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United States Patent [19]
Wang

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[54] **METHOD AND APPARATUS FOR ADAPTIVE CONTROL OF A VEHICLE POWER WINDOW**

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[73] Assignee: **TRW Inc.**, Lyndhurst, Ohio

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Related U.S. Application Data

[63] Continuation of application No. 08/521,540, Aug. 30, 1995, abandoned.

[51] **Int. Cl.⁶** **G05B 5/00**

[52] **U.S. Cl.** **318/466**; 318/286; 318/446; 318/461; 49/140

[58] **Field of Search** 318/445-487, 318/280-300; 49/139-140

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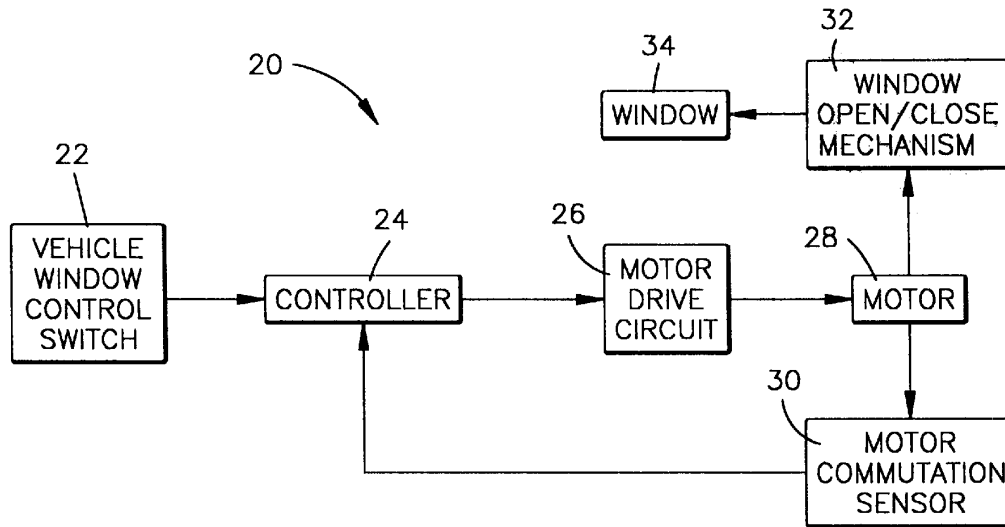
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[57] **ABSTRACT**

An adaptive vehicle power window control apparatus (20) includes an electric motor (28) for moving a member (34) between a first position and a second position. The space between the first position and the second position is divided into a plurality of trap zones and each zone has an associated sensitivity value. A controller 24 determines (40) a value functionally related to the present motor speed and determines (44) a value functionally related to a reference motor speed. The sensitivity value is adjusted as a function of the two determined values. A window zone determining function (62) determines which of the plurality zones the member (34) is located. The value functionally related to present motor speed is adjusted (52) as a function of the sensitivity value for the zone that the member is located. A comparing function (48) compares the adjusted value with the value functionally related to reference motor speed. The motor direction and movement is controlled as a function of the comparison. Zone locations are adjustable with a calibration procedure.

