United States Patent [19]

Kawakatsu et al.

[54] CONTROL APPARATUS AND METHOD FOR ENGINE/ELECTRIC HYBRID VEHICLE

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- [21] Appl. No.: 330,433
- [22] Filed: Dec. 14, 1981

Related U.S. Application Data

- [63] Continuation of Ser. No. 123,057, Feb. 25, 1980, Pat. No. 4,305,254.
- [51] Int. Cl.³ F02B 73/00
- [52] U.S. Cl. 60/716; 60/718;
- [58] **Field of Search** 60/698, 706, 709, 711, 60/716, 718; 180/65.2, 65.1; 290/17, 45

[56] References Cited

U.S. PATENT DOCUMENTS

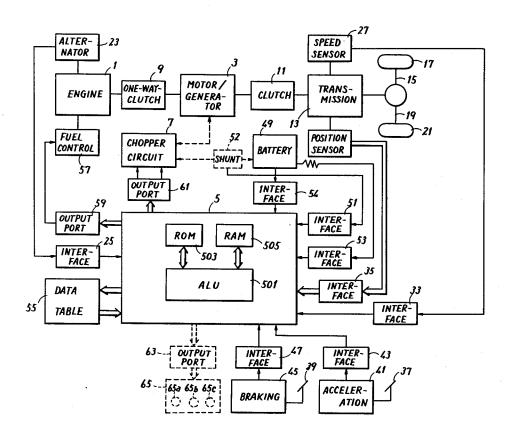
| 3,503,464 | 3/1970 | Yardney | . 180/65.2 |
|-----------|---------|-------------|------------|
| 3,923,115 | 12/1975 | Helling | . 180/65.2 |
| 4,042,056 | 8/1977 | Horwinski 1 | 80/65.2 X |

Primary Examiner—Allen M. Ostrager Assistant Examiner—Stephen F. Husar Attorney, Agent, or Firm—Darby & Darby

[57] ABSTRACT

A hybrid vehicle comprises an internal combustion engine and a motor/generator, which are controlled by a microcomputer. The internal combustion engine is rendered capable of a running operation in a region of a better fuel consumption characteristic. Outside the above described region, the motor is cooperatively driven with the internal combustion engine to provide a driving torque or only the motor is energized by a battery to provide a driving torque. On the other hand, when the hybrid vehicle is driven with a torque smaller than a predetermined lower limit value of the torque of the internal combustion engine, the redundant torque is used to drive the generator, so that a regenerative power is absorbed by the battery.

