



- [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**

5,140,316	8/1992	DeLand et al.	364/424.05
5,162,711	11/1992	Heckler	318/264
5,204,592	4/1993	Huyer .	
5,218,282	6/1993	Duhame .	
5,278,480	1/1994	Murray .	
5,334,876	8/1994	Washeleski et al.	307/10.1
5,399,950	3/1995	Lu et al.	318/565
5,432,413	7/1995	Duke et al.	318/139
5,497,326	3/1996	Berland et al. .	
5,525,876	6/1996	Filippi	318/282
5,530,329	6/1996	Shigematsu et al.	318/469
5,539,290	7/1996	Lu et al.	318/565
5,729,104	3/1998	Kamishima et al. .	
5,734,245	3/1998	Terashima et al. .	
5,832,664	11/1998	Tajima et al.	318/434 X

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.⁷** **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

FOREIGN PATENT DOCUMENTS

581509A1	2/1994	European Pat. Off. .
2502679	10/1982	France .
2189906A	11/1987	United Kingdom .
WO92/20891	11/1992	WIPO .

OTHER PUBLICATIONS

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

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[56] **References Cited**

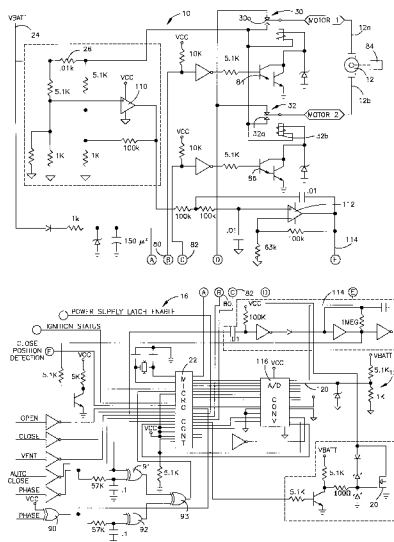
U.S. PATENT DOCUMENTS

4,514,670	4/1985	Fassel et al. .	
4,608,637	8/1986	Okuyama et al.	318/466 X
4,641,067	2/1987	Iizawa et al.	318/287
4,673,848	6/1987	Hagiwara et al. .	
4,686,598	8/1987	Herr .	
4,730,152	3/1988	Foust et al. .	
4,746,845	5/1988	Mizuta et al.	318/286
4,823,059	4/1989	Compeau .	
4,870,333	9/1989	Itoh et al.	318/286
4,980,618	12/1990	Milnes et al. .	
5,038,087	8/1991	Archer et al. .	
5,069,000	12/1991	Zuckerman .	
5,081,586	1/1992	Barthel et al.	364/424.05
5,131,506	7/1992	Mizuno et al. .	

