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(54) Title: HYDROGEN-PRODUCING FUEL CELL SYSTEMS AND METHODS OF OPERATING HYDROGEN-PRODUCING
FUEL CELL SYSTEMS FOR BACKUP POWER OPERATIONS

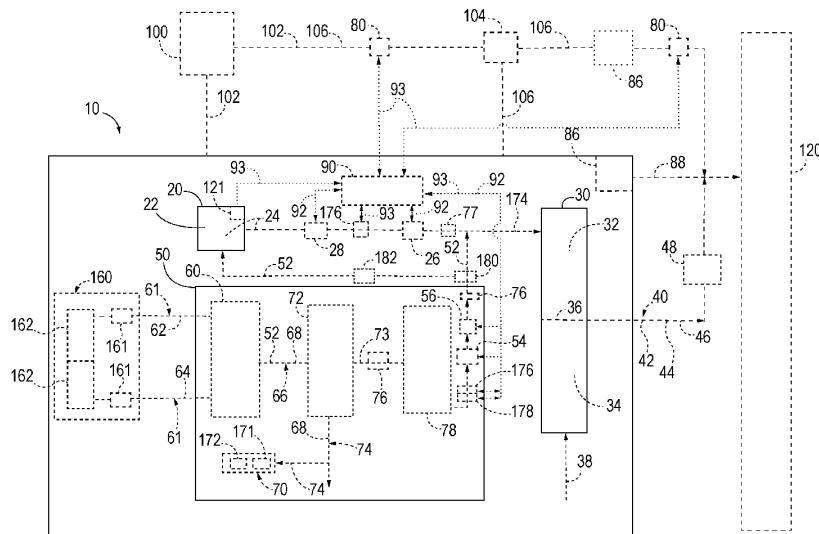


FIG. 1

(57) Abstract: Hydrogen-producing fuel cell systems (HPFCS) and methods. The HPFCS includes a fuel processor configured to produce generated hydrogen gas, a hydrogen storage device configured to contain stored hydrogen gas, and a fuel cell stack configured to produce an initial electrical output from the stored hydrogen gas and an oxidant and to produce a subsequent electrical output from the generated hydrogen gas and the oxidant. The methods include detecting an inability of a primary power source to satisfy an applied load. Responsive to the detecting, the methods include initiating a startup of the fuel processor, supplying stored hydrogen gas to the fuel cell stack to produce the initial electrical output, satisfying the applied load with the initial electrical output, supplying generated hydrogen gas to the fuel cell stack after the startup to produce a subsequent electrical output, and satisfying the applied load with the

[Continued on next page]

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