



**United States Patent** [19]

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**Boisvert et al.**

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- [54] **POWER WINDOW OR PANEL CONTROLLER**
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- [73] Assignee: **Nartron Corporation**, Reed City, Mich.
- [21] Appl. No.: **08/736,786**
- [22] Filed: **Oct. 25, 1996**

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**Related U.S. Application Data**

[63] Continuation of application No. **08/275,107**, Jul. 14, **1994**, which is a continuation-in-part of application No. **07/872,190**, Apr. 22, **1992**, abandoned.

[51] **Int. Cl.<sup>7</sup>** ..... **G05B 5/00**

[52] **U.S. Cl.** ..... **318/465; 318/466; 318/476; 388/815; 388/833; 388/903**

[58] **Field of Search** ..... 318/264-266, 318/280-286, 460-470, 565, 626, 434, 139, 474-477; 388/815, 833, 903; **701/36, 49**

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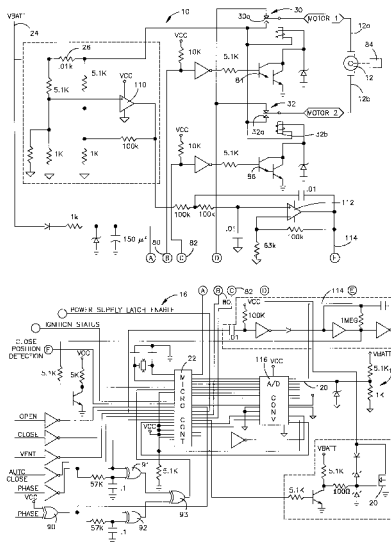
NHTSA notice published Apr. 16, 1991 in the Federal Register Issuing a final rule Amending Standard No. 118.

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[57] **ABSTRACT**

A controller for energizing a power-operable element, such as a sunroof, window, door, vehicle seat, a component of a major appliance or of a machine or of a conveyor system. The disclosed controller senses both hard and soft obstructions and de-activates or otherwise alters operation of a motor that drives the element when an obstruction is detected. The controller can also be used to actuate a brake. The controller senses obstructions during start-up of the motor and regulates the speed of the power-operable element by pulse width modulating motor energization signals.

