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Chin et al.

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(54) **OXIMETER SENSOR WITH OFFSET EMITTERS AND DETECTOR AND HEATING DEVICE**

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Related U.S. Application Data

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(51) **Int. Cl.**⁷ **A61B 5/00**

(52) **U.S. Cl.** **600/323; 600/334**

(58) **Field of Search** 600/310, 322-324, 600/334-344

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Primary Examiner—Linda C. M. Dvorak

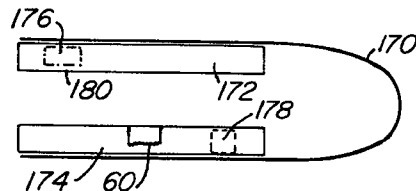
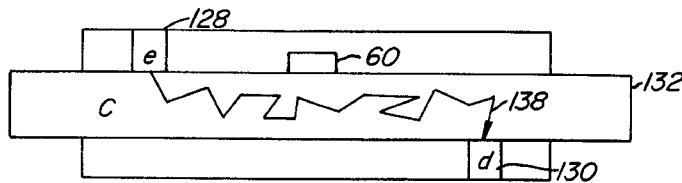
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(57) **ABSTRACT**

A method and apparatus for improving blood perfusion by both heating a patient's skin and providing emitters and a detector which are offset from each other. Since the emitters and detector are not directly opposite each other, the light is forced to pass through more blood perfused tissue (with blood perfusion enhanced by heating) to pass from the emitters to the detector. This causes the light emitted by the emitters to pass through more blood-perfused tissue to reach the detector than it would on the direct path through the appendage if the emitters and detector were opposite each other.

