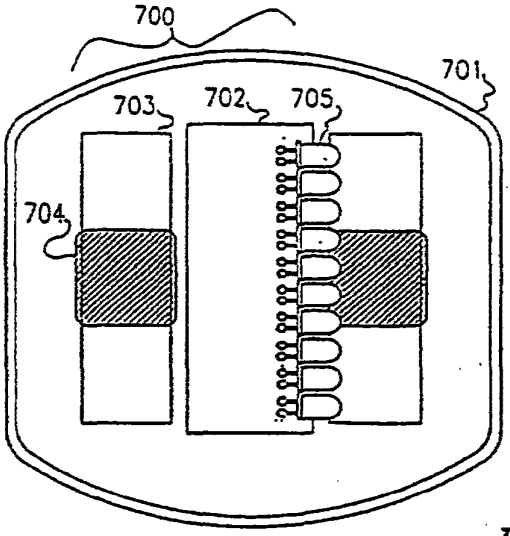

Fig 7

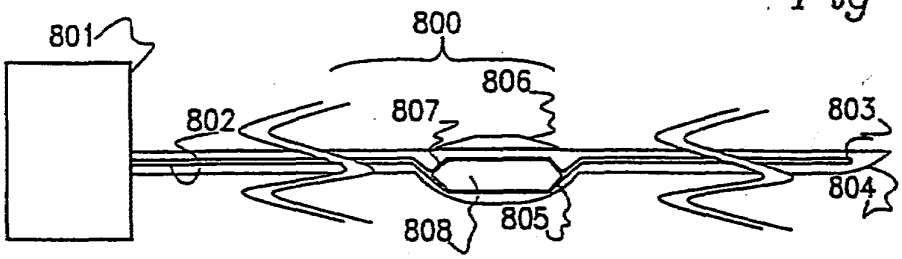

Fig 8

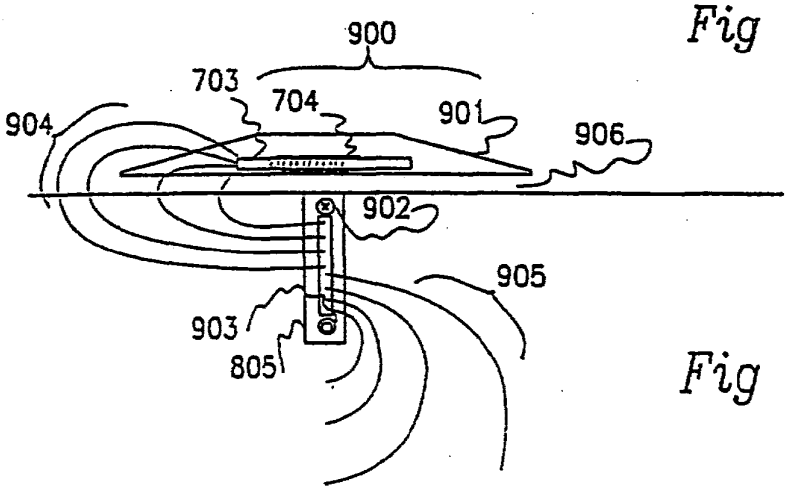

Fig 9

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(54) Inductively powered lighting

(57) An inductively powered lamp unit (500) that uses an inductive power pick up comprising a resonant circuit including an inductance (401) and capacitance (402), the induced current circulating in the resonant circuit is limited to a maximum value by a shorting switch (503) that closes a connection across the inductance (401) shorting the resonant circuit. The shorting switch (503) is controlled by a comparator (506) that compares the sensed current with a reference value (510). Voltage control maybe similarly implemented. Power is supplied to LED's (405), control data may also be conveyed through the inductive link. Applications include roadway markers, fire escape indicators, underwater or explosive environmental lighting.

EP 1 335 477 A3

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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 00 4713

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 3 873 884 A (GABRIEL FRED C) 25 March 1975 (1975-03-25) * claim 1 *	1,2	H02J17/00 H02J5/00 H05B33/08 H05B39/00
D,A	US 5 293 308 A (BOYS JOHN T ET AL) 8 March 1994 (1994-03-08) * column 6, line 31 - column 7, line 24 *	1,2	
A	US 4 914 539 A (TURNER JAMES B ET AL) 3 April 1990 (1990-04-03) * figure 1 * * column 3, line 26 - column 5, line 17 *	1,2	
A	EP 0 289 868 A (INDUCTRAN CORP) 9 November 1988 (1988-11-09) * claim 1 *	1,2	
A	WO 93/23907 A (NEW SYSTEMS LTD ;AVRAMENKO STANISLAV (RU); AVRAMENKO KONSTANTIN (R) 25 November 1993 (1993-11-25)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

H02J
H05B

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
THE HAGUE	11 February 2004	Kelperis, K

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

Application Number
EP 03 00 4713

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-5

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 03 00 4713

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-5

An inductively powered lamp comprising collection means coupled inductively to a power source operating at one selected frequency,a resonant circuit having a resonance frequency corresponding to the selected frequency, means to transfer power from the resonant circuit to the lamp and control maens to limit the maximum amount of the current in the resonant circuit

2. Claims: 6-9

A method of supplying electricity to a lamp unit comprising the steps of : forming a hole in stationary material,positioning in the hole wiring capable of generating an alternating inductive magnetic filed, covering the hole and positioning remote form wiring the lamp init

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 03 00 4713

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-02-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3873884 A	25-03-1975	GB 1461938 A	19-01-1977
US 5293308 A	08-03-1994	NZ 237572 A	22-12-1994
		AU 658605 B2	27-04-1995
		AU 1237392 A	02-11-1992
		CA 2106784 A1	27-09-1992
		DE 69227242 D1	12-11-1998
		DE 69227242 T2	20-05-1999
		DE 69233048 D1	12-06-2003
		DE 69233048 T2	18-03-2004
		EP 1211776 A2	05-06-2002
		EP 0577611 A1	12-01-1994
		EP 0818868 A2	14-01-1998
		ES 2125256 T3	01-03-1999
		WO 9217929 A1	15-10-1992
		JP 2667054 B2	22-10-1997
		JP 6506099 T	07-07-1994
		KR 180047 B1	15-05-1999
		MX 9201100 A1	01-09-1992
US 4914539 A	03-04-1990	NONE	
EP 0289868 A	09-11-1988	US 4836344 A	06-06-1989
		CA 1300698 C	12-05-1992
		EP 0289868 A2	09-11-1988
		JP 1039202 A	09-02-1989
WO 9323907 A	25-11-1993	AU 4078393 A	13-12-1993
		CA 2135299 A1	25-11-1993
		DE 69313631 D1	09-10-1997
		DE 69313631 T2	05-02-1998
		EP 0639301 A1	22-02-1995
		WO 9323907 A1	25-11-1993
		JP 7506716 T	20-07-1995
		US 6104107 A	15-08-2000

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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PCT

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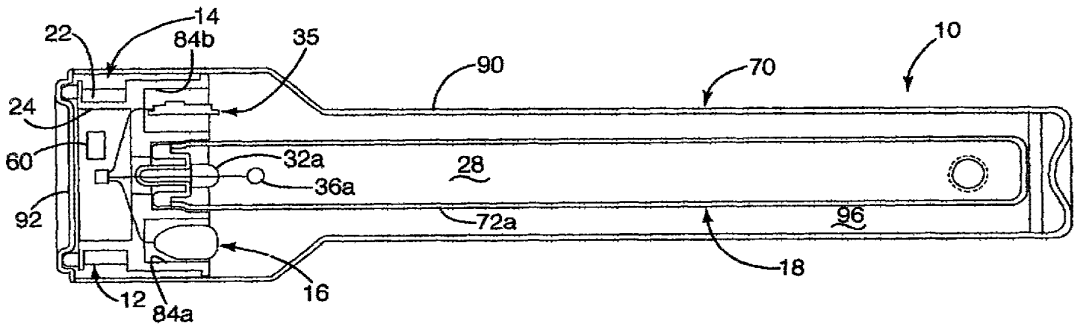
Published:
— *without international search report and to be republished upon receipt of that report*

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: INDUCTIVELY POWERED LAMP ASSEMBLY



(57) Abstract: A lamp assembly configured to inductively receive power from a primary coil. The lamp assembly includes a lamp circuit including a secondary and a lamp connected in series. In a first aspect, the lamp circuit includes a capacitor connected in series with the lamp and the secondary to tune the circuit to resonance. The capacitor is preferably selected to have a reactance that is substantially equal to or slightly less than the reactance of the secondary and the impedance of the lamp. In a second aspect, the lamp assembly includes a sealed transparent sleeve that entirely encloses the lamp circuit so that the transparent sleeve is fully closed and unpenetrated. The transparent sleeve is preferably the lamp sleeve itself, with the secondary, capacitor and any desired starter mechanism disposed within its interior.

WO 03/092329 A2

INDUCTIVELY POWERED LAMP ASSEMBLY

BACKGROUND OF THE INVENTION

The present invention is a continuation-in-part of U.S. Application Serial No. 90/592,194 entitled "Fluid Treatment System," which was filed on June 12, 2000.

The present invention relates to lighting and more particularly to a lamp assembly for use in connection with inductively powered lighting.

Although not widely available, inductively coupled lighting systems are known. A conventional inductively coupled lighting system generally includes a primary circuit having a primary coil (or "primary") that is driven by a power supply and a secondary circuit having a secondary coil (or "secondary") that inductively receives power from the primary. Inductive couplings provide a number of advantages over conventional direct electrical connections. First, inductively coupled lamps are typically safer and easier to connect and disconnect than hardwired lamps. With direct electrical connections, it is generally necessary to manipulate electrical connectors when installing and removing the lamp assembly. This typically requires some effort and creates a risk of electrical shock. Often, the electrical connectors are at least partially exposed, thereby increasing the risk of electrical shock. Inductively coupled lamps, on the other hand, do not require the manipulation of any electrical connectors. Instead, the secondary of the lamp assembly simply needs to be placed adjacent to the primary to permit the supply of power to the lamp assembly. Second, the elimination of electrical connectors also increases the reliability of the system by eliminating the problems associated with conventional electrical connectors. For example, conventional electrical connectors are subject to corrosion and to wear. These problems are particularly acute in an outdoor setting where environmental conditions may subject the electrical connectors to moisture. With repeated use, mechanical

connectors are also subject to wear and eventual failure. Third, inductively coupled lamps inherently provide a lower risk of an electrical hazard at the lamp assembly. As noted above, the lamp assembly is electrically separated from the power source. All power must be inductively passed from the power source to the lamp assembly. Because there is an intrinsic limit on the amount of power that can be inductively passed to the lamp assembly, the amount of power at the lamp assembly is limited and the risk of electrical hazards is reduced.

Although conventional inductively coupled lamps provide a number of important advantages over directly connected lamps, they do suffer significant drawbacks. An inductive coupling is inherently less efficient than a direct electrical connector. This is partly due to the power required to create and sustain the electromagnetic field. The primary inefficiencies in a conventional inductive coupling result from a poorly tuned circuit. These inefficiencies are manifest in increased heat gain and in noise created by vibration in the primary and secondary. The efficiency issues are exaggerated with higher power lighting applications. In addition, existing lamp circuits require precise alignment of the primary and secondary to provide any reasonable level of efficiency. This requires more precise tolerances and limits the configuration and layout of the lamp assembly and the overall lamp.

One of the largest reliability issues facing the lamp industry is caused by the penetration of the lamp sleeve by wires or other electrical conductors. Typically, the wires pass into the interior of the lamp through a glass stem. Because glass does not readily adhere to and seal around the wires, there is a material risk of lamp leakage at the point the wires penetrate the lamp. Although efforts have been made to optimize the seal, this remains a significant reliability concern.

With conventional inductively powered lamps, there are also reliability issues associated with exposure of the lamp circuit components to the environment, for example, water and moisture from the environment can damage circuit components. To address this concern, at least one inductively powered lighting system encloses the entire lamp assembly within a sealed enclosure. U.S. Patent 5,264,997 to Hutchisson et al discloses a lamp that is mounted to a printed wiring board that is spaced from the secondary on a plurality of posts. The printed wiring board includes various electrical component required for operation of the inductive coupling. Separate shell and lens components are sealed together to form a leaktight enclosure around the lamp, the printed wiring board and the secondary. The shell is specially shaped to receive the secondary and to be interfitted with a socket containing the primary. Although the sealed enclosure provides improved protection from environmental conditions, it is relatively bulky and only provides light transmission in the direction of the lens.

As can be seen, there remains a need for an inductively coupled lamp assembly that is efficient, provides improved reliability in a variety of conditions and is easily adapted to many different lamp configurations.

SUMMARY OF THE INVENTION

The aforementioned problems are overcome by the present invention wherein a lamp assembly is provided with a lamp, an inductive secondary for powering the lamp and a capacitor. The capacitor is connected in series with the lamp and the secondary, and is selected to have a reactance at the operating frequency that is approximately equal to or slightly less than the combined impedance of the lamp and the secondary at operating temperature. As a result, the lamp circuit operates at or near resonance. With electric-discharge lamps, the series capacitor also functions to limit the

flow of current in the secondary circuit, precluding an uncontrolled increase in current that would otherwise occur with an electric-discharge lamp.