[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



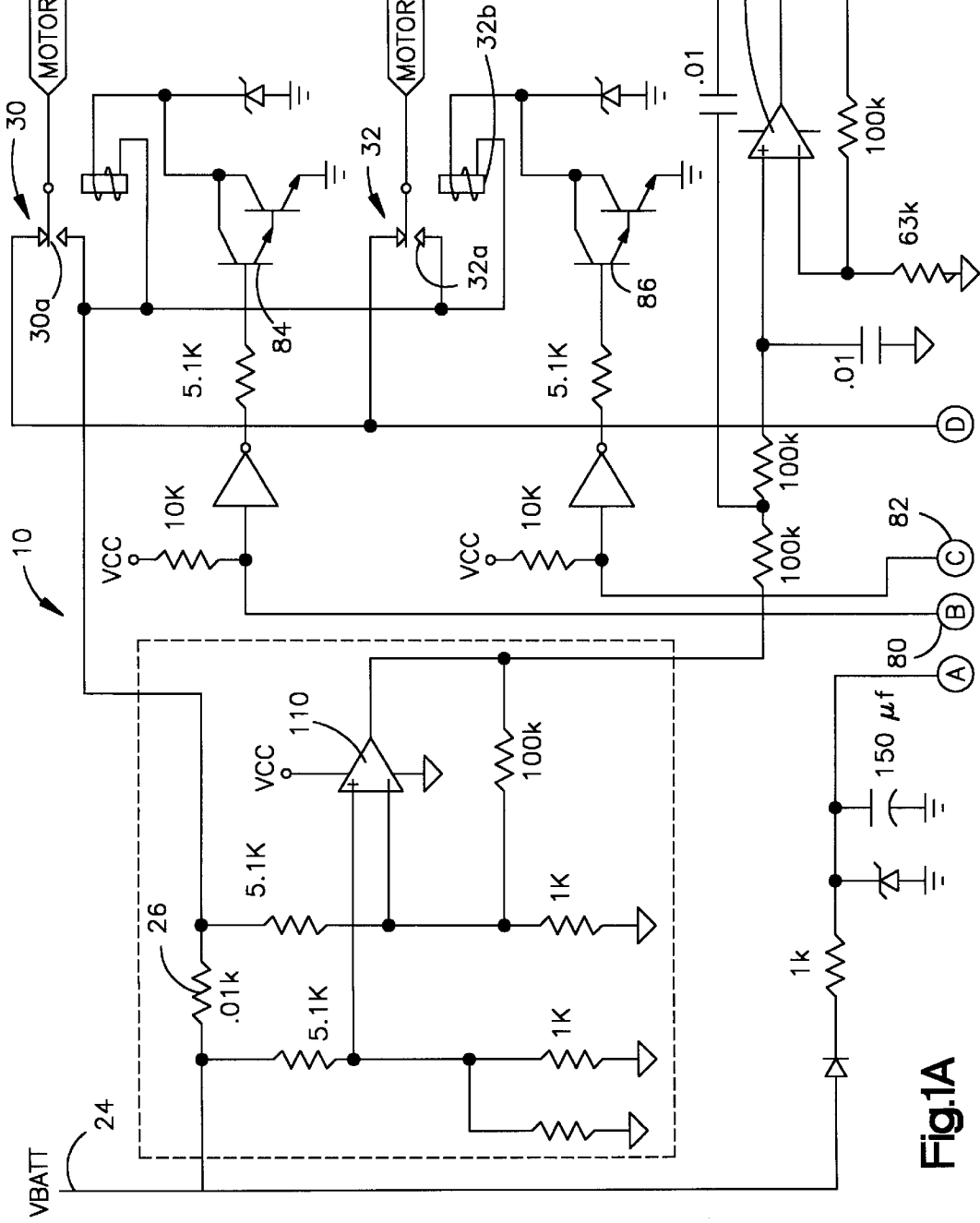


