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(54) **COLLISION MONITORING SYSTEM**

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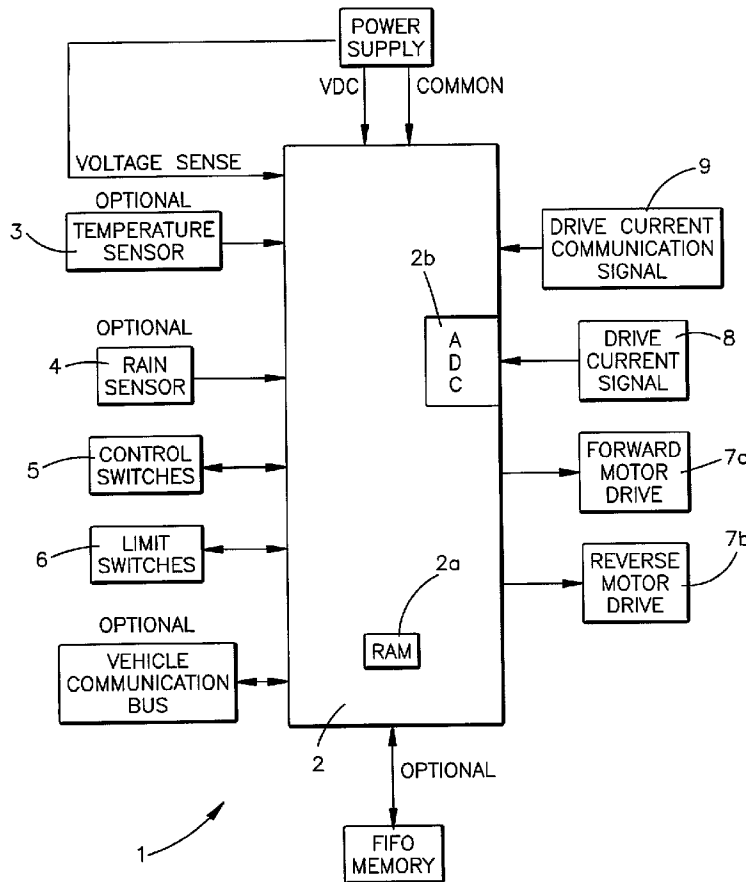(73) Assignee: **Nartron Corporation**

