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(54) Title: HYDROGEN GENERATION SYSTEMS AND METHODS UTILIZING SODIUM SILICIDE AND SODIUM SILICA GEL MATERIALS

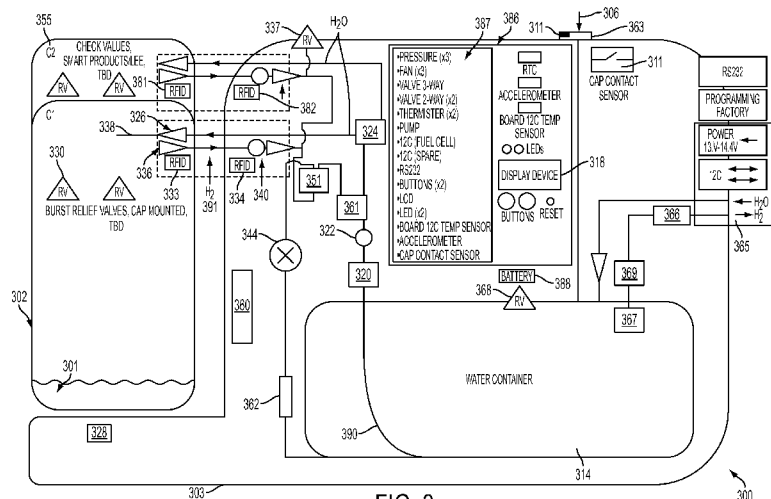


FIG. 3

(57) Abstract: Systems, devices, and methods combine reactant materials and aqueous solutions to generate hydrogen. The reactant materials can sodium suicide or sodium silica gel. The hydrogen generation devices are used in fuels cells and other industrial applications. One system combines cooling, pumping, water storage, and other devices to sense and control reactions between reactant materials and aqueous solutions to generate hydrogen. Multiple inlets of varied placement geometries deliver aqueous solution to the reaction. The reactant materials and aqueous solution are churned to control the state of the reaction. The aqueous solution can be recycled and returned to the reaction. One system operates over a range of temperatures and pressures and includes a hydrogen separator, a heat removal mechanism, and state of reaction control devices. The systems, devices, and methods of generating hydrogen provide thermally stable solids, near-instant reaction with the aqueous solutions, and a non-toxic liquid by-product.