

United States Patent [19] Chance

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[54] PATHLENGTH CORRECTED OXIMETER AND THE LIKE

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[75] Inventor: Britton Chance, Marathon, Fla.

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[73] Assignee: Non-Invasive Technology, Inc., Philadelphia, Pa.

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[*] Notice: The term of this patent shall not extend beyond the expiration date of Pat. No. 5,553,614.

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[21] Appl. No.: 31,945

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[22] Filed: Mar. 16, 1993

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Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 645,590, Jan. 24, 1991. [51] Int. Cl. 6 A61N 5/02 [52] U.S. Cl. 128/633; 128/637; 128/664; 128/665; 356/39; 356/341; 356/432 [58] Field of Search 606/2, 10-12; 128/633, 634, 664, 665, 897, 898; 356/4, 5, 51, 39, 72, 319, 320, 323, 341, 432-436, 256

(List continued on next page.)

Primary Examiner-David M. Shay Attorney, Agent, or Firm-Fish & Richardson P.C.

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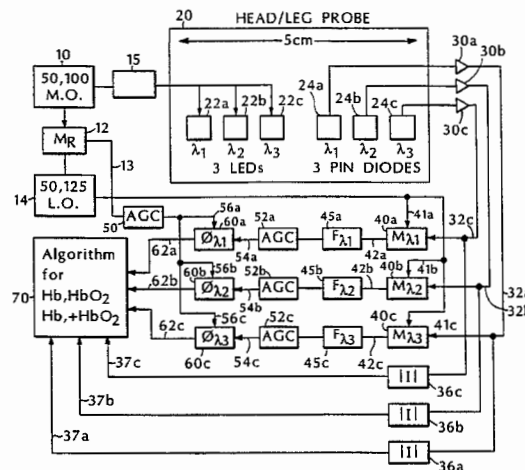
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[57] ABSTRACT

A pathlength corrected spectrophotometer for tissue examination includes an oscillator for generating a carrier waveform of a selected frequency, an LED light source for generating light of a selected wavelength that is intensity modulated at the selected frequency introduced to a subject, and a photodiode detector for detecting light that has migrated in the tissue of the subject. The spectrophotometer also includes a phase detector for measuring a phase shift between the introduced and detected light, a magnitude detector for determination of light attenuation in the examined tissue, and a processor adapted to calculate the photon migration pathlength and determine a physiological property of the examined tissue based on the pathlength and on the attenuation data.