**32 Claims, 15 Drawing Sheets**





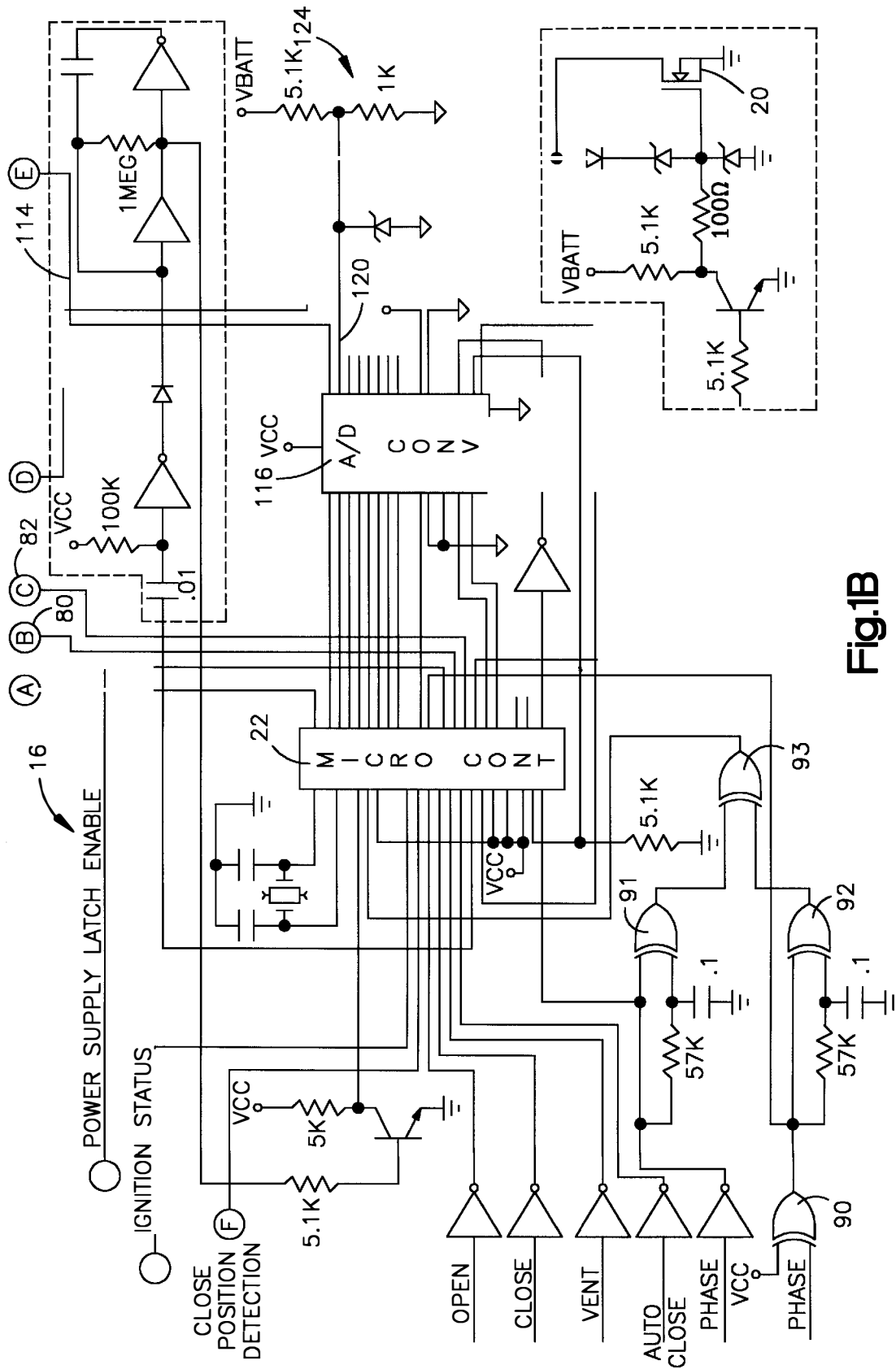
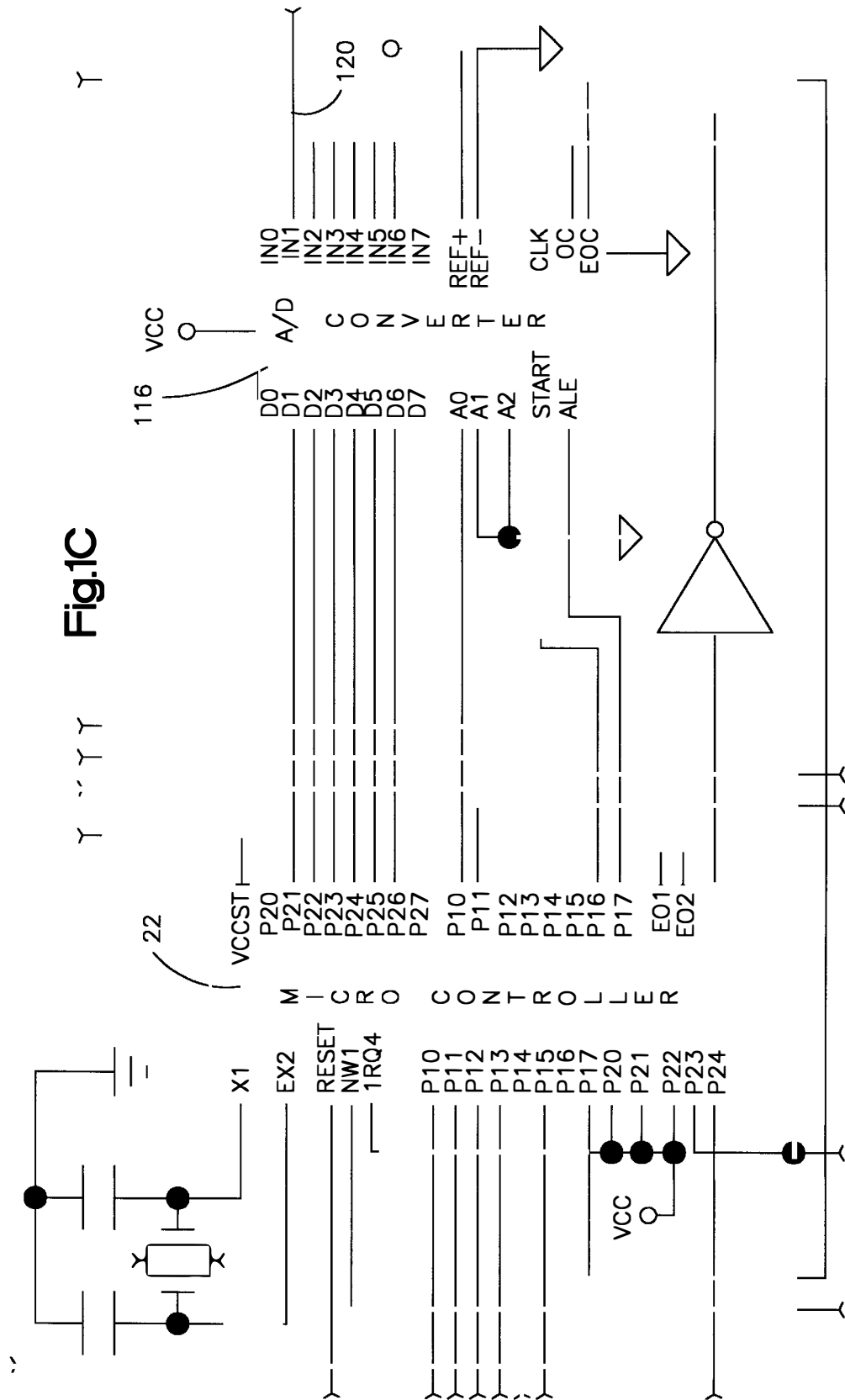
