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Ibaraki et al.

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[54] HYBRID DRIVE SYSTEM FOR MOTOR VEHICLE

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Int. Cl.⁷ B60K 6/04 **U.S. Cl.** **180/65.2**; 180/65.8; 318/376;

701/55

[58] **Field of Search** 180/65.2, 65.1, 180/65.3, 65.4, 65.8; 318/8, 376; 701/22,

51, 55

[56] References Cited

U.S. PATENT DOCUMENTS

4,335,429	6/1982	Kawakatsu 180/65.2 X
4,470,476	9/1984	Hunt
5,343,970	9/1994	Severinsky
5,346,031	9/1994	Gardner 180/65.2 X
5,558,175	9/1996	Sherman 180/65.2
5,656,921	8/1997	Farrall 180/65.2 X
5,697,466	12/1997	Moroto et al

FOREIGN PATENT DOCUMENTS

0 552 140 7/1993 European Pat. Off. .

5-50865 3/1993 Japan.

6-38304 2/1994 Japan.

OTHER PUBLICATIONS

Patent Abstracts of Japan, vol. 95, No. 003, JP-A-07 067208, Mar. 10, 1995.

Primary Examiner—Michael Mar

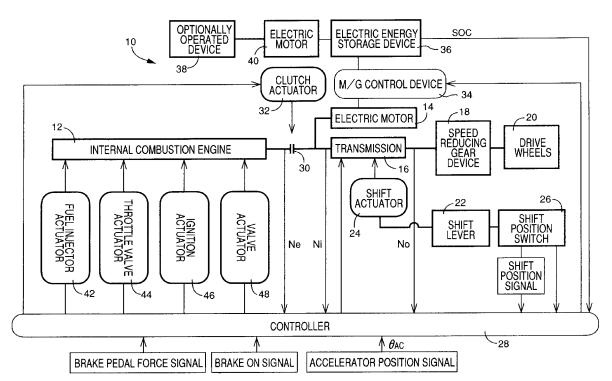
Attorney, Agent, or Firm-Oblon, Spivak, McClelland,

Maier & Neustadt, P.C.

ABSTRACT

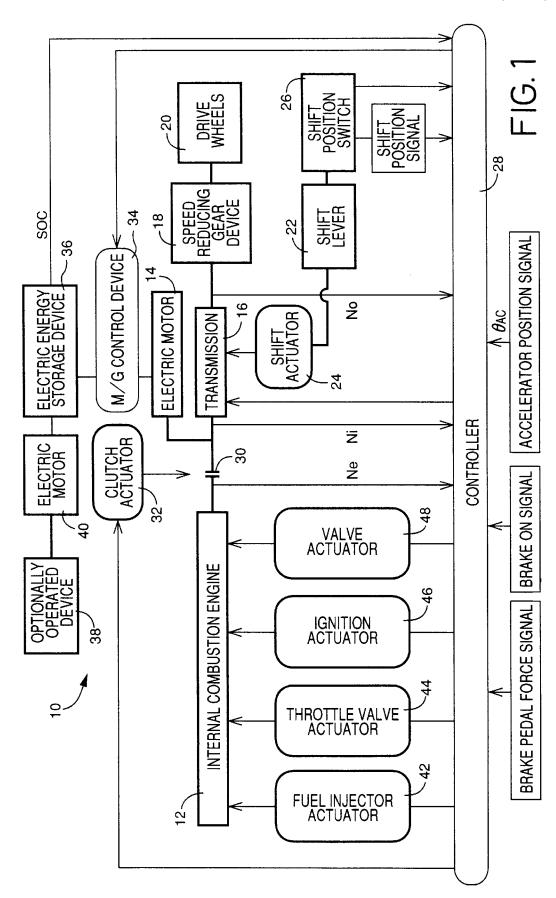
A hybrid vehicle drive system including an engine, an electric motor operated by an electric energy stored in a storage device charged by operation of the engine, and a controller for selecting a low-load drive mode for driving the vehicle by the electric motor when the vehicle running condition is in a predetermined low-load range, and a high-load drive mode for driving the vehicle by the engine when the running condition is in a predetermined high-load range in which a load acting on the hybrid drive device is higher than that in the low-load range, and wherein the controller includes an emergency drive control device operated in the event of a failure of the first and second drive power sources, for operating the other, normal drive power source to drive the motor vehicle, and a range changing device for changing one of the low-load and high-load ranges which corresponds to the normal drive power source when the normal drive power source is operated by the emergency drive control device.

