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(21) International Application Number: PCT/US98/21638 (22) International Filing Date: 21 October 1998 (21.10.98) (30) Priority Data: 60/064,831 21 October 1997 (21.10.97) US (71) Applicant: MAGNA-LASTIC DEVICES, INC. [US/US]; 111 West Buchanan Street, Carthage, IL 62321-0130 (US). (72) Inventor: GARSHELIS, Ivan, J.; 176 South Mountain Road, Pittsfield, MA 01201 (US). (74) Agent: FRIEDMAN, Stuart, J.; Sixbey, Friedman, Leedom & Ferguson, P.C., Suite 600, 2010 Corporate Ridge, McLean, VA 22102 (US).	(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published Without international search report and to be republished upon receipt of that report.	
(54) Title: COLLARLESS CIRCULARLY MAGNETIZED TORQUE TRANSDUCER HAVING TWO PHASE SHAFT AND METHOD FOR MEASURING TORQUE USING SAME		
(57) Abstract A magnetoelastic torque sensor for providing an output signal indicative of the torque applied to a member about an axially extending axis of the member, comprising a member which is unitary and of generally homogeneous chemical composition, the member comprising separate magnetically active and magnetically substantially passive regions. A first magnetoelastically active region in the member is magnetically polarized in a single circumferential direction and possesses sufficient magnetic anisotropy to return the magnetization in the region, following the application of torque to the member, to the single circumferential direction when the applied torque is reduced to zero, whereby the magnetoelastically active region produces a magnetic field varying with the torque. Magnetic field sensors are mounted proximate to the magnetoelastically active region and oriented with respect thereto to sense the magnitude of the magnetic field at the sensors and provide the output signal in response thereto. The magnetoelastically active region of the member is formed of a polycrystalline material wherein at least 50 % of the distribution of local magnetizations lie within a 90° quadrant symmetrically disposed around the single circular direction and has a coercivity sufficiently high to prevent irreversible loss of the magnitude of the circumferential polarization.		