In another aspect, the present invention provides an inductively powered lamp assembly in which the entire lamp assembly circuit is sealed within a transparent sleeve. Preferably, the entire lamp assembly circuit, including secondary and any associated capacitor, is sealed within the sleeve of the lamp. In an alternative embodiment, the secondary and lamp, as well as any capacitor and starter device, are contained within a second closed plastic, Teflon, glass or quartz sleeve with no wires or other elements penetrating the sleeve. The void defined between the second sleeve and the lamp sleeve is preferably evacuated or filled with a functional gas to provide the desire level of heat conduction or insulation.

In a further aspect, the present invention provides a remotely actuated switch to provide preheat of electric-discharge lamp. The switch is provided to short the electrodes across the secondary for a specific period of time at lamp start-up. In addition this circuit may have a series resistor to help limit preheat current. In one embodiment, the switch is an electromagnetic switch that is preferably actuated by a magnetic field generated by a corresponding coil in a lamp control circuit.

The present invention provides a simple and inexpensive lamp assembly for use with inductively powered lighting. Because the lamp assembly operates at or near resonance, it has a high power factor and is highly efficient. This reduces power loss through heat build up and also provides for quiet operation of the inductive coupling -- even in relatively high power applications. The efficiency of the secondary circuit demands less precise alignment between the primary and secondary, thereby permitting a greater degree of latitude in the layout and configuration of the lamp and the lamp assembly. The sealed

sleeve provides the lamp circuit with improved protection from the environment without limiting the transmission of light from the lamp. Although with some light sources, the spectrums emitted may see losses based on the specific transmissive properties of the materials used in the sleeves, for example, some materials are not highly transmissive to UV light. The present invention allows functional gases to be entrapped within the sealed sleeve to increase or reduce the degree to which the lamp is isolated from the environment. Further, by enclosing the entire lamp circuit within the lamp sleeve, the need for wires or electrical leads that penetrate the sleeve can be eliminated. This greatly improves the reliability of the lamp while dramatically reducing manufacturing losses. Also, the electromagnetic switch of the present invention provides an inexpensive and reliable alternative to conventional starter circuits.

These and other objects, advantages, and features of the invention will be readily understood and appreciated by reference to the detailed description of the invention and the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view of a lamp assembly according to one embodiment of the present invention;

Fig. 2 is a sectional view the lamp assembly of Fig. 1 taken perpendicularly to the sectional view of Fig. 1;

Fig. 3 is a schematic diagram of a lamp circuit according to one embodiment of the present invention;

Fig. 4 is a sectional view of an alternative lamp assembly having an incandescent lamp;

Fig. 5 is a sectional view of an alternative lamp assembly having an incandescent lamp with a universal base;

Fig. 6 is a sectional view of an alternative lamp assembly having a halogen lamp;

Fig. 7 is a sectional view of an alternative lamp assembly having a halogen lamp with the base located outside of the lamp sleeve;

Fig. 8 is a sectional view of an alternative lamp assembly having a halogen lamp with no base;

Fig. 9 is a sectional view of an alternative lamp assembly having a fluorescent lamp with no outer sleeve;

Fig. 10 is a sectional view of an alternative lamp assembly having a type T-5 or T-8 fluorescent lamp;

Fig. 11 is a schematic diagram of a lamp circuit for the lamp assembly of Fig. 10;

Fig. 12 is a schematic diagram of an alternative lamp circuit for the lamp assembly of Fig. 10;

Fig. 13 is a schematic diagram of yet another alternative lamp circuit for the lamp assembly of Fig. 10;

Fig. 14 is a schematic diagram of a further alternative lamp circuit for the lamp assembly of Fig. 10;

Fig. 15 is a sectional view of an alternative lamp assembly having a PL type fluorescent lamp;

Fig. 16 is a sectional view of the alternative lamp assembly having a PL type fluorescent lamp taken perpendicularly to the sectional view of Fig. 15;

Fig. 17 is a partially sectional exploded view of an alternative lamp assembly;

Fig. 18 is a sectional view of a portion of the alternative lamp assembly of Fig. 16;

Fig. 19 is a sectional view of a portion of an alternative lamp assembly; and

Fig. 20 is a sectional view of a portion of yet another alternative lamp assembly.

DETAILED DESCRIPTION OF INVENTION

A lamp assembly according to an embodiment of the present invention is shown in Figs. 1 and 2, and is generally designated 10. For purposes of disclosure, the present invention is first described in connection with a conventional type PL-S 11 watt UV lamp converted for use at 38 watt, such as the type used in a water treatment device. The lamp assembly 10 generally includes a lamp circuit 12 and an outer sleeve 70. The lamp circuit 12 includes a secondary 14, a capacitor 16 and a lamp 18, all connected in series (See Fig. 3). The secondary 14 inductively receives power from the primary (not shown) of an associated ballast (not shown). The series capacitor 16 is specially tuned, as described in more detail below, so that the lamp circuit operates at resonance under specific operating conditions. The entire lamp circuit 12 is fully enclosed within the outer sleeve 70, including the secondary 14, capacitor 16 and lamp 18. At least a portion of the outer sleeve 70 is transparent and is not penetrated by electrical wires or other elements.

Although the following embodiment is described in connection with a type PL-S 38 watt UV lamp, the present invention is intended and well suited for use with lamps of various types and styles, including electric-discharge, incandescent, pulsed white light and light emitting diode ("LED") lamps. This disclosure presents various alternative

embodiments showing incandescent lamps and electric-discharge lamps. These examples are provided to illustrate the broad applicability and adaptability of the present invention, and not to provide any limit on the scope of the claims.

A wide variety of ballasts capable of powering the inductive lamp assembly of the present invention are well known to those skilled in the field. Accordingly, the ballast will not be described in detail. One ballast particularly well-suited for use with the type PL-S 38W UV lamp of the illustrated embodiment is disclosed in U.S. Application Serial No. 90/592,194 entitled "Fluid Treatment System," which was filed on June 12, 2000, which is incorporated herein by reference in its entirety. This ballast can be readily adapted to provide efficient operation of all of the disclosed embodiments of the present invention.

I. Lamp Configuration

As noted above, the type PL-S 38W UV lamp preferably includes an outer sleeve 70 that encloses the lamp circuit 12 to protect it from the environment (See Figs. 1 and 2). The outer sleeve 70 preferably includes a main body 90 and a cap 92. The main body 90 is a generally cylindrical tube having an open end and a closed end. After the lamp circuit 12 is installed within the main body 90, the cap 92 is sealed over the open end of the main body 90 to fully enclose the lamp circuit 12. The lamp circuit 12 generally includes a secondary 14, a capacitor 16 and a lamp 18. As described below, the lamp circuit 12 may also include a starter 35 (See Fig. 2). The lamp 18 is a generally conventional PL-S type lamp having a quartz sleeve with two parallel legs 72a-b that are interconnected to cooperatively define a chamber 28. The chamber 28 is partially evacuated and contains the desired electric-discharge gas, such as mercury vapor. A stem 32a-b is located at the base of each leg 72a-b. A pair of conventional or custom designed

electrodes 26a-b are disposed within the chamber 28, one mounted atop each of the stems 32a-b. In this embodiment, the outer sleeve 70 is preferably manufactured from quartz to permit the efficient passage of UV light. In non-UV applications, the outer sleeve may be manufactured from glass, Teflon or plastic, depending in part on the heat generated by the lamp and the operating environment of the lamp. For example, an alternative outer sleeve can be manufactured from a length of Teflon tubing having sealed opposite ends (not shown). The Teflon tubing can be fitted over the remainder of the lamp assembly, and its opposite ends can be crimped or otherwise sealed to close the Teflon sleeve. Preferably, each end of the Teflon tubing is folded back onto itself and crimped using heat and pressure.

The lamp assembly 10 also includes a base 50 and a support 86 that hold opposite ends the lamp 18 within the outer sleeve 70. The base 50 is generally cylindrical and dimensioned to be fitted closely within the outer sleeve 70. In addition to holding one end of the lamp 18, the base 50 also receives the various electrical components of the lamp circuit 12. The base 50 defines an annular recess 80 to receive the windings of the secondary 14, a pair of apertures 82a-b to receive the base end of each leg 72a-b, and a pair of voids 84a-b to contain the capacitor 16 and any desired starter 35. The lamp assembly 10 may also include a heat reflector 58 disposed between the secondary and the electrodes 36a-b. The heat reflector 58 is preferably shaped to match the cross-sectional shape of the lamp sleeve 52 at the point where it is mounted, and is preferably manufactured from a conventional reflective material, such as aluminum or aluminum foil on a suitable substrate. The support 86 is generally disc-shaped and is dimensioned to be fitted closely within the outer sleeve 70. The support 86 preferably includes a tab 88 to be frictionally fitted between the legs 72a-b of the quartz sleeve 52. The precise design and

configuration of the base 50 and support 86 can vary among applications depending on the design and configuration of the outer sleeve 70 and the various components of the lamp circuit 12. The base 50 and support 86 are preferably manufactured from materials capable of withstanding high heat, such as ceramic or high temperature plastics.

In one embodiment, the void 96 defined between the outer sleeve 70 and the lamp sleeve 52 is configured to provide the lamp assembly with the desired conductive or insulative properties. For example, this void 96 can be evacuated to insulate the lamp from cold environments. Alternatively, the void 96 can be filled with heavier gases, such as argon and neon, or fluids to conduct heat in hot environments. The conduction of heat from lamps in hot environments will help to protect the lamp from overheating and may also help to provide maximum intensity.

In some applications, the lamp assembly 10 may also include a mechanism that permits the ballast to sense the presence of the lamp assembly 10. This permits the ballast to power the primary (not shown) only when the lamp assembly 10 is installed. Although the sensing mechanism is not necessary in many applications, particularly in low-power applications, it does provide a more efficient design that conserves power, reduces heat build-up and protects the primary from certain types of damage associated with continuous operation. In one embodiment, the lamp assembly 10 includes a sensing magnet 60 and the ballast (not shown), or an associated control circuit, includes a reed switch (not shown) that is activated by the sensing magnet 60. More specifically, when the lamp assembly 10 is installed, the sensing magnet 60 is positioned adjacent to reed switch (not shown). The magnetic field from the sensing magnet 60 causes the reed switch 62 to close, thereby providing a signal to the ballast or control circuit that the lamp assembly 10 is in place. The sensing magnet is preferably mounted to the base 50, but may be mounted

in other locations as desired. Alternatively, the sensing magnet 60 and reed switch (not shown) can be replaced by a mechanical switch (not shown). For example, a switch can be disposed where it is mechanically closed by installation of the lamp assembly 10. Another alternative is to provide the lamp with a manually actuated on/off switch, for example, a toggle switch, that selectively turns the ballast on and off.

II. Lamp Circuit

The lamp circuit 12 will now be described in connection with the type PL-S 38W UV lamp described above (See Figs. 1 and 2). As noted above, the lamp circuit 12 generally includes a lamp 18, a secondary 14 and a capacitor 16. A schematic diagram of a lamp circuit 12 is shown in Fig. 3. In this embodiment, the lamp circuit 12 includes a single secondary 14, preferably in the form of a coil of small diameter wire 22. The precise characteristics of the secondary 14 will vary from application to application as a function of the primary (not shown) and the load (e.g. the lamp). The wire 22 is preferably conventional magnet or LITZ wire depending on the power settings and heat dissipation. The wire is preferably wrapped around the base 50 within the annular recess 80, which provides the secondary 14 with a hollow core. If desired, the hollow core 24 can be replaced by other conventional cores. The type of wire, the number of turns of wire and the diameter of the core (and consequently the diameter of the turns of wire) will vary from application to application, depending on various factors such as the characteristics of the primary and the load of the lamp 18. The inductance of the secondary 14 is selected as a function of the operating frequency and the impedance of the load (i.e. the lamp) at the supplied power. More specifically, the inductance of the secondary 14 is determined by the following formula:

$$\text{Inductance of the Secondary} = \frac{\text{Impedance of the Load}}{2 \times \text{Operating Frequency}}$$

In the described 38 watt embodiment, the secondary 14 is configured to receive power from a primary operating at approximately 100 kilohertz. The secondary 14 includes 72 turns of wire and the primary includes 135 turns of wire. In the described 38 watt embodiment, the secondary 14 has a value of 196 microhenries at 100 kilohertz, having a reactance of approximately 123 ohms. The secondary 14 is preferably located within the base 50 of the lamp assembly 10. The diameter of the secondary 14 is preferably selected to closely fit with the base 50. The secondary 14 is electrically connected to lamp 18 by leads 51a-b. Although the secondary 14 is preferably circular, it may vary in shape from application to application. For example, the secondary may be square, oval, triangular, trapezoidal, hexagonal or even spherical. The secondary is preferably positioned internally or externally concentric to the primary, or the two coils may be placed end to end.

The capacitor 16 is selected to provide optimum power factor correction given the mechanical constraints, thereby providing resonance in the lamp circuit 12. The power factor is preferably .90 or better, and more preferably .96 or better, but in some applications lower values may be acceptable. Without sufficient power factor correction, the reactive currents in the secondary will reflect back into the primary as a lower impedance load. This would cause a shift upward in operating power and current, as well as higher losses in the form of heat gain in the primary circuit. This effect is contrary to what one might initially expect but is in fact due to the inverse nature of reflected impedance within a series resonant primary circuit. Experience has revealed that reactive currents and losses in the primary increase very quickly at factors below .90. This can have a material adverse impact on efficiency, especially when it is considered that these

losses are additive to the losses caused by coupling coefficient and dc resistances. In general, the capacitor 16 is selected to have a reactance that is approximately equal to or slightly less than the resistive impedance of the lamp 18 and the reactive impedance of the secondary 14 when the lamp 18 is at its operating temperature. Like the inductance of the secondary 14, the reactance of the capacitor is selected as a function of the operating frequency and the impedance of the load (i.e. the lamp) at the supplied power. More specifically, the reactance of the capacitor is selected in accordance with the following formula:

$$\text{Reactance of the Capacitor} = \frac{1}{\text{Impedance of the Load} \times 2 \times \text{Operating Frequency}}$$

At this reactance, the capacitor 16, secondary 14 and lamp 18 will be operating close to resonance, providing a high power factor and consequently high efficiency. In the illustrated embodiment, the capacitor 16 has a value of approximately 12.9 nanofarads (nf). This value will change in response to variations in the primary (not shown), secondary 14 and/or lamp 18.

