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Ferran

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(54) **MULTI-PHASE PERMANENT MAGNET
BRUSHLESS DC ELECTRIC MOTOR**

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H02K 11/00 (2006.01)

(52) **U.S. Cl.**
USPC **310/71; 310/179; 310/256**

(58) **Field of Classification Search**
USPC **310/71, 179-180, 184, 198,**
310/156.12-156.14

See application file for complete search history.

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(57) **ABSTRACT**

A multi-phase, permanent magnet brushless DC electric motor includes 24 phase windings operating at a reduced voltage so that the motor can be powered by batteries or other sources of DC voltage to enable the motor to be used safely for propelling watercraft or other vehicles where the higher voltages required for conventional high horsepower motors would not be acceptable. The motor is wound by solid conductors spaced apart by 7.5 degrees. The conductors are interconnected and electrically driven by a sequence of drive currents to provide a six-pole stator. The connections to and interconnections between the stator windings are mirrored at each end of the stator to distribute the connections and interconnections between the two ends of the motor. A corresponding six-pole rotor using permanent magnets secured to a hollow rotor core is caused to rotate by the fields generated by the stator.

6 Claims, 46 Drawing Sheets

