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(71) Applicant: **EICHER MOTORS LIMITED** [IN/IN]; Royal Enfield (A Unit of Eicher Motors Ltd.), 296, Rajiv Gandhi Salai, Elcot Sez, Sholinganallur, Chennai, Tamil Nadu 600119 (IN).

(72) Inventors: **THALIYANVEEDU, Hareesh**; Royal Enfield, 296, Rajiv Gandhi Salai, Elcot Sez, Sholinganallur, Chennai, Tamil Nadu 600119 (IN). **KUMAR, Naresh**; Royal Enfield, 296, Rajiv Gandhi Salai, Elcot Sez, Sholinganallur, Chennai, Tamil Nadu 600119 (IN). **KRISHNAPPA, Umesh**; Royal Enfield, 296, Rajiv Gandhi Salai, Elcot Sez, Sholinganallur, Chennai, Tamil Nadu 600119 (IN). **KUMAR, Veeramani Dinesh**; Royal Enfield, 296, Rajiv Gandhi Salai, Elcot Sez, Sholinganallur, Chennai, Tamil Nadu 600119 (IN).

(74) Agent: **MAHUA RAY**; REMFRY & SAGAR, Attorneys-at-Law, Remfry House at the Millennium Plaza, Sector 27, Gurugram, HARYANA 122 009 (IN).

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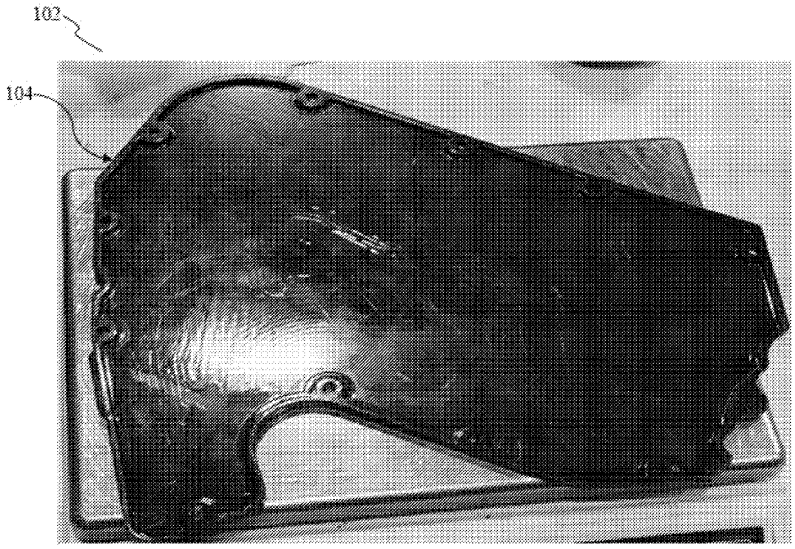

Figure 2

(57) Abstract: A battery module 100 for electric vehicles is disclosed, comprising one or more battery cells configured to store and supply electrical energy. The battery module includes a battery enclosure 102 fabricated from Magnesium or Magnesium alloys, such as AZ91D. A dielectric coating 104, is uniformly applied to the inner surface of the battery enclosure 102, composed of insulating materials including ceramic-based coatings, fluoropolymer coatings, epoxy-based resins, high-density coatings, and hybrid polymer-ceramic coatings. The dielectric coating 104 is applied using a spray deposition process to ensure uniform coverage and adhesion. The battery module 100 provides enhanced electrical insulation, thermal management, and environmental protection, making it suitable for high-performance electric vehicles.

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