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United States Patent [19]

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Moroto et al.

[45] Date of Patent: **Dec. 16, 1997**

[54] **HYBRID VEHICLE**

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[21] Appl. No.: **149,806**

[57] **ABSTRACT**

[22] Filed: **Nov. 10, 1993**

A hybrid vehicle maintains its travel even if the motor driving system used therein suddenly encounters some problem in operation. The hybrid vehicle has an internal combustion engine and an electric motor with its output connected to an output axle. A clutch is provided to selectively connect the internal combustion engine to the output axle and a hydraulic power transmission is provided between the clutch and the internal combustion engine. A drive power share computer apportions the needed drive power between the engine and the motor. A detector is provided for detecting a malfunction of the motor. A first controller serves to release the clutch when the vehicle is running in a motor drive mode and a second controller effects engagement of the clutch and driving with the engine, even when the vehicle is a motor drive mode, when the detector detects a malfunction of the motor.

[30] **Foreign Application Priority Data**

Nov. 12, 1992 [JP] Japan 4-302675

[51] Int. Cl.⁶ **B60K 6/02**

[52] U.S. Cl. **180/65.2; 180/65.8; 364/424.026; 364/424.085**

[58] **Field of Search** 180/65.2, 65.8, 180/178, 179, 65.3, 65.4; 364/424.01, 424.03, 424.026, 424.084, 424.085

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22 Claims, 11 Drawing Sheets

