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Boisvert et al.

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(54) **COLLISION MONITORING SYSTEM**
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Related U.S. Application Data

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ation-in-part of application No. 07/872,190, filed on
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G05D 3/00 (2006.01)

(52) **U.S. Cl.** **318/466; 318/461; 318/465;**
318/467; 318/468; 318/469

(58) **Field of Classification Search** **318/264-266,**
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See application file for complete search history.

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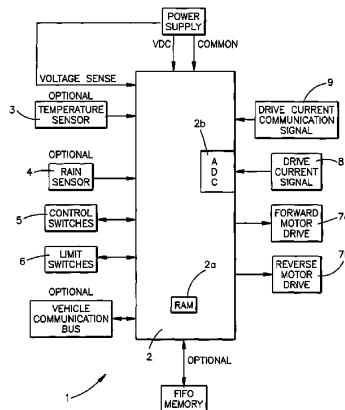
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Tummino LLP

(57) **ABSTRACT**

Disclosed is an improved system and method for sensing both
hard and soft obstructions for a movable panel such as a
sunroof. A dual detection scheme is employing that includes
an optical sensing as the primary means and electronic sens-
ing of motor current as a secondary means. The secondary
means utilizes system empirical precharacterization, fast pro-
cessing algorithms, motor parameter monitoring including
both current sensing and sensorless electronic motor current
commutation pulse sensing, and controller memory, to adap-
tively modify electronic obstacle detection thresholds in real
time without the use of templates and cycle averaging tech-
niques.

24 Claims, 9 Drawing Sheets



US 7,548,037 B2

Page 2

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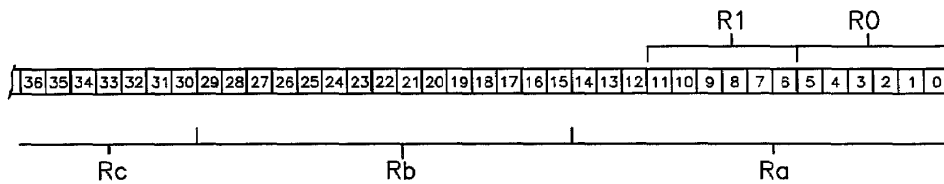
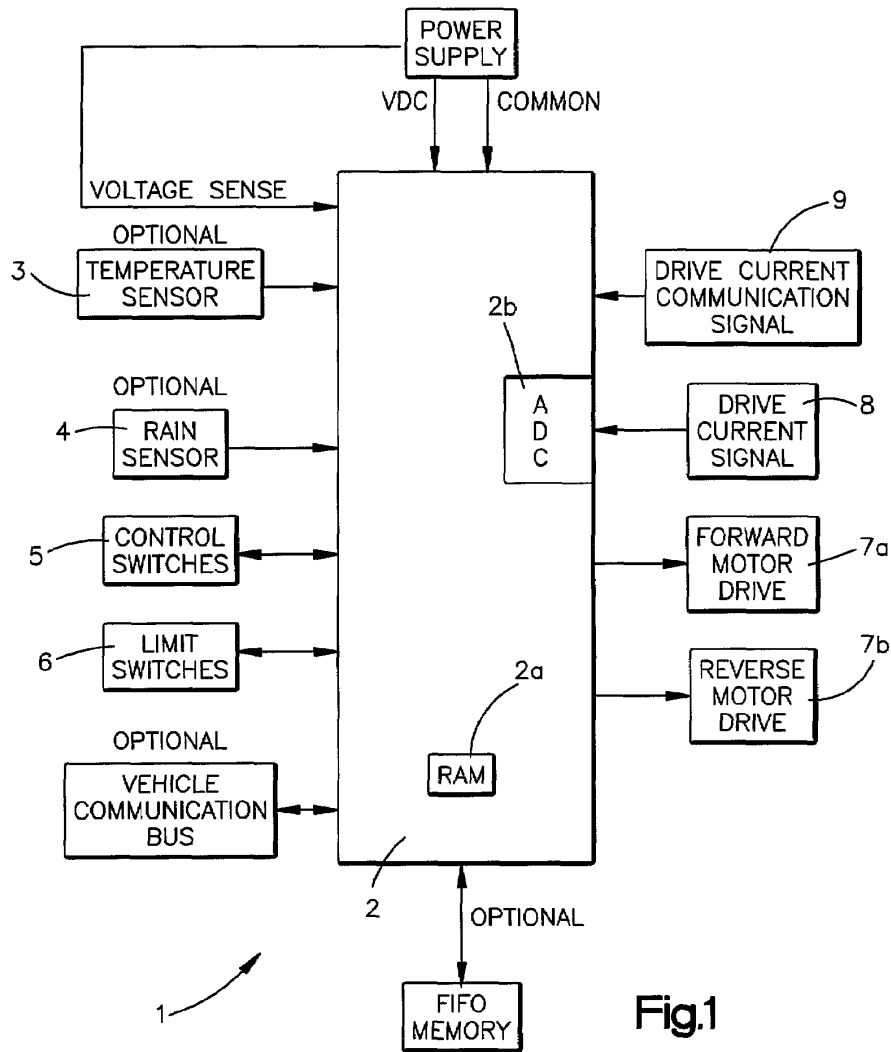


