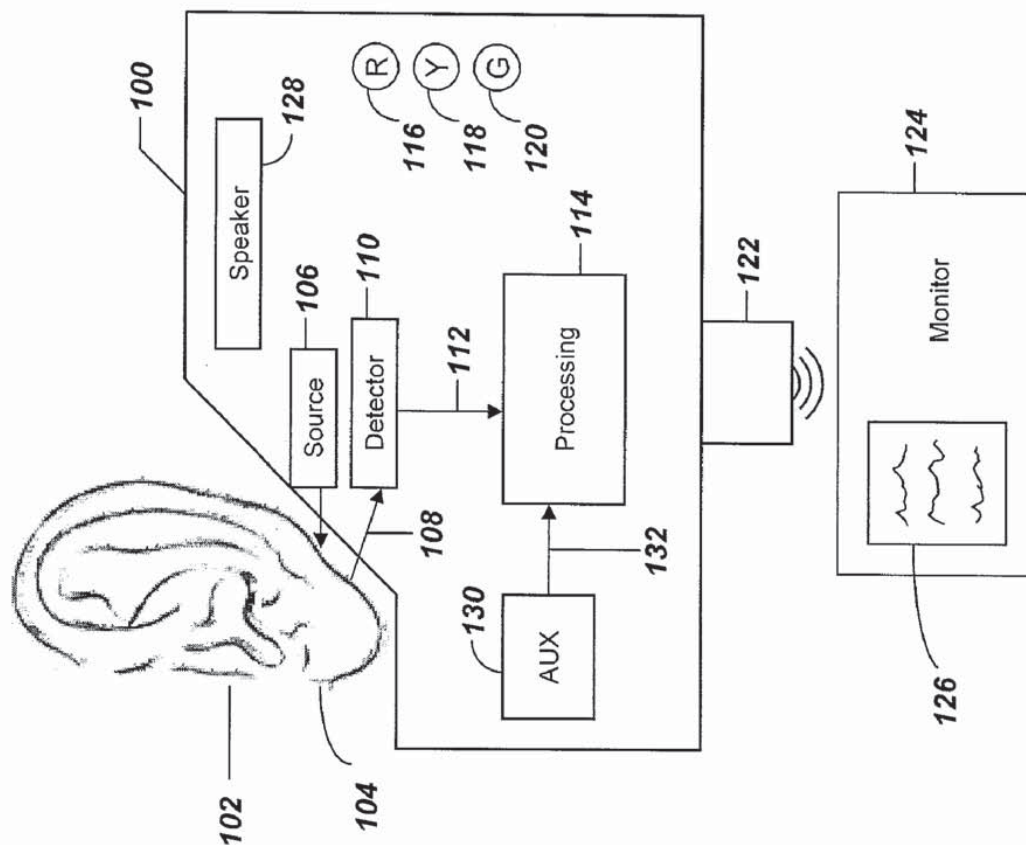


Fig. 1

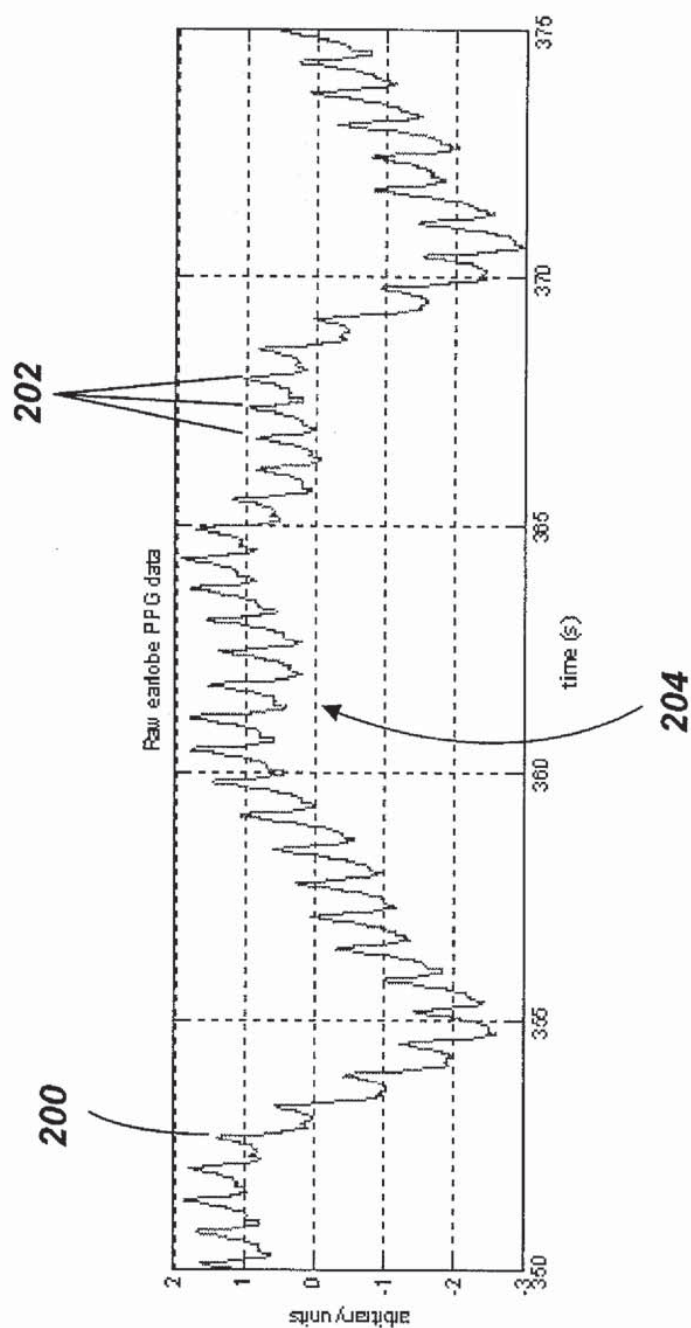


Fig. 2

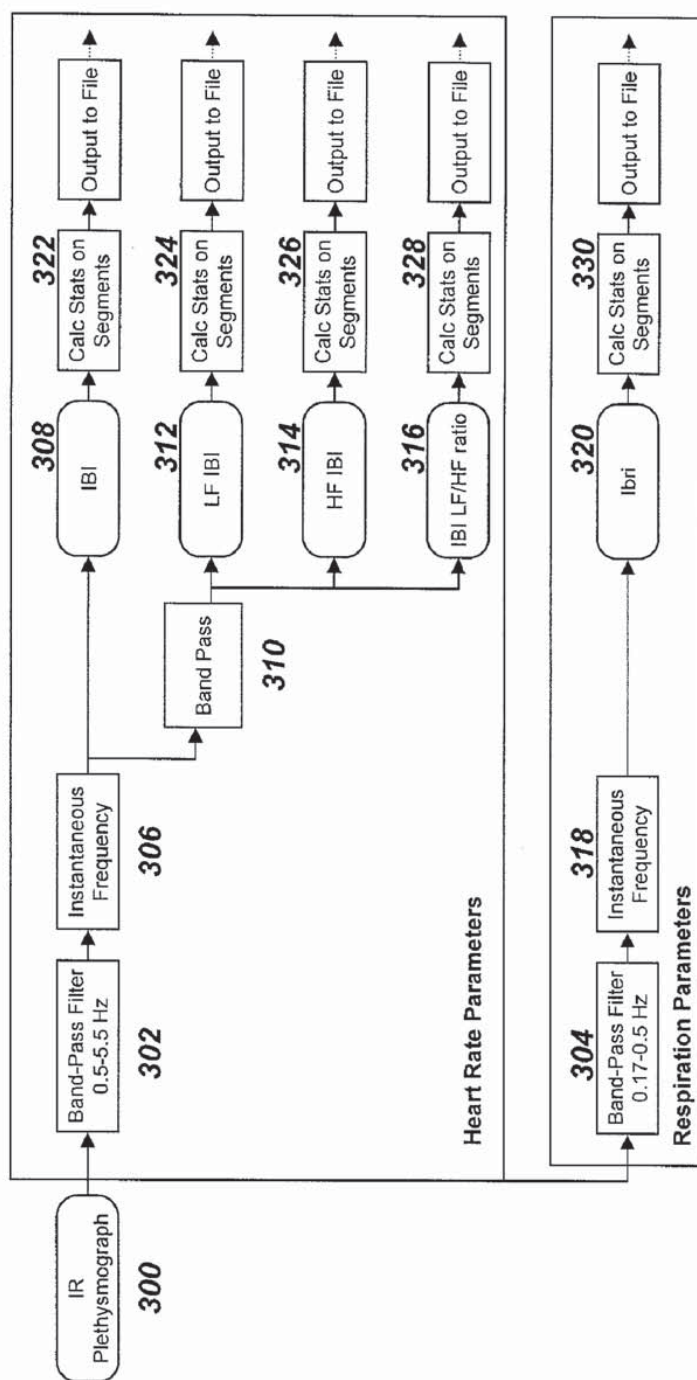