The secondary and capacitor formulas presented above provide a rough approximation of the desired capacitor and secondary reactance values. To provide more refined values (and thereby fine-tune the power factor, current limiting effect, and overall operating parameters), an iterative testing procedure may be employed. This iterative testing may be required in some applications to provide the desire level of efficiency in the secondary circuit. The operating parameters of these designs include preheat, strike voltage, and operating current. All of these parameters can be configured through this tuning process along with changes in values of ratios, capacitance and inductance.

Although the capacitor 16 is preferably tuned to the secondary 14 and lamp 18 when the lamp 18 is at operating temperature, the capacitor 16 can alternatively be tuned to provide optimum efficiency at other times. For example, in electric-discharge lamps where greater current is required to start the lamp, the present invention can be employed to boost the circuit during start-up. In such applications, the capacitor is selected to have a reactance that is approximately equal to the combined impedance of the secondary and the lamp at start-up temperature (rather than at operating temperature). This will increase the efficiency of the lamp circuit during start-up, permitting the use of a ballast with a lower current maximum.

Given the nature of plasma, electric-discharge lamps attempt to maintain voltage at a substantially constant inherent voltage. As a result, if the secondary 14 generates voltage in excess of the inherent voltage of the lamp, the lamp will attempt to consume the excess power. Because the resistance of in an electric-discharge lamp decreases in response to the flow of current, the lamp has the potential to drawing increasingly more current until the circuit limits or self-destructs. This concern is addressed by the capacitor 16, which functions to limit the current supplied to the lamp. The current limiting function is an inherent characteristic of a capacitor. It has been determined that the capacitor value required to place the secondary circuit at resonance is approximately equal to the capacitor value needed to provide appropriate current limiting. Accordingly, it has been determined that the current limiting function is achieved in the present invention by selecting a capacitor value appropriate to provide unity power factor.

When the present invention is incorporated into an electric-discharge lamp assembly, the lamp circuit 12 preferably includes a conventional starter 35 (See Fig. 2), glow bulb or other equivalent mechanism. Starters and glow bulbs are well known and will

therefore not be described in detail in this application. In one embodiment of an electric-discharge lamp assembly, the conventional starter is replaced by a remotely actuatable switch, such as electromagnetic switch 34 (See Fig. 3). The electromagnetic switch 34 is wired in series between the electrodes 36a-b, thereby selectively permitting the switch 34 to close the circuit between the electrodes 36a-b. When closed, the switch 34 permits current to flow directly through the electrodes 36a-b, rather than through requiring it to arc through the gas. As a result, when the switch 34 is closed, the electrodes 36a-b are rapidly heated. The electromagnetic switch 34 is preferably arranged substantially perpendicular to the field of the primary so that the electromagnetic switch 34 is not actuated by the electromagnetic field of the primary. Instead, a separate coil 38 is positioned adjacent to the electromagnetic switch 34 where it can be charged to selectively close the switch 34. A microprocessor 40 preferably controls operation of the coil 38 and therefore the electromagnetic switch 34. The microprocessor 40 is programmed to charge the coil 38 for a fixed period of time each time that the lamp circuit is powered on. This closes the electromagnetic switch 34 shorting the electrodes 36a-b together. Alternatively, the microprocessor 40 can be replaced by a conventional one-shot timer circuit (not shown) that is configured to charge the coil for the desired period of time each time that the lamp is started.

III. Alternative Embodiments

The configuration of the lamp assembly may vary materially from application to application depending largely on the type of lamp and the associated power requirements. The present invention can be readily modified to permit use with a wide variety of existing lighting systems. The following alternative embodiments describe a variety of alternative embodiments adapted for various uses. These alternative

embodiments are intended to be illustrative of the wide adaptability of the present invention, and not intended to be exhaustive.

An alternative embodiment showing the present invention incorporated into an incandescent lamp is shown in Fig. 4. In this embodiment, the lamp assembly 110 includes a glass sleeve 152 and a plastic base 150. The glass sleeve 152 is generally bulb shaped and includes an inwardly turned and generally cylindrical stem 132. A secondary 114 is mounted within the glass sleeve 152 about stem 132. A filament 136 is mounted to the secondary 114 extending upwardly into the bulbous portion of the glass sleeve 152 in a conventional manner. Unlike the embodiment described above, the base 150 in this embodiment is fitted to the outside of the glass sleeve 152. The base 150 is configured to be interfitted with a corresponding socket (not shown). The illustrated base 150 is generally circular and includes an annular recess 156 configured to snap fit into a corresponding socket (not shown). The base 150 also includes an upper flange 158 that provides a gripping edge for removing the lamp assembly 110 from a socket (not shown). The base 150 may, however, take on a variety of different configurations to permit the lamp assembly 110 to mechanical connect to a variety of different sockets. For example, the base may be externally threaded. As illustrated, lamp assembly 110 also preferably includes a sensing magnet 160. The sensing magnet 160 may be fitted into a corresponding retaining wall 162 in the bottom of base 150. As described above, the sensing magnet 160 functions with a magnetically actuated switch, such as a reed switch, to advise the primary or control circuit of the presence of the lamp assembly 110. This permits the primary to be powered only when a lamp assembly 110 is in place. As shown in Fig. 5, the incandescent lamp assembly 110' can be configured to operate with a conventional universal base. In

this embodiment, the base 150' includes a pair of mounting pins 156a-b that are configured to interlock with matching slots in a conventional universal base lamp socket (not shown).

An alternative embodiment showing the present invention incorporated into a halogen lamp is shown in Fig. 6. In this embodiment, the lamp assembly 210 generally includes a quartz sleeve 252 and a ceramic base 250. The materials of the sleeve 252 and base 250 are selected to withstand the particularly high temperature at which halogen lamps operate. The quartz sleeve 252 is preferably fully sealed and does not include any penetrating elements, such as wires or other electrical connectors. A filament 236, secondary 214 and capacitor 216 are enclosed within the quartz sleeve 252. In some applications, the capacitor 216 may not be necessary to provide an acceptable level of efficiency and may accordingly be eliminated. The lamp assembly 210 further includes a heat reflector 258 disposed between the filament 236 and the secondary 214. The base 250 may include quarter turn threads 256a-b that are threadedly interfitted within a corresponding socket (not shown). The base 250 can be provided with alternative structure to facilitate installation in the socket. A sensing magnet 260 is preferably mounted to the inside bottom surface of the base 250.

In an alternative halogen lamp assembly 210', the quartz sleeve 252' is shortened to terminate just within the neck of the base 250' (See Fig. 7). The secondary 214' is moved outside of the quartz sleeve 252' and is positioned in the base 250'. In this embodiment, the secondary 214' is isolated from the heat of the filament 236'. This embodiment may also include a sensing magnet 260'.

In another alternative halogen lamp assembly 210", the base is eliminated and the sensing magnet 260"is moved into the interior of the sealed quartz sleeve 252". As shown in Fig. 8, the quartz sleeve 252" defines an annular recess 256" that extends entirely

around the sleeve 252" to permit the lamp assembly 210" to be snap-fitted into a corresponding socket (not shown).

Another alternative embodiment is shown in Fig. 9. In this embodiment, the lamp assembly 310 includes a base 350 that is disposed outside of the lamp sleeve 352 and the lamp assembly 310 does not include an outer sleeve. The lamp sleeve 352 encloses the electrodes 336a-b and the desired electric-discharge gas, for example, mercury vapor. The secondary 314, capacitor 316, any desired starter mechanism (such as a conventional starter or the magnetically actuated switch described above) and all electrical connections are contained inside the base 350, but outside of the lamp sleeve 352. The base 350 is configured to correspond with a conventional universal base, and includes a pair of mounting pins 356a-b that interlock with matching slots in the lamp socket (not shown). The base 350 may alternatively be configured to match with other socket configurations. A sensing magnet 360 is preferably mounted in the base 350. If desired, an outer sleeve (not shown) can be added to this lamp assembly 310 to enhance its protection from the environment. If included, the outer sleeve would preferably extend around the entire lamp assembly, except for the base 350. The base 350 would be mounted to the exterior of the outer sleeve where it can be interfitted with a lamp socket.

An alternative embodiment showing the present invention incorporated into a type T5 or T8 fluorescent lamp is shown in Figs. 10 and 11. The lamp assembly 410 includes an elongated glass sleeve 452 and a pair of secondaries 414a-b--one located at each end of the sleeve 452. Given the different physical location of the two secondaries 414a-b, the power supply is preferably configured to include two separate primaries (not shown) that separately power the two secondaries 414a-b. The two primaries are disposed adjacent to the corresponding secondary 414a-b. It is typical to evenly distribute the power between

the coils 414a-b, but is not strictly necessary. Preferably, the secondary coils 414a-b are set to opposite polarity with each primary and secondary combination being configured to sustain half of the voltage and current needed to power the lamp. The sleeve 452 preferably includes an annular stem 432a-b formed at each opposite end to receive the secondaries 414a-b. An electrode 436a-b is electrically connected to each secondary 414a-b. A capacitor 416 is connected in series between the two secondaries 414a-b. The preferred method for calculating the value of the capacitors 416a-b in this embodiment is to initially analyze the circuit as though only a single coil was going to be used in accordance with the methodology described above (in connection with the first disclosed embodiment). The value of the single capacitor of this hypothetical configuration is then halved to provide the value for each of the two capacitors 416a-b of this embodiment. Optional end caps 420a-b, preferably of aluminum, are fitted over opposite ends of the sleeve 452. The lamp assembly 410 may include a conventional starter 435 as shown in Fig. 11. In this embodiment, conductors 498a-b are required to extend between the two secondary coils 414a-b. The conductors 498a-b are preferably contained within the lamp sleeve 452. As an alternative, magnetic switches 434a-b, or other remotely actuated switches, are used in place of a conventional starter. As shown in Fig. 12, the lamp assembly 410' includes a separate switch 434a-b that is mounted in series between each secondary coil 414a-b' and it's corresponding filament or electrode 436a-b'. By closing the switches 434a-b, the power from each secondary coil 414a-b' is supplied directly to its corresponding filament. In this embodiment, only a single conductor 498' is required to extend between the secondary coils 414a-b'. The capacitor 416' is connected in series along the conductor 498'.

An alternative circuit for a dual-coil lamp assembly 410" is shown in Fig. 13. In this circuit, no conductors are required to extend between the two secondary coils 414a-b". Instead, each secondary coil 414a-b" includes a dedicated switch 434a-b" and a dedicated capacitor 416a-b". The lamp controller is preferably configured to open and close the two switches 434a-b" in unison. The preferred method for calculating the value of the capacitors 416a-b" is to initially analyze the circuit in accordance with the first disclosed embodiment as though only a single coil and single capacitor were going to be used. The value of the single capacitor of this hypothetical configuration is then halved to provide the value for each of the two capacitors 416a-b" of this embodiment. In some applications, the power may not be evenly distributed between the two secondaries. In such applications, the ratio between the value of the two capacitors should be equivalent to the ratio of the power between the two secondaries.

Another alternative circuit for a dual-coil lamp 410"' is shown in Fig. 14. In this alternative, only a single secondary coil 414"' is provided. The secondary coil 414"' is connected to electrodes 436a-b"' located at opposite ends of the lamp. This circuit includes a pair of conductors 498a-b"' that extend between the coils. A conventional starter 435"' or other starter mechanism, such as magnetic switches, is included to start the lamp. In this embodiment, the value of the capacitor 416"' is preferably selected in accordance with the method of the first disclosed embodiment.

A further alternative embodiment showing the present invention adapted for use in a PL type fluorescent lamp is shown in Figs. 15 and 16. In this embodiment, the entire lamp circuit is enclosed within the lamp sleeve 552, and no outer sleeve is included. As illustrated, the lamp assembly 510 includes a glass sleeve 552 having two interconnected legs 502a-b. This lamp assembly 510 may include any of the dual-coil lamp circuits

described above. For purposes of disclosure, this embodiment is described in connection with a lamp assembly 510 having a separate secondary 514a-b mounted in the base of each leg 502a-b. The two secondaries 514a-b are preferably powered by a single primary (not shown) surrounding or adjacent to one end of the lamp assembly 510. Each secondary 514a-b is connected in series with an electrode 536a-b, a capacitor 516a-b and a magnetically actuated starter switch 534a-b. The value of each capacitor 516a-b is selected as described above is connection with the embodiment of Fig. 13. This lamp assembly 510 may also include a sensing magnet 560.