Fig.8

Fig.2A

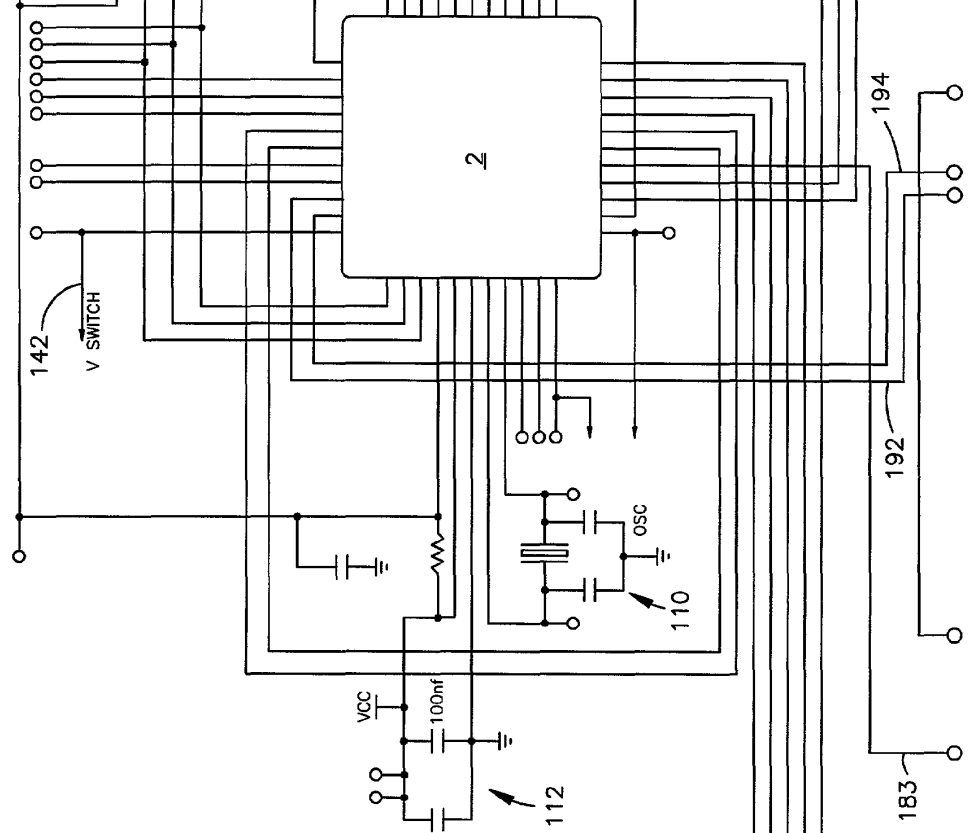
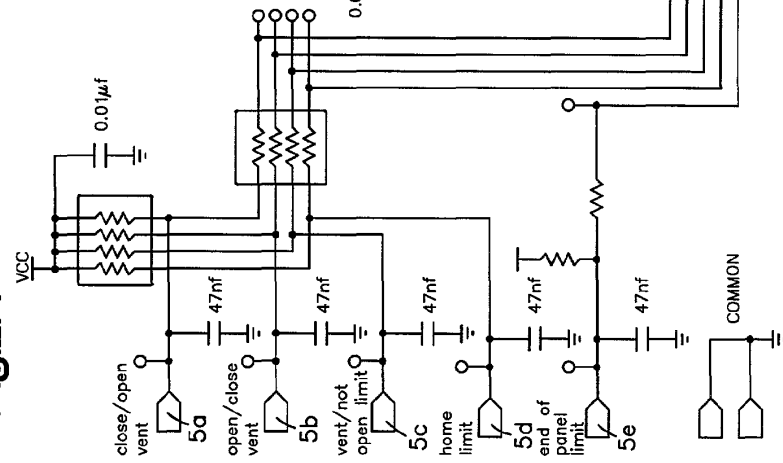
