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(71) Applicant: MAGNA-LASTIC DEVICES, INC. [US/US]; 111 West Buchanan Street, Carthage, IL 62321-0130 (US).

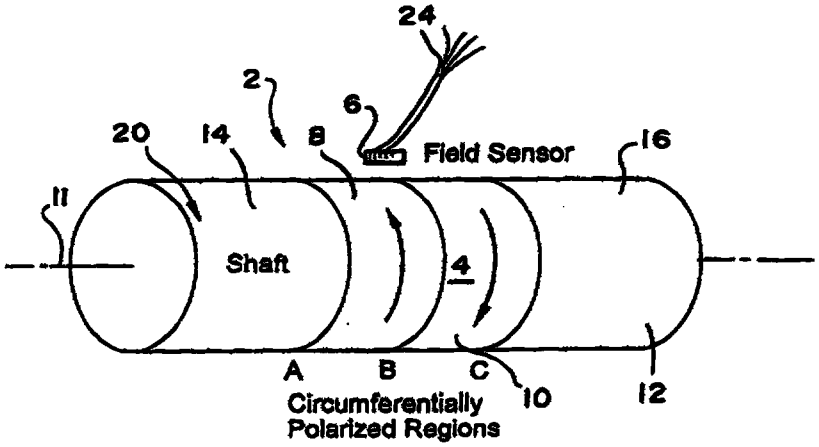
(72) Inventor: GARSHELIS, Ivan, J.; 176 South Mountain Road, Pittsfield, MA 01201 (US).

(74) Agent: FRIEDMAN, Stuart, J.; Sixbey, Friedman, Leedom & Ferguson, P.C., Suite 600, 2010 Corporate Ridge, McLean, VA 22102 (US).

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(54) Title: COLLARLESS CIRCULARLY MAGNETIZED TORQUE TRANSDUCER 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 first magnetoelastically active region in the member, the region being magnetically polarized in a single circumferential direction and possessing 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 filed at the sensors and provide the output signal in response thereto. At least 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 °C quadrant symmetrically disposed around the single circular direction and having a coercivity sufficiently high that the field arising from the magnetoelastically active region does not magnetize regions of the member proximate to the magnetoelastically active region to give rise to parasitic magnetic fields which are of sufficient strength to destroy the usefulness, for torque sensing purposes, of the net magnetic field seen by the magnetic field sensor means.