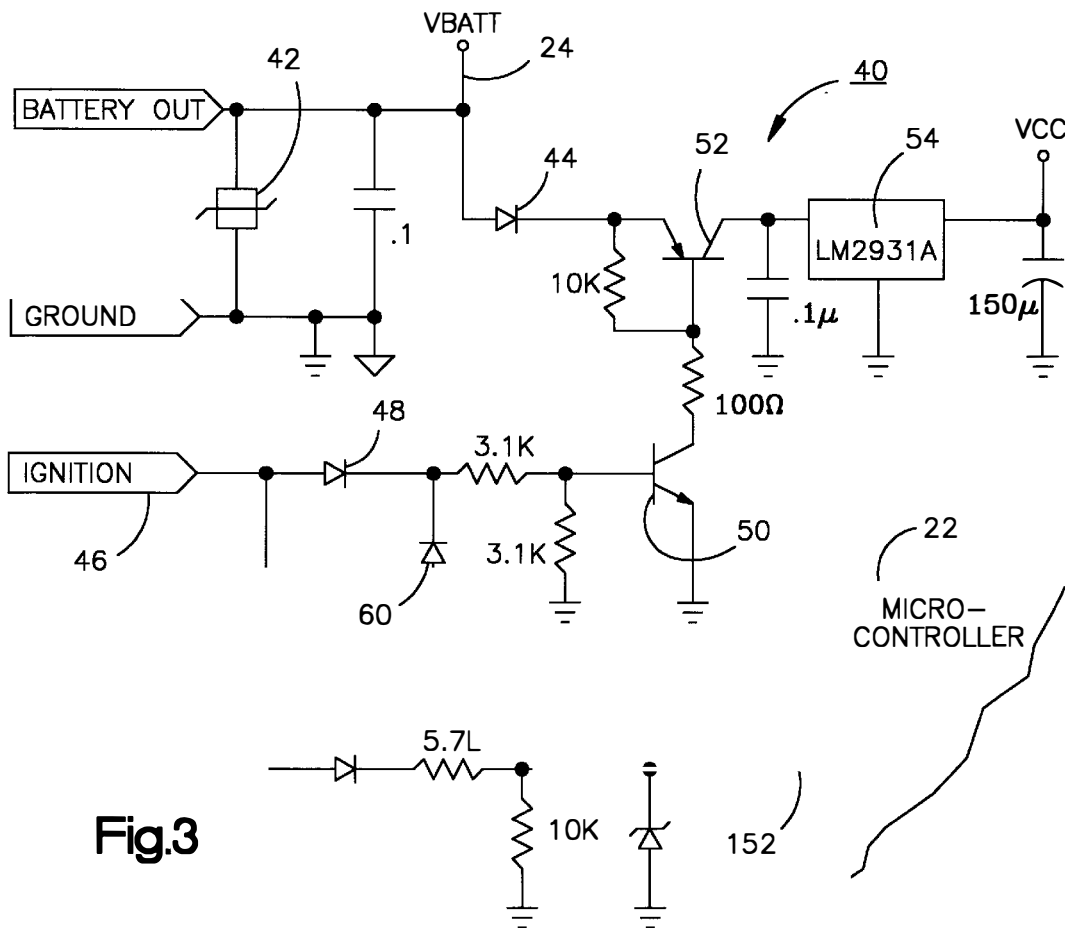
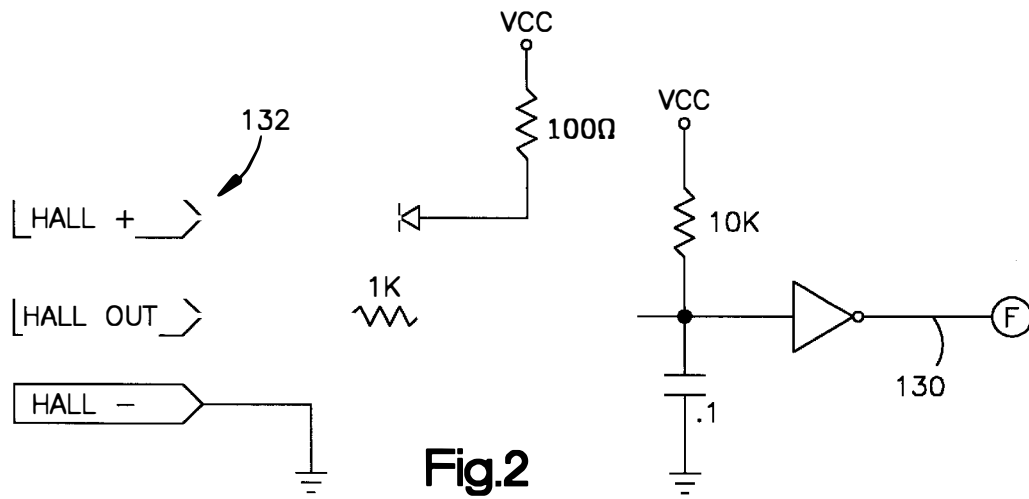


Fig.1B





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