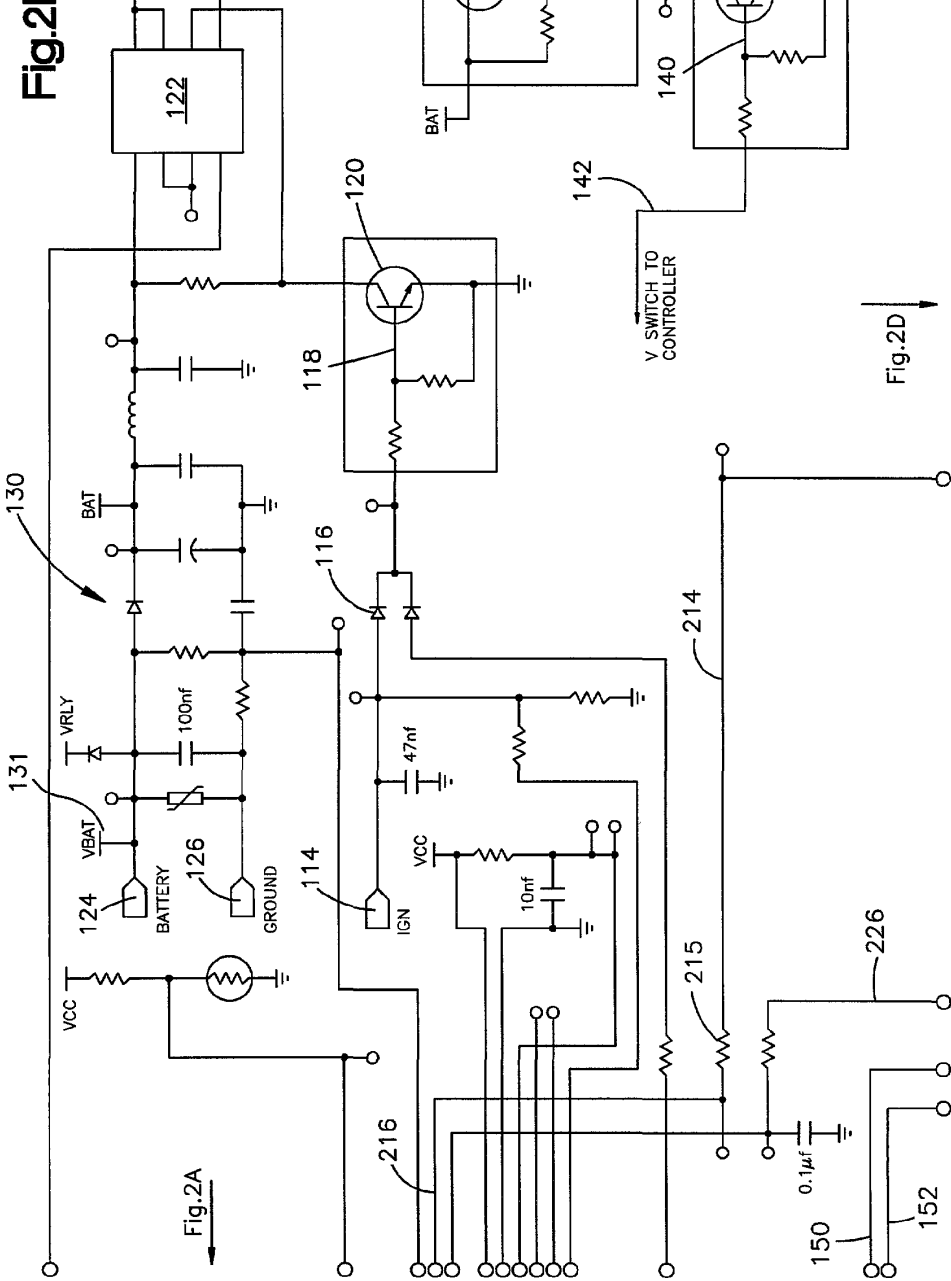


Fig.2C



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