



US009808206B1

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

(10) **Patent No.:** **US 9,808,206 B1**  
(45) **Date of Patent:** **Nov. 7, 2017**

(54) **DATA ACQUISITION QUALITY AND DATA FUSION FOR PERSONAL PORTABLE WIRELESS VITAL SIGNS SCANNER**

*A61B 5/7221* (2013.01); *A61B 5/742* (2013.01); *A61B 5/7405* (2013.01)

(58) **Field of Classification Search**

CPC ..... *A61B 19/2203*; *A61B 19/5212*; *A61B 2019/2223*; *A61B 5/72*; *A61B 6/5258*; *A61B 5/11*; *A61B 5/1107*; *A61B 5/1118*; *A61B 5/113*; *A61B 5/1135*  
USPC ..... 600/534, 536, 595  
See application file for complete search history.

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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 168 days.

(21) Appl. No.: **14/292,814**

(22) Filed: **May 30, 2014**

**Related U.S. Application Data**

(60) Provisional application No. 61/875,681, filed on Sep. 9, 2013, provisional application No. 61/924,230, filed on Jan. 6, 2014.

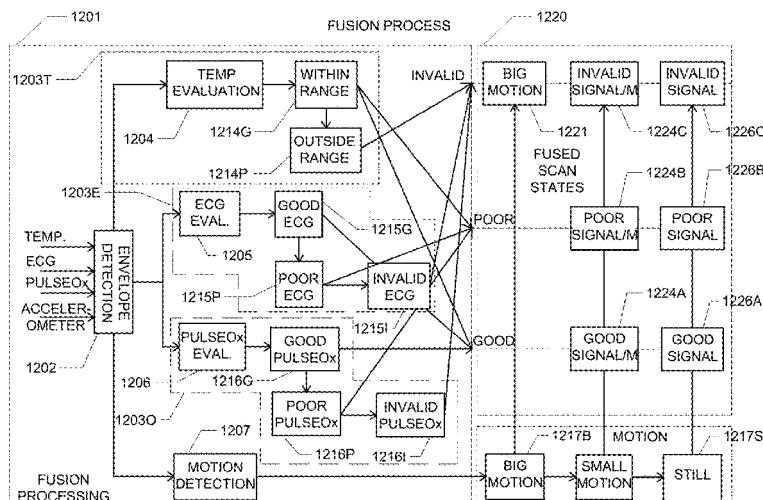
(51) **Int. Cl.**  
*A61B 5/11* (2006.01)  
*A61B 5/00* (2006.01)  
*A61B 5/0205* (2006.01)  
*A61B 5/0295* (2006.01)  
*A61B 5/0402* (2006.01)  
*A61B 5/1455* (2006.01)

(52) **U.S. Cl.**  
CPC ..... *A61B 5/7282* (2013.01); *A61B 5/02055* (2013.01); *A61B 5/0295* (2013.01); *A61B 5/0402* (2013.01); *A61B 5/14551* (2013.01);

(57) **ABSTRACT**

In one embodiment of the invention, an interactive vital signs scanning method is disclosed including concurrently scanning for a plurality of vital signs with a portable vital signs scanner; detecting movement of the portable vital signs scanner during the scanning for the plurality of vital signs; and determining a measure of quality of the scanning for the plurality of vital signs with the portable vital signs scanner. In another embodiment, a method of improving the quality of vital signs data is disclosed including concurrently sensing data from a plurality of vital signs sensors over a period of time with a portable vital signs scanner; determining a plurality of vital sign values for a respective plurality of vital signs in response to the sensed data from the plurality of vital signs sensors over the period of time; and fusing at least two vital sign values of the plurality of vital sign values for the respective plurality of vital signs.

