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(54) **APPARATUS AND METHOD FOR LASER TREATMENT WITH SPECTROSCOPIC FEEDBACK**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,865,113 A 2/1975 Sharon et al.
4,266,549 A 5/1981 Kimura
4,517,973 A 5/1985 Sunago et al.
4,785,806 A 11/1988 Deckelbaum
5,071,417 A * 12/1991 Sinofsky 606/8
5,275,594 A 1/1994 Baker et al.
5,350,376 A * 9/1994 Brown 606/12
5,366,456 A 11/1994 Rink et al.
5,409,481 A * 4/1995 Poppas et al. 606/12
5,501,680 A 3/1996 Kurtz et al.
5,507,287 A 4/1996 Palcic et al.
5,634,920 A 6/1997 Hohla
5,653,706 A 8/1997 Zavislan et al.
5,662,643 A * 9/1997 Kung et al. 606/3
5,741,215 A 4/1998 D'Urso

(Continued)

FOREIGN PATENT DOCUMENTS

WO WO 00/62700 10/2000

OTHER PUBLICATIONS

Sebern et al. "Laser treatment of nevus flammus (portwine stain) with spectroscopic feedback: the smart scalpel," Proc. SPIE, vol. 3519, pp. 32-42, 1999.*

(Continued)

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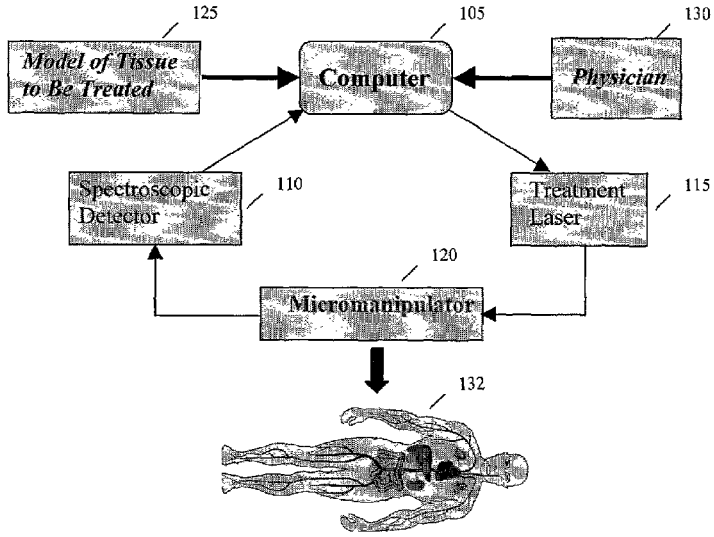
(57) **ABSTRACT**

A platform Smart Scalpel system using rapid real-time feedback for effecting laser treatment. The platform system includes an imaging system for rapid real-time detection of tissue characteristics, a processing system for processing the detected characteristics, and a treatment system for effecting treatment in accordance with results of the processing. The platform system provides for preprogramming and real-time inputting conditions and parameters for diagnosis using the imaging system and/or treatment using the treatment system.

37 Claims, 29 Drawing Sheets