26 Claims, 5 Drawing Sheets



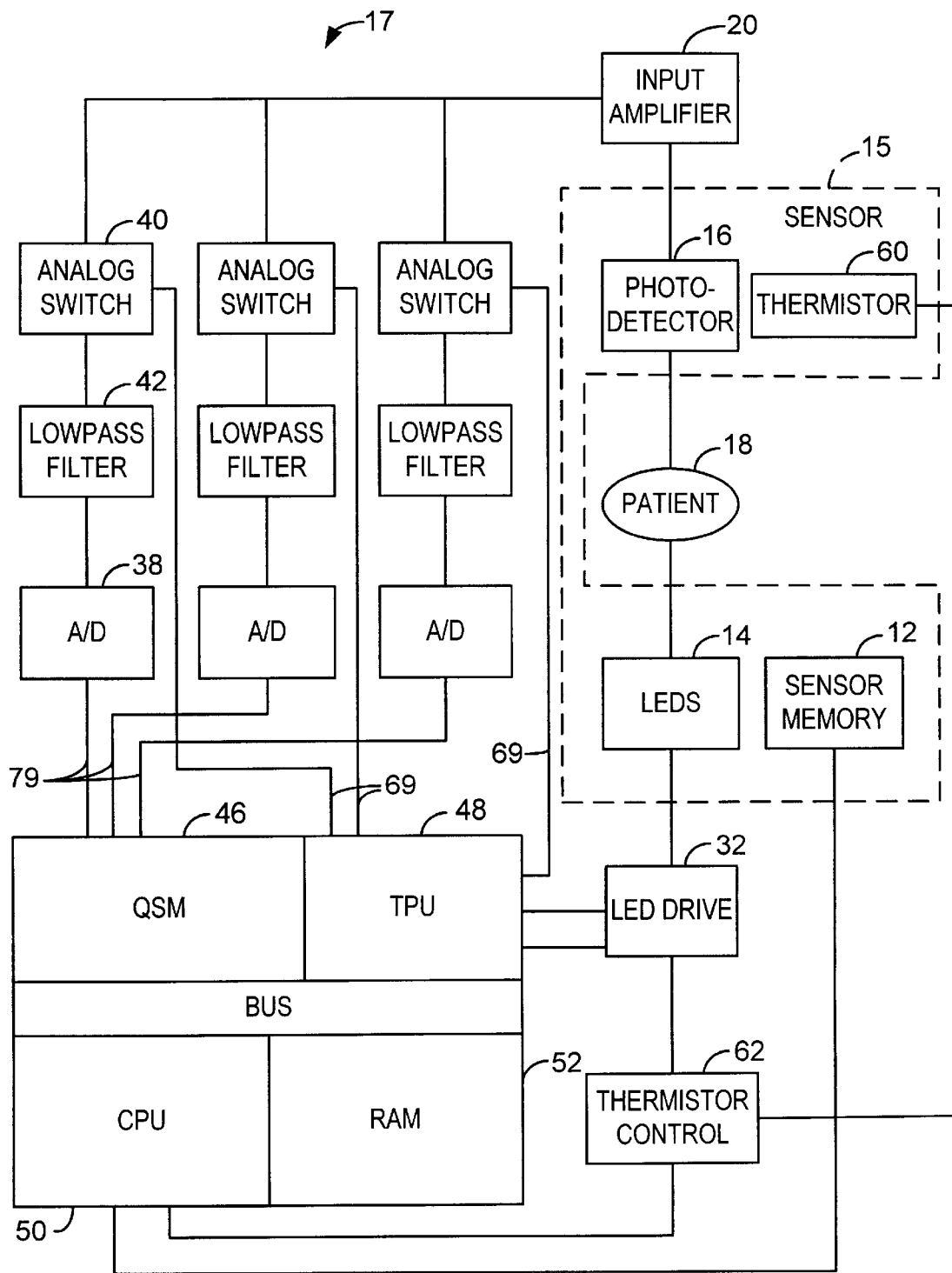


FIG. 1.

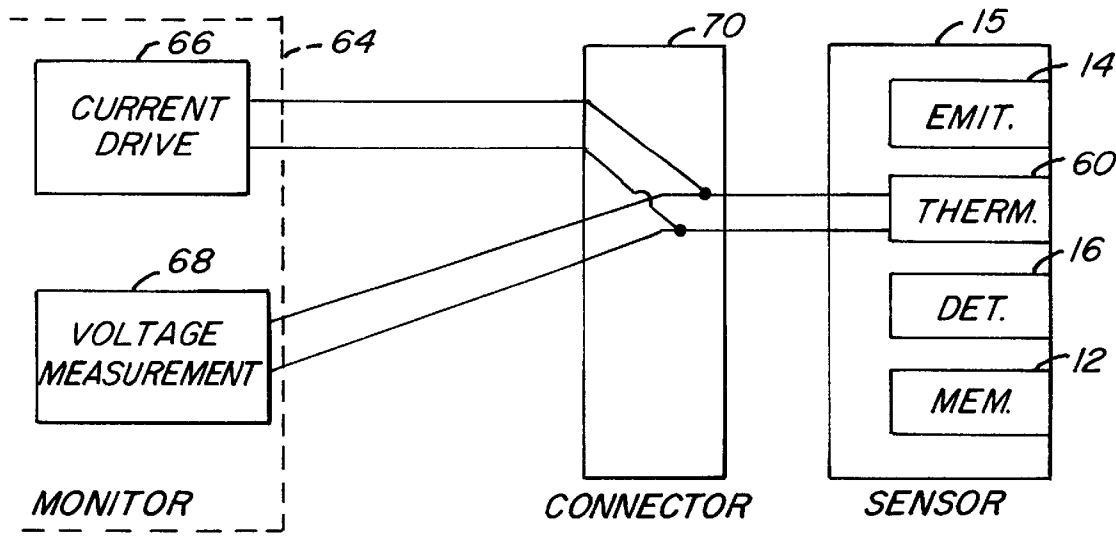


FIG. 2.

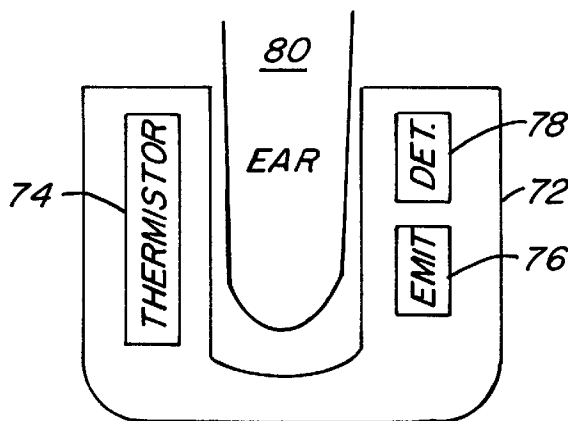


FIG. 3.