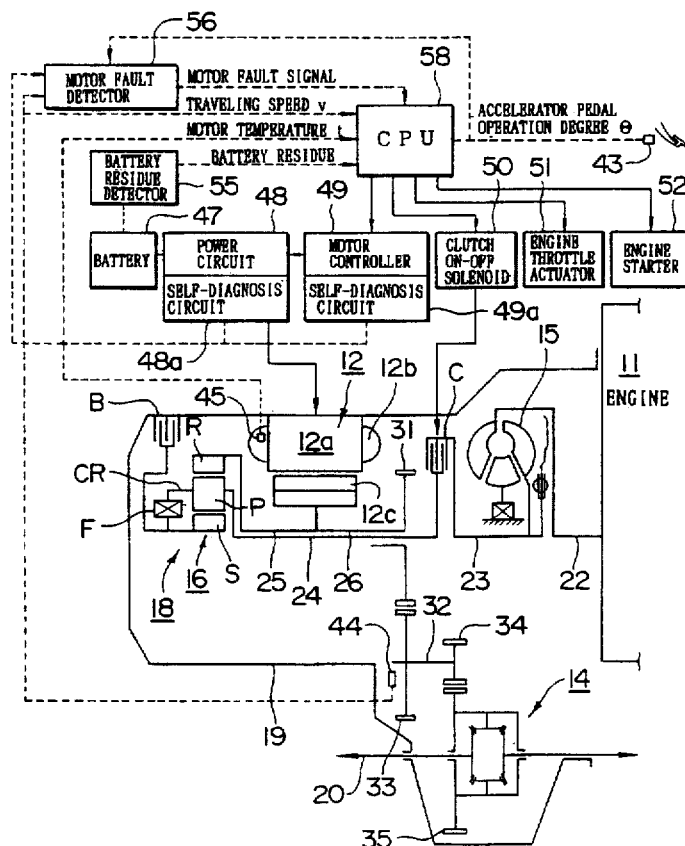


FIG. 1

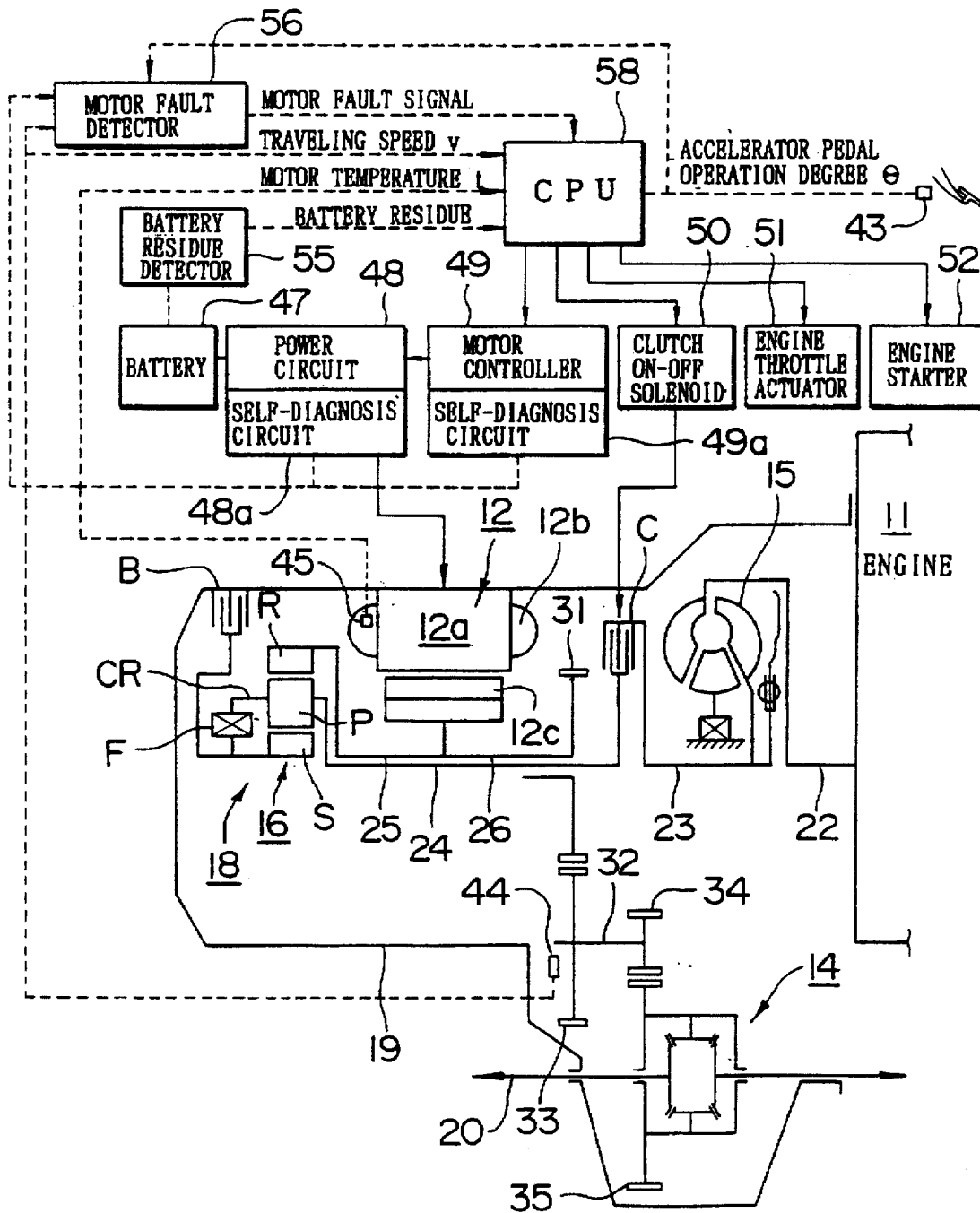


