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

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(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.

(74) *Attorney, Agent, or Firm* — Alford Law Group, Inc.;
Andy Pho

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

(57) **ABSTRACT**

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

Related U.S. Application Data

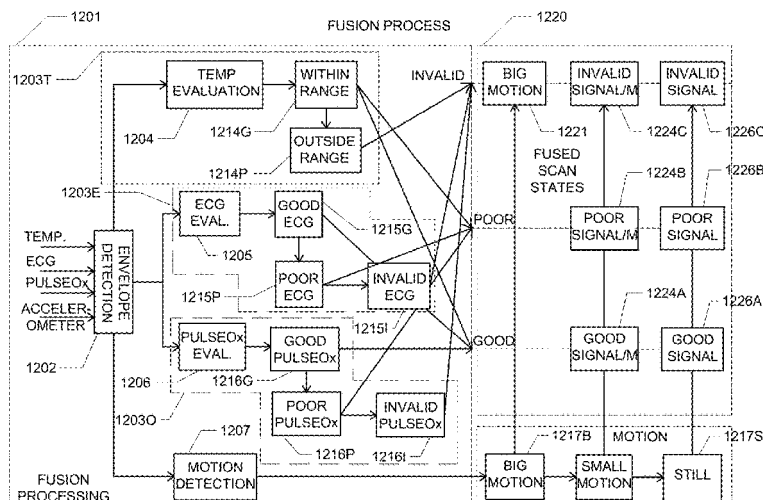
(60) Provisional application No. 61/875,681, filed on Sep. 9, 2013, provisional application No. 61/924,230, filed on Jan. 6, 2014.

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.

(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);

21 Claims, 27 Drawing Sheets



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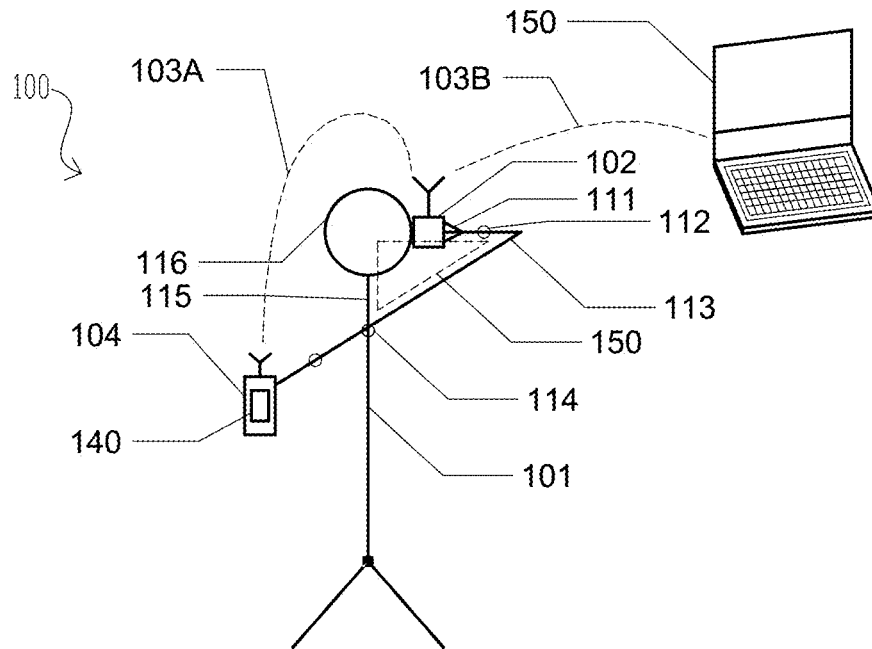


