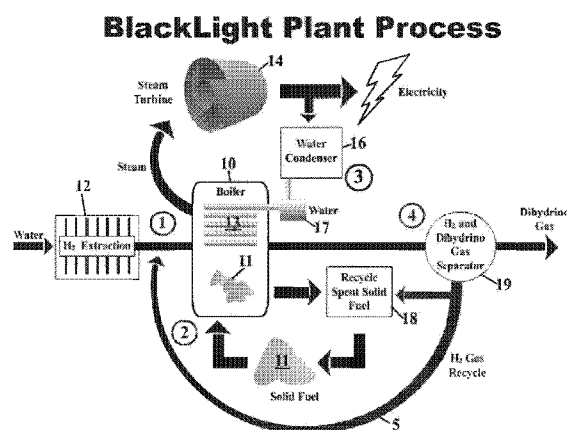


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- (54) Title:** HETEROGENEOUS HYDROGEN-CATALYST POWER SYSTEM

Fig. 2



- (57) Abstract:** A power source and hydride reactor is provided that powers a power system comprising (i) a reaction cell for the catalysis of atomic hydrogen to form hydrinos, (ii) a chemical fuel mixture comprising at least two components chosen from: a source of catalyst or catalyst; a source of atomic hydrogen or atomic hydrogen; reactants to form the source of catalyst or catalyst and a source of atomic hydrogen or atomic hydrogen; one or more reactants to initiate the catalysis of atomic hydrogen; and a support to enable the catalysis, (iii) thermal systems for reversing an exchange reaction to thermally regenerate the fuel from the reaction products, (iv) a heat sink that accepts the heat from the power-producing reactions, and (v) a power conversion system. In an embodiment, the catalysis reaction is activated or initiated and propagated by one or more other chemical reactions such as a hydride-halide exchange reaction between a metal of the catalyst and another metal. These reactions are thermally reversible by the removal of metal vapor in the reverse exchange. The hydrino reactions are maintained and regenerated in a batch mode using thermally-coupled multi-cells arranged in bundles wherein cells in the power-production phase of the cycle heat cells in the regeneration phase. In this intermittent cell power design, the thermal power is statistically constant as the cell number becomes large, or the cells cycle is controlled to achieve steady power. In another power system embodiment, the hydrino reactions are maintained and regenerated continuously in each cell wherein heat from

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the power production phase of a thermally reversible cycle provides the energy for regeneration of the initial reactants from the products. Since the reactants undergo both modes simultaneously in each cell, the thermal power output from each cell is constant. Thermal power is converted to electrical power by a heat engine exploiting a cycle such as a Rankine, Brayton, Stirling, or steam-engine cycle. In another embodiment, the exchange reactions are constituted in half-cell reactions as the basis of a unique fuel cell wherein direct electrical power is developed with energy released by the reaction of hydrogen to form hydrinos.