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# United States Patent [19]

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Lateur et al.

[45] Date of Patent: **Oct. 20, 1998**

[54] **HYBRID PARALLEL ELECTRIC VEHICLE**

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[21] Appl. No.: **372,173**

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[22] Filed: **Jan. 12, 1995**

[51] Int. Cl.<sup>6</sup> ..... **B60K 1/00**

### [57] ABSTRACT

[52] U.S. Cl. .... **180/65.2; 180/65.4; 180/165**

A hybrid electric drive system is described that includes a heat engine having a drive shaft, and two electric motor/generators having rotors that are coaxially connected to the drive shaft. A control arrangement for these elements is also described that provides a relatively simple combined operation for driving a vehicle.

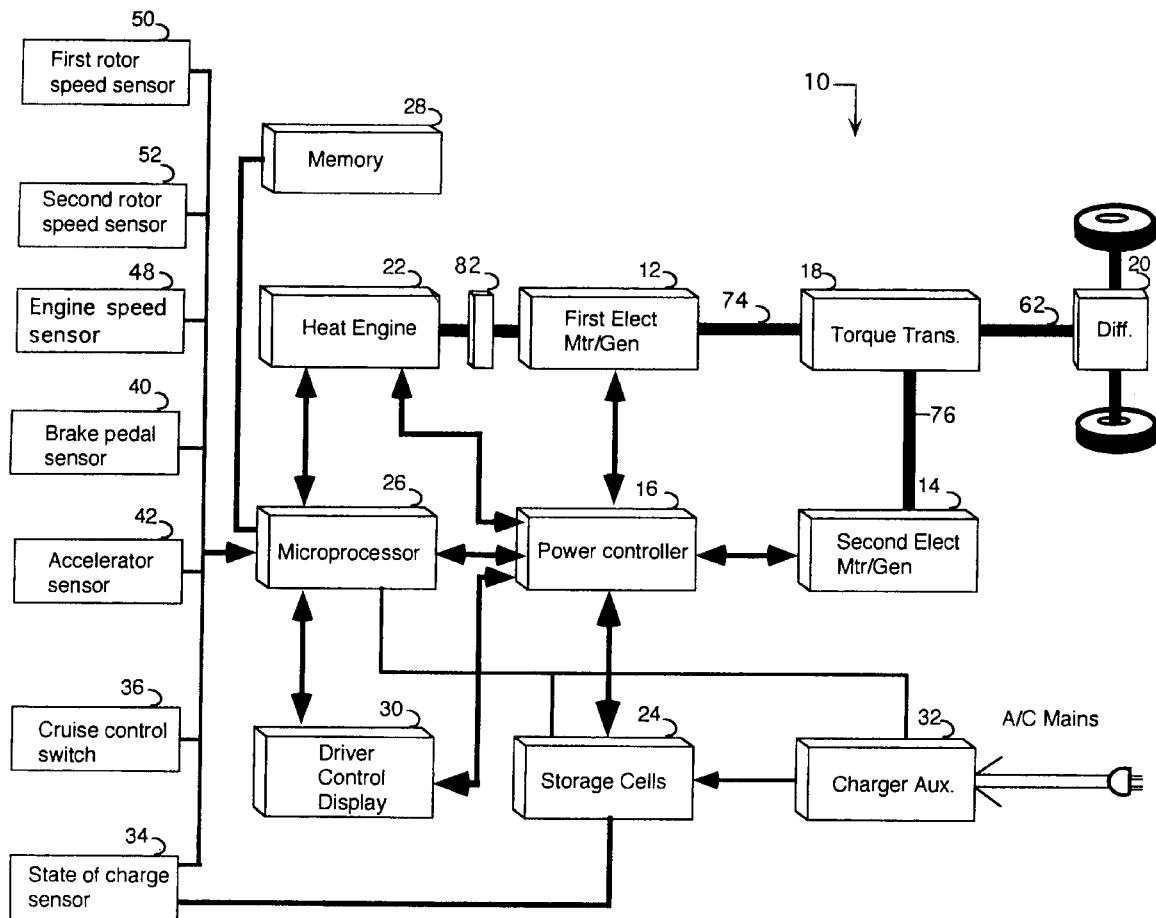
[58] Field of Search ..... 60/716; 180/65.2,  
180/65.1, 65.4, 65.3; 475/3, 5; 364/426.041;  
318/141, 149, 34, 41, 46, 53, 59, 61

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**19 Claims, 9 Drawing Sheets**