An alternative lamp assembly 610 having an alternative sealing structure is shown in Figs. 17 and 18. As shown in the exploded view of Fig. 17, the lamp assembly 610 generally includes a locking ring 602, an outer sleeve 670, a lamp 618 and a base 650. The locking ring 602, outer sleeve 670 and base 650 cooperate to seal the lamp assembly 610. As perhaps best shown in Fig. 18, the base 650 includes a cylindrical central portion 652 that is shaped to receive the secondary 614 and the lamp 618. More specifically, the lamp 618 is mounted to a printed circuit board assembly ("PCBA") 654, which will preferably also support any capacitor or starter mechanism incorporated into the lamp assembly 610. The lamp/PCBA combination is mounted to the base 650, for example, by fasteners or a snap-fit. The base 650 also includes annular channel 656 that extends around the base 650 to receive the end of the outer sleeve 670. An o-ring 604 is fitted around the central portion 652 within the annular channel 656. The base 650 may include an annular rib (not shown) to prevent the o-ring 604 from riding up the central portion 652. Once assembled, the o-ring 604 is disposed between the inner diameter of the outer sleeve 670 and the outer diameter of the central portion 652 of the base 650. In this position, the o-ring 604 not only provides an effective seal against water, but it also functions as a

vibration damper that cushions vibrations between the lamp and the outer sleeve 670. The outer sleeve 670 is a generally cylindrical tube having a closed end and an open end. A bead 672 or other flange extends around the open end of the outer sleeve 670. The outer sleeve 670 is secured to the base 650 by the locking ring 602. The locking ring 602 is generally ring-shaped and is fitted over the outer sleeve 670 and the base 650. The locking ring 602 has a generally inverted L-shaped cross section with a radial leg 674 and an axial leg 676. The radial leg 674 engages the bead 672 and the axial leg 676 engages the outer surface of the base 650. Alternatively, as shown in Fig. 19, the locking ring 602' and base 650' can be configured so that the axial leg 676' is fitted within the annular channel 656'. In either case, the axial leg 676 or 676' is secured to the base 650 or 650' to lock the outer sleeve 670 in the annular channel 656 of the base 650. The locking ring 602 may be attached to the base 650 using various attachment methods. For example, the locking ring 602 may be sonic or heat welded to the base 650. Alternatively, the lamp assembly 610" may include a locking ring 602" having a lower flange 678 (See Fig. 20) that permits the locking ring 602' to be snap-fitted onto the base 650', or the locking ring and base can includes threads (not shown) to permit the locking ring to be threaded to the base.

The above description is that of various embodiments of the invention. Various alterations and changes can be made without departing from the spirit and broader aspects of the invention as defined in the appended claims, which are to be interpreted in accordance with the principles of patent law including the doctrine of equivalents. Any reference to claim elements in the singular, for example, using the articles "a," "an," "the" or "said," is not to be construed as limiting the element to the singular.

CLAIMS

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

-1-

An inductively powered lamp assembly comprising:

an inductive secondary to receive power from an inductive primary, said inductive primary having a reactance;

a lamp disposed in series with said secondary, said lamp having an impedance; and

a capacitor disposed in series with said inductive secondary and said lamp, said capacitor selected to have a reactance that is substantially equal to or slightly less than said impedance of said lamp and said reactance of said secondary, whereby said capacitor, said lamp and said secondary operate substantially at resonance.

-2-

The lamp assembly of claim 1 wherein said reactance of said secondary is further defined as an operating reactance;

said impedance of said lamp is further defined as an operating impedance;

wherein said capacitor, said lamp and said secondary operate substantially in resonance when said lamp and said secondary are substantially at operating temperature.

-3-

The lamp assembly of claim 2 wherein said secondary is further defined as a coil of LITZ wire.

-4-

The lamp assembly of claim 2 wherein said secondary is further defined as a coil of magnet wire.

-5-

The lamp assembly of claim 3 wherein said lamp assembly includes a closed sleeve surrounding and fully enclosing said secondary, said lamp and said capacitor, said sleeve being unpenetrated.

-6-

The lamp assembly of claim 5 wherein said closed sleeve is substantially transparent to light of a desired wave length.

-7-

The lamp assembly of claim 3 wherein said lamp includes a lamp sleeve, said capacitor and said secondary being fully enclosed within said lamp sleeve, whereby said lamp sleeve is unpenetrated.

-8-

The lamp assembly of claim 7 wherein said lamp sleeve is substantially transparent to light of a desire wave length.

-9-

The lamp assembly of claim 8 wherein said lamp is further defined as an incandescent lamp.

-10-

The lamp assembly of claim 8 wherein said lamp is further defined as an electric discharge lamp.

-11-

The lamp assembly of claim 8 wherein said lamp is further defined as a light emitting diode.

-12-

The lamp assembly of claim 3 wherein said secondary is coaxial with said lamp.

-13-

An inductively powered lamp assembly comprising:

an inductive secondary to receive power from an inductive primary, said inductive secondary having a reactance;

a lamp disposed in series with said secondary, said lamp having an impedance that is substantially equal to said reactance of said secondary; and

a capacitor disposed in series with said secondary and said lamp, said capacitor having a reactance that is substantially equal to or slightly less than said impedance of said lamp and said reactance of said secondary.

-14-

The lamp assembly of claim 13 wherein said reactance of said secondary is further defined as an operating reactance;

said impedance of said lamp is further defined as an operating impedance;

wherein said lamp and said secondary operate substantially in resonance when said lamp and said secondary are substantially at operating temperature.

-15-

The lamp assembly of claim 14 wherein said secondary is further defined as a coil of LITZ wire.

-16-

The lamp assembly of claim 15 wherein said secondary is further defined as a coil of magnet wire.

-17-

The lamp assembly of claim 15 wherein said lamp assembly includes a closed transparent sleeve surrounding and fully enclosing said secondary, said capacitor and said lamp, said sleeve being unpenetrated.

-18-

The lamp assembly of claim 17 wherein said lamp includes a lamp sleeve, said lamp sleeve being substantially transparent to light of a desired wave length, said secondary being fully enclosed within said lamp sleeve, whereby said lamp sleeve is unpenetrated.

-19-

The lamp assembly of claim 18 wherein said lamp is further defined as an incandescent lamp.

-20-

The lamp assembly of claim 18 wherein said lamp is further defined as an electric discharge lamp.

-21-

The lamp assembly of claim 15 wherein said secondary is coaxial with said lamp.

-22-

An inductively powered lamp assembly comprising:

a lamp circuit including:

an inductive secondary to receive power from an inductive primary; and

a lamp disposed in series with said secondary;

a transparent sleeve entirely enclosing said lamp circuit.

-23-

The lamp assembly of claim 22, wherein said sleeve defines a chamber surrounding said lamp circuit, said chamber being partially evacuated to insulate said lamp from the environment.

-24-

The lamp assembly of claim 22, wherein said sleeve defines a chamber surrounding said lamp circuit; and

further including a gas filling said chamber, said gas selected to provide a desired level of heat conduction between said lamp and the environment.

-25-

The lamp assembly of claim 24 wherein said lamp circuit further includes a capacitor in series with said lamp and said secondary, said capacitor being entirely contained within said sleeve.

-26-

An inductively powered lamp assembly comprising:

an electric-discharge lamp having a pair of electrodes;

a secondary to receive power from an inductive primary, each of said electrodes including a first lead electrically connected to said secondary; and

a magnetic starter switch operable between open and closed positions in response to a magnetic field, each of said electrodes including a second lead electrically connected to said magnetic starter switch, said magnetic starter switch shorting said electrodes across said secondary when in said closed position to preheat said lamp.

-27-

The lamp assembly of claim 26 wherein said magnetic starter switch is operable in response to a magnetic field oriented substantially perpendicularly to a magnetic field powering said secondary.

-28-

An inductively powered electric-discharge lamp assembly comprising:

a lamp having a pair of electrodes and an electric-discharge gas contained within a lamp sleeve;

an inductive secondary to receive power from an inductive primary;

means for electrically connecting said secondary to at least one of said electrodes, whereby said secondary provides power to said electrode when subjected to an appropriate electromagnetic field generated by an inductive primary; and

wherein said secondary and said electrically connecting means are enclosed within said sleeve, whereby said lamp is self-contained with said sleeve being fully sealed and unpenetrated.

-29-

The electric discharge lamp assembly of claim 28, wherein said inductive secondary has a reactance, said lamp having an impedance that is substantially equal to said reactance of said secondary, said capacitor having a reactance that is substantially equal to or slightly less than said impedance of said lamp and said reactance of said secondary.

-30-

The electric discharge lamp assembly of claim 29 further comprising a magnetic starter switch being operable between open and closed positions in response to a magnetic field, said magnetic starter switch shorting said electrodes across said secondary when in said closed position to preheat said lamp.

-31-

An inductively powered incandescent lamp assembly comprising:

an incandescent lamp having a filament contained within a lamp sleeve;

an inductive secondary to receive power from an inductive primary;

means for electrically connecting said secondary to said filament, whereby said secondary provides power to said filament when subjected to an appropriate magnetic field by an inductive primary; and

wherein said secondary and said electrically connecting means are enclosed within said sleeve, whereby said lamp is self-contained with said sleeve being fully sealed and unpenetrated.

-32-

The electric discharge lamp assembly of claim 31 further comprising a capacitor connected in series with said inductive secondary and said lamp; and

wherein said inductive secondary has a reactance, said lamp having an impedance that is substantially equal to said reactance of said secondary, said capacitor having a reactance that is substantially equal to or slightly less than said impedance of said lamp and said reactance of said secondary.

-33-

An inductively powered electric-discharge lamp assembly comprising:

first and second secondaries;

a lamp having first and second electrodes, said first electrode being electrically connected to said first secondary, said second electrode being electrically connected to said second secondary;

a capacitor connected in series between said first secondary and said second secondary; and

a starter means for preheating said electrodes, said starter means electrically connected in series between said first electrode and said second electrode.

-34-

The electric-discharge lamp assembly of claim 33 wherein:

each of said first secondary and said second secondary includes first and second leads;

each of said first electrode and said second electrode includes first and second leads, said first lead of said first electrode being electrically connected to said first lead of said first secondary, said first lead of said second electrode being electrically connected to said first lead of said second secondary;

said capacitor being connected in series between said second lead of said first secondary and said second lead of said second secondary; and

said starter means being electrically connected in series between said second lead of said first electrode and said second lead of said second electrode.

-35-

The electric-discharge lamp assembly of claim 34 wherein said secondaries have a combined reactance, said lamp having an impedance that is substantially equal to said combined reactance of said secondaries, said capacitor having a reactance that is substantially equal to or slightly less than said impedance of said lamp and said combined reactance of said secondaries.

-36-

An inductively powered electric-discharge lamp assembly comprising:

first and second secondaries;

a lamp having first and second electrodes, said first electrode being electrically connected to said first secondary, said second electrode being electrically connected to said second secondary;

a capacitor connected in series between said first electrode and said second electrode; and

first and second remotely operable switch means for preheating said electrodes, said first switch means electrically connected in series between said first electrode and said first secondary to selectively short said first electrode across said first secondary, said second switch means electrically connected in series between said second electrode and said second secondary to selectively short said second electrode across said second secondary.

-37-

The electric-discharge lamp assembly of claim 36 wherein:

each of said first secondary and said second secondary includes first and second leads;

each of said first electrode and said second electrode includes first and second leads, said first lead of said first electrode being electrically connected to said first lead of said first secondary, said first lead of said second electrode being electrically connected to said first lead of said second secondary;

said capacitor being connected in series between said second lead of said first electrode and said second lead of said second electrode;

said first switch means being electrically connected in series between said second lead of said first electrode and said second lead of said first secondary; and

said second switch means being electrically connected in series between said second lead of said second electrode and said second lead of said second secondary.

-38-

The electric-discharge lamp assembly of claim 36 wherein said secondaries have a combined reactance, said lamp having an impedance that is substantially equal to said combined reactance of said secondaries, said capacitor having a reactance that is substantially equal to or slightly less than said impedance of said lamp and said combined reactance of said secondaries.

-39-

An inductively powered electric-discharge lamp assembly comprising:

first and second secondaries;

a lamp having first and second electrodes, said first electrode being electrically connected to said first secondary, said second electrode being electrically connected to said second secondary;

a capacitor connected in series between said first electrode and said second electrode; and

first and second remotely operable switch means for preheating said electrodes, said first switch means electrically connected in series between said first electrode and said first secondary to selectively short said first electrode across said first secondary, said second

switch means electrically connected in series between said second electrode and said second secondary to selectively short said second electrode across said second secondary.

-40-

The electric-discharge lamp assembly of claim 39 wherein:

each of said first secondary and said second secondary includes first and second leads;

each of said first electrode and said second electrode includes first and second leads, said first lead of said first electrode being electrically connected to said first lead of said first secondary, said first lead of said second electrode being electrically connected to said first lead of said second secondary;

said capacitor being connected in series between said second lead of said first electrode and said second lead of said second electrode;

said first switch means being electrically connected in series between said second lead of said first electrode and said second lead of said first secondary; and

said second switch means being electrically connected in series between said second lead of said second electrode and said second lead of said second secondary.

-41-

The electric-discharge lamp assembly of claim 40 wherein said secondaries have a combined reactance, said lamp having an impedance that is substantially equal to said combined reactance of said secondaries, said capacitor having a reactance that is substantially equal to or slightly less than said impedance of said lamp and said combined reactance of said secondaries.

-42-

An inductively powered electric-discharge lamp assembly comprising:

first and second secondaries;

a lamp having first and second electrodes, said first electrode being electrically connected to said first secondary, said second electrode being electrically connected to said second secondary;

first and second capacitors, said first capacitor connected in series between said first electrode and said first secondary, said second capacitor connected in series between said second electrode and said second secondary; and

first and second remotely operable switch means for preheating said electrodes, said first switch means electrically connected in series between said first electrode and said first secondary to selectively short said first electrode across said first secondary, said second switch means electrically connected in series between said second electrode and said second secondary to selectively short said second electrode across said second secondary.