Fig.1A

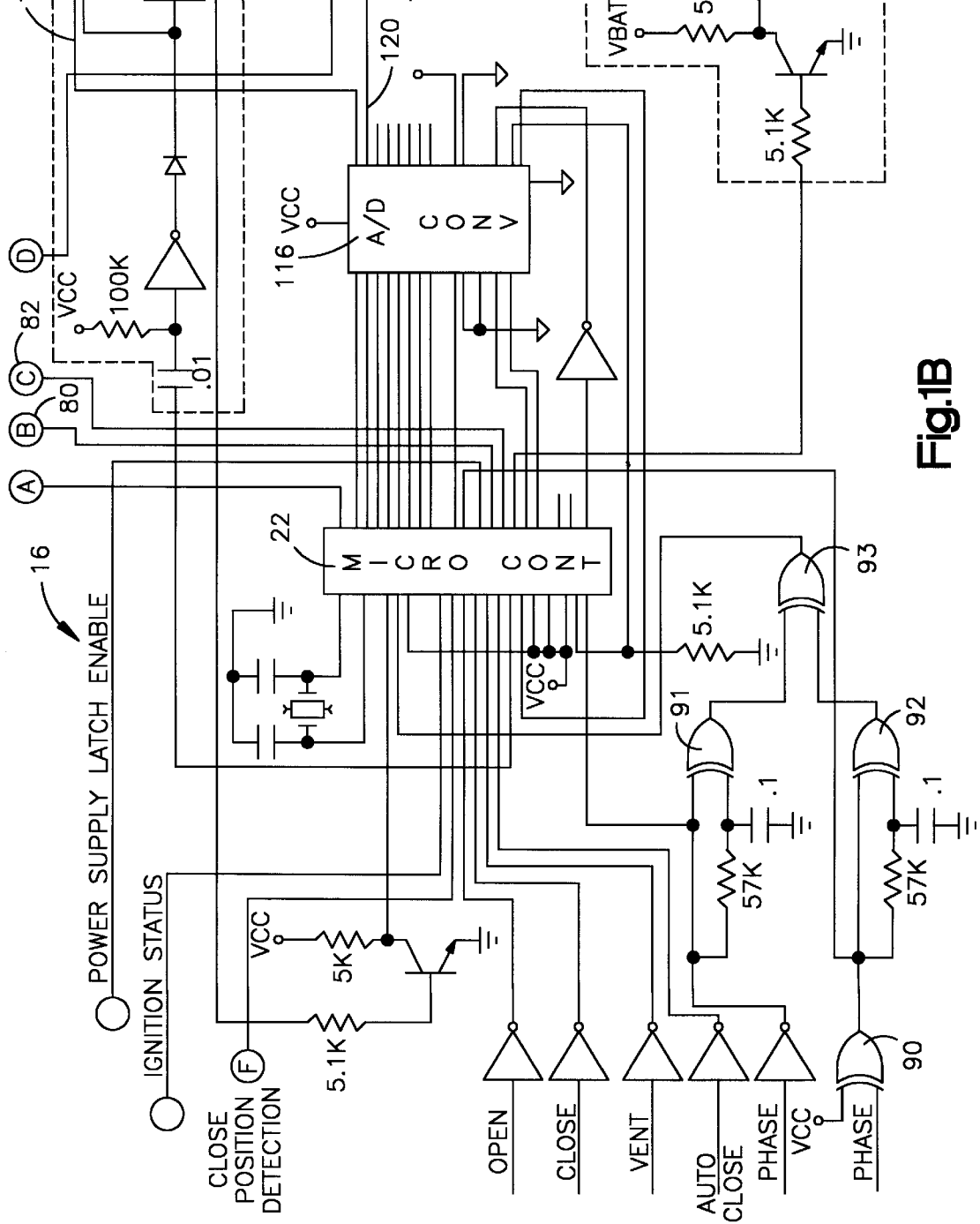


Fig.1B