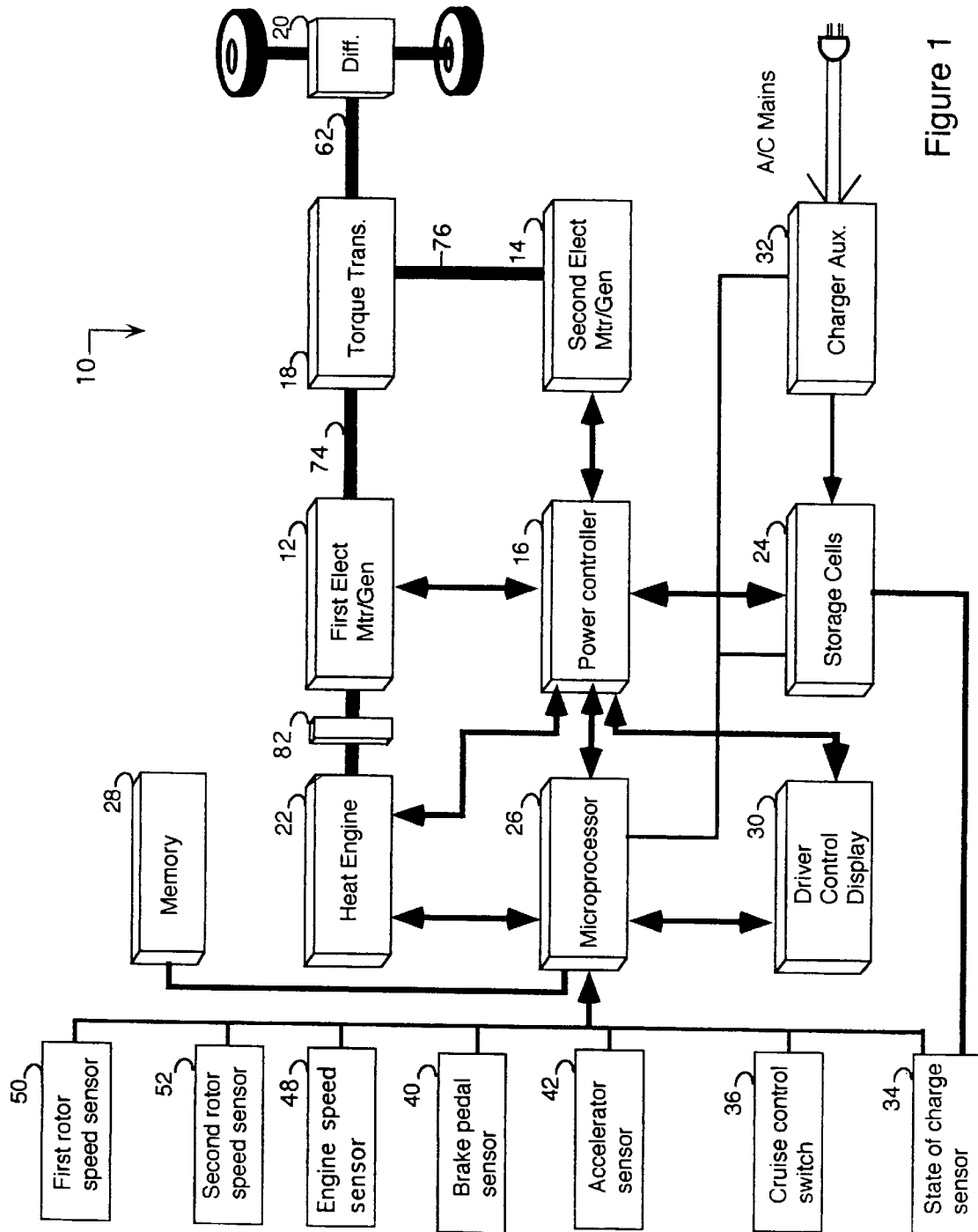


Figure 1

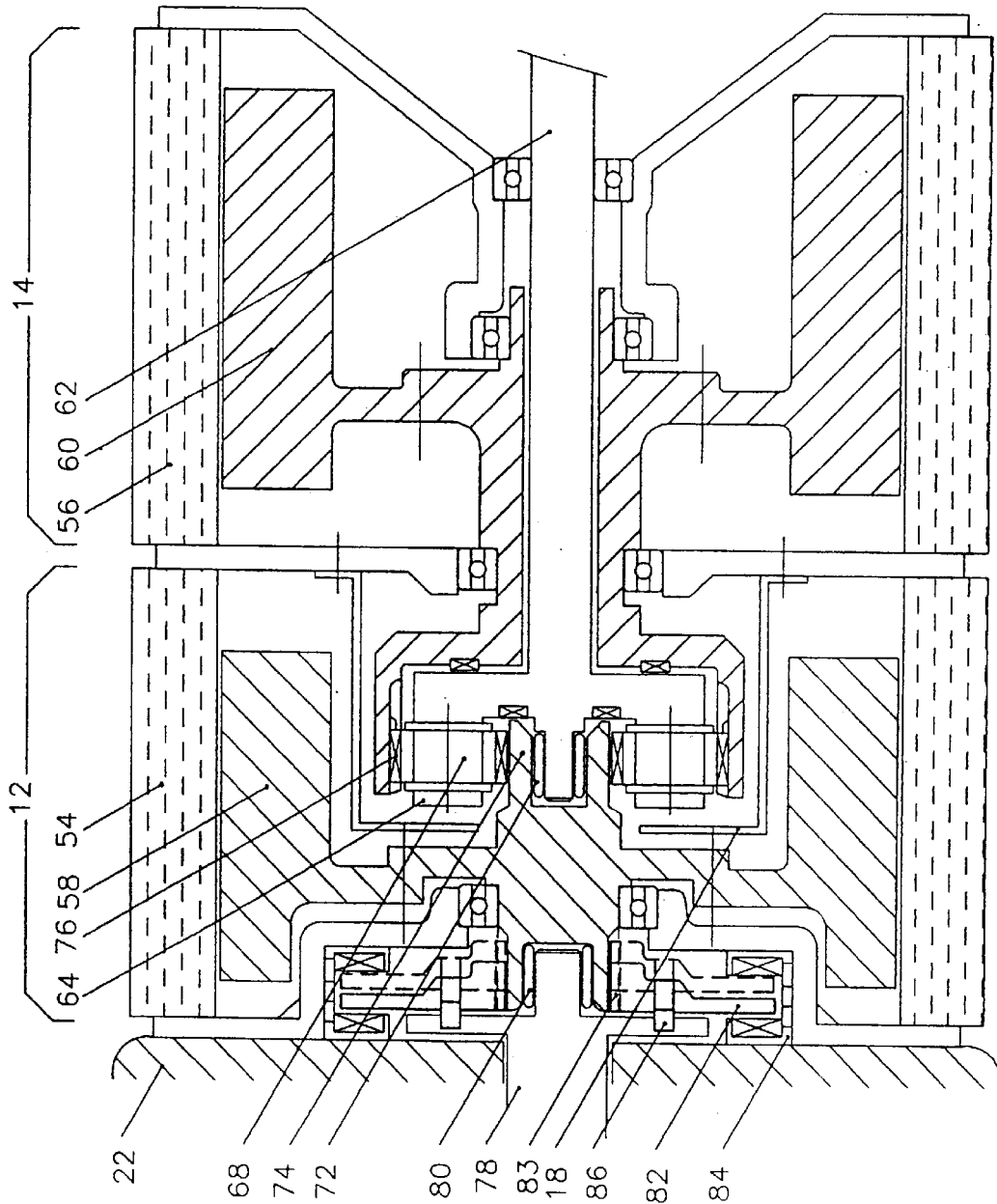


FIG. 2

