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(54) Title of the invention : Enhancing Energy-Efficient and Total Thermal Management heating and cooling System for Electric Vehicles

(51) International classification	:B60L 11/18, B60K 1/04, B60K 1/00, B60K 6/28, H01M 10/6556	(71)Name of Applicant : <b>1)Dr. Ravinaik Banoth</b> Address of Applicant :Professor, Department of Mechanical Engineering, St.Martins Engineering College, Dhulapally Road Kompally Secundrabad-500100, India Telangana India
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(57) Abstract :

The transportation business is growing quickly, and people are becoming more worried about the environment, which has made the switch from regular cars with internal combustion engines to electric vehicles (EVs) even faster. Electric cars have many benefits, such as less pollution, better energy efficiency, and less dependence on fossil fuels. It is still very hard to keep the right temperature for some important parts of electric vehicles, such as lithium-ion batteries, electric motors, power electronics, and passenger cabins. Not being able to control the temperature well can have a big effect on how well a battery works. This can make driving less safe, waste energy, and shorten the range of the car. This idea is to provide electric automobiles an energy-efficient heating and cooling system that works together with the car's other systems. The basic goal of the system is to keep different car parts at the right temperatures. The system that has been shown to work well for controlling thermal conditions uses a number of cutting-edge technologies, such as air cooling, liquid cooling, heating with heat pumps, smart temperature monitoring, and systems for recovering waste heat. The system employs sensors and a central control unit to constantly check for changes in temperature so that it may change how it heats and cools. The method makes the most of all the energy used and cuts down on the need for more power by using waste heat from electric motors and power electronics to control the temperature of the battery or heat the cabin. Also, the proposed thermal management system makes sure that the temperature is evenly spread across the lithium-ion battery pack. This makes the battery last longer, makes operations safer, and makes charging more effective. The integrated design also makes passengers more comfortable and has less of an effect on the vehicle's range. Overall, the suggested technology gives electric vehicles a reliable, long-lasting, and energy-efficient way to manage their heat. This plan provides a lot of benefits, such as better vehicle performance, longer battery life, better environmental sustainability, and more safety. Keywords: Electric Vehicles (EVs), Thermal Management System (TMS), Battery Thermal Management System (BTMS), Lithium-ion Battery, Energy Efficiency, Heat Pump Technology, Liquid Cooling System.

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