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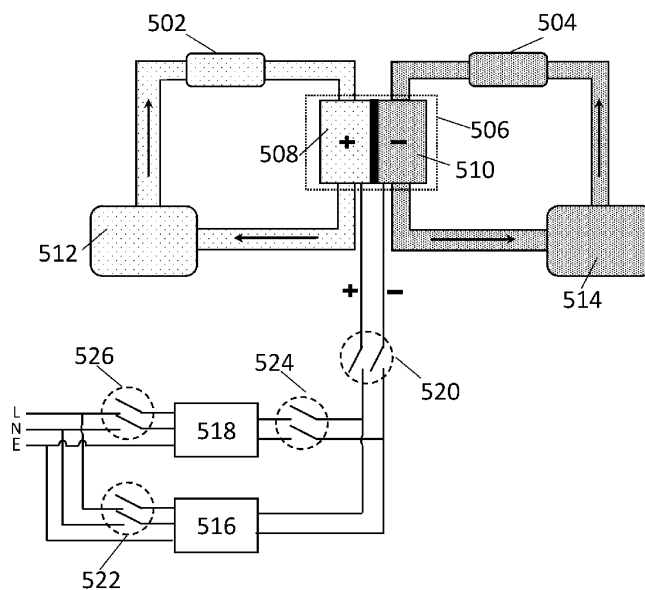


FIG. 5

(57) Abstract: Charging initiation methods for flow batteries, controllers for flow batteries and flow battery systems are disclosed. A charging initiation method for a flow battery which allows charging of the flow battery from an AC power supply with a power converter having a minimum operational DC voltage is described. The flow battery comprises a positive electrolyte tank containing a positive electrolyte, a negative electrolyte tank containing a negative electrolyte, a cell stack comprising a positive porous electrode and a negative porous electrode, a positive electrolyte pump which when activated pumps the positive electrolyte from the positive electrolyte tank through the positive porous electrode, and a negative electrolyte pump which when activated pumps the negative electrolyte from the negative electrolyte tank through the negative porous electrode. The charging initiation method comprises: connecting a DC power supply to the positive porous electrode and the negative porous electrode to charge the cell stack, while the positive electrolyte pump

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and the negative electrolyte pump are deactivated; and in response to a pre-charging condition: disconnecting the DC power supply from the positive porous electrode and the negative porous electrode; connecting the power converter coupled to an the AC power supply to the positive porous electrode and the negative porous electrode to charge the cell stack from the AC power supply; and activating the positive electrolyte pump and the negative electrolyte pump.