1 Claim, 22 Drawing Figures

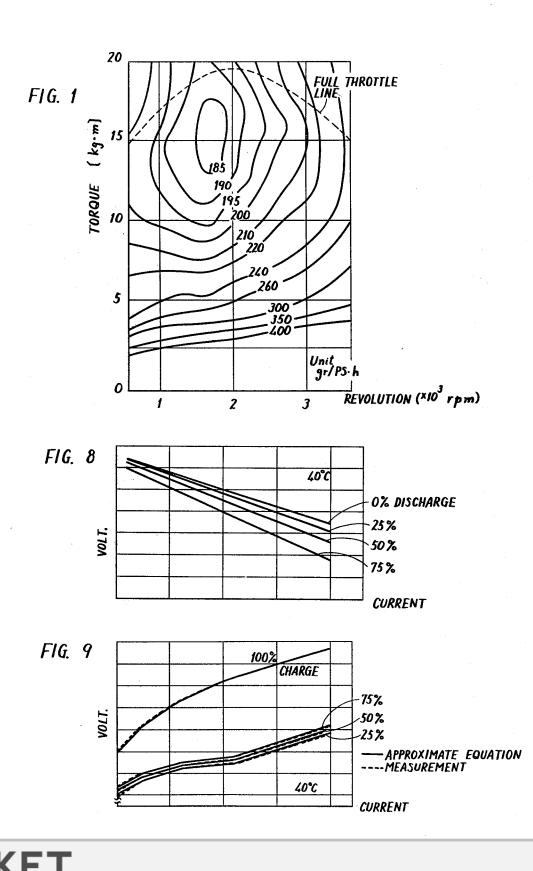


[11] 4,407,132 [45] Oct. 4, 1983

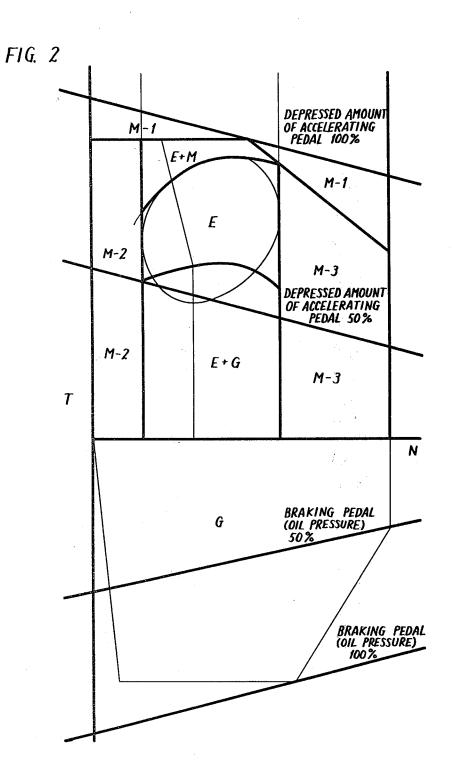
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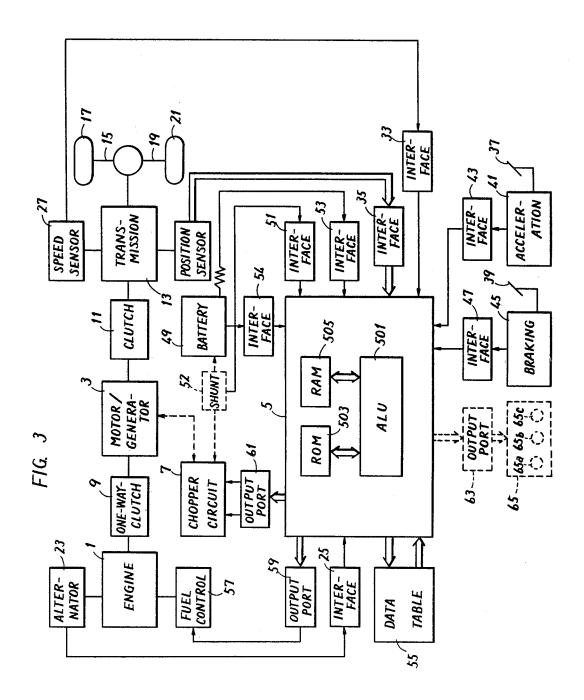
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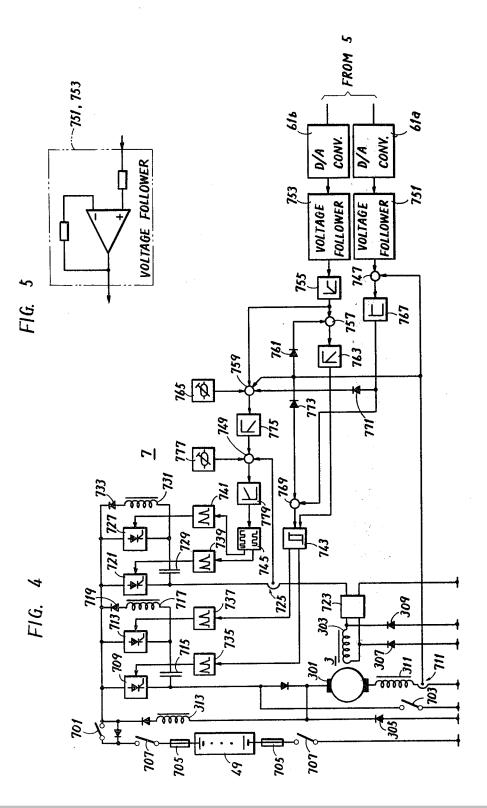
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