FIG. 1A

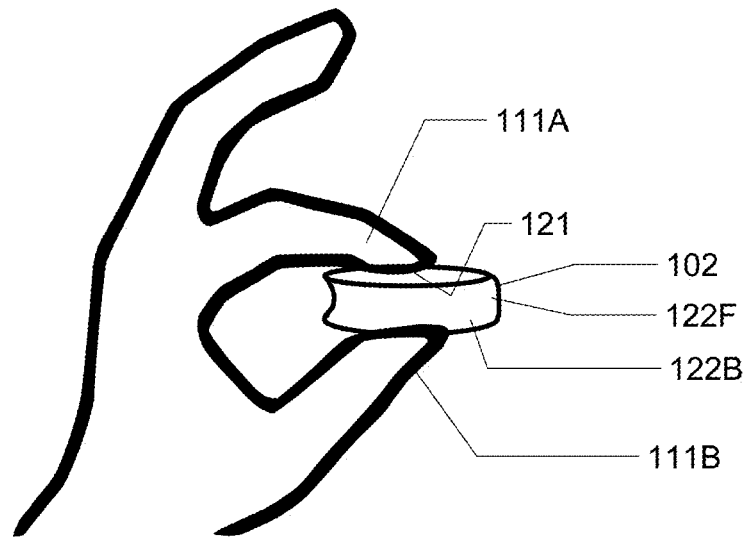


FIG. 1B

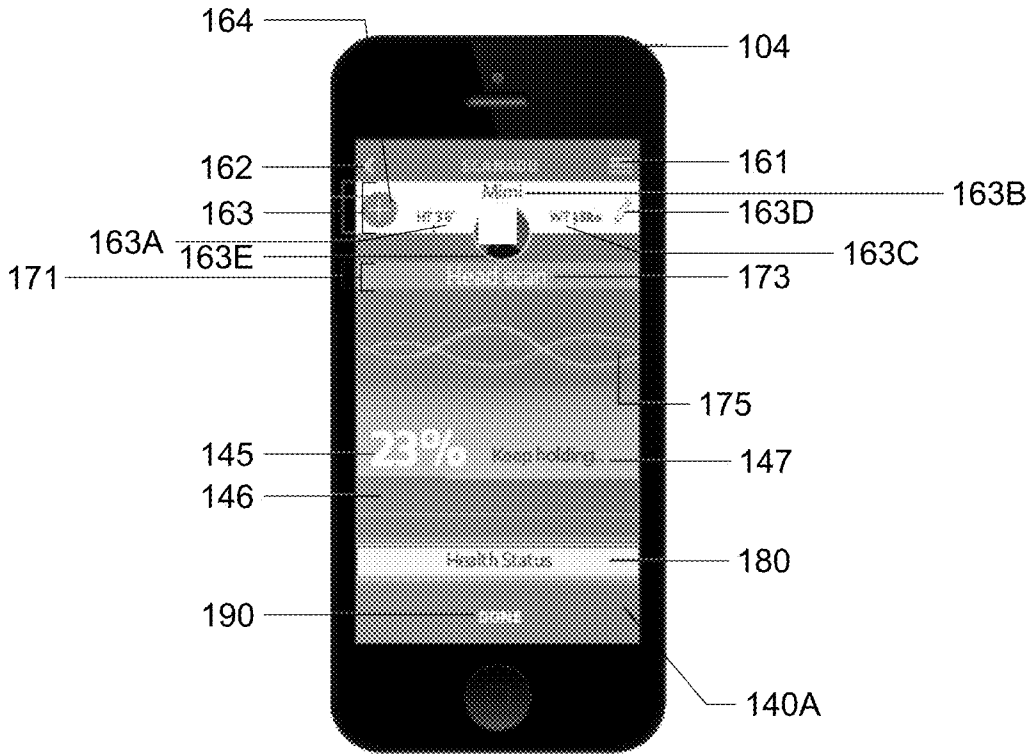


FIG. 1C

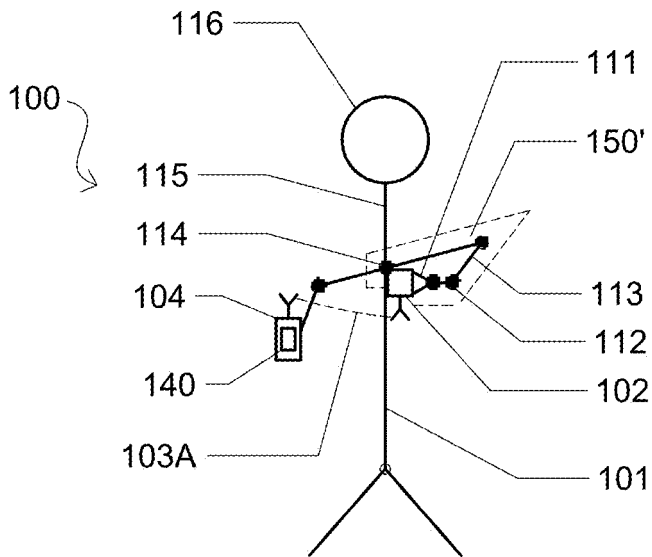


FIG. 1D

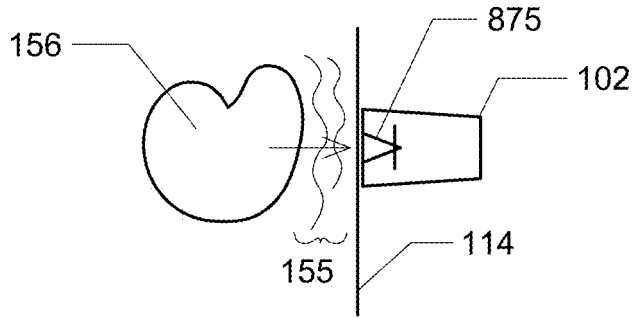