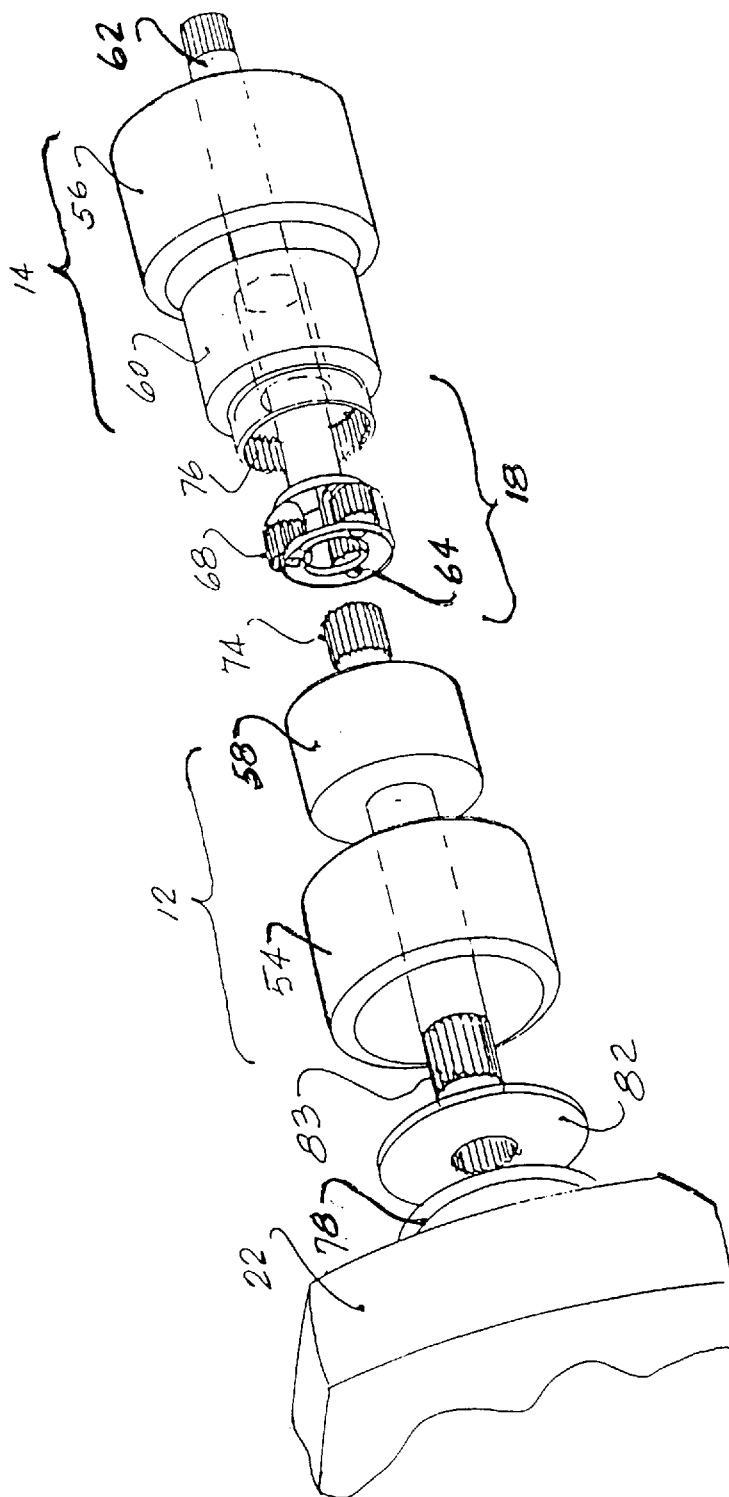


Figure 3

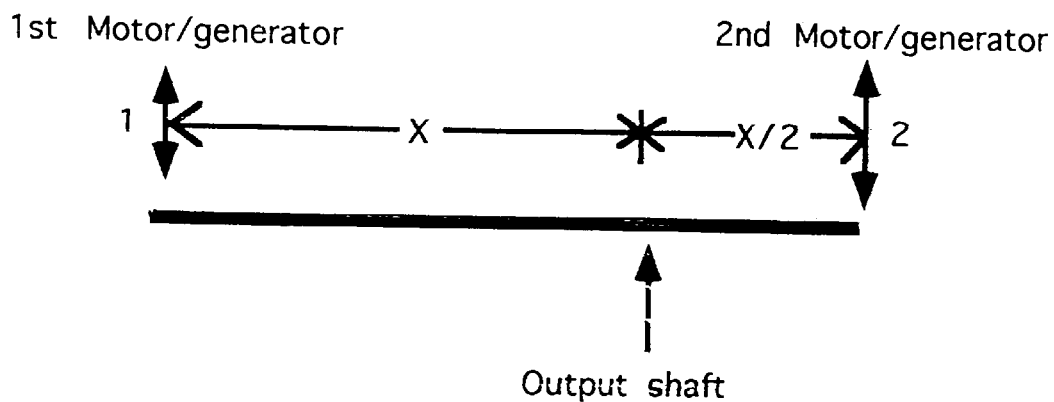


Figure 4 a

