

United States Patent [19]

Zuckerman

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[54] REVERSING APPARATUS FOR POWERED VEHICLE DOOR SYSTEMS

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[52] U.S. Cl. 49/28; 49/214; 49/360

[58] Field of Search 49/214, 213, 362, 360, 49/28, 29, 30

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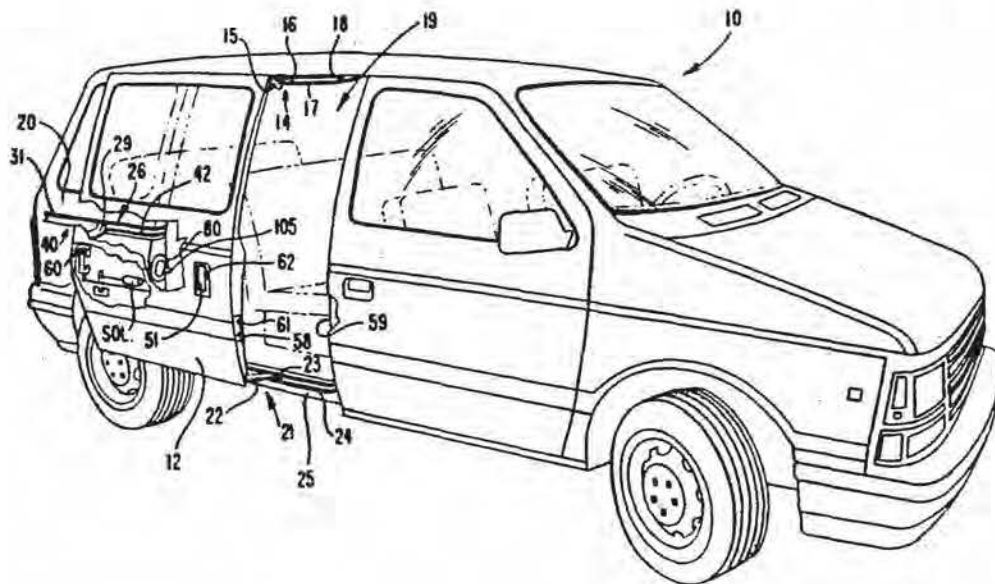
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[57] **ABSTRACT**

An obstruction detecting reversing apparatus is disclosed for a motor driven device, such as a powered vehicle door or window system, wherein the device undergoes varying loads, and consequently varying current draws, during normal operation. In order to accurately detect the presence of an obstruction, in light of such normally varying currents, the apparatus circuit logic monitors instantaneous motor current and compares it with the time average of motor current over a very short preceding time interval, which "tracks" normal current draw in order to sense an obstruction-caused rise in motor current at virtually any stage of the door closing operation, and thus also accommodates normal changes in current draw caused by different gravity effects when the device is oriented in different grade-caused orientations.