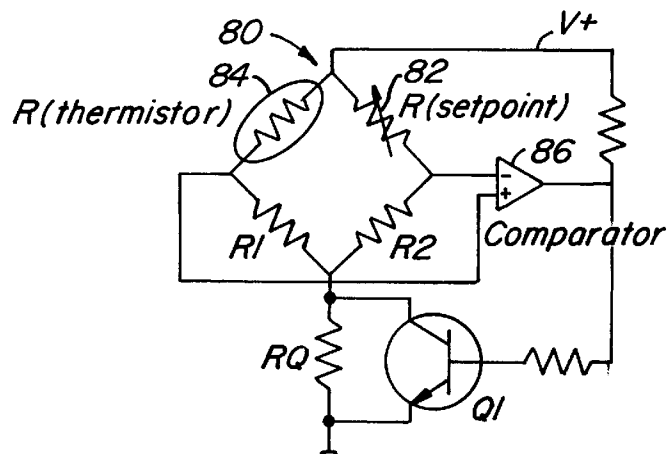
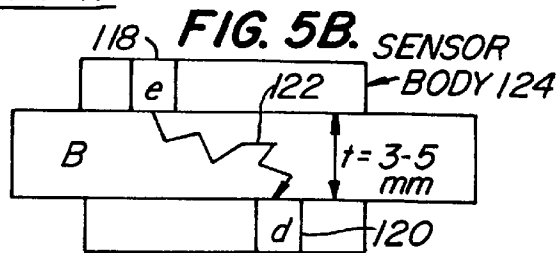
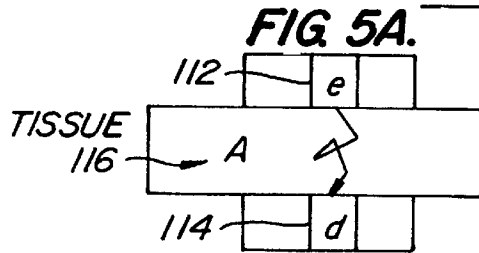
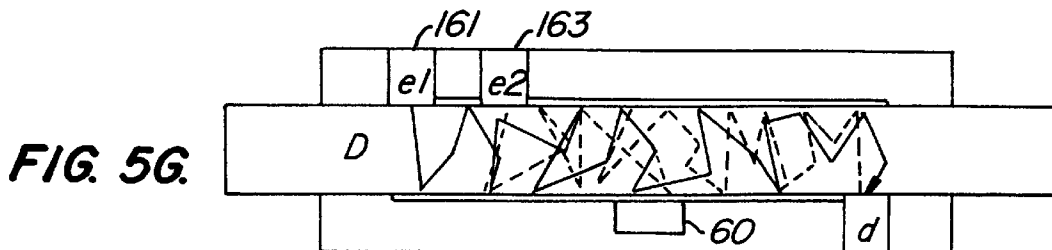
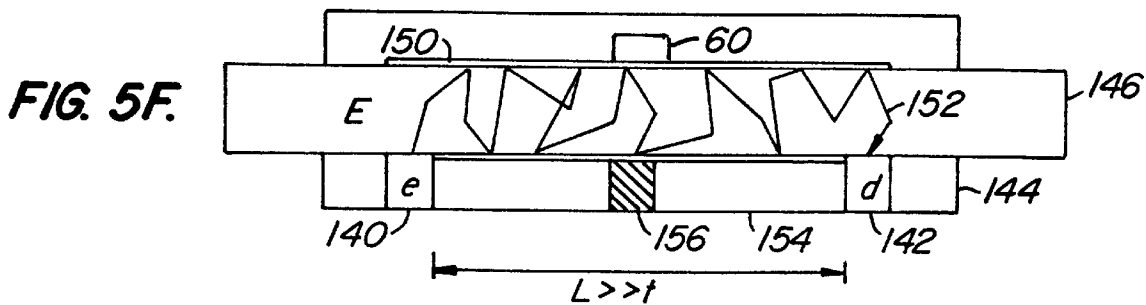
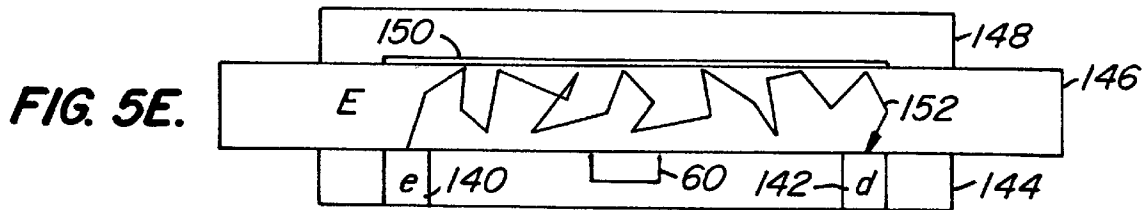
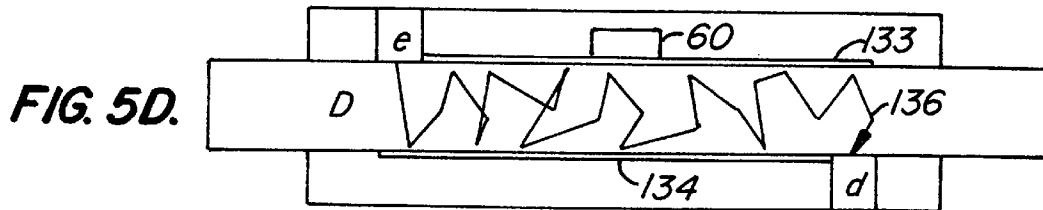
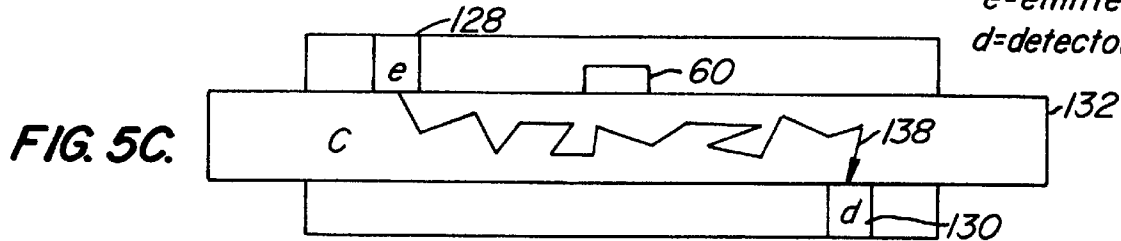


