(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

PCT

(43) International Publication Date
7 September 2007 (07.09.2007)

(10) International Publication Number
WO 2007/100265 A1

(51) **International Patent Classification:**
H02M 5/04 (2006.01) *H02M 7/217* (2006.01)
//02/ 5/00 (2006.01)

(21) **International Application Number:**
PCT/NZ2007/000041

(22) **International Filing Date:**
28 February 2007 (28.02.2007)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**
545664 28 February 2006 (28.02.2006) NZ

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(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available):* AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FT, 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, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

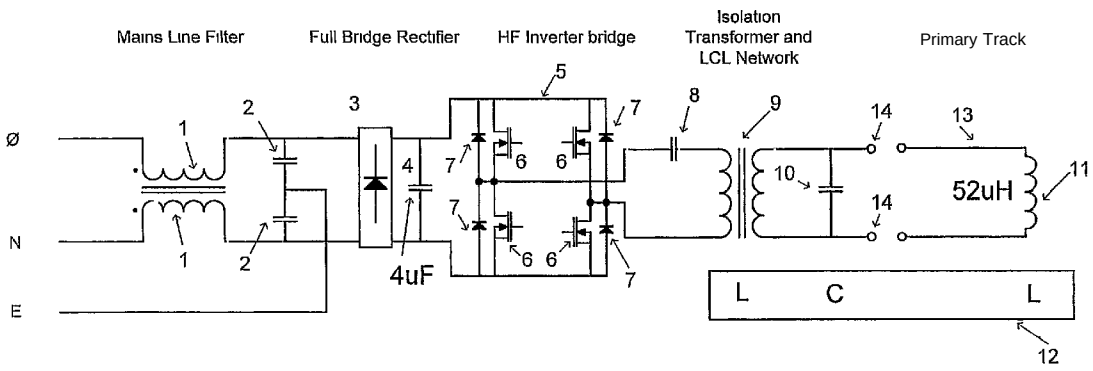
(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available):* ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*
— *with amended claims*

Date of publication of the amended claims: 18 October 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SINGLE PHASE POWER SUPPLY FOR INDUCTIVELY COUPLED POWER TRANSFER SYSTEMS



(57) **Abstract:** An ICPT system has a single phase power supply which energises a conductive path (13) and has an inverter (5) to provide an alternating current at an operating frequency greater than the single phase utility supply frequency in the conductive path. The inverter modulates the amplitude of the alternating current with respect to the utility supply frequency such that the amplitude of the alternating current varies. The pick-up has an energy storage element (26) to provide a continuous supply of power to a load (27) irrespective of the varying amplitude of the alternating current in the conductive path.

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AMENDED CLAIMS
received by the International Bureau on 17 Aug 2007 (17.08.07)

1. An ICPT system having:

a conductive path;

a pick-up adapted to receive power from the conductive path;

a power supply to energise the conductive path, the power supply having a single phase input for receiving single phase electric power at a utility supply frequency and a converter means to provide an alternating current at an operating frequency greater than the utility supply frequency in the conductive path and the converter means modulating the amplitude of the alternating current with respect to the utility supply frequency such that the amplitude of the alternating current varies;

wherein the pick-up has an energy storage element adapted to provide a continuous supply of power to a load supplied thereby irrespective of the varying amplitude of the alternating current in the conductive path.

2. An ICPT system as claimed in claim 1 wherein the power supply includes a transformer and a capacitive element wherein the leakage inductance of the transformer, the capacitance of the capacitive element and the inductance of the conductive path provide an LCL filter.

3. An ICPT system as claimed in claim 1 or claim 2 wherein the leakage inductance of the transformer, the capacitance of the capacitive element and the inductance of the conductive path each have substantially the same reactance or are tuned to have substantially the same reactance.

4. An ICPT system as claimed in any one of the preceding claims wherein the power supply has essentially no DC energy storage components.

5. An ICPT system as claimed in any one of the preceding claims wherein the power supply modulates the alternating current to vary in amplitude between substantially zero and a maximum value.

6. An ICPT system as claimed in any one of the preceding claims wherein the pick¬up includes a controller to control the flow of power to the energy storage element.

using the energy storage element to provide a continuous supply of power to a load supplied thereby irrespective of the varying amplitude of the alternating current in the conductive path.

16. A method as claimed in claim 15 including modulating the alternating current to vary in amplitude between substantially zero and a maximum value.

17. A method as claimed in claim 15 or claim 16 including controlling the flow of power from the conductive path to the energy storage element.

18. A method as claimed in claim 17 including controlling a switch between an OFF state or an ON state to control the flow of power to the energy storage element.

19. A method as claimed in claim 18 including operating the switch at a selected frequency and controlling the duty ratio of the switch to control the flow of power to the energy storage element.

20. An method as claimed in claim 19 including varying the duty ratio dependant on the amplitude of the voltage or current of the conductive path.

21. A method as claimed in claim 19 or claim 20 including controlling the duty ratio of the switch to improve the input power factor of the power supply.

22. A method as claimed in claim 19 or claim 20 wherein the duty ratio comprises the ratio of the switch ON time to switch OFF time in each switch cycle and the method includes controlling the duty ratio such that the complement of the duty ratio is proportional to the amplitude of the voltage in the conductive path.

23. An ICPT power supply including:
a single phase input for receiving single phase electric power at a utility supply frequency;
an output for connection to a conductive path of an ICPT system;
a converter means to provide an alternating current at a power transfer frequency greater than the utility supply frequency, and the converter means modulating the amplitude of the alternating current with respect to the utility supply frequency such that the amplitude of the alternating current varies;

an inductive element and a capacitive element provided between the converter means and the output;

wherein in use the inductance of the inductive element, the capacitance of the capacitive element and the inductance of the conductive path provide an LCL filter.

24. An ICPT power supply as claimed in claim 23 including a transformer, and the inductive element comprises the leakage inductance of the transformer.

25. An ICPT power supply as claimed in claim 24 wherein the leakage inductance of the transformer, the capacitance of the capacitive element and the inductance of the conductive path each have substantially the same reactance or are tuned to have substantially the same reactance.

26. An ICPT power supply as claimed in claim 24 or claim 25 wherein the transformer comprises an isolating transformer.

27. An ICPT power supply as claimed in any one of claims 24 to 26 wherein the capacitive element is provided in parallel with an output winding of the transformer.

28. An ICPT power supply as claimed in any one of claims 23 to 27 wherein the power supply has essentially no DC energy storage components.

29. An ICPT system substantially as herein described with reference to any one of the embodiments shown in the accompanying drawings.

30. A method of supplying power to a load using an ICPT system substantially as herein described with reference to any one of the embodiments shown in the accompanying drawings.

31. An ICPT power supply substantially as herein described with reference to any one of the embodiments shown in the accompanying drawings.

AMENDED SHEET (ARTICLE 19)