6 Claims, 9 Drawing Sheets

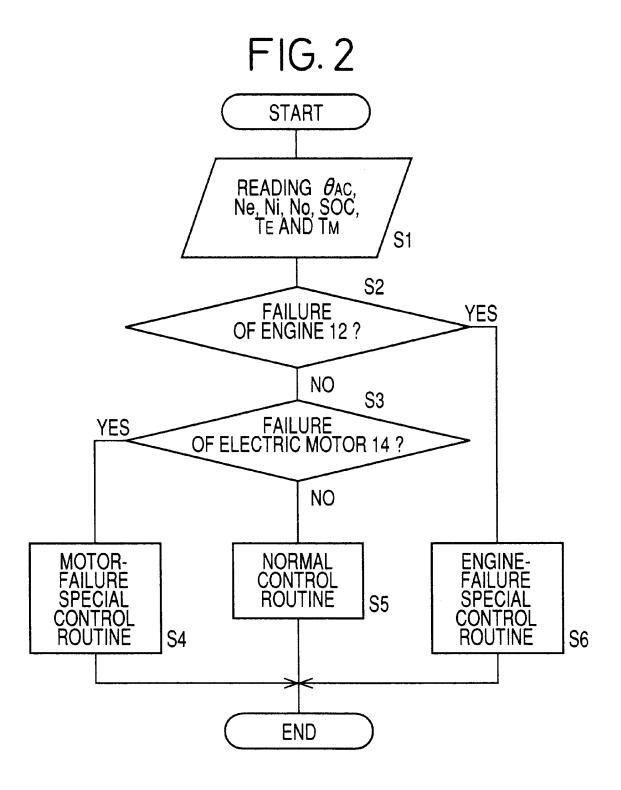




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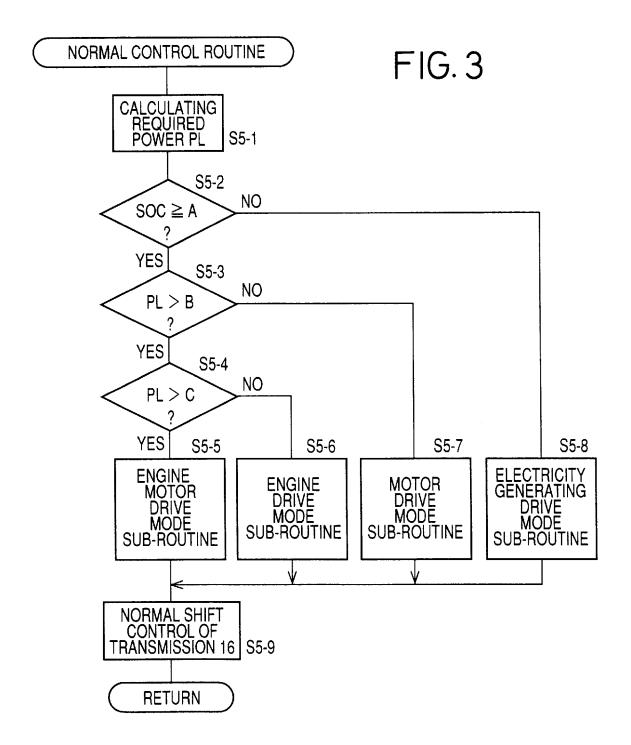
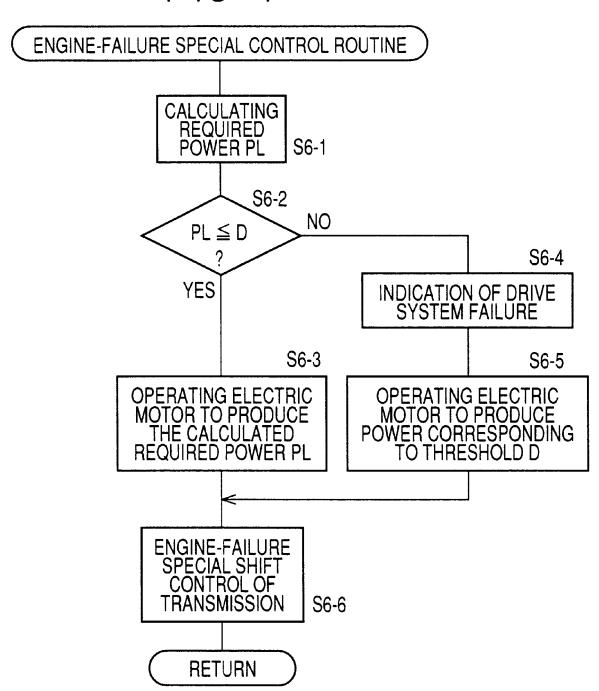




FIG. 4





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