Fig. 3

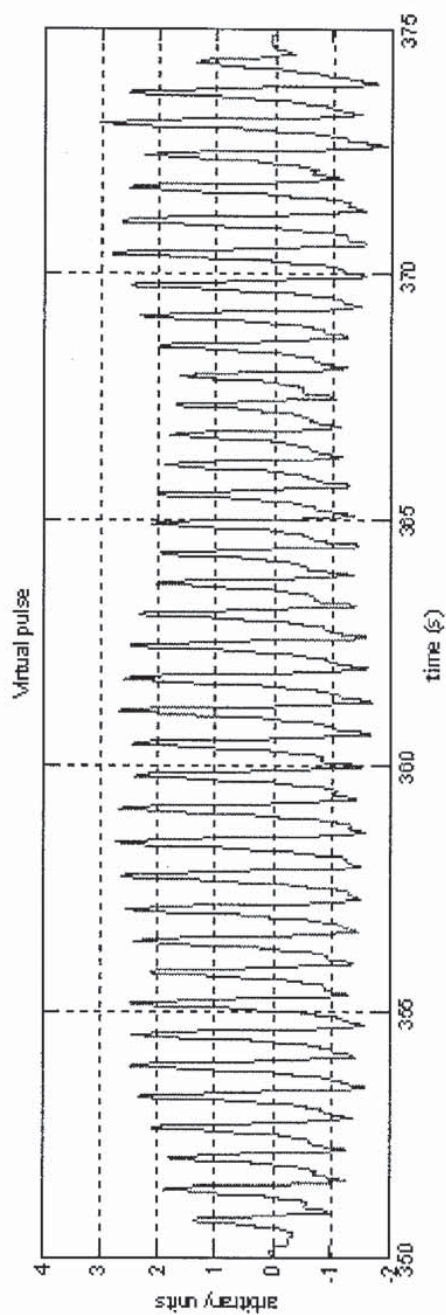


Fig. 4

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