

(43) International Publication Date
13 December 2012 (13.12.2012)

- (51) **International Patent Classification:**
B60L 5/00 (2006.01) *B60M 3/04* (2006.01)
- (21) **International Application Number:**
PCT/EP2012/061027
- (22) **International Filing Date:**
11 June 2012 (11.06.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
1109825.8 10 June 2011 (10.06.2011) GB
- (71) **Applicant (for all designated States except US):** BOMBARDIER TRANSPORTATION GMBH [DE/DE];
Schöneberger Ufer 1, 10785 Berlin (DE).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** VOLLENWYDER, Kurt [CA/CA]; 170 Chelsea Road, Kingston, Ontario K7M 3Y8 (CA). WORONOWICZ, Konrad [CA/CA]; 5029 Fox Run Place, Kingston, Ontario K7P 0E4 (CA). CZAINSKI, Robert [PL/DE]; Waldsassener Str. 65, 12279 Berlin (DE). MEINS, Jürgen [DE/DE]; Am Hasengarten 18, 38126 Braunschweig (DE).

(74) **Agents:** BRUNOTTE, Joachim et al.; Patentanwälte Bressel und Partner, Potsdamer Platz 10, 10785 Berlin (DE).

(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, QA, RO, RS, RU, RW, 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, 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, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

[Continued on next page]

(54) **Title:** SYSTEM AND METHOD FOR TRANSFERRING ELECTRIC ENERGY TO A VEHICLE USING CONSTANT CURRENT OPERATION OF SEGMENTS OF A CONDUCTOR ARRANGEMENT

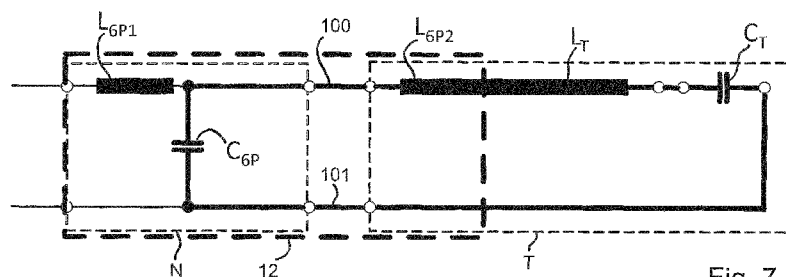


Fig. 7

(57) **Abstract:** The invention relates to a system for transferring electric energy to a vehicle (81; 91), in particular to a track bound vehicle (81) such as a light rail vehicle or to a road automobile (91) such as a bus, wherein - the system comprises an electric conductor arrangement (3, T) for producing an alternating electromagnetic field and for thereby transferring electromagnetic energy to the vehicle, - the conductor arrangement (3, T) comprises a plurality of segments (T1, T2, T3, T4, T5, T6), wherein each segment (T1, T2, T3, T4, T5, T6) extends along a section of the path of travel of the vehicle, - each segment comprises one line for each phase of an alternating current which is to be carried by the segment in order to produce the electromagnetic field, - the system comprises a current supply (3) for conducting electric energy to the plurality of the segments (T1, T2, T3, T4, T5, T6), wherein the segments (T1, T2, T3, T4, T5, T6) are electrically connected in parallel to each other with the current supply (3), - at least one of the segments (T1, T2, T3, T4, T5, T6) is coupled to the current supply (3) via an associated constant current source (12) adapted to keep the electric current through the segment (T1, T2, T3, T4, T5, T6) constant - while the segment (T1, T2, T3, T4, T5, T6) is operated - independently of the electric power which is transferred to one or more vehicles travelling along the segment (T1, T2, T3, T4, T5, T6), - each constant current source (12) comprises a first inductance (L_{6P1}) and optionally more than one inductances and comprises a first capacitance (C_{6P}) and optionally more than one capacitances, the inductances and the capacitances being adapted to each other and to the voltage at the input side of the constant current source so that a desired constant current is output to the output side, i.e. the side of the segment, - the first inductance (L_{6P1}) is arranged in a line (100) of the constant current source (12) which connects the input side with the output side and at least one junction of the line (100) is connected with the first capacitance (C_{6P}), - the first inductance (L_{6P1}) and the first capacitance (C_{6P}) as well as a second inductance (L_{6P2}), which is formed at least partly by the inherent inductance (L_T) of the segment (T), are adapted to each other and to any additional capacitance in the segment (T) can be operated at a corresponding resonance frequency and the reactive power produced by the segment (T) is essentially zero.

**Published:****(88) Date of publication of the international search report:**

22 August 2013

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*