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(71) Applicant: **V-FLOW TECH PTE. LTD.** [SG/SG]; 1
Cleantech Loop, #02-26, Singapore 637141 (SG).

(72) Inventors: **BHATTARAI, Arjun**; c/o V-Flow Tech Pte.
Ltd., 1 Cleantech Loop, #02-26, Singapore 637141 (SG).
KUMAR, Avishek; c/o V-Flow Tech Pte. Ltd., 1 Cleantech
Loop, #02-26, Singapore 637141 (SG).

(74) Agent: **LINDSAY, Jonas Daniel**; Marks & Clerk Singa-
pore LLP, Tanjong Pagar Post Office, P.O. Box 636, Singa-
pore 910816 (SG).

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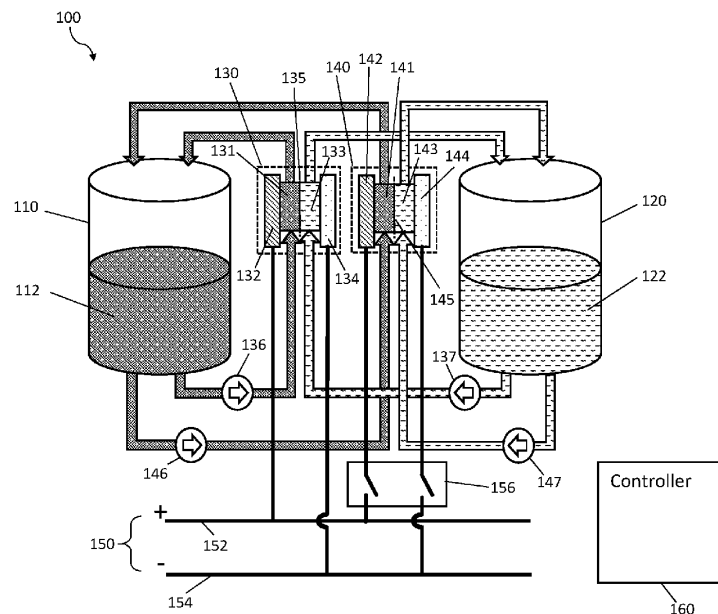


FIG.1

(57) Abstract: Flow battery systems and control methods are disclosed. A flow battery system comprises: a positive electrolyte tank containing a positive electrolyte; a negative electrolyte tank containing a negative electrolyte; a primary stack comprising a positive porous electrode and a negative porous electrode separated by a membrane, the positive porous electrode of the primary stack and the negative porous electrode of the primary stack being coupled to a power bus; a primary stack positive electrolyte pump configured to pump positive electrolyte from the positive electrolyte tank through the positive electrode of the primary stack; a primary stack negative electrolyte pump configured to pump negative electrolyte from the negative electrolyte tank through the negative electrode of the primary stack; an auxiliary stack comprising a positive porous electrode and a negative porous electrode separated by a membrane, the positive porous electrode of the auxiliary stack and the negative porous electrode of the auxiliary stack being coupled to the power bus; an

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auxiliary stack positive electrolyte pump configured to pump positive electrolyte from the positive electrolyte tank through the positive electrode of the auxiliary stack; an auxiliary stack negative electrolyte pump configured to pump negative electrolyte from the negative electrolyte tank through the negative electrode of the auxiliary stack; and a controller configured to activate and deactivate the auxiliary stack positive electrolyte pump and the auxiliary stack negative electrolyte pump based on a detected power load on the power bus.