FIG. 2

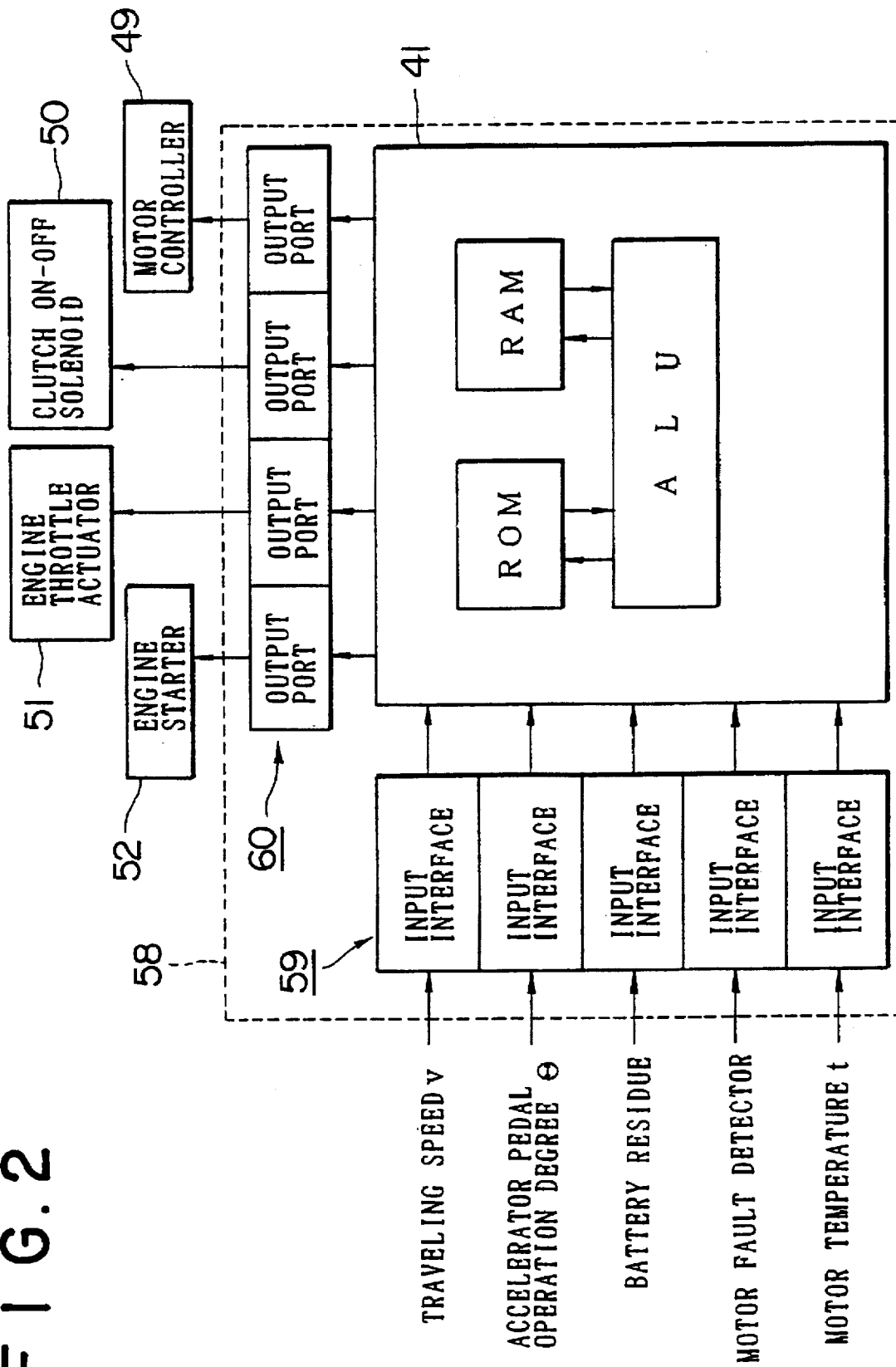


FIG. 3

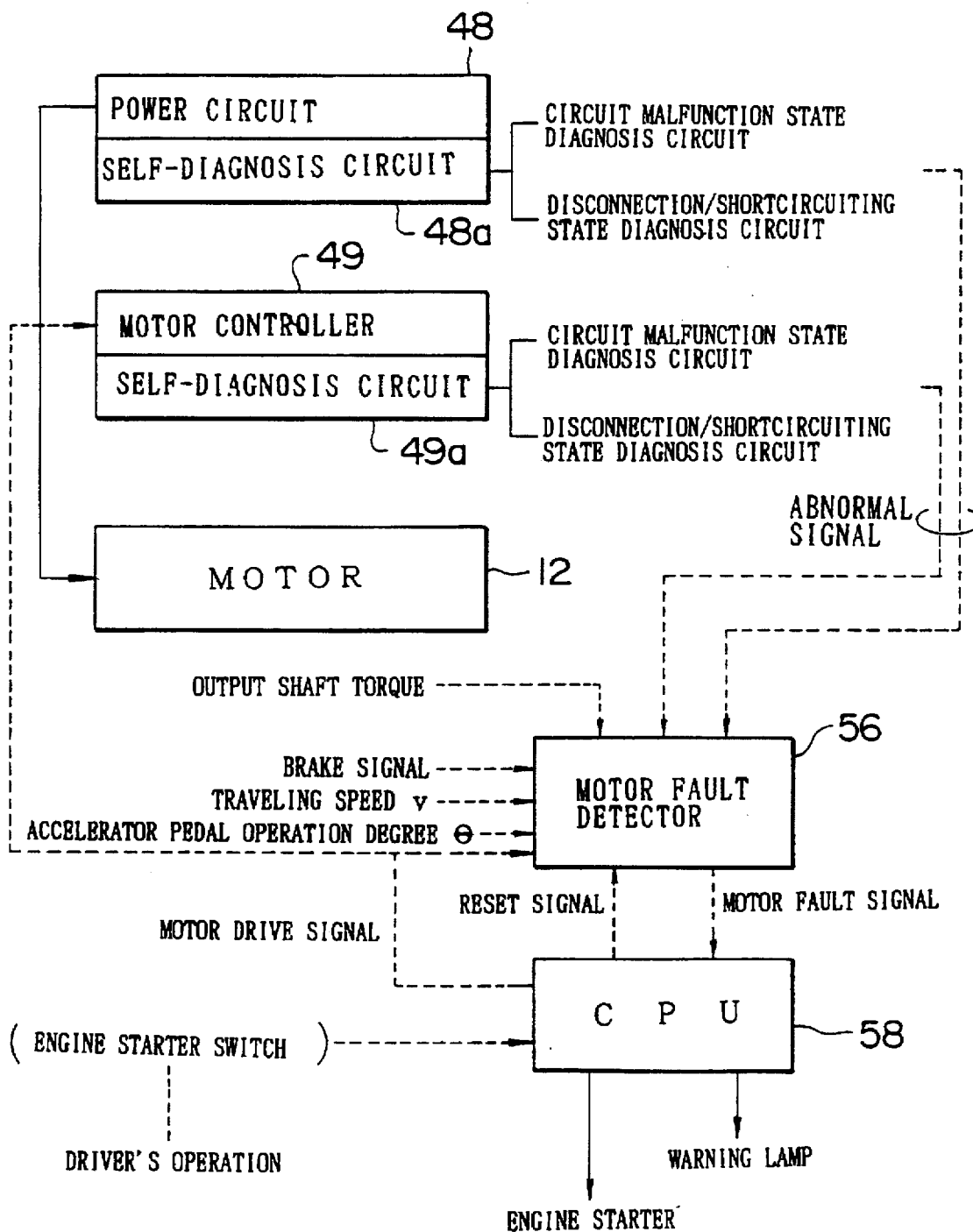