30 Claims, 7 Drawing Sheets



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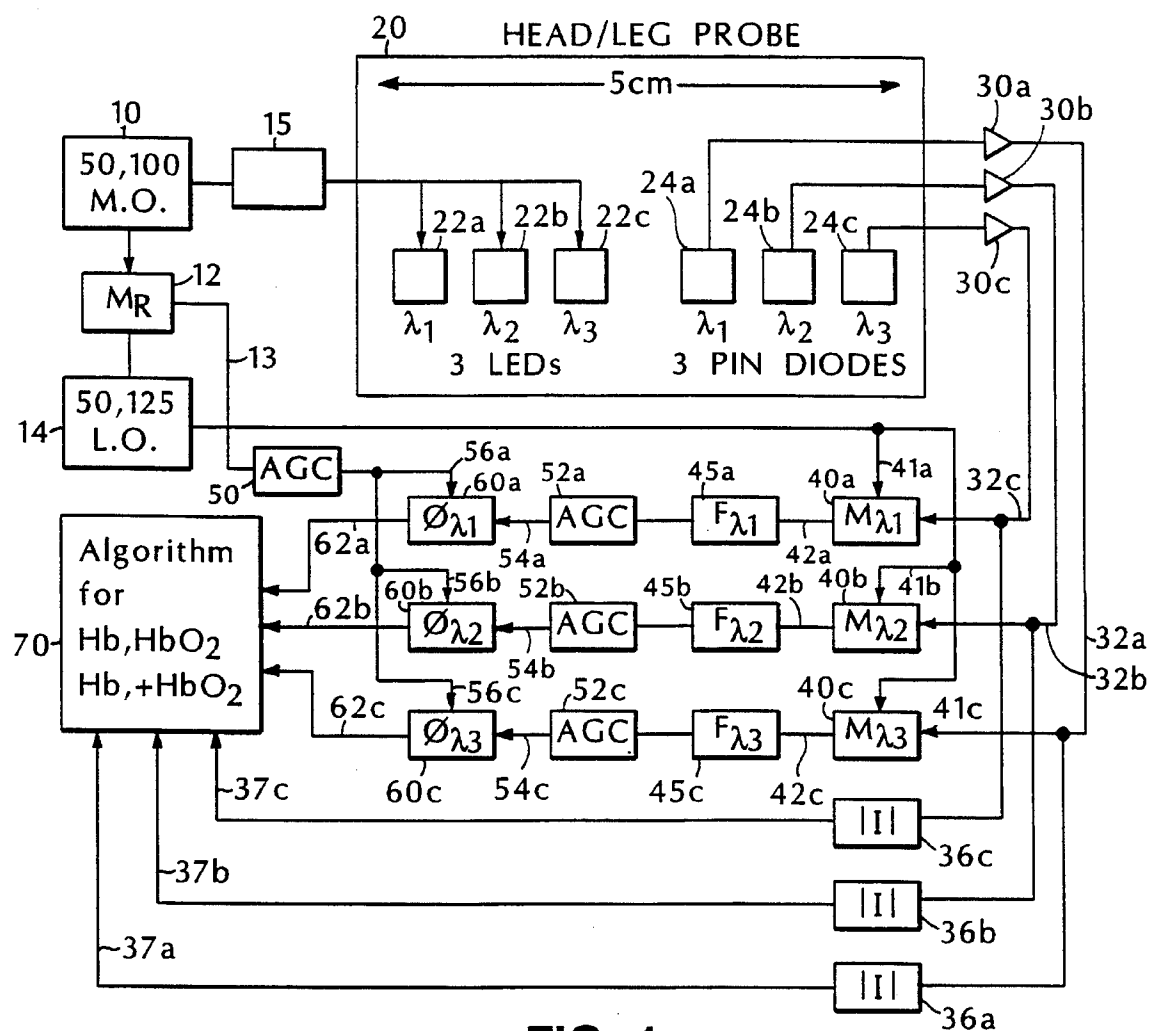


