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Schulz et al.

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(54) **SHIELDED OPTICAL PROBE AND METHOD**

JP 11053662 2/1999
JP 11185193 7/1999
WO 97/23159 7/1997

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OTHER PUBLICATIONS

“Pulse Oximeter 3 and 3i,” Minolta, <http://www.minoltausa.com/eprise/main/MinoltaUSA/MUSAContent/ISD/DetailPage?canam>, 1 page downloaded and printed from the World Wide Web on Aug. 7, 2002.

“PULSOX Sensors,” Minolta, <http://www.pulsoxminolta.ch/probeslhtm>, 4 pages downloaded and printed from the World Wide Web on Aug. 7, 2002.

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* cited by examiner

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Primary Examiner—Que T. Le

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Related U.S. Application Data

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(51) **Int. Cl.⁷** **G06K 15/00**

(52) **U.S. Cl.** **250/557**; 250/461.2; 128/633

(58) **Field of Search** 250/557, 227.14, 250/221, 214.1, 573, 461.2, 338.5, 239; 356/41, 39; 128/633, 665–667

(57) **ABSTRACT**

An optical probe, which is particularly suited for use in measurements on tissue material of a patient. In one embodiment, the probe comprises upper and lower housing elements incorporating a light energy source and corresponding detector. The tissue material of the patient is disposed between the upper and lower housing elements such that the light energy emitted by the source passes through the tissue material to the detector. A plurality of light shields are attached to one or both of the housing elements to reduce the amount of ambient and reflected light reaching the detector. Additionally, various portions of the upper and lower housing elements and shields utilize light absorbent coloration and/or coatings which further mitigate the effects of undesired ambient and reflected light, thereby reducing noise generated within the instrument and increasing its accuracy. In one embodiment, the light shields are made removable from the optical probe, thereby facilitating replacement. A circuit for monitoring the condition of the probe, and indicating when replacement of the probe is desirable, is also disclosed.