FIG. 4

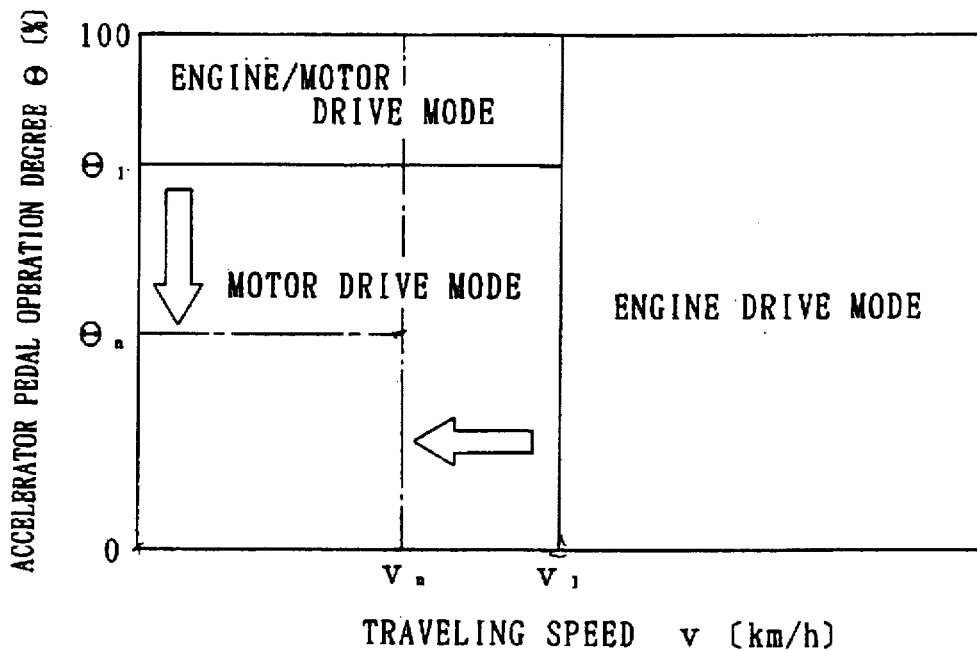