FIG. 1

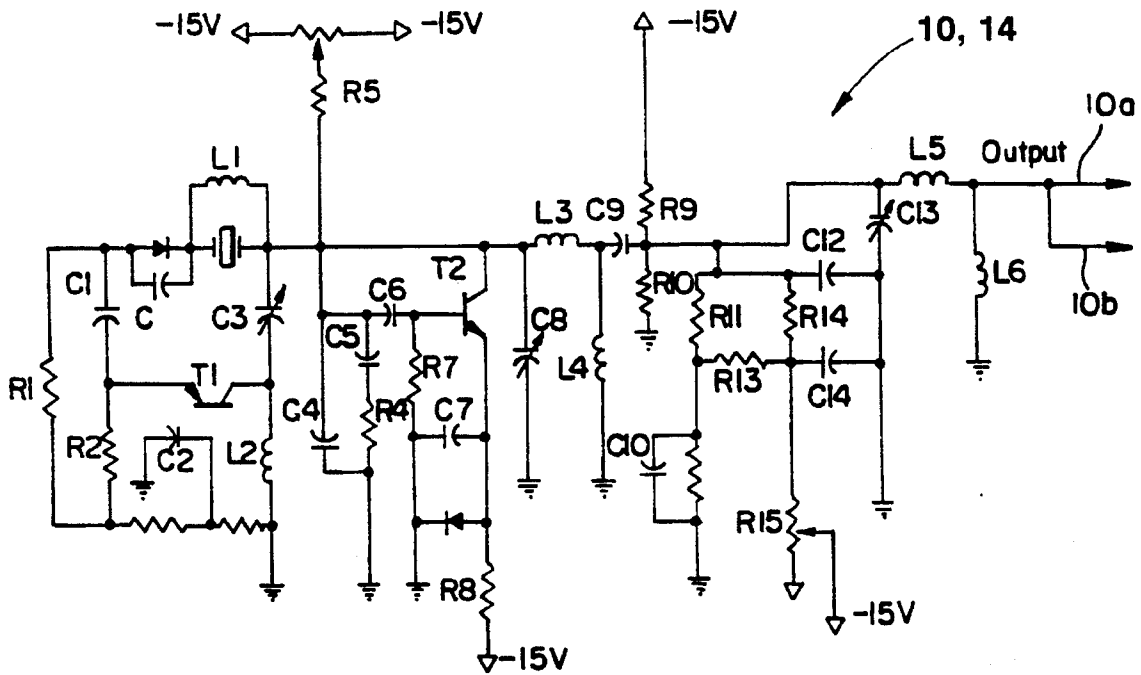


FIG. 2

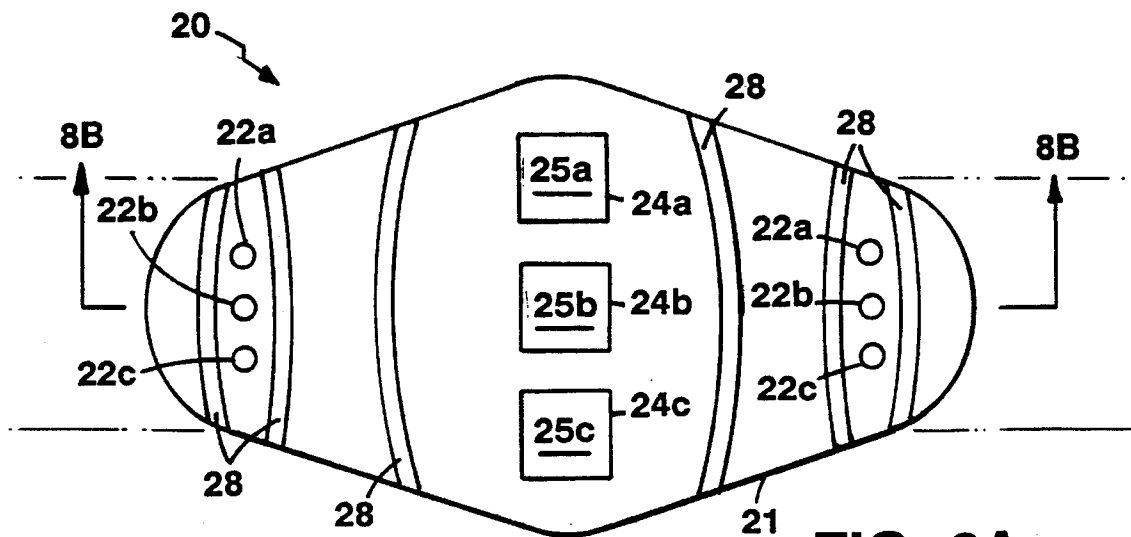


FIG. 8A

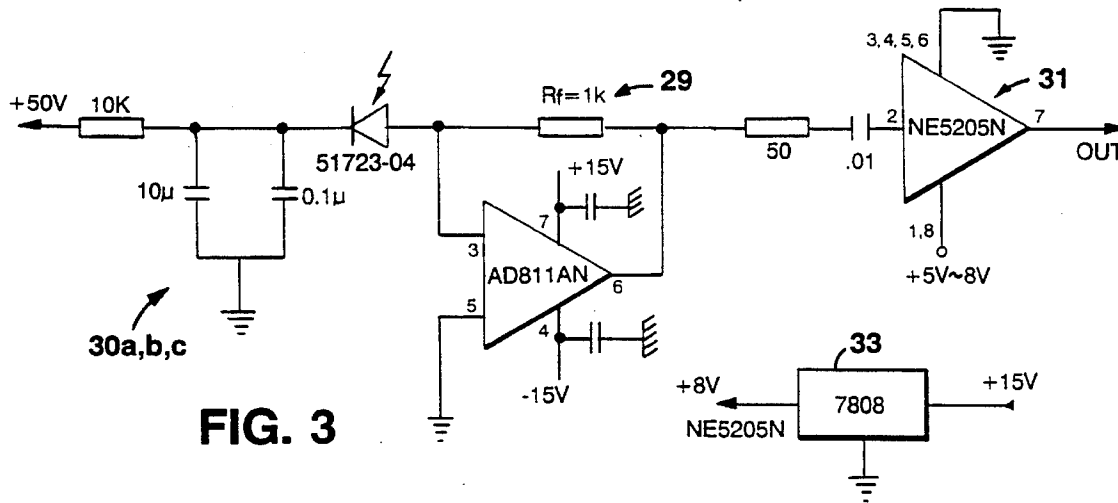


FIG. 3