-43-

The electric-discharge lamp assembly of claim 42 wherein:

each of said first secondary and said second secondary includes first and second leads;

each of said first electrode and said second electrode includes first and second leads, said first lead of said first electrode being electrically connected to said first lead of said first secondary, said first lead of said second electrode being electrically connected to said first lead of said second secondary;

said first capacitor being connected in series between said first lead of said first electrode and said first lead of said first secondary;

said second capacitor being connected in series between said first lead of said second electrode and said first lead of said second secondary;

said first switch means being electrically connected in series between said second lead of said first electrode and said second lead of said first secondary; and

said second switch means being electrically connected in series between said second lead of said second electrode and said second lead of said second secondary.

-44-

The electric-discharge lamp assembly of claim 43 wherein said lamp has an impedance, a combined reactance of said first secondary and said second secondary being substantially equal to said impedance of said lamp, a combined reactance of said first capacitor and said second capacitor being substantially equal to or slightly less than said impedance of said lamp and said combined reactance of said first secondary and said second secondary.

-45-

A method of manufacturing a lamp assembly comprising the steps of:

connecting a lamp to an inductive secondary,

connecting a capacitor in series with the lamp and the inductive secondary;

inserting the lamp, the capacitor, and the secondary into a structure; and

sealing the structure so that the lamp, the capacitor and the secondary do not penetrate the structure.

-46-

The method of claim 45 wherein the capacitor is selected to have a reactance that is substantially equal to or slightly less than the impedance of the lamp and the reactance of the secondary, whereby the capacitor, the lamp and the secondary operate substantially at resonance.

-47-

The method of claim 46 wherein said lamp connecting step includes the steps of:

connecting a first end of a filament wire to a first lead of the inductive secondary;

connecting a second end of a filament wire to a first lead of the capacitor; and

connecting a second lead of the capacitor to a second lead of the inductive secondary.

-48-

The method of claim 46 wherein said lamp connecting step includes the steps of:

connecting a first lamp electrode to a first lead of the inductive secondary;

connecting a second lamp electrode to a first lead of the capacitor; and

connecting a second lead of the capacitor to a second electrode of the inductive secondary.

-49-

A method of manufacturing a lamp assembly comprising the steps of:

connecting a lamp to an inductive secondary, the lamp having an impedance and the secondary having a reactance,

connecting a capacitor in series with the lamp and the inductive secondary, the capacitor being selected to have a reactance that is substantially equal to or slightly less than the impedance of the lamp and the reactance of the secondary, whereby the capacitor, the lamp and the secondary operate substantially at resonance.

-50-

The method of claim 49 wherein said lamp connecting step includes the steps of:

connecting a first end of a filament wire to a first lead of the inductive secondary;

connecting a second end of a filament wire to a first lead of the capacitor; and

connecting a second lead of the capacitor to a second lead of the inductive secondary.

-51-

The method of claim 49 wherein said lamp connecting step includes the steps of:

connecting a first lamp electrode to a first lead of the inductive secondary;

connecting a second lamp electrode to a first lead of the capacitor; and

connecting a second lead of the capacitor to a second lead of the inductive secondary.

-52-

The lamp assembly of claim 17 wherein said sleeve is a substantially flexible plastic tube, opposite ends of said tube being sealed to provide a fully sealed enclosure.

-53-

The lamp assembly of claim 52 wherein said opposite ends of said tube are crimped.

-54-

The lamp assembly of claim 53 wherein said plastic tube is further defined as a Teflon tube.

-55-

A lamp assembly for an inductively powered lamp comprising:

a base;

a lamp mounted to said base;

an outer sleeve mounted to said base about said lamp, said outer sleeve having a flange;

a flexible, resilient seal disposed between said base and said outer sleeve;

a locking ring fitted over said sleeve and secured to said base, said locking ring entrapping said flange to retain said outer sleeve in place on said base about said lamp.

-56-

The lamp assembly of claim 55 wherein said base defines an annular channel, said flange seated within said annular channel.

-57-

The lamp assembly of claim 56 wherein said seal is fitted about said base within said annular channel.

-58-

The lamp assembly of claim 57 wherein said locking ring includes a radial portion and an axial portion, said radial portion engaging said flange, said axial portion being affixed to said base.

-59-

The lamp assembly of claim 55 wherein said base includes a generally cylindrical portion having an outer surface, said outer sleeve having a generally cylindrical portion having an inner surface, said seal being disposed between and directly engaging said outer surface of said base and said inner surface of said sleeve.

-60-

The lamp assembly of claim 59 wherein said seal is an o-ring seal.