FIG. 4

PRIOR ART



e=emitters
d=detector



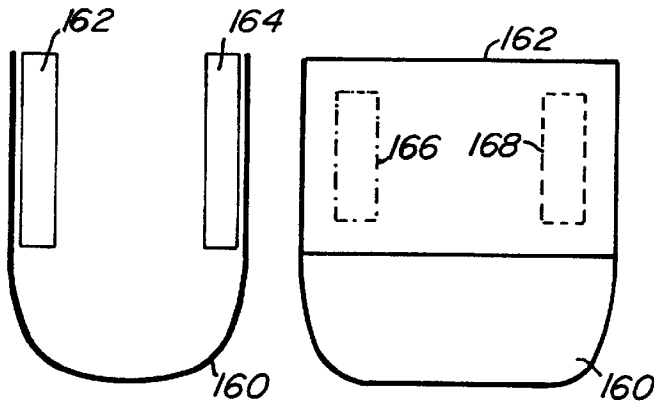


FIG. 6A.

FIG. 6B.

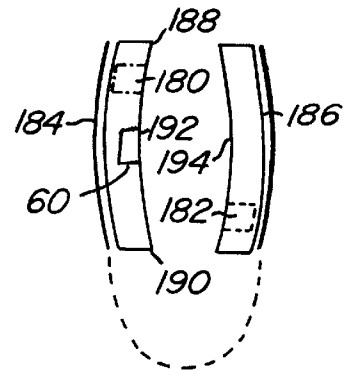


FIG. 8.

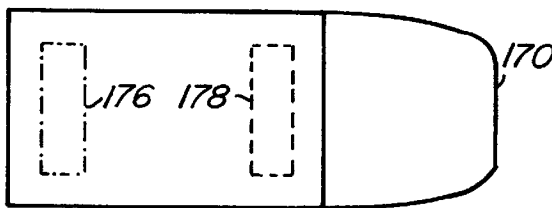


FIG. 7A.

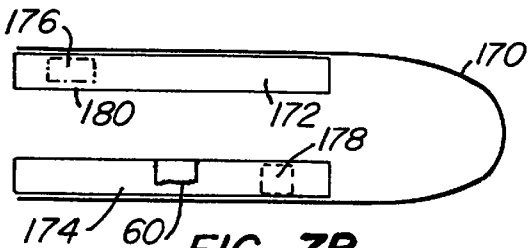


FIG. 7B.

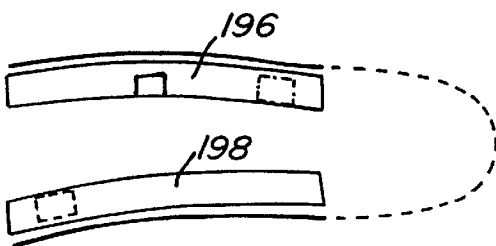


FIG. 9.

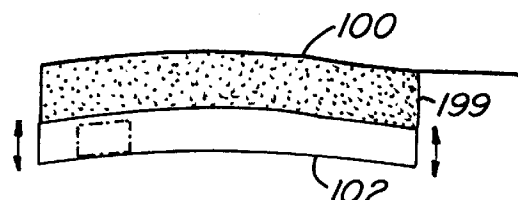


FIG. 10.

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