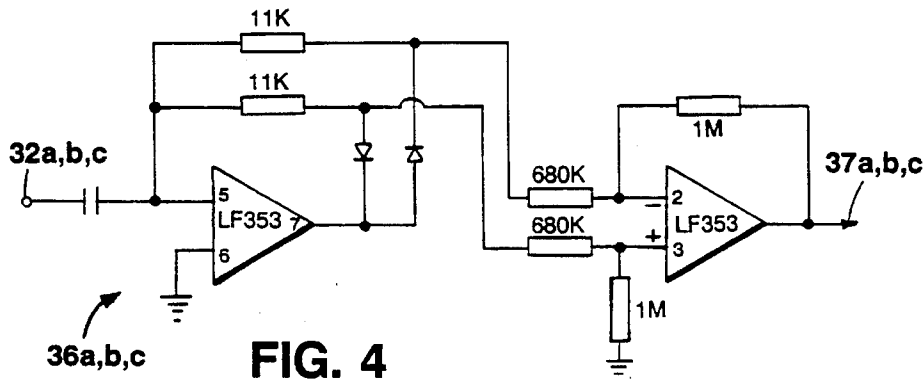


FIG. 4

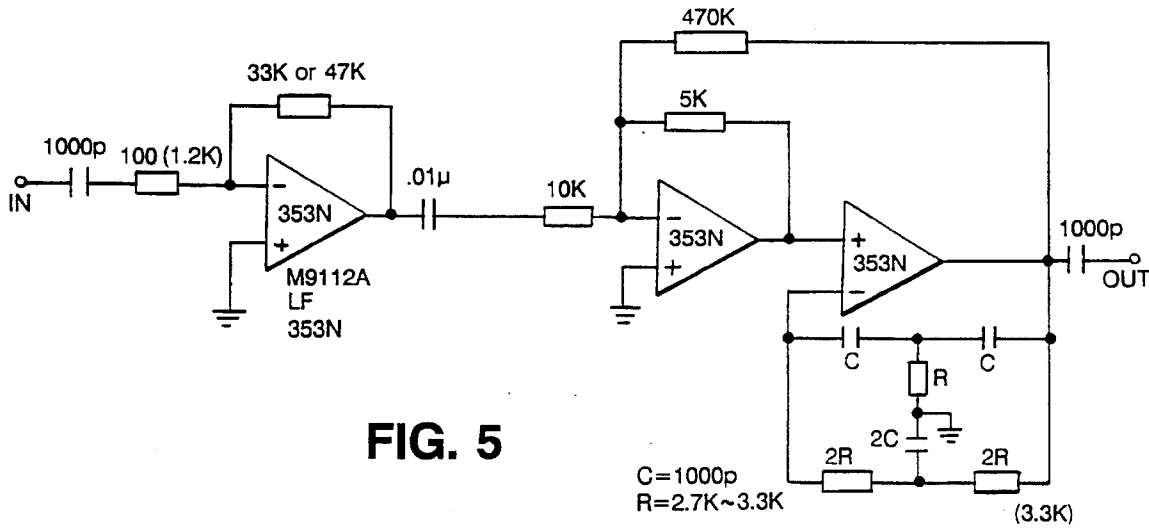


FIG. 5

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