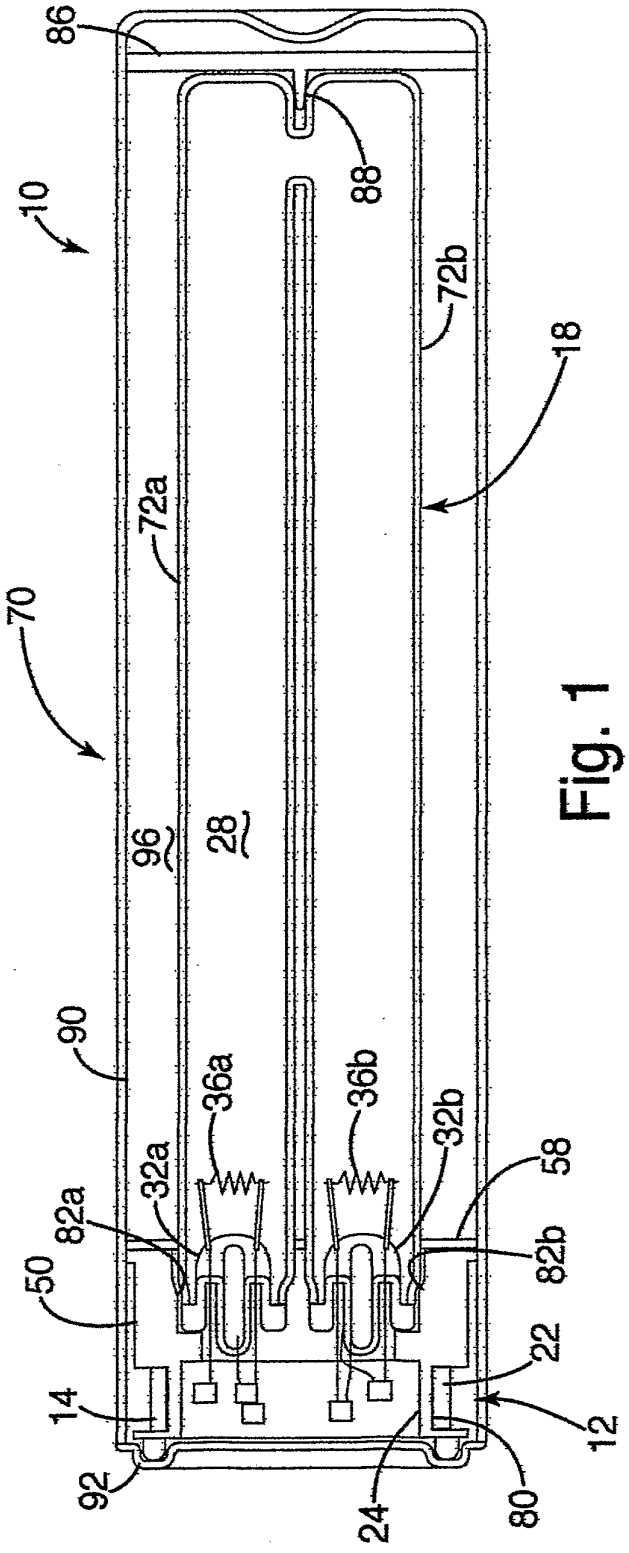


Fig. 1

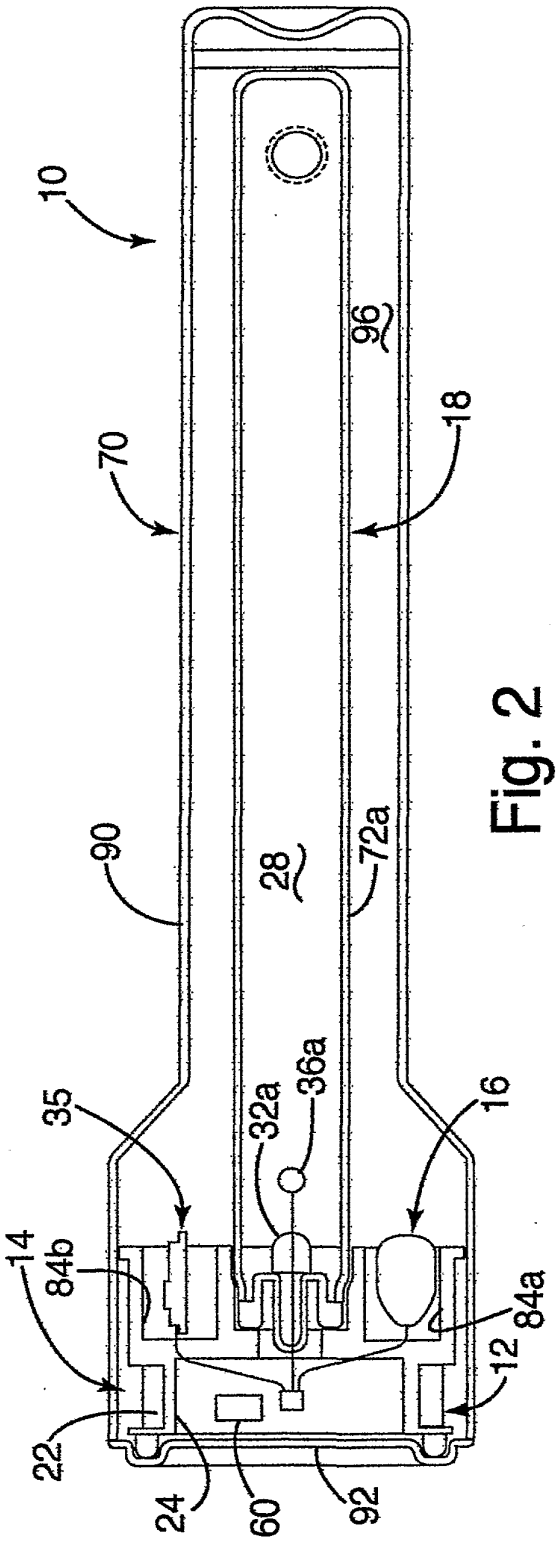


Fig. 2

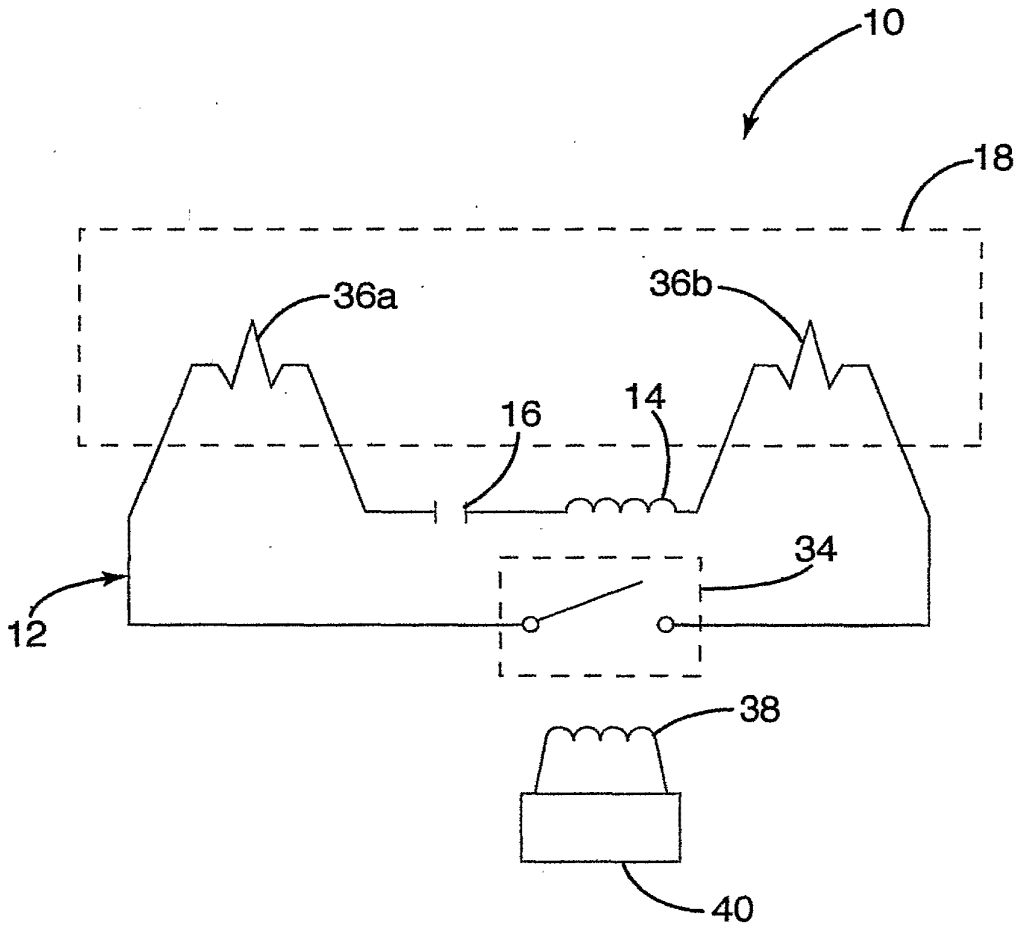


Fig. 3

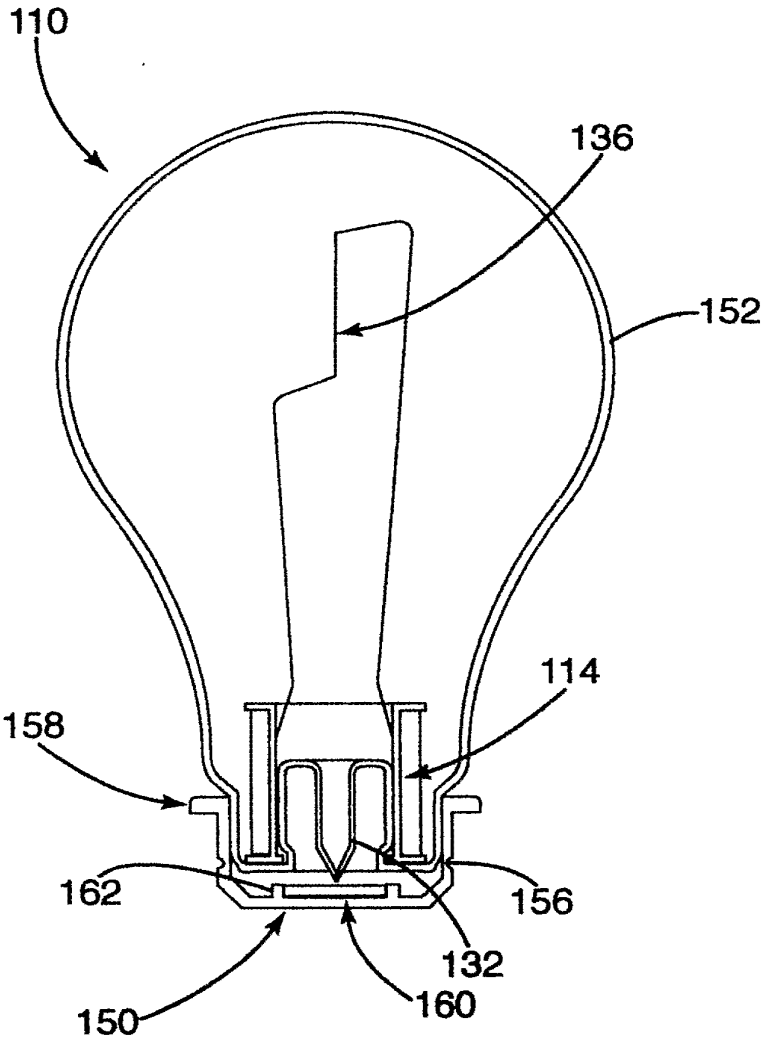


Fig. 4

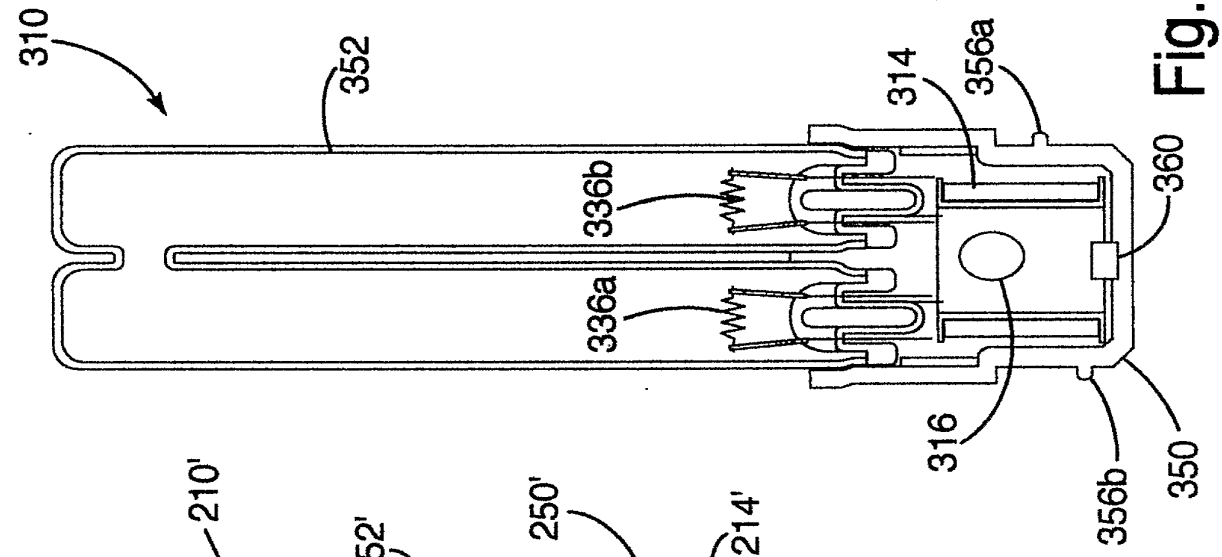


Fig. 9

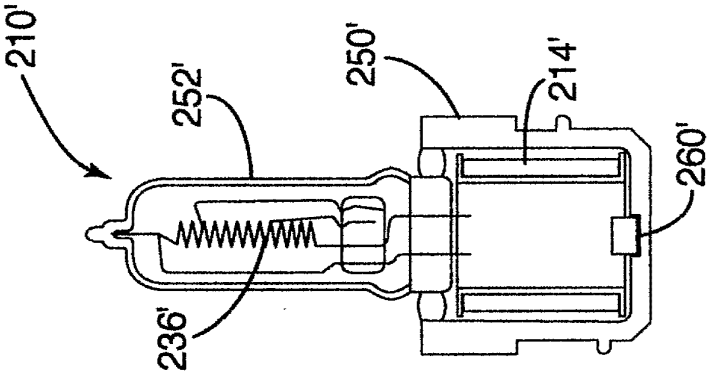


Fig. 7

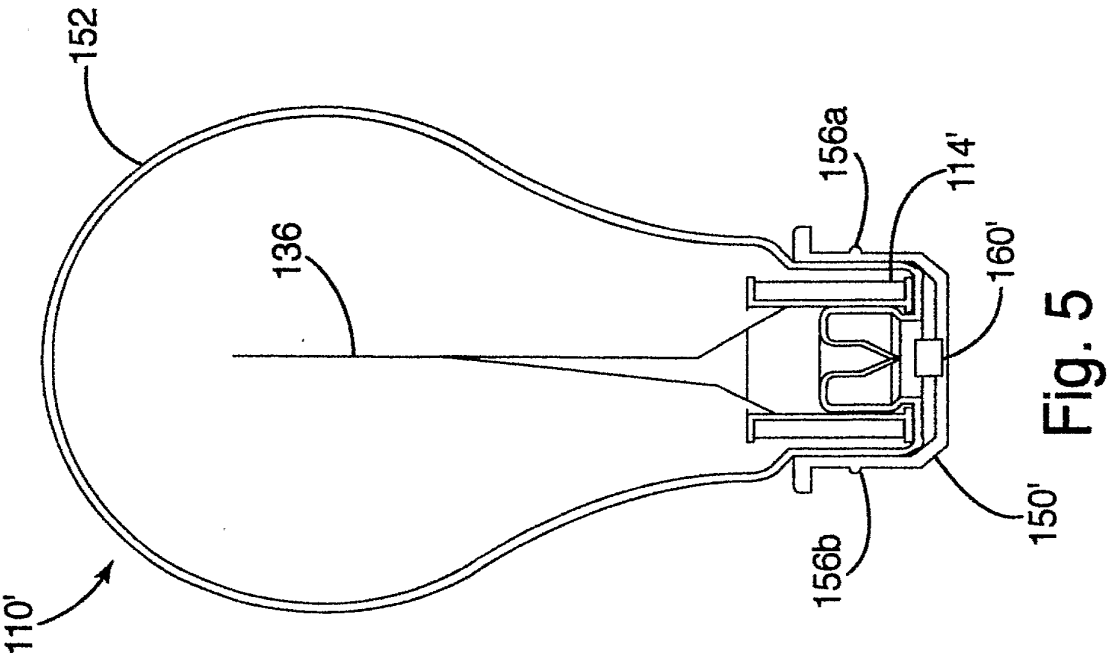


Fig. 5

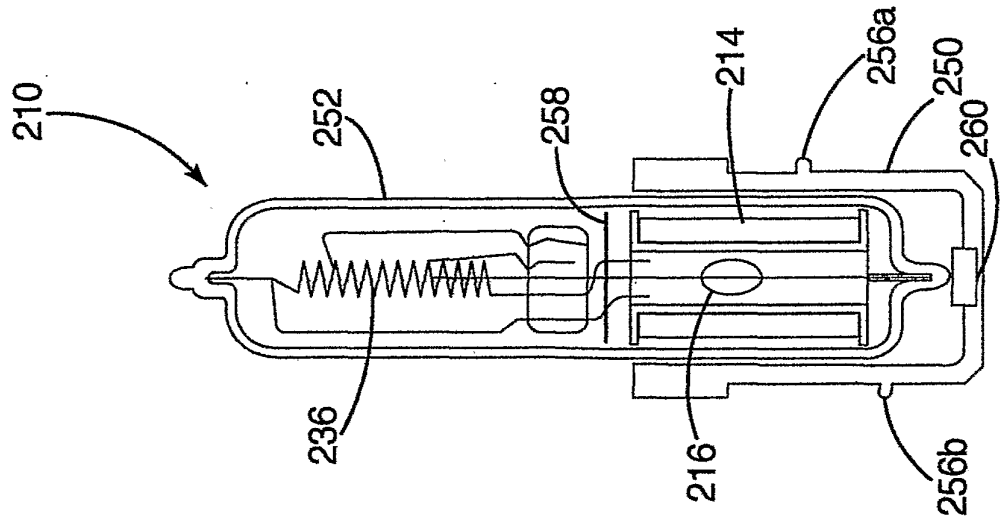


Fig. 6

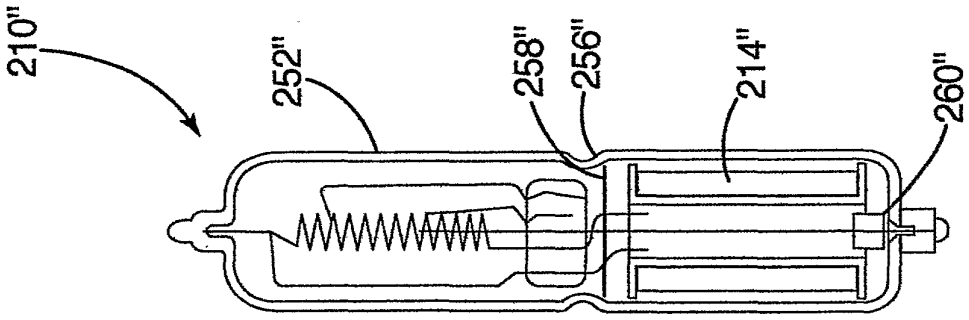


Fig. 8

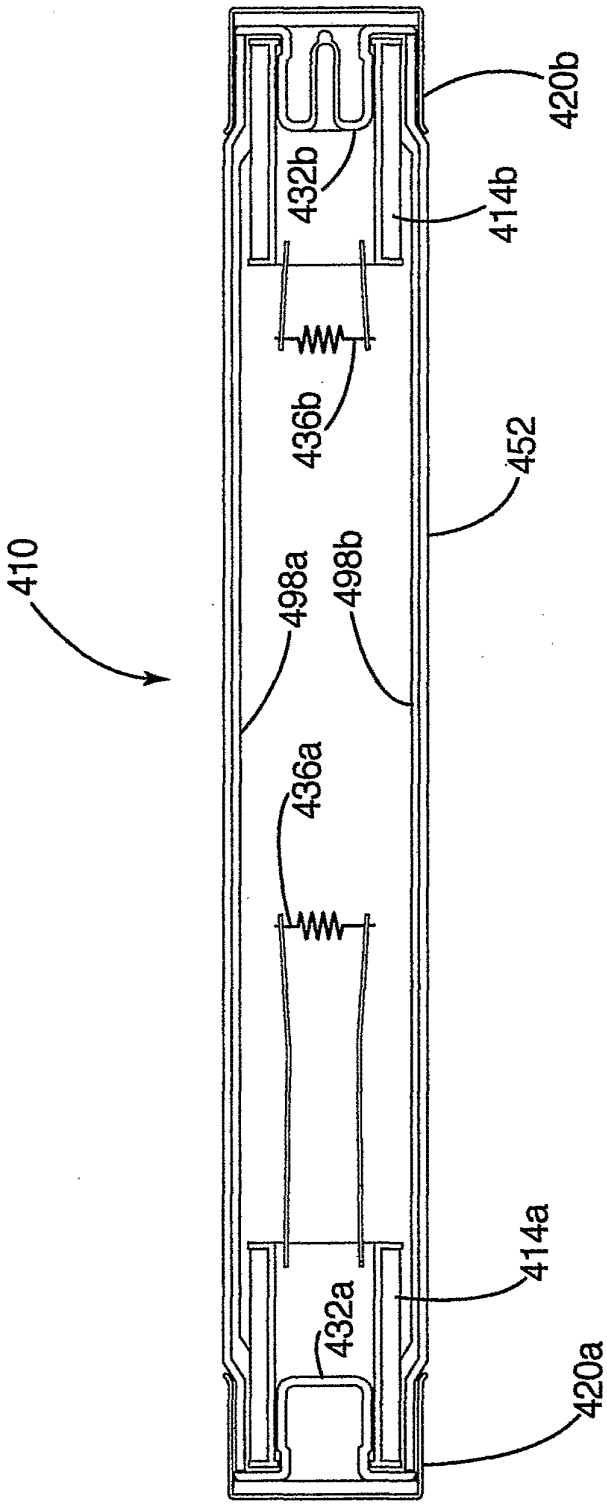


Fig. 10

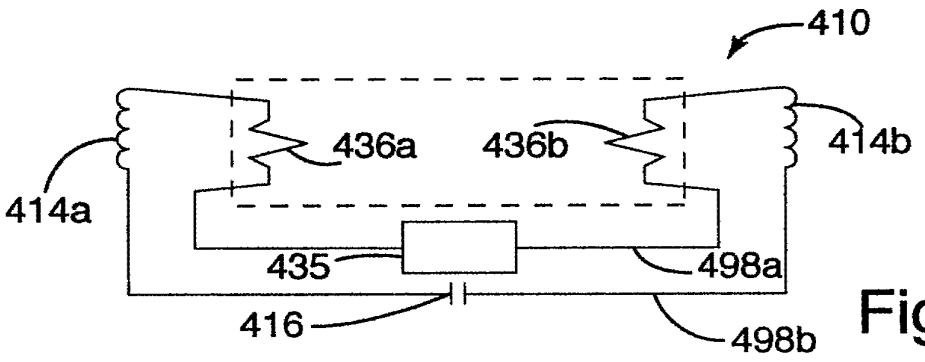


Fig. 11

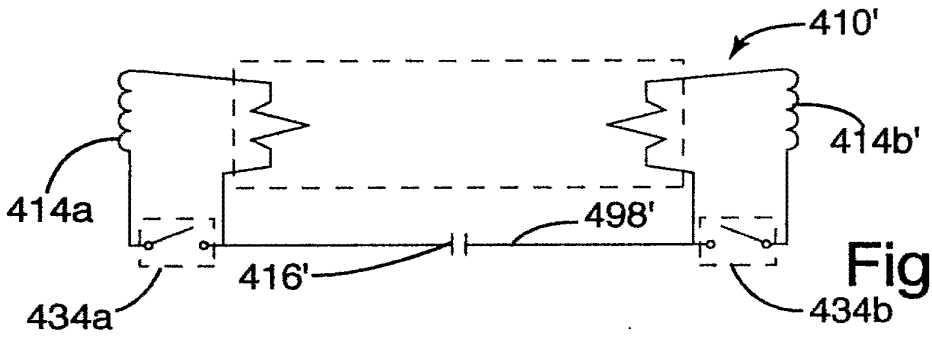


Fig. 12

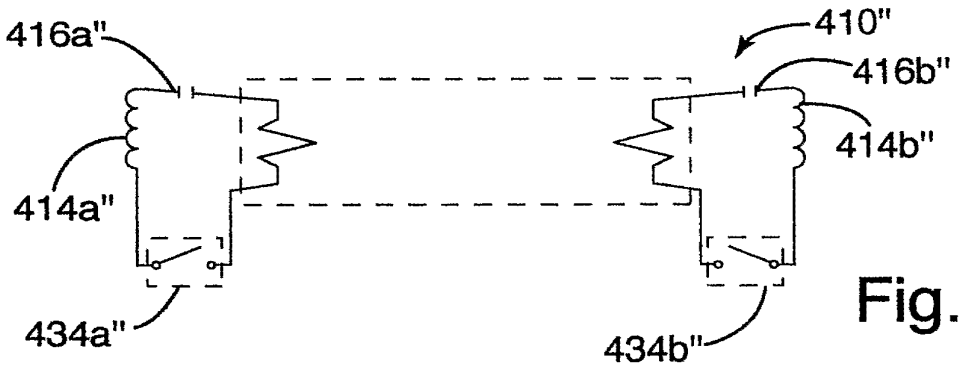


Fig. 13

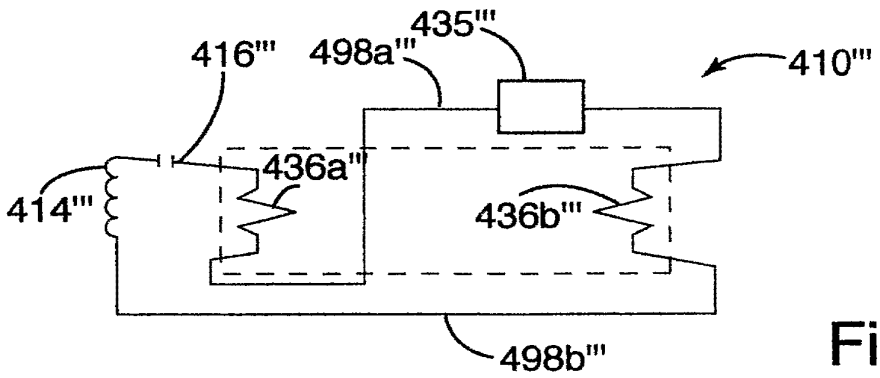


Fig. 14

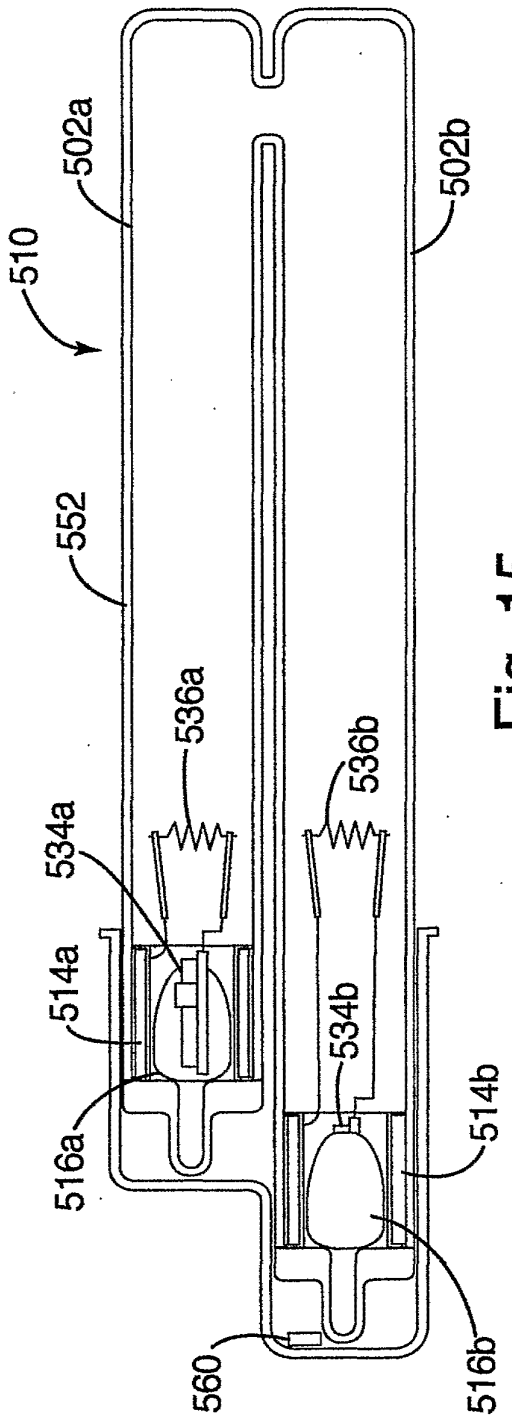


Fig. 15

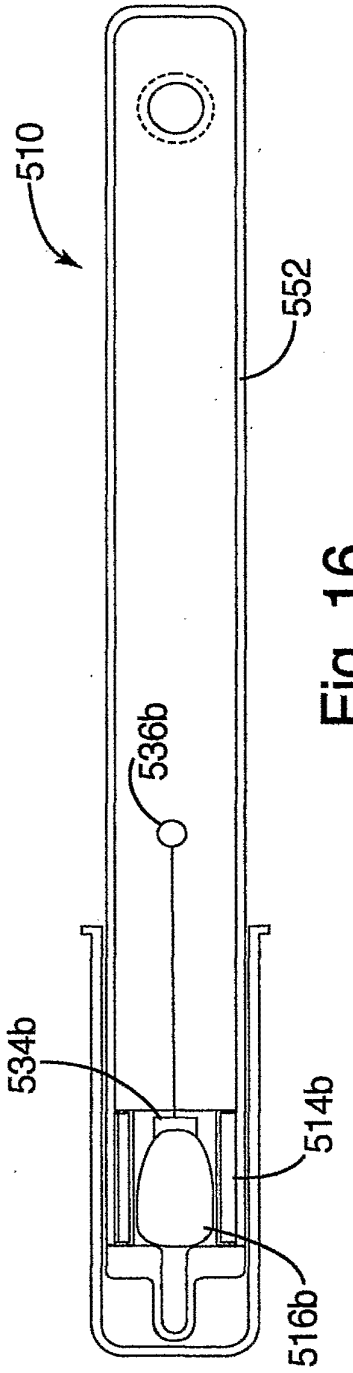


Fig. 16

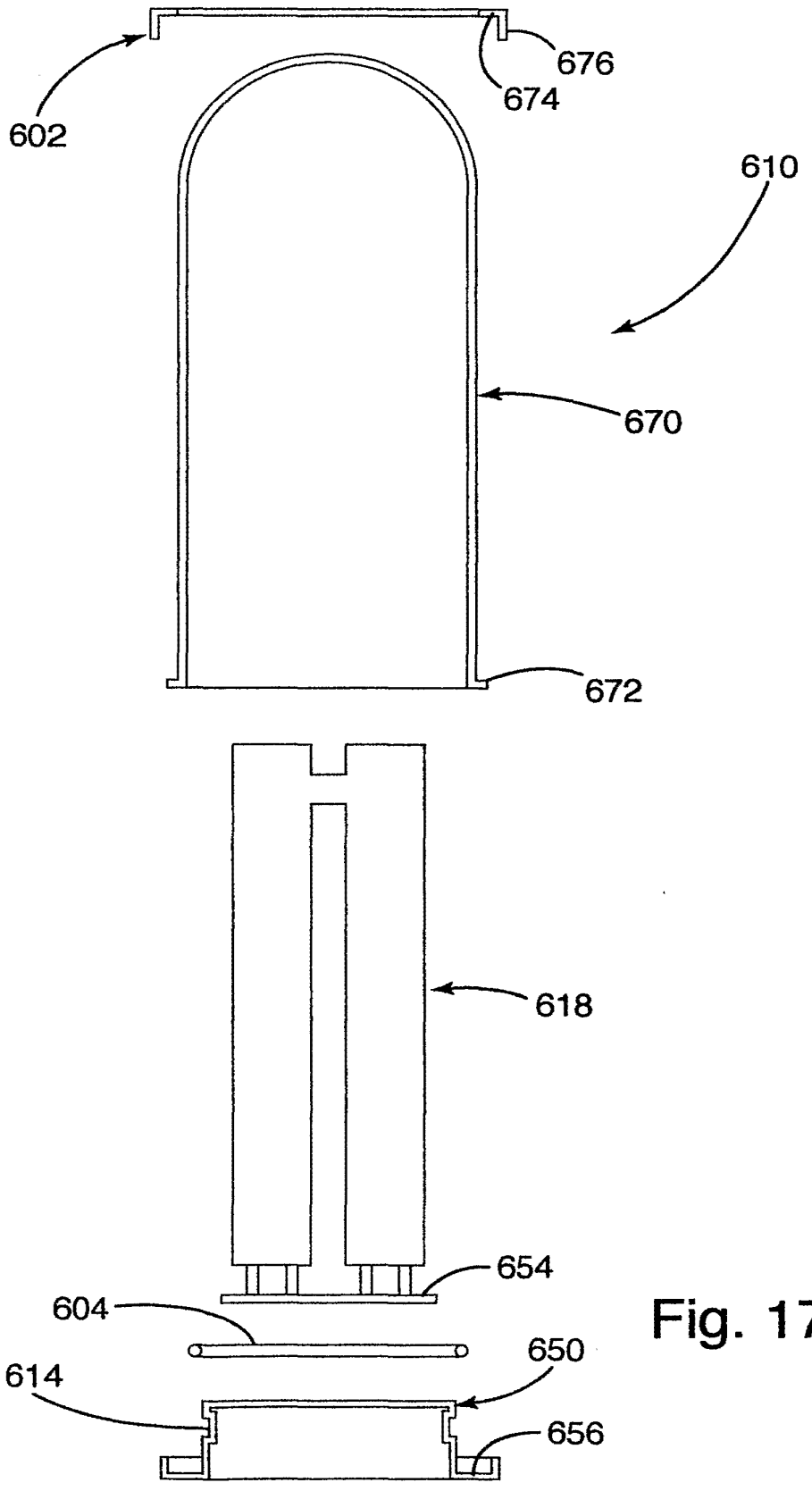


Fig. 17

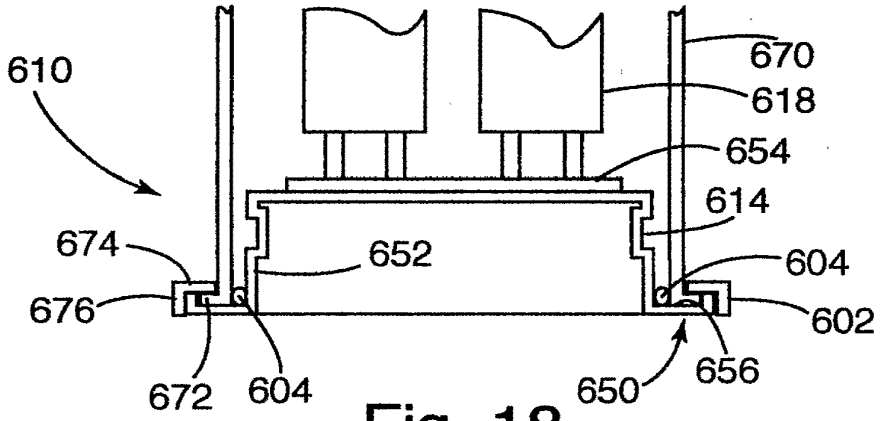


Fig. 18

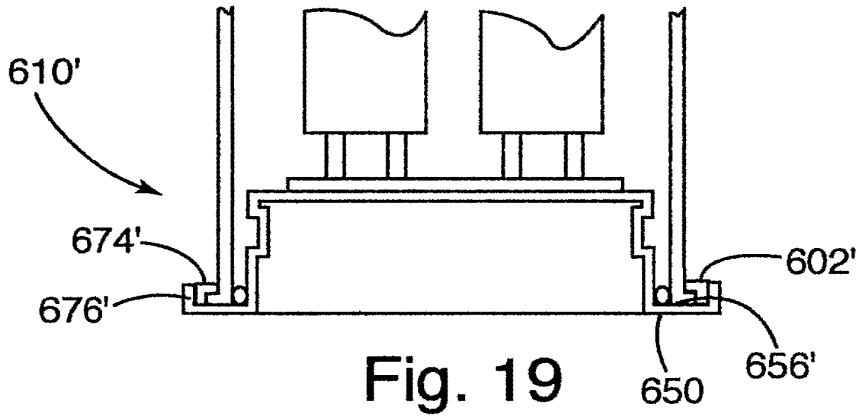


Fig. 19

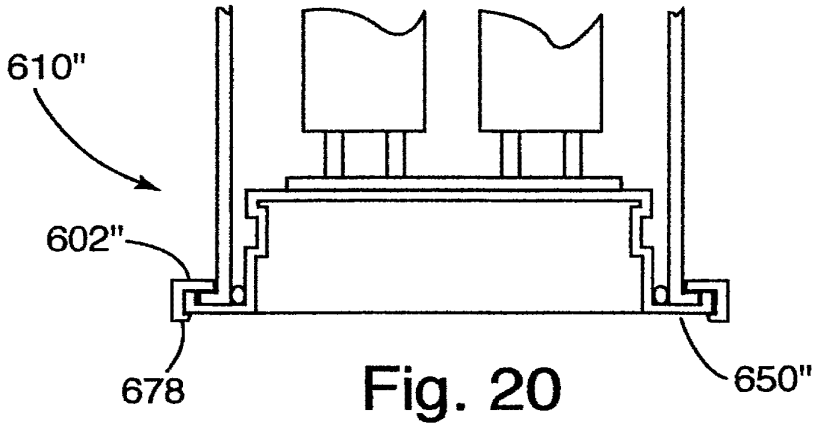


Fig. 20

PATENT COOPERATION TREATY

ARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

To: STUART MEYER
FENWICK & WEST LLP
801 CALIFORNIA STREET
MOUNTAIN VIEW, CA 94041

	Date of mailing *(day/month/year)* 30 JAN 2012
Applicant's or agent's file reference 17157 PCT	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/US2011/054544	International filing date *(day/month/year)* 03 October 2011
Applicant WITRICITY CORPORATION	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

   For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 – 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90*bis*.1 and 90*bis*.3).

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 Telephone No. PCT OSP: 571-272-7774

Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 17157 PCT	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US2011/054544	International filing date *(day/month/year)* 03 October 2011	(Earliest) Priority Date *(day/month/year)* 06 October 2010
Applicant WITRICITY CORPORATION		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language**, the international search was carried out on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

   ☒ the text is approved as submitted by the applicant.

   ☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

   ☒ the text is approved as submitted by the applicant.

   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

   a. the figure of the drawings to be published with the abstract is Figure No. 1

   ☒ as suggested by the applicant.

   ☐ as selected by this Authority, because the applicant failed to suggest a figure.

   ☐ as selected by this Authority, because this figure better characterizes the invention.

   b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/054544

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - H02J 7/02 (2011.01)
USPC - 320/109
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - B60L 11/18; B60Q 1/52; G01R 31/36; H02J 7/00, 7/02; H04B 5/00; H04M 10/44 (2012.01)
USPC - 180/65.29; 307/104; 320/108, 109, 149, 152

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, Google Patents, Google Scholar

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2002/0167294 A1 (ODAOHHARA) 14 November 2002 (14.11.2002) entire document	1-56
Y	US 2010/0235006 A1 (BROWN) 16 September 2010 (16.09.2010) entire document	1-56
Y	US 2010/0156355 A1 (BAUERLE et al) 24 June 2010 (24.06.2010) entire document	3, 7, 26-30, 51, 54
Y	US 6,012,659 A (NAKAZAWA et al) 11 January 2000 (11.01.2000) entire document	5-6
Y	US 2010/0109445 A1 (KURS et al) 06 May 2010 (06.05.2010) entire document	10-12, 17, 26-30, 34, 39
Y	US 2007/0024246 A1 (FLAUGHER) 01 February 2007 (01.02.2007) entire document	18
Y	US 2006/0214626 A1 (NILSON et al) 28 September 2006 (28.09.2006) entire document	45

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 January 2012	30 JAN 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: STUART MEYER
FENWICK & WEST LLP
801 CALIFORNIA STREET
MOUNTAIN VIEW, CA 94041

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	30 JAN 2012

Applicant's or agent's file reference	FOR FURTHER ACTION
17157 PCT	See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2011/054544	03 October 2011	06 October 2010

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - H02J 7/02 (2012.01)
USPC - 320/109

Applicant WITRICITY CORPORATION

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer:
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	12 January 2012	Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2011/054544

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

   ☐ on paper

   ☐ in electronic form

   b. (time)

   ☐ in the international application as filed