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(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 sensing of motor current as a secondary means. The secondary means utilizes system empirical precharac-terization, fast processing algorithms, motor parameter monitoring including both current sensing and sensorless electronic motor current commutation pulse sensing, and controller memory, to adaptively modify electronic obstacle detection thresholds in real time without the use of templates and cycle averaging techniques.
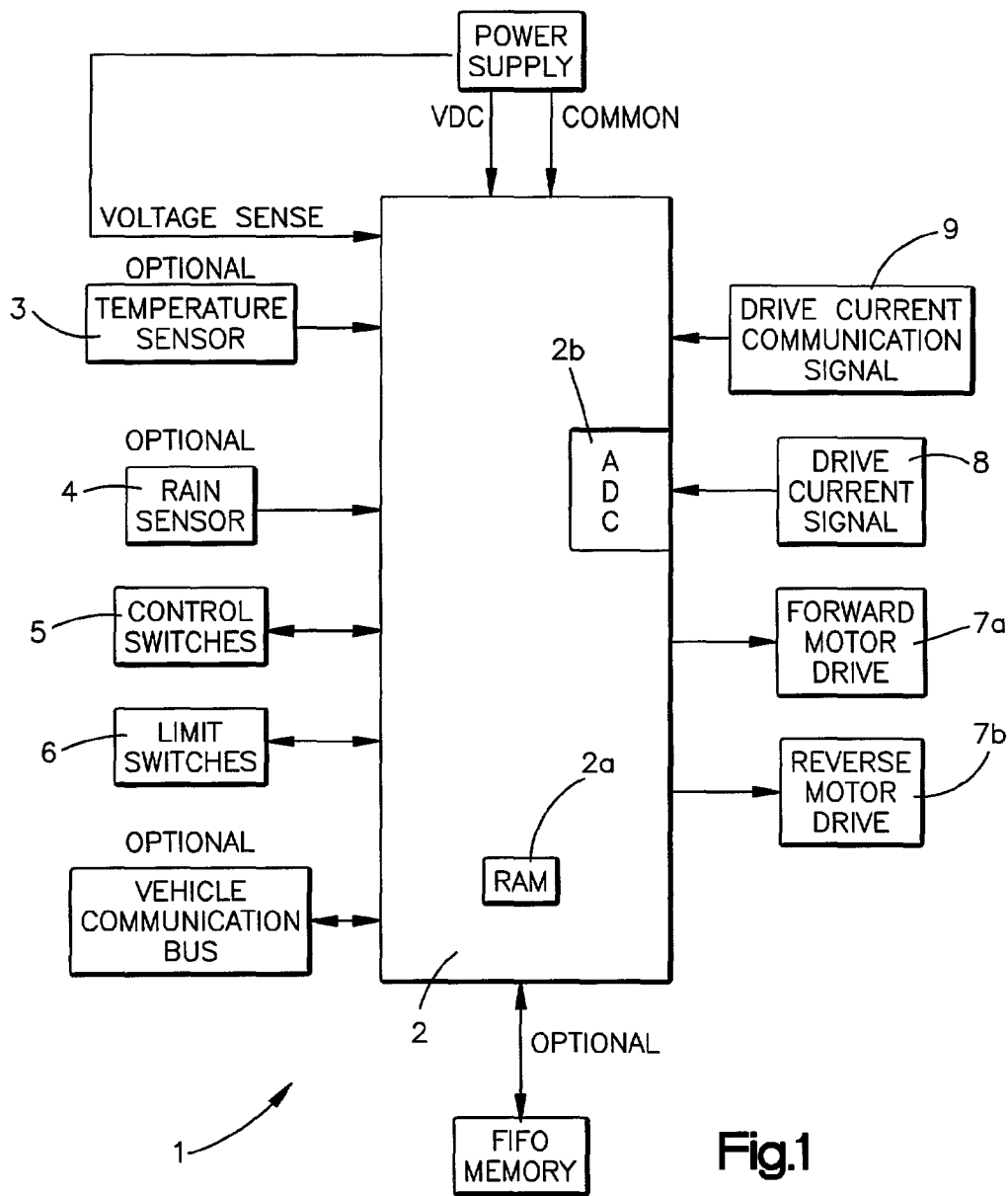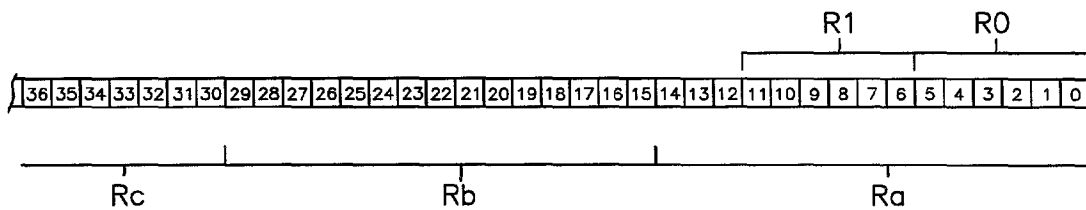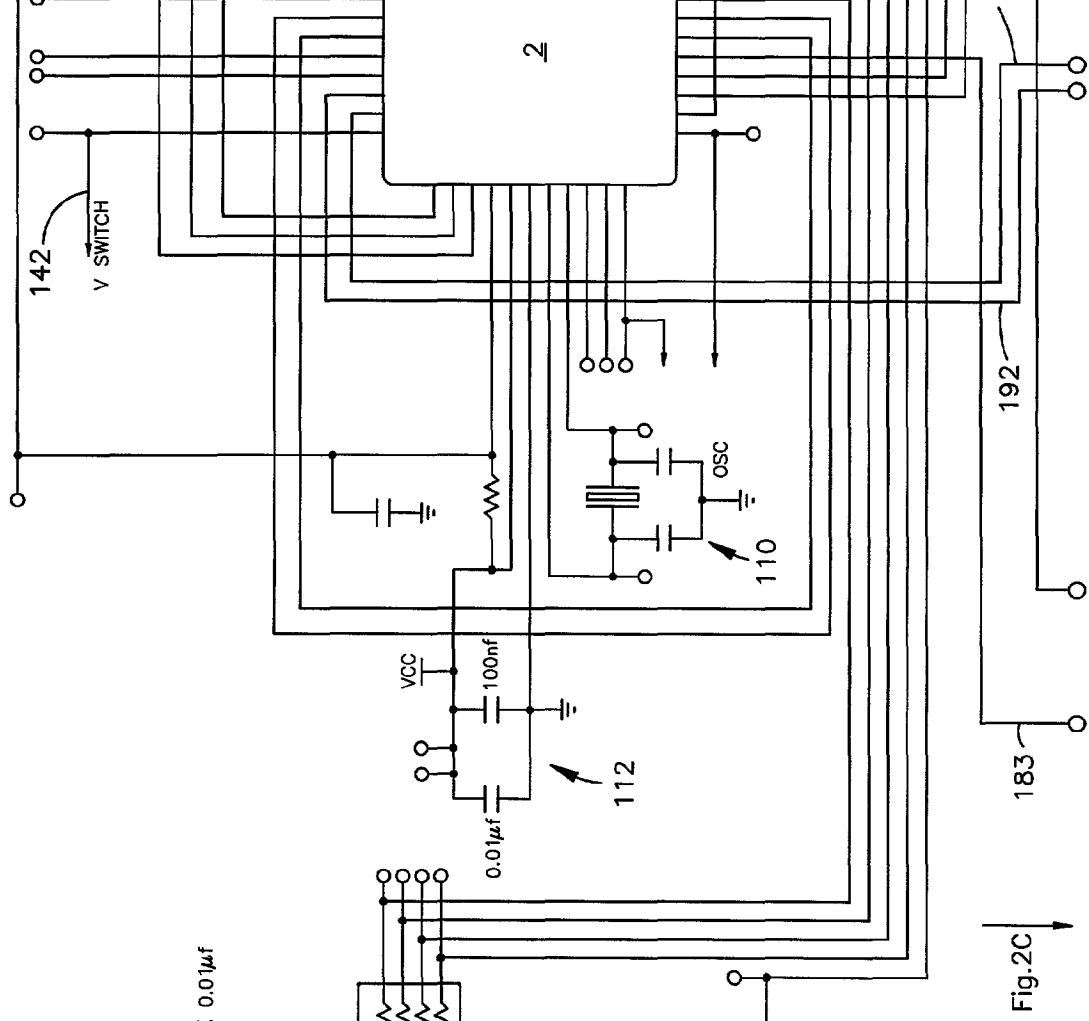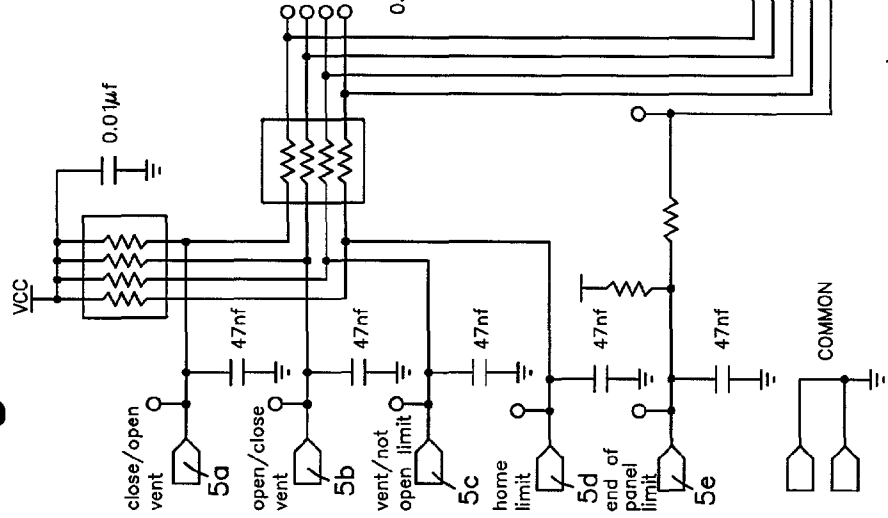
Fig.1

