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| (21) International Application Number: PCT/US96/16860<br>(22) International Filing Date: 21 October 1996 (21.10.96)<br>(30) Priority Data:<br>08/560,726 20 November 1995 (20.11.95) US<br>(71) Applicant: QUANTUM CORPORATION [US/US]; 500 Mc-<br>Carthy Boulevard, Milpitas, CA 95035 (US).<br>(72) Inventors: HUANG, Ben; 114 Lowell Avenue, Palo Alto, CA<br>94301 (US). HARTMAN, Albert; 4013 Ben Lomond Drive,<br>Palo Alto, CA 94306 (US).<br>(74) Agents: CHEN, John, C. et al.; Quantum Corporation, 500<br>McCarthy Boulevard, Milpitas, CA 95035 (US). |    | (81) Designated States: AU, CA, CN, JP, KR, SG, European patent<br>(AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU,<br>MC, NL, PT, SE).<br><br>Published<br>With international search report. |

(54) Title: D.C. BRUSHLESS MOTOR WITH MINIMIZED NET RADIAL FORCES AND LOW COGGING TORQUE

## (57) Abstract

A ten pole/twelve slot brushless DC motor for a disk drive spindle includes a base; a cylindrical rotor structure rotating relative to the base and a generally symmetrically slotted stator structure fixed about an axis of rotation. The rotor structure includes a permanent magnet ring structure (56) defining ten permanently magnetized alternating north-south magnet segments (56a-56j). The stator structure includes a ferromagnetic core (60) defining twelve slots (65) between twelve stator poles (64). Coils of insulated wire are wound around the stator poles in one of a plurality of winding patterns and connected into a series of phases, e.g. three phases.

