



(51) International Patent Classification:
G01N 21/84 (2006.01) **B60C 11/24** (2006.01)

(21) International Application Number:
PCT/US2011/030185

(22) International Filing Date:
28 March 2011 (28.03.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/869,427 26 August 2010 (26.08.2010) US

(71) Applicant (for all designated States except US): **THE BOEING COMPANY** [US/US]; 100 North Riverside Plaza, Chicago, Illinois 60606-2016 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **FOLLOWELL, David A.** [US/US]; 1200 Saddle Post, Wildwood, Missouri 63038 (US).

(74) Agents: **COUSINS, Clifford G** et al.; The Boeing Company, P.O. Box 2515, MC 110-SD54, Seal Beach, California 90740-1515 (US).

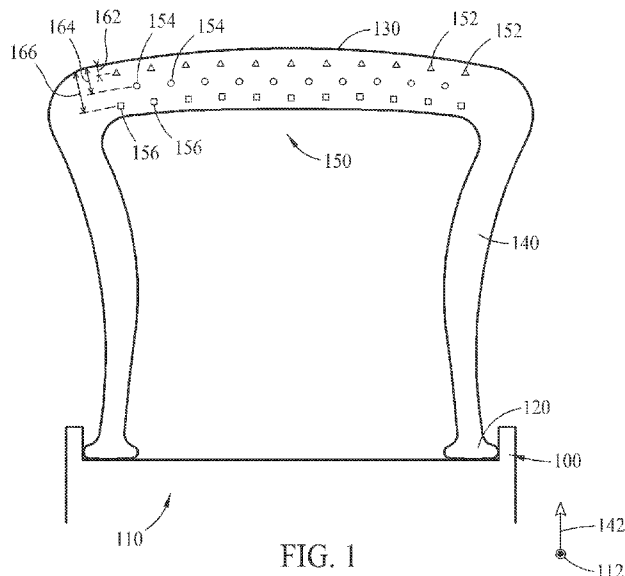
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: AUTOMATED TIRE INSPECTIONS UTILIZING FLUORESCING NANO-PARTICLES



(57) Abstract: Methods and systems are provided for monitoring a structural health of an object. A state of fluorescence of at least one particle associated with the object is identified, and a structural health parameter associated with the object is determined based on the identified state of fluorescence of the at least one particle. In one embodiment, a tire (100) is embedded with fluorescing nano-particles (152,154,156), which are exposed during the operation life of the tire. Such exposure, in combination with appropriate stimulation, will induce the nanoparticles into a state of fluorescence. As such, a color and/or an intensity of the fluorescing emission may be indicative of structural health of the tire.