**21 Claims, 27 Drawing Sheets**



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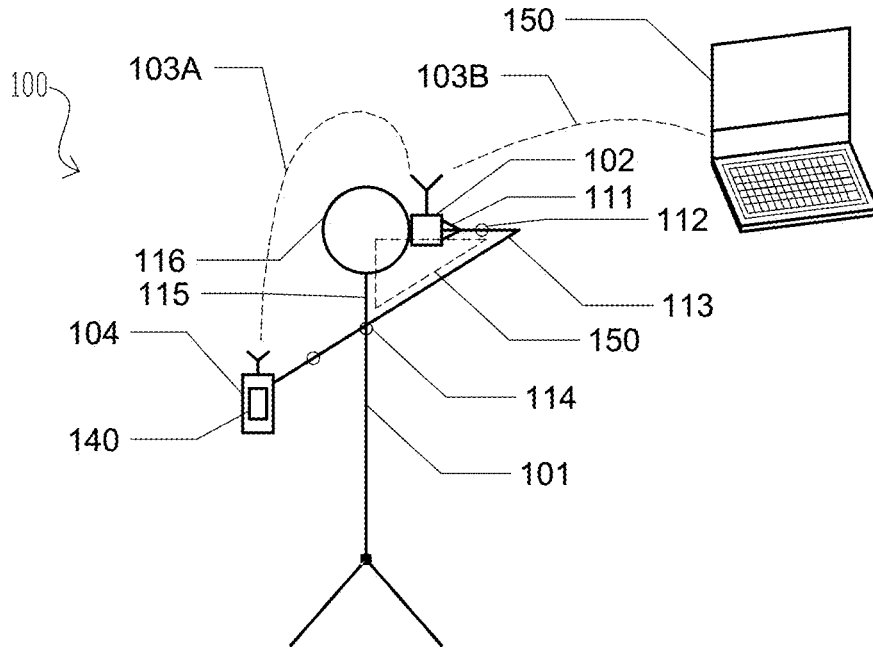