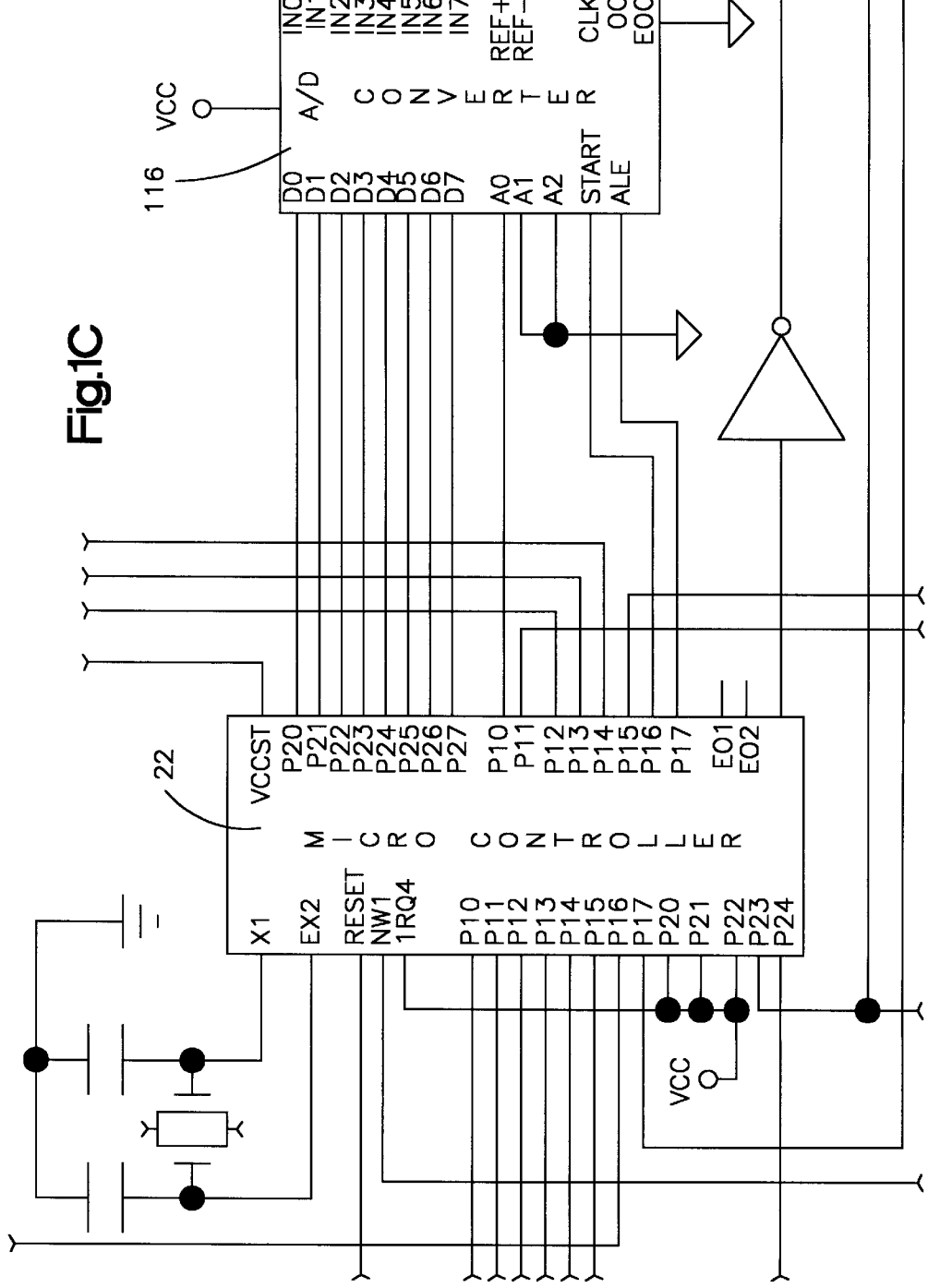
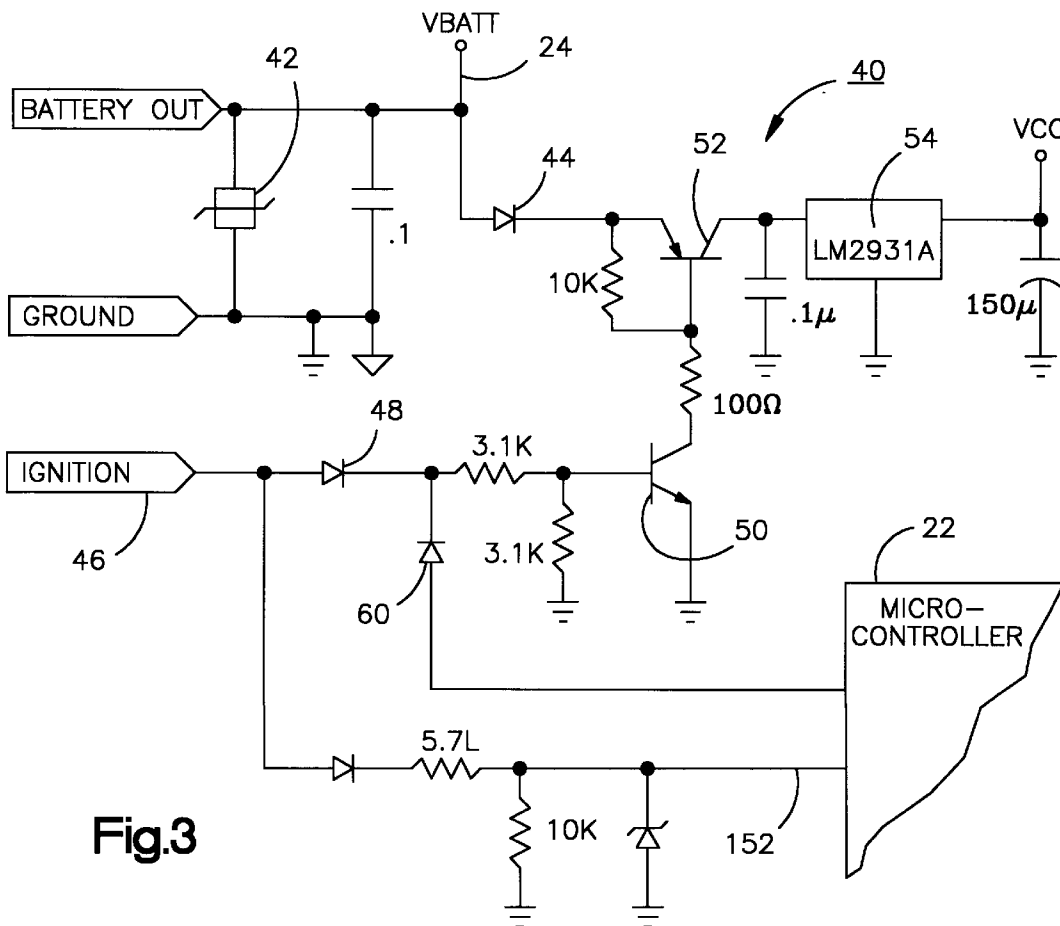
