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(19) **United States**(12) **Patent Application Publication**
TRUDEL et al.(10) **Pub. No.: US 2022/0352782 A1**(43) **Pub. Date: Nov. 3, 2022**(54) **ELECTRIC AXLE WITH DIRECT ROTOR
AND HEAD SPRAY COOLING****H02K 5/18** (2006.01)**H02K 9/193** (2006.01)**B60K 1/00** (2006.01)(71) Applicant: **DANA TM4 INC.**, Boucherville (CA)(52) **U.S. Cl.**(72) Inventors: **Carl TRUDEL**, Boucherville (CA);
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Methods and systems are provided for an electric axle in a vehicle. The electric axle comprises an electric motor having a stator and a rotor, a coolant manifold mounted to an end plate of the rotor, wherein the coolant manifold is configured to flow coolant to rotor coolant lines extending axially through the rotor, and a spray ring comprising coolant lines coupled to the coolant manifold, wherein coolant flowing from the coolant manifold to the spray ring flows in a direction angled to an axial direction, wherein the spray ring is positioned circumferentially about axial stator end windings.