22 Claims, 7 Drawing Sheets



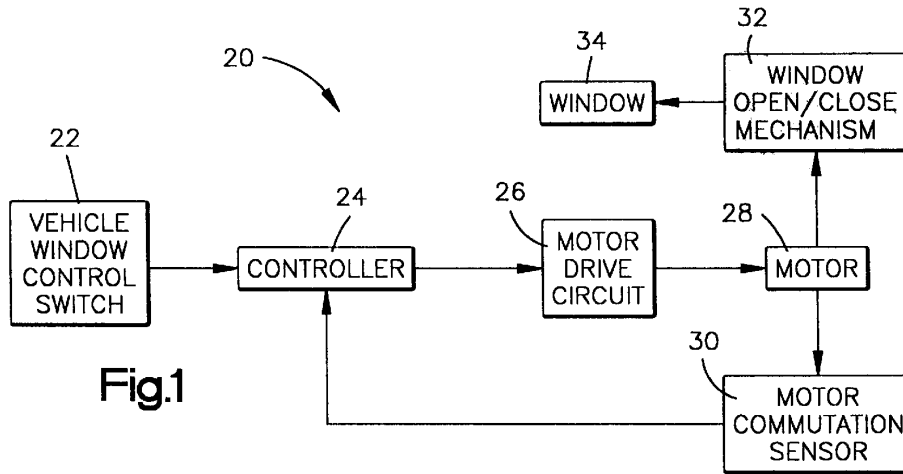


Fig.1

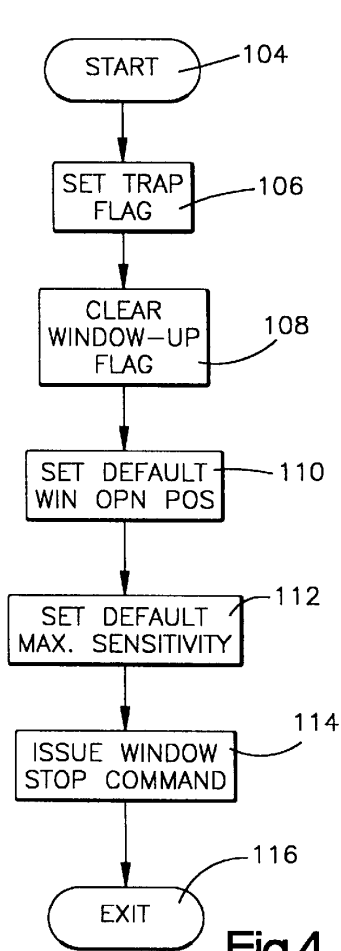


