



- (51) **International Patent Classification:**
A61N 1/36 (2006.01) A61N 1/05 (2006.01)
- (21) **International Application Number:**
PCT/US2014/071959
- (22) **International Filing Date:**
22 December 2014 (22.12.2014)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
61/919,806 22 December 2013 (22.12.2013) US
61/925,423 9 January 2014 (09.01.2014) US
62/092,214 15 December 2014 (15.12.2014) US
- (71) **Applicant: RESEARCH FOUNDATION OF THE CITY UNIVERSITY OF NEW YORK** [US/US]; c/o Technology Commercialization Office, 555 West 57th Street, Suite 1407, New York, New York 10019 (US).
- (72) **Inventor: AHMED, Zaghoul;** c/o Research Foundation of the City University of New York, Technology Commercialization Office, 555 West 57th Street, Suite 1407, New York, New York 10019 (US).
- (74) **Agents: LOPEZ, Orlando et al.;** Burns & Levinson, LLP, 125 Summer Street, Boston, Massachusetts 02110 (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, BN, 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, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, 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, KM, ML, MR, NE, SN, TD, TG).

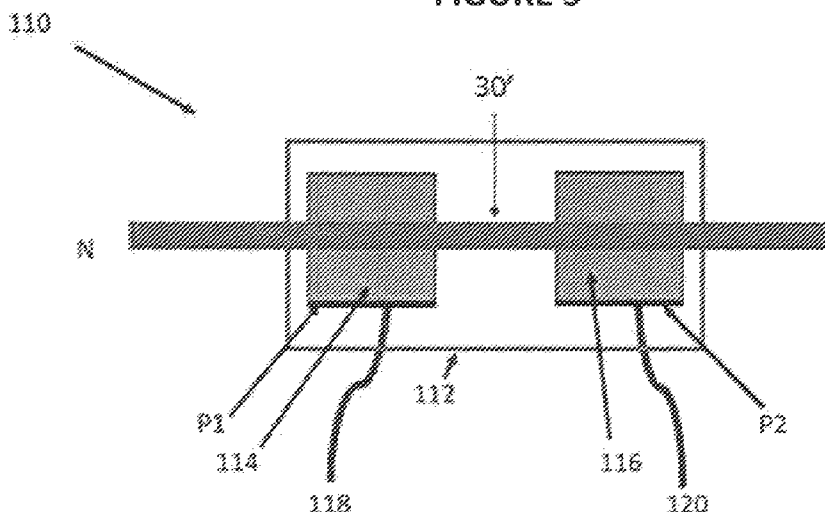
Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

Published:

- *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

(54) **Title:** TRANS-SPINAL DIRECT CURRENT MODULATION SYSTEMS

FIGURE 3

(57) **Abstract:** Improved neuromodulation control of neurological abnormalities associated with effector organs in vertebrate beings using direct current stimulation for modulating spinal cord excitability, having a peripheral-current supplying component for providing direct current peripheral nerve stimulation and a spinal-current supplying component providing direct current for spinal stimulation, and a controller managing such functions.