18 Claims, 16 Drawing Sheets



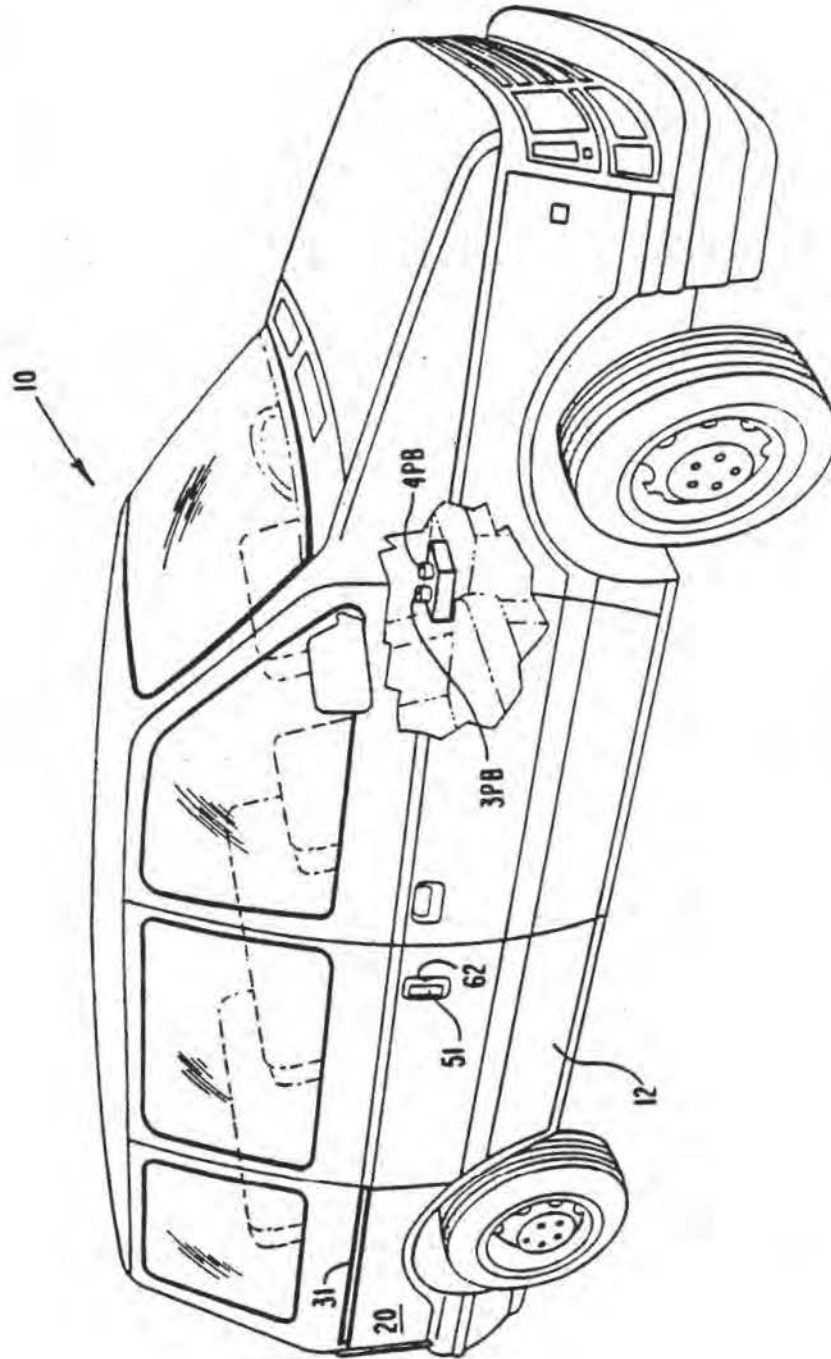
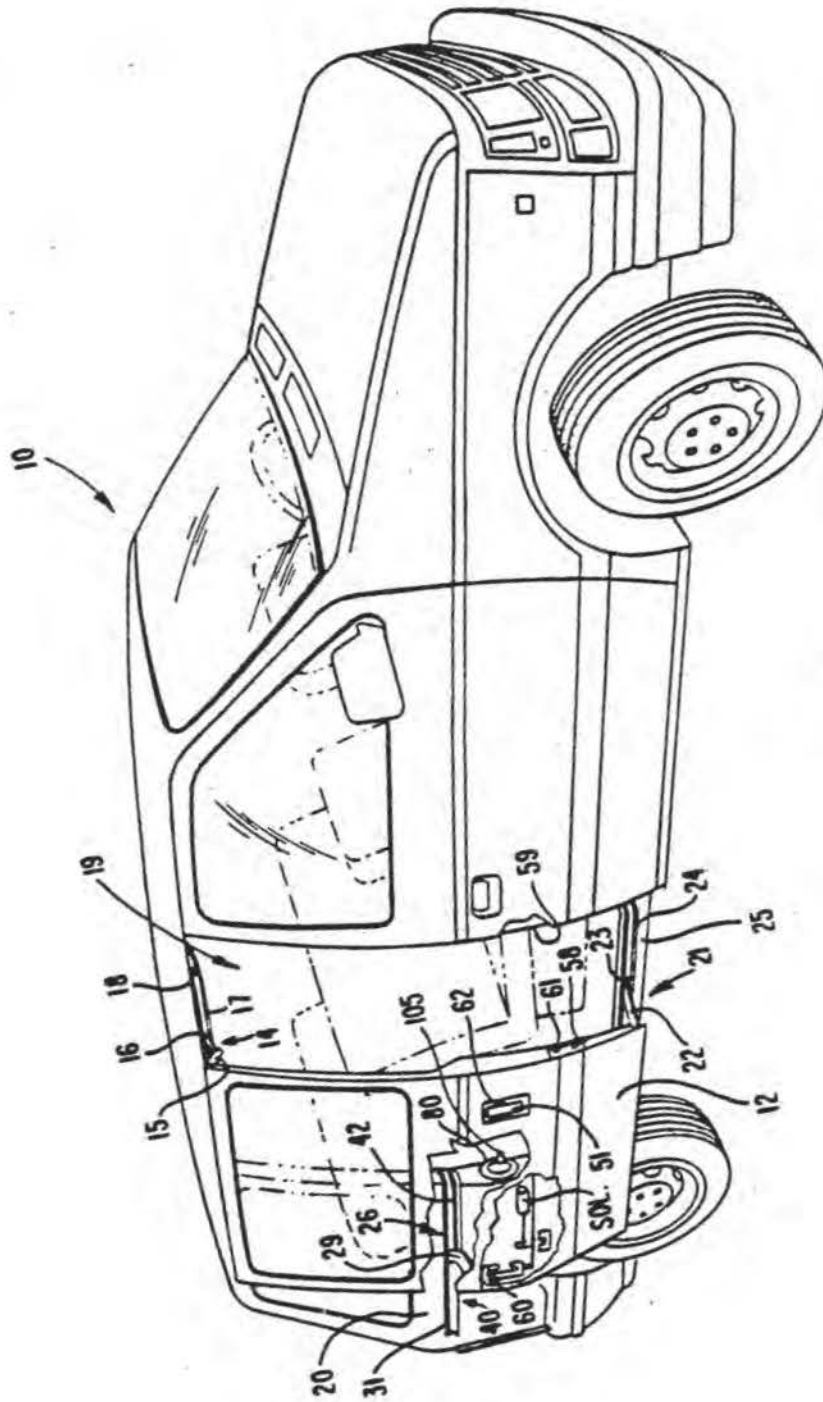