   ☐ together with the international application in electronic form

   ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2011/054544

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-56	YES
	Claims	None	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-56	NO
Industrial applicability (IA)	Claims	1-56	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1-2, 4, 8-9, 13-16, 19-25, 31-33, 35-38, 40-44, 46-50, 52-53, and 55-56 lack an inventive step under PCT Article 33(3) as being obvious over Odaohhara in view of Brown.

Regarding claims 1 and 49, Odaohhara disclose a safety system (par. 12-13, power supply system) and method (par. 17, method) for a charger to provide protection (par. 12, maintain safety when a battery is connected to a charger) with respect to an object that may become hot during operation of the charger (par. 12, battery maybe charged to a voltage above predetermined voltage, which causes the battery to become hot), the safety system (par. 12, system to maintain safety) comprising: a detection subsystem (par. 13, detecting means; par. 43, current detection circuit 64 and voltage detection circuit 63; par. 56, abnormal current detection table 73; fig.5) for detecting an object (par. 18, recognize the battery is connected to charger); and a notification subsystem (par. 13, notification means; par. 52, notification unit 76) operatively coupled to the detection subsystem (73, detection table) and configured to provide an indication of the object (par. 13-14, notifying system of malfunction occurrence of the battery), but is silent on the particulars of the detecting the presence of an object in substantial proximity to the charger.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose detecting an object in proximity to a charger (par. 30-32, detect the presence of the vehicle is now approaching the apparatus, or charger).
Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claims 2 and 50, modified Odaohhara disclose claims 1 and 50, respectively, Odaohhara further disclose comprising a management subsystem (fig. 2, CPU 61 within intelligent battery system; par. 43-44, CPU 61 is adapted to detect abnormal charging) operatively coupled to the detection subsystem (fig. 2, CPU 61 connected to detection circuit 63, 64; par. 43-44) and configured to mitigate an effect of the object (par. 51-52, based on the CPU 61 functionality determine whether to turn off or continue charging of battery).

Regarding claim 4, modified Odaohhara disclose a safety system as in claim 1, Odaohhara further disclose wherein the notification subsystem includes an annunciator (par. 62, notify the user of malfunction with a beep sound).

Regarding claims 8 and 55, modified Odaohhara claims 2 and 50, respectively, but Odaohhara is silent on the particulars of wherein the management subsystem is configured to move the object.
However, Brown in discussing a method and apparatus for automatic charging of electrically powered vehicle (title) disclose moving an object (par. 111, base may be movable within the plane of the ground; par. 46, charging apparatus 110a moves in one, two or all three axes and rotate as necessary). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Regarding claim 9, modified Odaohhara disclose a safety system as in claim 2, Odaohhara further disclose the management subsystem (61, CPU) is configured to alter operation of the charger (par. 51-52, based on the CPU 61 it is determined whether to continue or abort operation of charger), but Odaohhara is silent on the particulars of responsive to detection of the object.
However, Brown in discussing a method and apparatus for automatic charging of electrically powered vehicle (title) disclose altering an operation of a charger responsive to detection of an object (par. 35, various triggers associated with the vehicle, or object, can alter the operation of charging the vehicle). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claim 13, modified Odaohhara disclose a safety system as in claim 1, but Odaohhara is silent on wherein the detection subsystem includes a wall-mounted sensor.
However, Brown in discussing a method and apparatus for automatic charging of electrically powered vehicle (title) disclose a wall-mounted sensor (fig. 1, item 130, optical visual guide; par. 49, sensor may be embedded in guide 130). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claim 14, modified Odaohhara disclose a safety system as in claim 1, but Odaohhara is silent on the particulars of wherein the detection subsystem includes a light sensor.