Fig.4

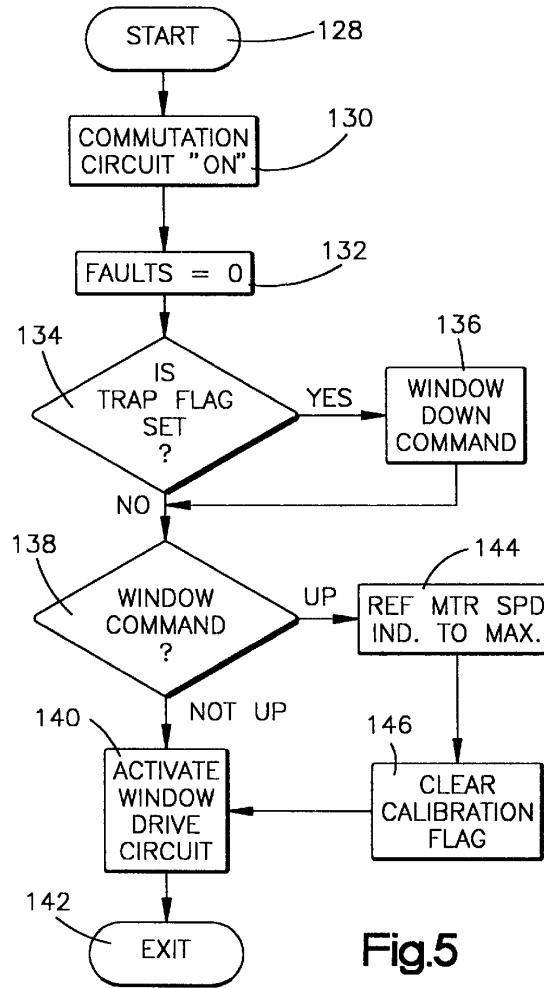
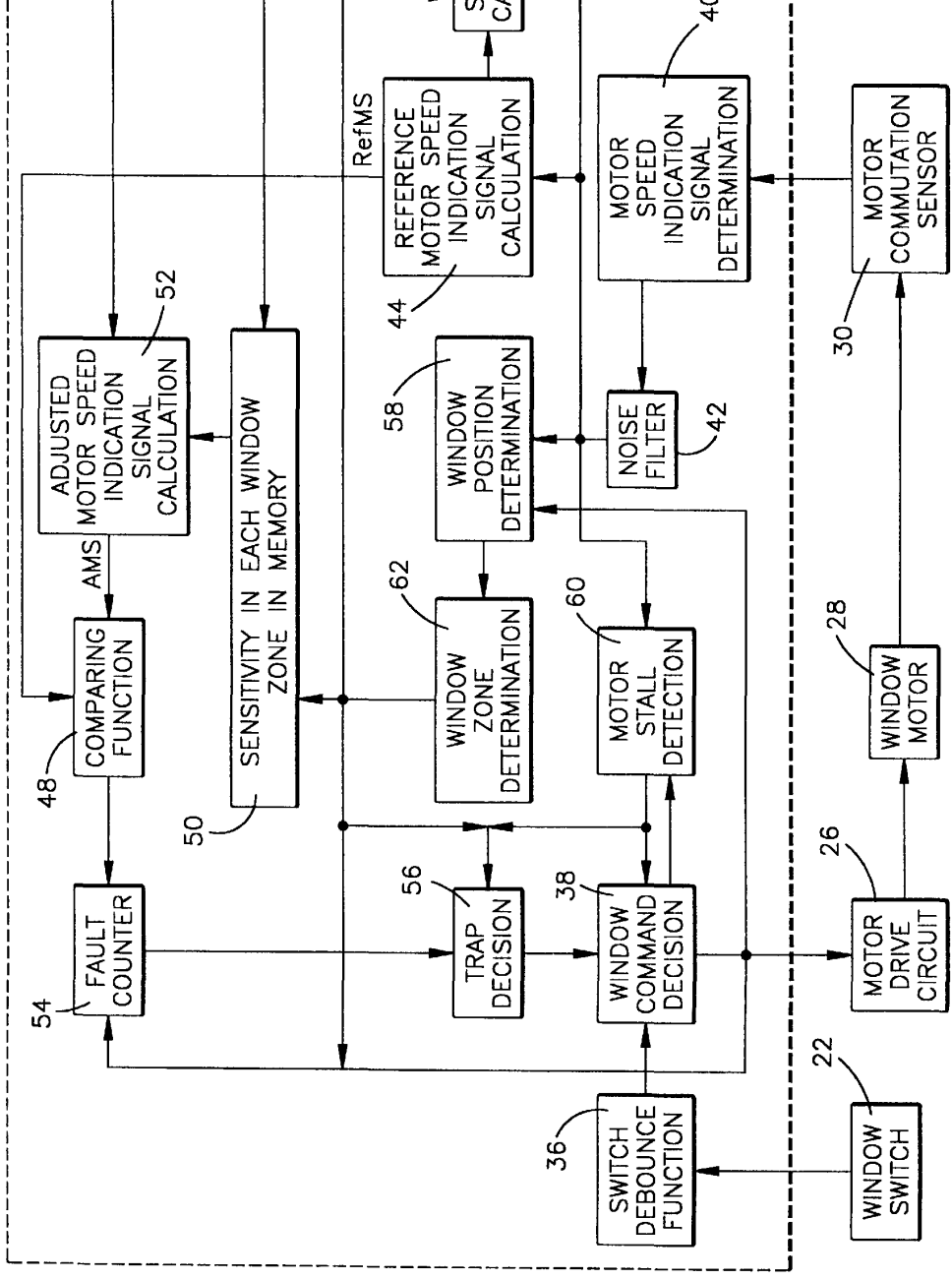