FIG. 1



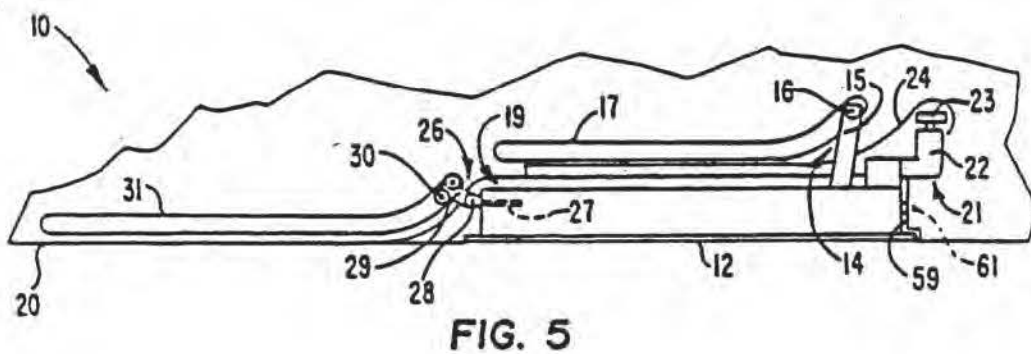
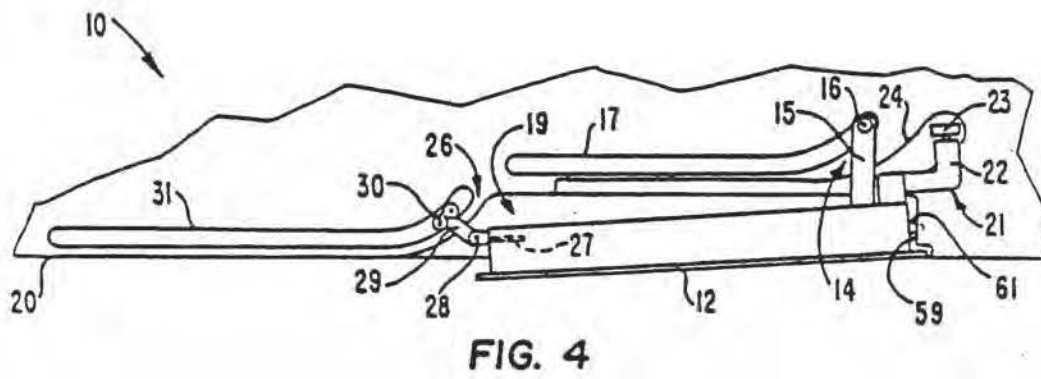
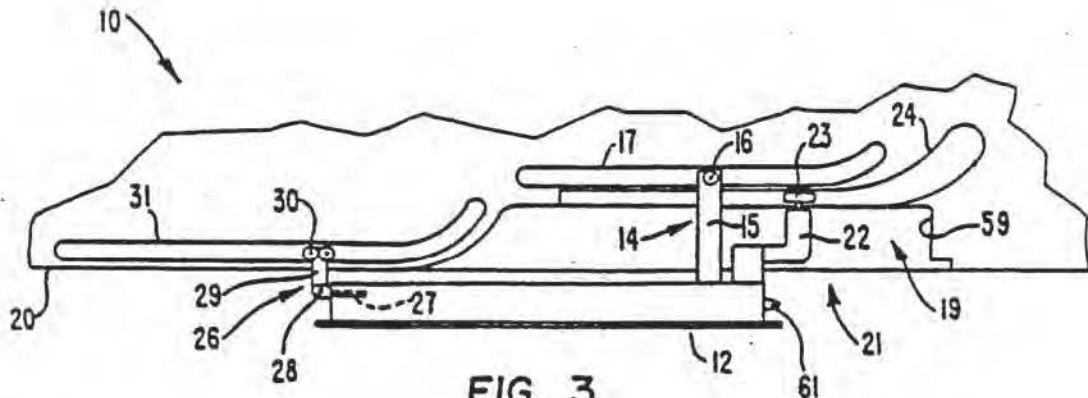