Fig.8

Fig.2A

close/open vent — 5a

open/close vent — 5b

vent/not open limit — 5c

home limit — 5d

end of panel limit — 5e

COMMON

47nf

VCC

0.01μf

VCC

100nf

0.01μf

112

OSC

110

142

∨ SWITCH

192

183

Fig.2C

Fig.2A

Fig.2D

130

131

120

118

116

142

V SWITCH TO
CONTROLLER

VRLY

BAT

100nf

47nf

10nf

VCC

VBAT

VCC

BATTERY

GROUND

IGN

124

126
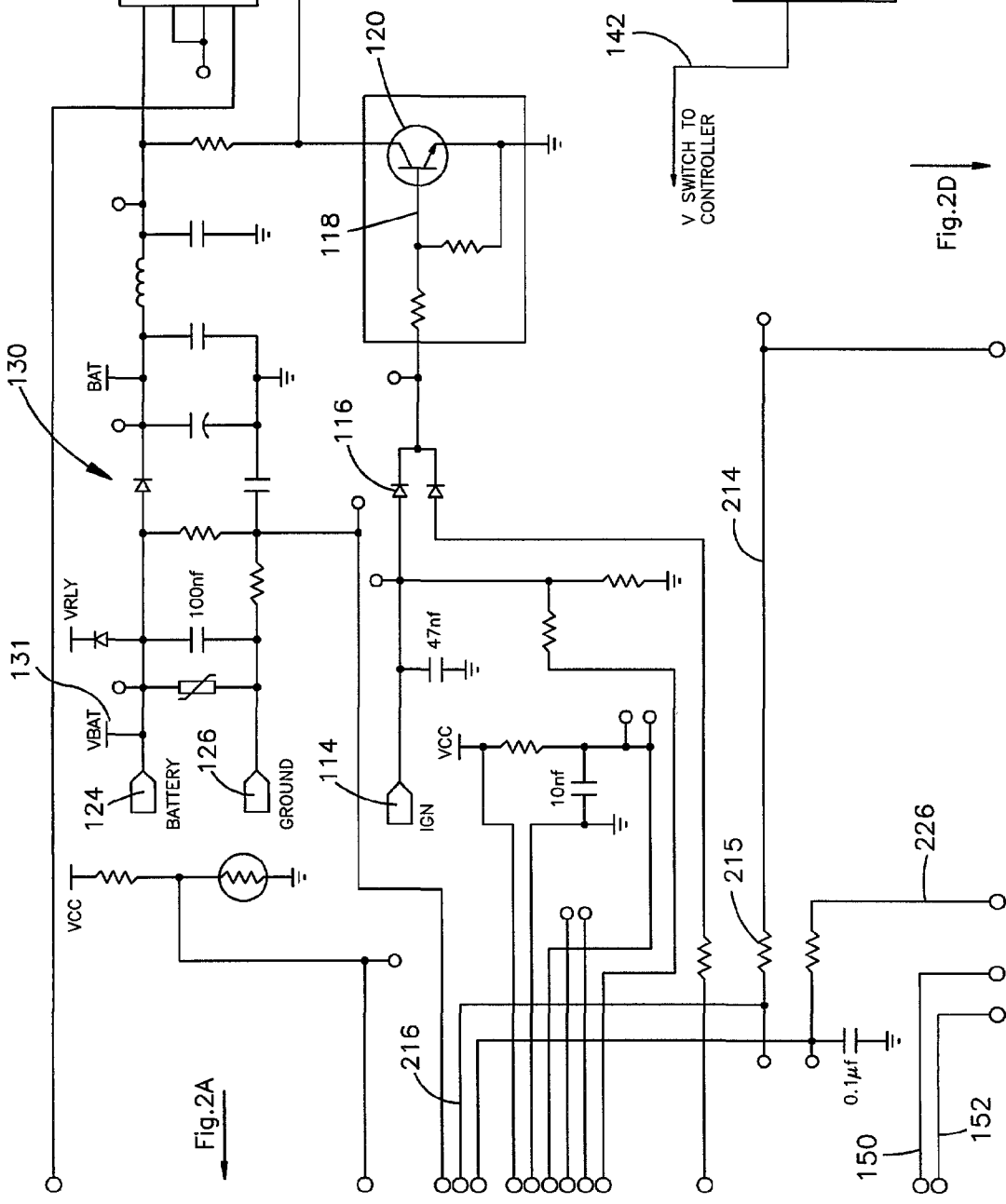
114

214

215

216

216

226

150

152

0.1μf

Fig.2C

DOCKET ALARM
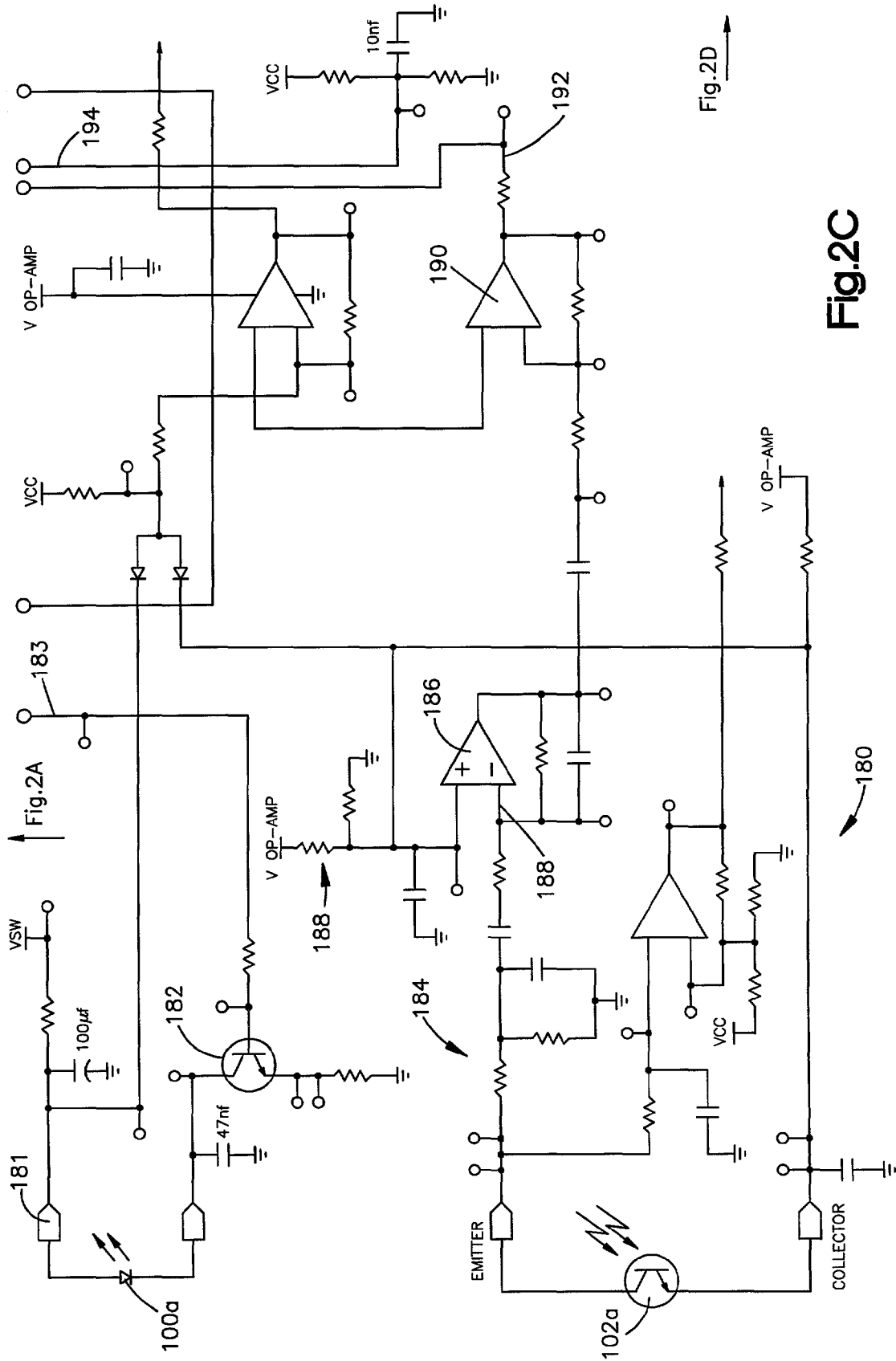
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