Fig.5



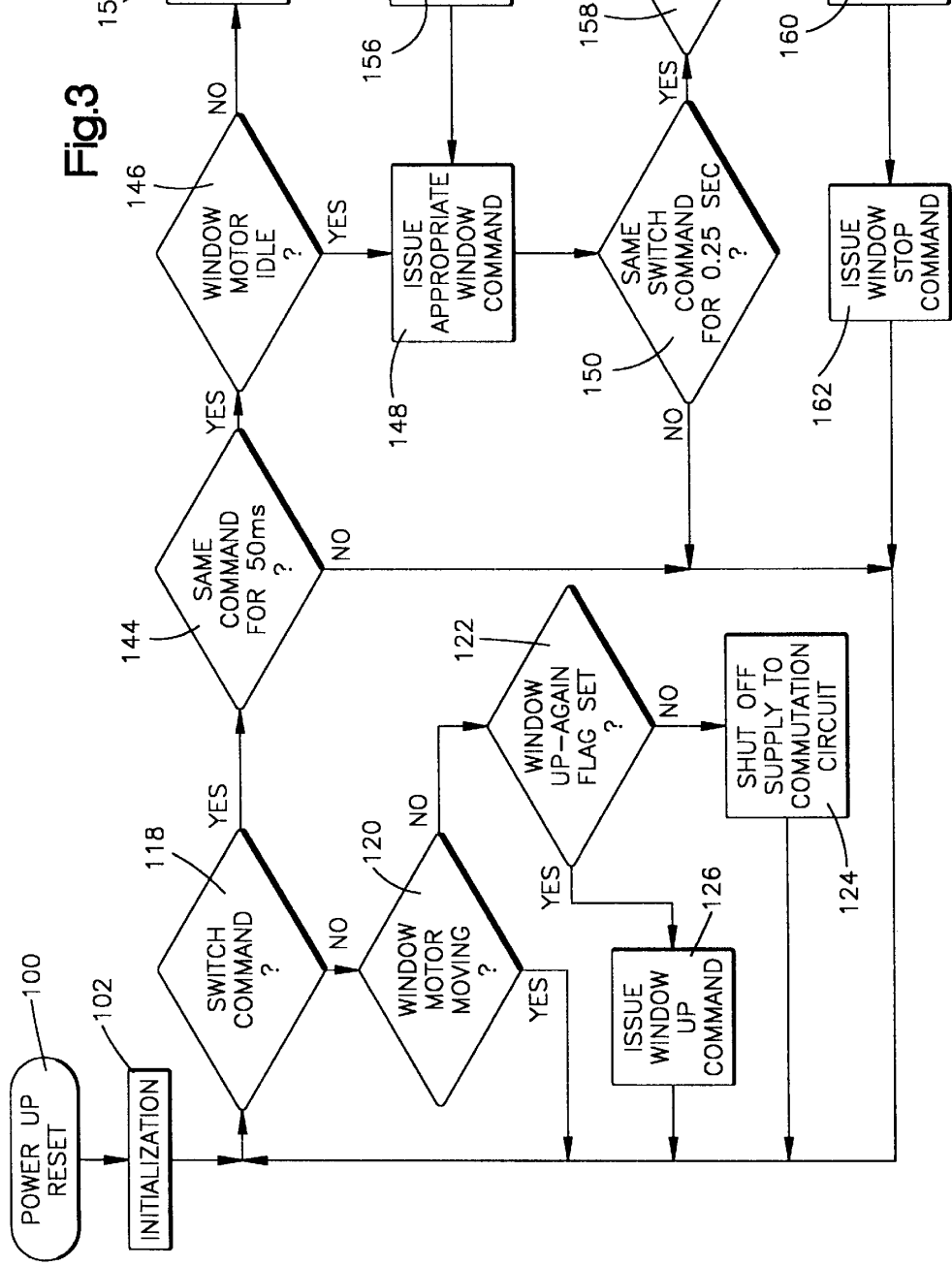


Fig.3

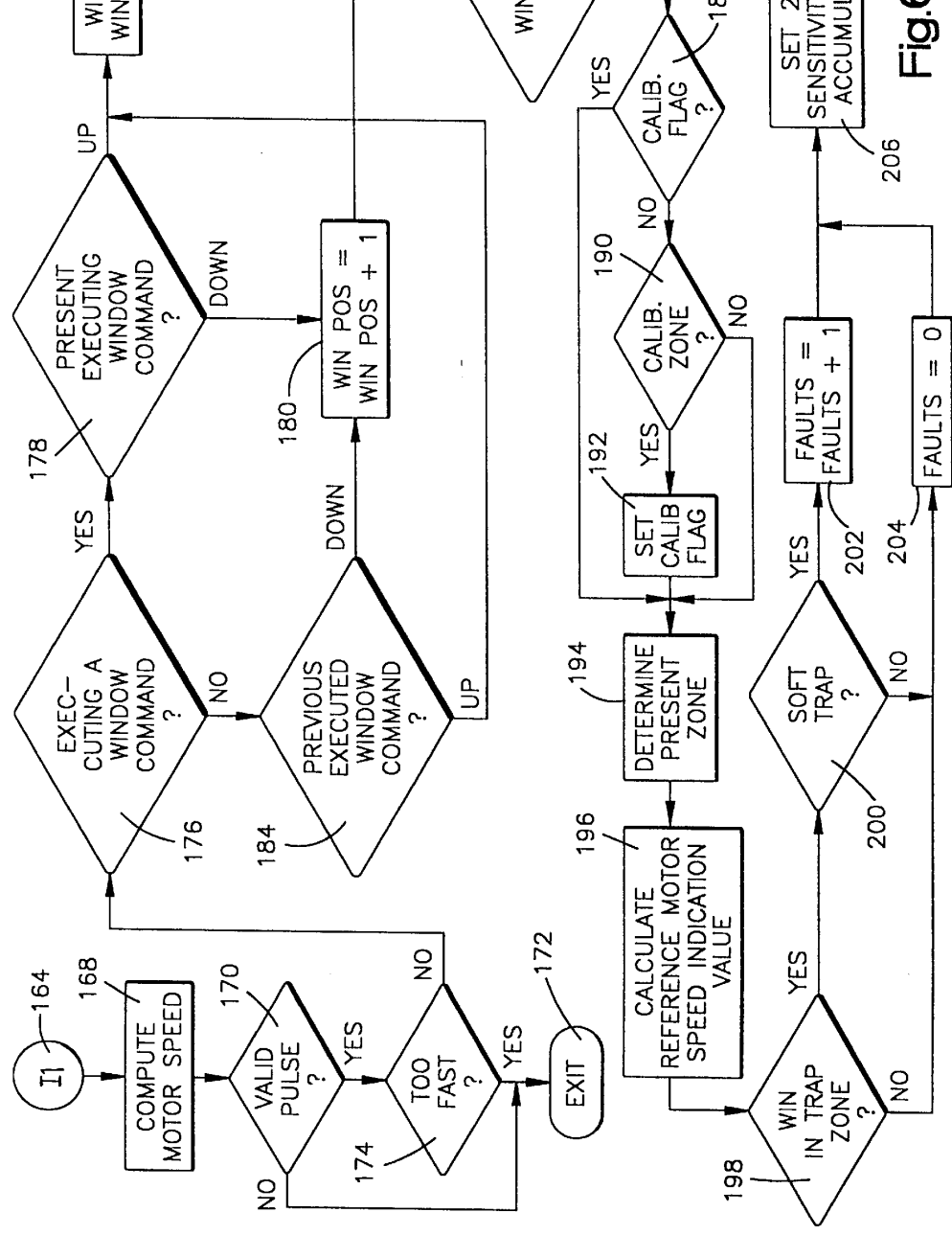


Fig. 1

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