FIG. 1E

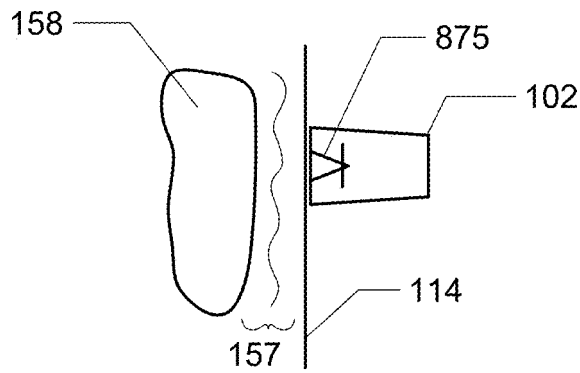


FIG. 1F

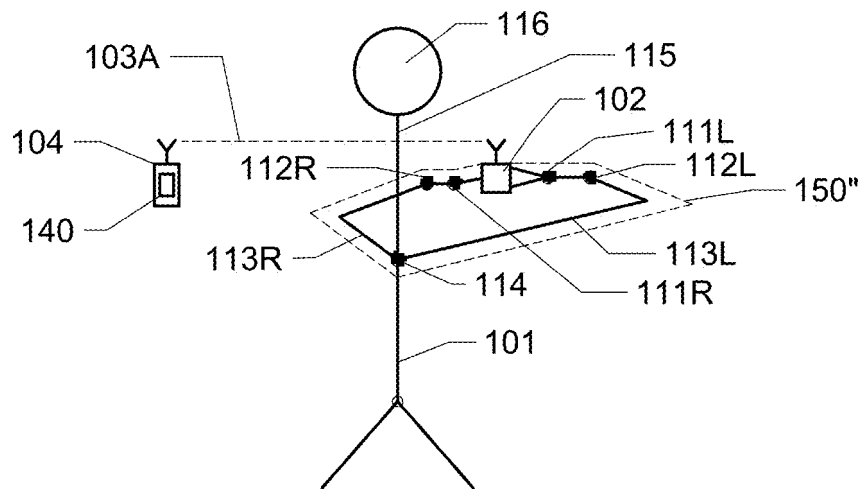


FIG. 1G

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