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(54) Title of the invention : Thermal Management System for Lithium-Ion Battery Pack Using Curved Strips or Rings or Rings with Fins

(51) International classification :H01M0010613000, H01M0010625000, H01M0010480000, H05K0007200000, H01M0010647000 (86) International Application No :NA Filing Date :NA (87) International Publication No : NA (61) Patent of Addition to Application Number :NA Filing Date :NA (62) Divisional to Application Number :NA Filing Date :NA		(71)Name of Applicant : 1)INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD Address of Applicant :Dhanbad - 826004, Jharkhand, India Dhanbad ----- ----- Name of Applicant : NA Address of Applicant : NA (72)Name of Inventor : 1)Ram Babu Gupta Address of Applicant :Department of Mechanical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad ----- 2)Devesh kumar Address of Applicant :Department of Mechanical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad ----- 3)Rahul Ranjan Address of Applicant :Department of Mechanical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad ----- 4)Tanmay Dutta Address of Applicant :Department of Mechanical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad -----
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(57) Abstract :

The present invention introduces a novel air-cooled battery thermal management system (100, 200, 300) employing various arrangements of curved strips (3a) or rings (3b) or rings with fins (3c), tubes (4), and plates (5, 5A) to enhance the cooling of cells (1) inside the box (2, 2A) by conductive and convective heat transfer. Curved strips (3a) and tubes (4) help to maintain the uniformity of temperature inside the battery pack. Plates (5, 5A) positioned at the top of the top busbar (6) and at the bottom of the bottom busbar (6) accelerate heat dissipation from the busbar (6) by conductive heat transfer. Cool air is introduced into the battery pack through a single inlet port or plurality of inlet ports on the inlet face (7), which removes heat from the cells (1), curved strips (3a) or rings (3b) or rings with fins (3c) and tubes (4) via convective heat transfer, and finally dissipates this heat in the environment via a single outlet port or plurality of outlet ports on the outlet face (8) to reduce the temperature of the cells (1) in the battery pack and improve the performance, safety, and life of the battery pack. Additional inlet port (9) of air at the bottom of the box (2A) helps to improve the cooling of the cells further. [figures 1, 5, 9]

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