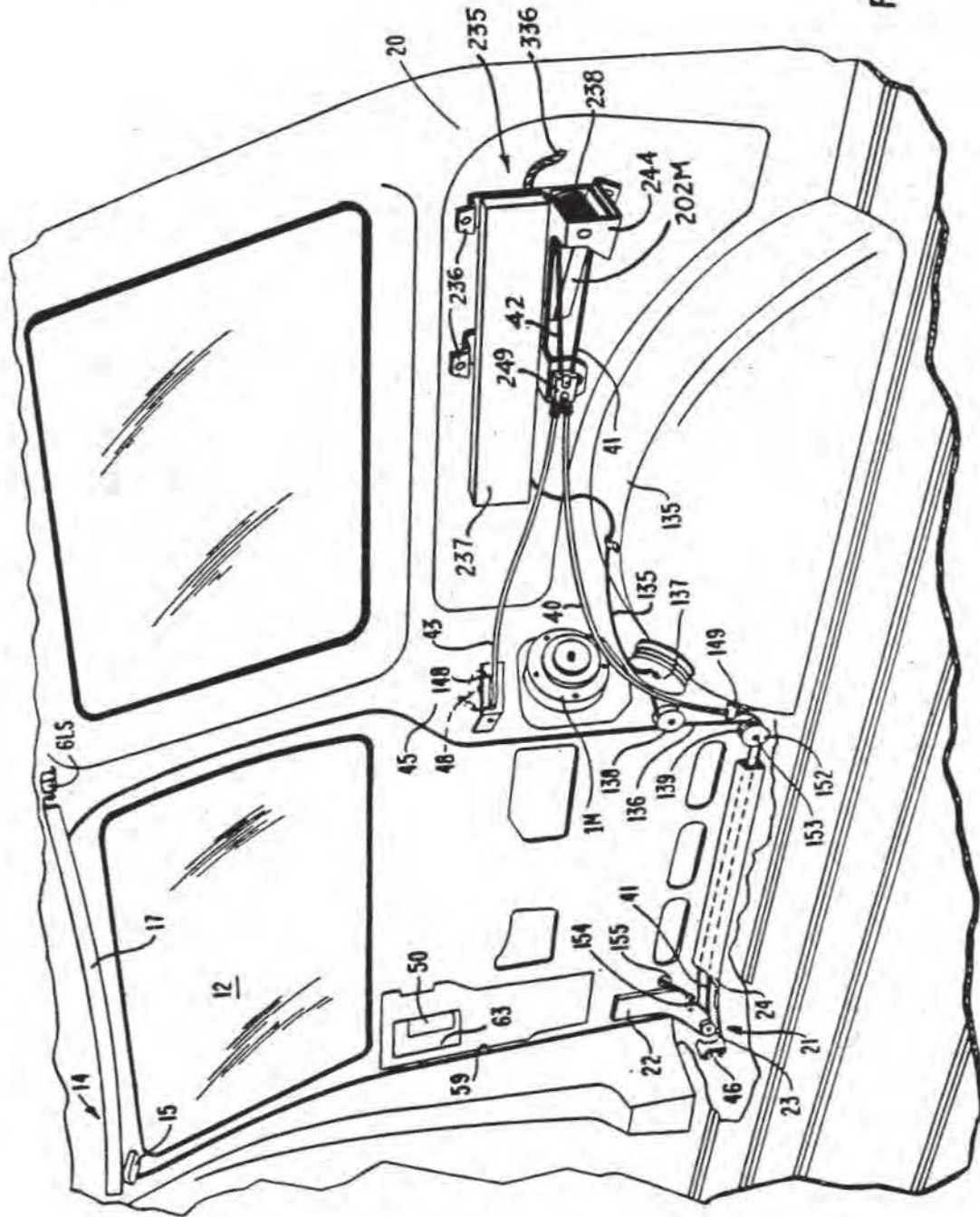


FIG. 6



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