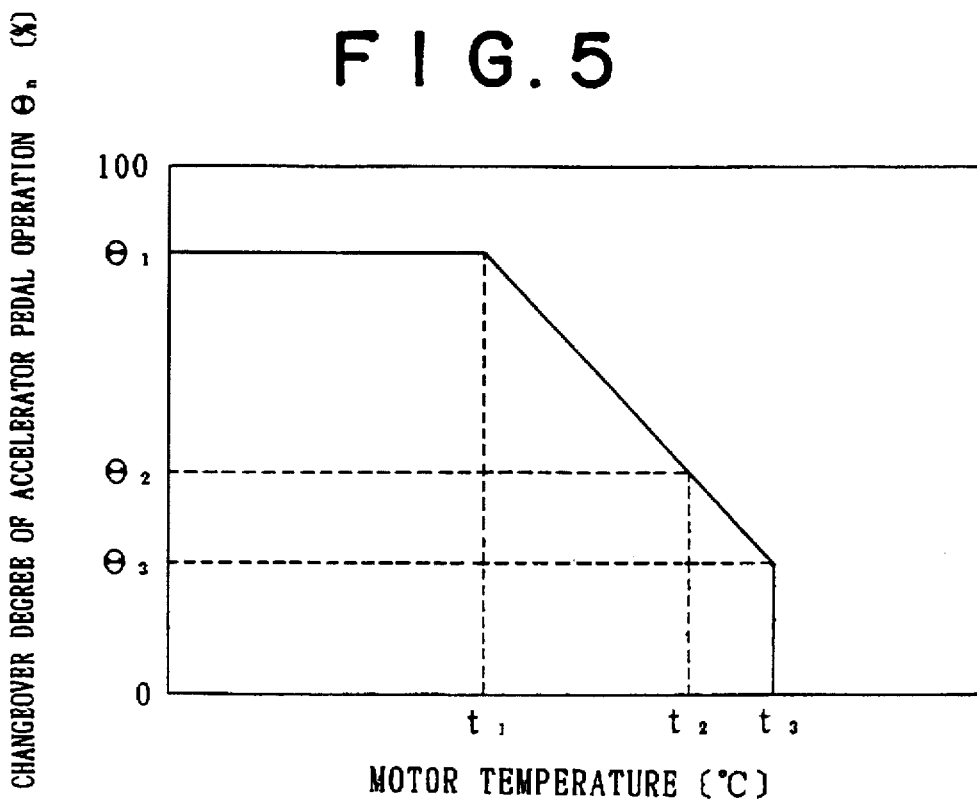


FIG. 5



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