FIG. 1A

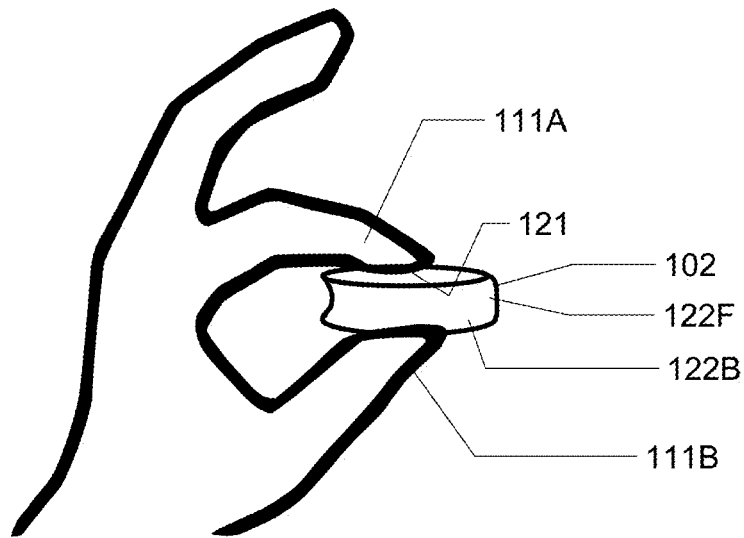


FIG. 1B

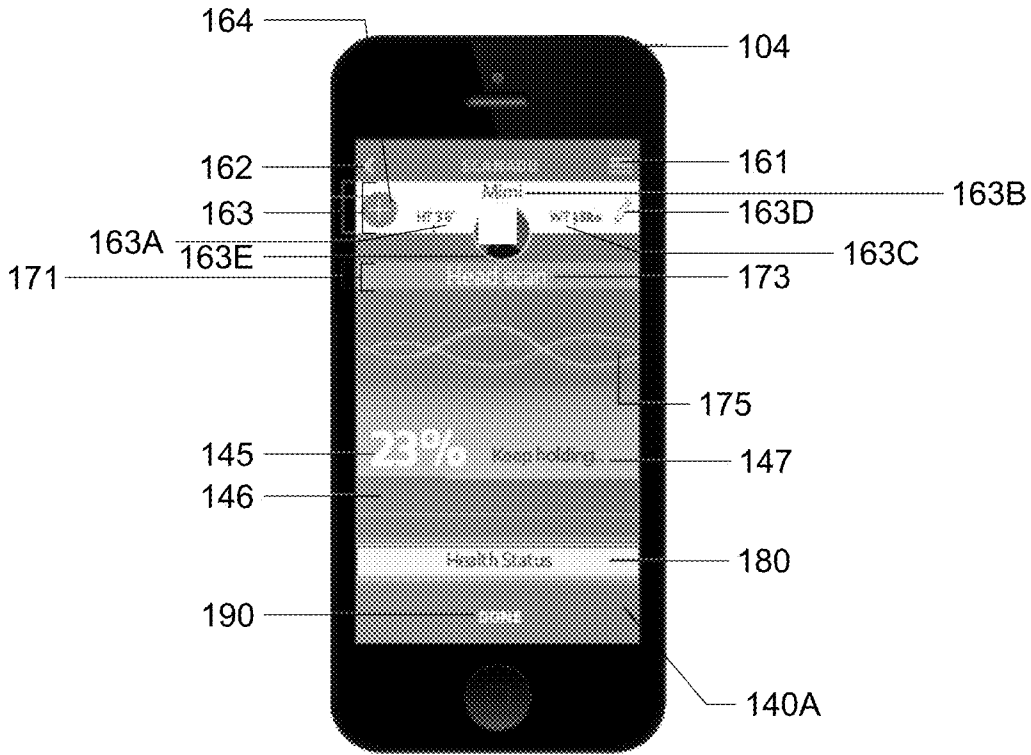


FIG. 1C

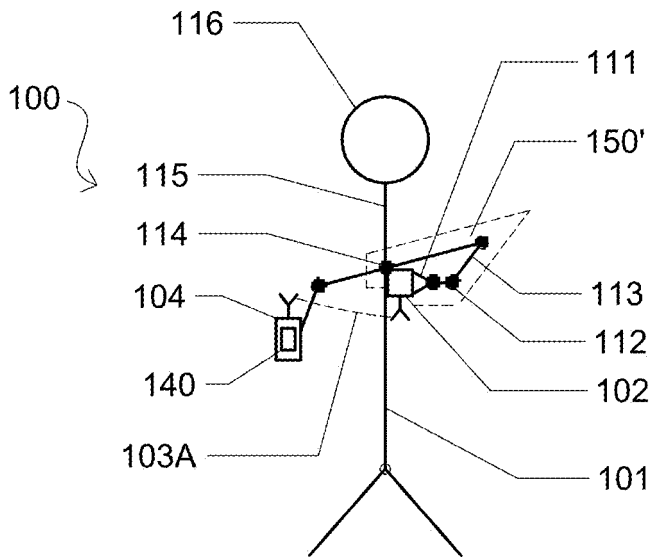


FIG. 1D

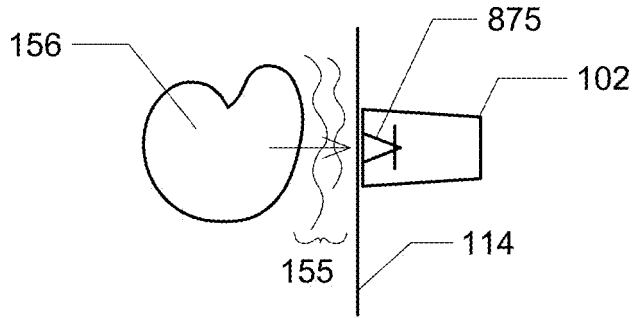


FIG. 1E

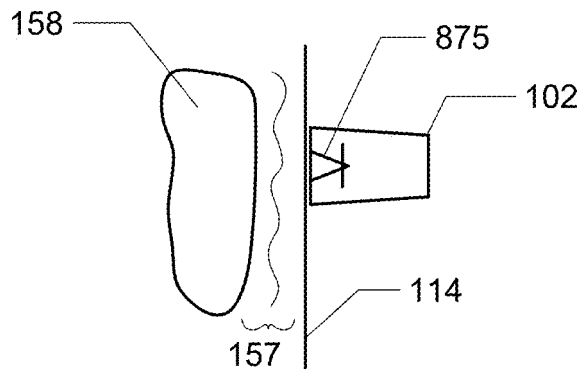


FIG. 1F

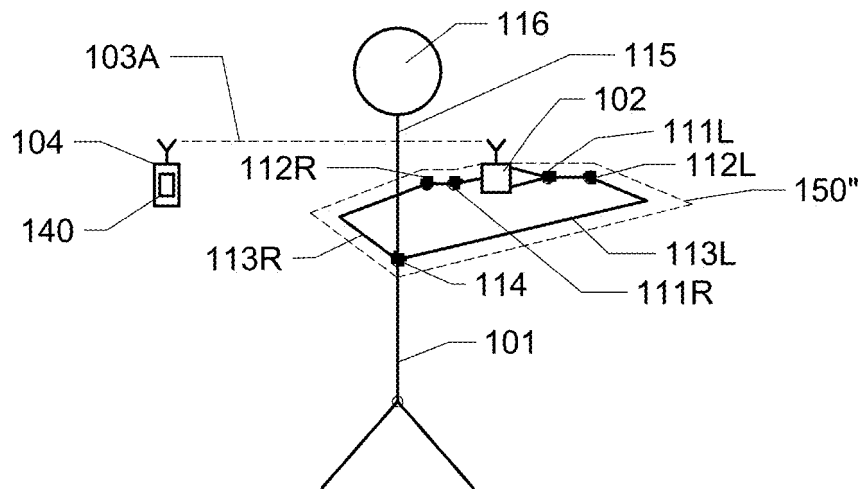


FIG. 1G

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