(56) **References Cited**

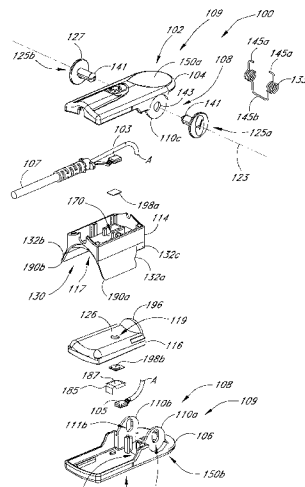
U.S. PATENT DOCUMENTS

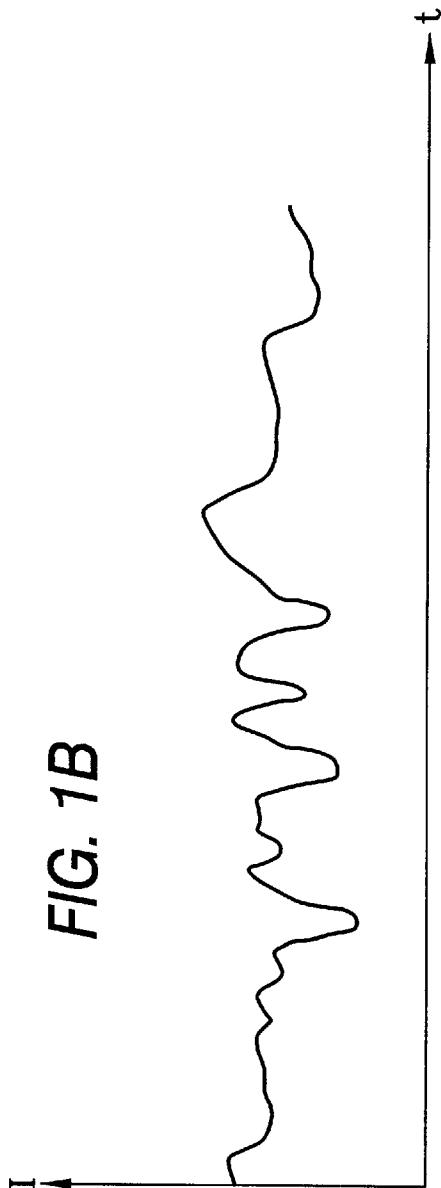
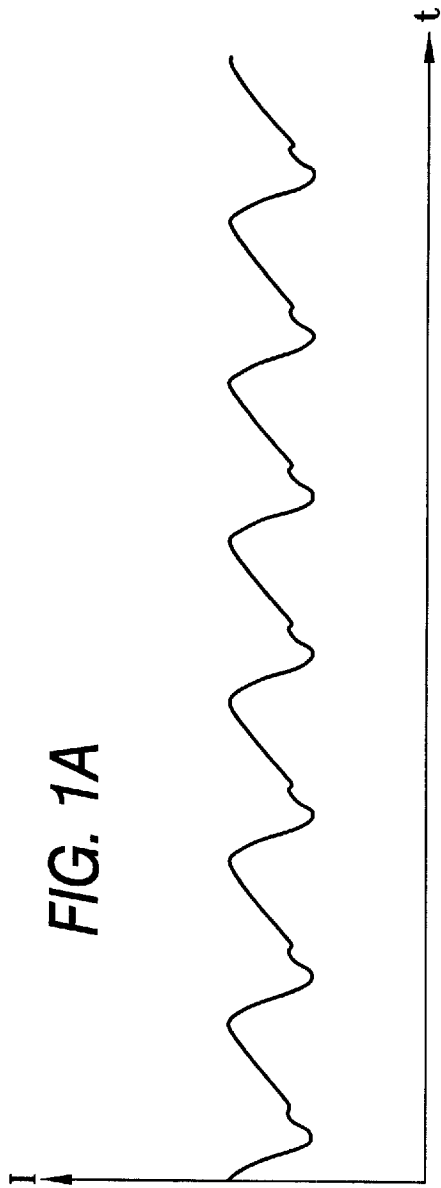
4,685,464 A	8/1987	Goldberger et al.	128/633
5,247,931 A	9/1993	Norwood	128/633
5,313,940 A	5/1994	Fuse et al.	128/633
5,438,986 A	8/1995	Disch et al.	128/633
5,490,523 A *	2/1996	Isaacson et al.	128/633
5,939,609 A	8/1999	Knapp et al.	73/1.01