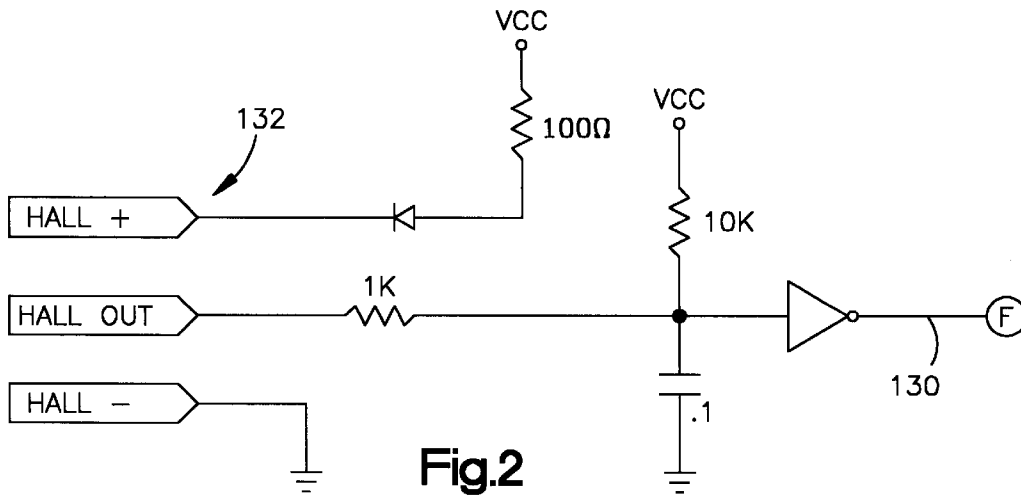


Fig.1C



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