



US009510785B2

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

(10) **Patent No.:** **US 9,510,785 B2**

(45) **Date of Patent:** **\*Dec. 6, 2016**

(54) **STRAIN MONITORING SYSTEM AND APPARATUS**

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/725,286**

(22) Filed: **May 29, 2015**

(65) **Prior Publication Data**  
US 2015/0265213 A1 Sep. 24, 2015

**Related U.S. Application Data**

(63) Continuation of application No. 14/147,299, filed on Jan. 3, 2014, now Pat. No. 9,060,743, which is a (Continued)

(51) **Int. Cl.**  
**A61B 5/00** (2006.01)  
**A61B 5/103** (2006.01)  
(Continued)

(52) **U.S. Cl.**  
CPC ..... **A61B 5/686** (2013.01); **A61B 5/0031** (2013.01); **A61B 5/0205** (2013.01); **A61B 5/076** (2013.01);  
(Continued)

(58) **Field of Classification Search**  
CPC ... **A61B 5/6846**; **A61B 5/0031**; **A61B 5/1126**;  
**A61B 5/14532**; **A61B 5/14546**; **A61B 5/4566**  
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(57) **ABSTRACT**

A system for monitoring strain as an indicator of biological conditions, such as spinal fusion, glucose levels, spinal loading, and heart rate. The system includes an inter-digitated capacitor sensor, and RF transmitter, and an associated antenna, all of which are microminiature or microscopic in size and can be implanted in a biological host such as a human or animal. An inductively coupled power supply is also employed to avoid the need for implantation of chemical batteries. Power is provided to the sensor and transmitter, and data is transmitted from the sensor, when an external receiving device, such as a handheld RF ID type receiver, is placed proximate the location of the implanted sensor, transmitter and inductively coupled power supply. The implanted sensor, transmitter and inductively coupled power supply can be left in place permanently or removed when desired.

**15 Claims, 29 Drawing Sheets**