FOREIGN PATENT DOCUMENTS

EP	262 779	4/1988
EP	481 612	10/1990
EP	745 348	12/1996
EP	0 832 598 A2	4/1998
JP	02017462	1/1990
JP	10314149	12/1998

36 Claims, 11 Drawing Sheets





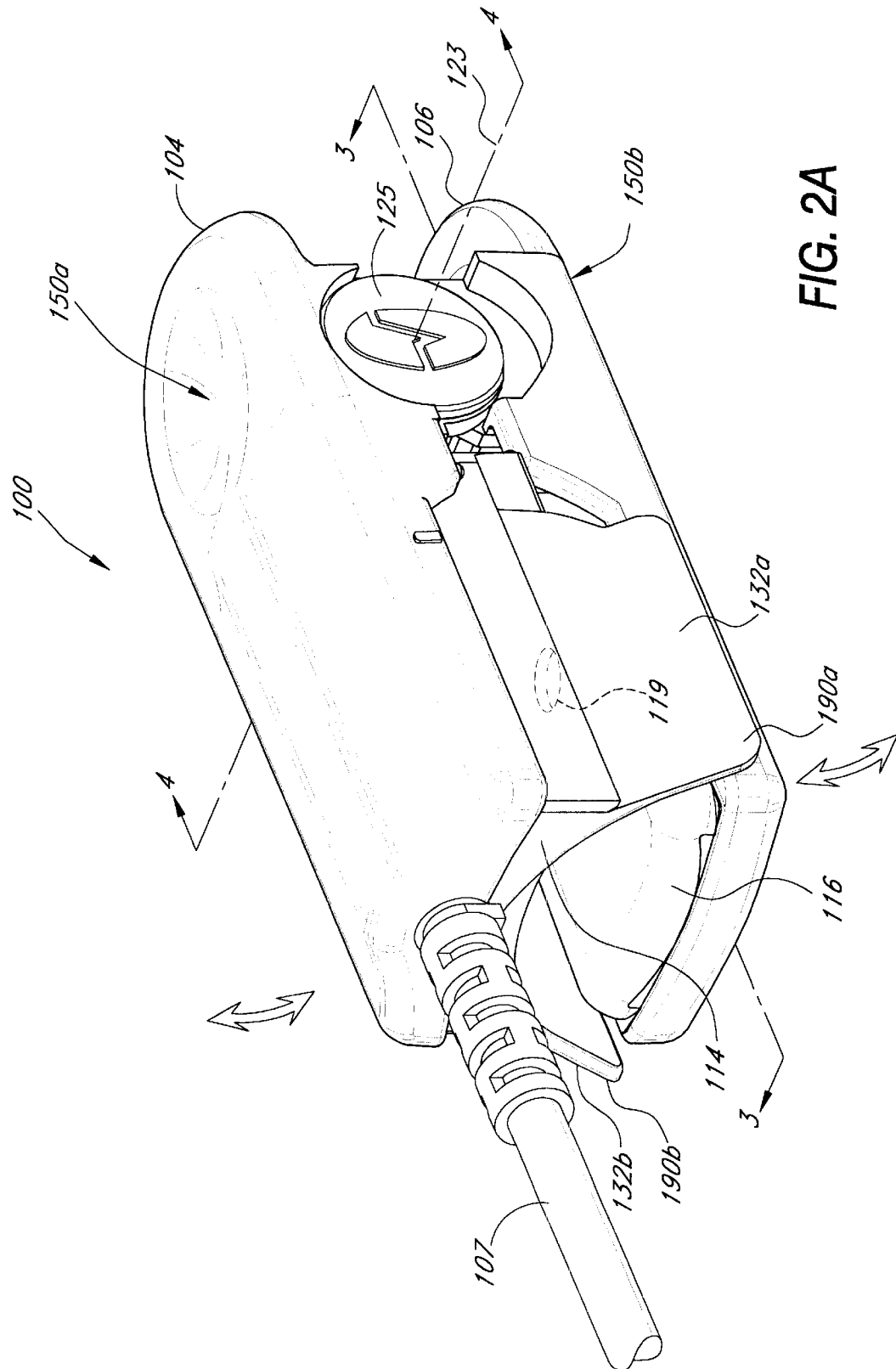


FIG. 2A

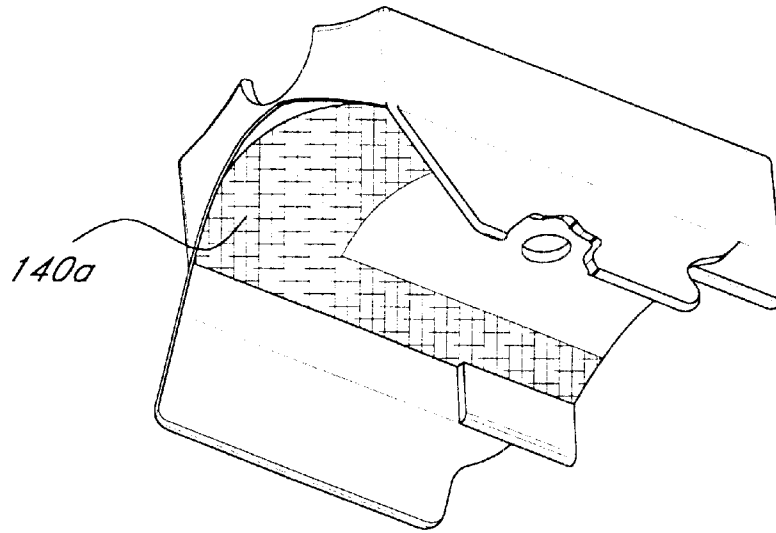


FIG. 2B

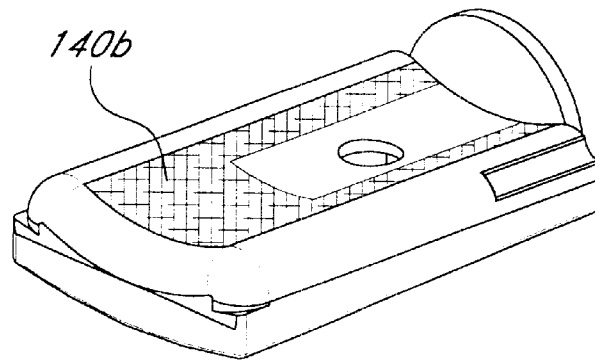


FIG. 2C

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