

(12) **United States Patent**
Chang

(10) **Patent No.:** **US 9,411,070 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

- (54) **EXTENDABLE WIRELESS SOIL MEASUREMENT 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 425 days.
- (21) Appl. No.: **14/105,799**
- (22) Filed: **Dec. 13, 2013**
- (65) **Prior Publication Data**
US 2015/0168594 A1 Jun. 18, 2015
- (51) **Int. Cl.**
G01V 9/00 (2006.01)
A01G 25/16 (2006.01)
G01N 33/24 (2006.01)
A01C 21/00 (2006.01)
- (52) **U.S. Cl.**
CPC *G01V 9/00* (2013.01); *A01G 25/167* (2013.01); *A01C 21/007* (2013.01); *G01N 2033/245* (2013.01)
- (58) **Field of Classification Search**
None
See application file for complete search history.

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- (57) **ABSTRACT**
- A two-tier wireless soil measurement apparatus is disclosed, including a top head and a plurality of sensors, wherein the top head being placed on or above the ground and the plurality of sensors being buried under the soil for sensing soil conditions, generating soil data representing the sensed soil conditions, and transmitting generated soil conditions to the top head; the plurality of sensors able to be assembled into a pole and each of the plurality of sensors including a sensor unit for sensing a soil condition; a circuit module connected to the sensor unit for transmitting sensed soil condition to the top head, a sensor housing for housing the sensor unit and the circuit module; and an engaging element for engaging two sensors in a head-to-tail manner for form a pole.
- 9 Claims, 7 Drawing Sheets**

