



US010004405B2

(12) **United States Patent**
Li et al.

(10) **Patent No.:** **US 10,004,405 B2**

(45) **Date of Patent:** **Jun. 26, 2018**

(54) **SYSTEM AND IMAGING METHOD FOR USING PHOTOACOUSTIC EFFECT**

(56) **References Cited**

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U.S. PATENT DOCUMENTS
5,254,112 A * 10/1993 Sinofsky A61B 5/02007
600/439
2005/0131289 A1* 6/2005 Aharoni A61B 5/02007
600/407

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(Continued)

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FOREIGN PATENT DOCUMENTS
TW 201119628 A 6/2011
TW 201227050 A 7/2012
(Continued)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 44 days.

OTHER PUBLICATIONS

(21) Appl. No.: **14/721,096**

Communication From the Taiwan Patent Office (A Taiwan Office Action With Objections to the Written Description for Containing Informalities) Regarding a Counterpart Taiwan Application Dated (Taiwan Year 105) dated Jan. 13, 2016.

(22) Filed: **May 26, 2015**

(Continued)

(65) **Prior Publication Data**

US 2016/0213256 A1 Jul. 28, 2016

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(30) **Foreign Application Priority Data**

Jan. 22, 2015 (TW) 104102102 A

(57) **ABSTRACT**

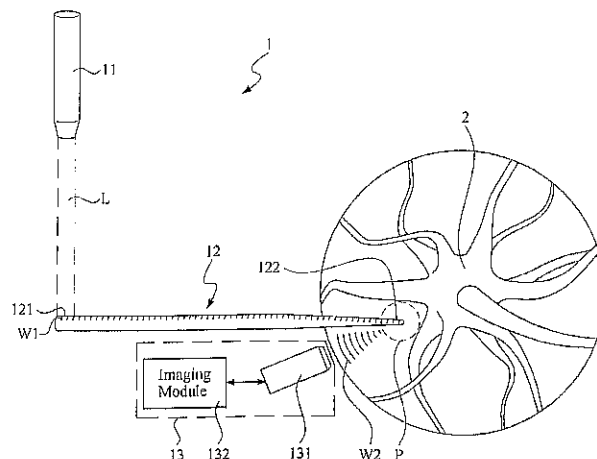
(51) **Int. Cl.**
A61B 5/05 (2006.01)
A61B 5/00 (2006.01)
(Continued)

A system and an imaging method for using photoacoustic effect are provided in the present invention. The system includes a light source for generating a light beam, a wave-guide probe and an ultrasound receiving device. The wave-guide probe further has a reception portion and at least one transmission portion. The reception portion receives the light beam and then triggers a photoacoustic effect inside the reception portion so as thereby to generate at least one sound wave thereinside to be further transmitted to the at least one transmission portion. The transmission portion is merged into the organic medium. When the sound wave is transmitted to the transmission portion, an ultrasound area is generated inside the organic medium. The ultrasound receiving device is located adjacent to the organic medium, receives the ultrasound generated in the ultrasound area to form an

(52) **U.S. Cl.**
CPC **A61B 5/0095** (2013.01); **A61B 5/6848** (2013.01); **A61B 8/12** (2013.01); **A61B 8/4483** (2013.01); **G10K 15/046** (2013.01)

(Continued)

(58) **Field of Classification Search**
CPC **G10K 15/046; A61B 8/12; A61B 8/4483**
See application file for complete search history.



研發處
9070101001-1817
專利權
使用(保管)人: 賴廷昭

2018/08/07
年限: 6
補
臺灣大學