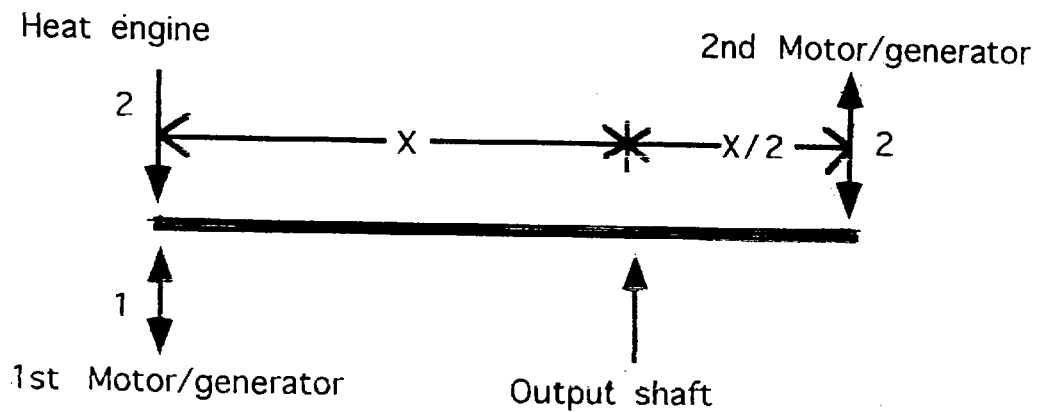


Figure 4 b

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