However, Brown in discussing a method and apparatus for automatic charging of electrically powered vehicle (title) disclose a light sensor (par. 59, sensor may use optics, laser or low-power light signal). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claim 15, modified Odaohhara disclose a safety system as in claim 1, but Odaohhara is silent on wherein the detection subsystem includes a camera.
However, Brown in discussing a method and apparatus for automatic charging of electrically powered vehicle (title) disclose using a camera for detecting (par. 113, sensor may include a camera, CCD, etc.). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claim 16, modified Odaohhara disclose a safety system as in claim 1, but Odaohhara is silent on the particulars of wherein the detection subsystem includes a sensor mounted on a vehicle.
However, Brown in discussing a method and apparatus for automatic charging of electrically powered vehicle (title) disclose a sensor mounted to a vehicle (par. 65, on-board sensor). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claim 19, modified Odaohhara disclose a safety system as in claim 1, Odaohhara further disclose configured to use the detection system for baseline calibration before the charger commences charging (par. 12-13, based on the calculated battery capacity determine whether to charge or not; par. 17-18, based on calculated value or reference value of charging current determine whether to charge).

Regarding claims 20 and 52, modified Odaohhara disclose claims 1 and 49, respectively, Odaohhara further disclose wherein the notification subsystem includes an annunciator/local indicator configured to provide a warning signal in an area proximate to the object (par. 62, provides notification warning signal, such as a beep sound to the user, which implicitly implies that the user in within some area).

Regarding claim 21, modified Odaohhara disclose a safety system as in claim 20, Odaohhara further disclose wherein the warning signal is a visual indication (par. 62, warning signal can be a flashing LED).

Regarding claim 22, modified Odaohhara disclose a safety system as in claim 20, Odaohhara further disclose wherein the warning signal is an aural indication (par. 62, warning signal can be a beep sound).

Regarding claim 23, modified Odaohhara disclose a safety system as in claim 1, Odaohhara further disclose wherein the notification subsystem is configured to provide a remote notification of the object (par. 62, CPU 11 receives the alert to notify the user of the malfunction by displaying on the LCD 18; fig. 1, depicts 10 computer system remote from 52 intelligent battery).

Supplemental Box

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Continuation of:

Regarding claims 24 and 53, modified Odaohhara disclose claims 23 and 49, respectively, Odaohhara further disclose the remote notification (par. 62, displaying a malfunction occurrence on the LCD 18, which is remote of from the charger), but is silent on the particulars of an electronically delivered message.
However, Brown in discussing a method and apparatus for automatic charging of electrically powered vehicle (title) disclose an electronic message (par. 40, indication can be in expressed in words, letters, etc. to provide indication to operator). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claim 25, modified Odaohhara disclose a safety system as in claim 1, but Odaohhara is wherein the notification subsystem is enabled upon movement of a vehicle away from the object.
However, the determining of whether is a vehicle is away from or near to an object is known in the art as evidenced by Brown. Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose determining that vehicle is moving away (par. 54, driving away from the apparatus). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claim 31, modified Odaohhara disclose a safety system as in claim 2, Odaohhara further disclose wherein the management subsystem (CPU 61; par. 44) is configured to turn off the charger responsive to detection of the object (par. 44, turning off charger based on the detecting abnormal charging of battery).

Regarding claim 32, modified Odaohhara disclose a safety system as in claim 2, Odaohhara further disclose wherein the management subsystem (CPU 61) is configured to reduce a charging level of the charger responsive to detection of the object (par. 44, based on detecting abnormal charging of battery turn off charger).

Regarding claims 33 and 56, modified Odaohhara disclose claims 2 and 50, respectively, Odaohhara further disclose wherein the management subsystem (CPU 61) is configured to change an operational parameter of the charger responsive to detection of the object (par. 56-57, CPU in intelligent battery uses formulas to determine the operating parameters for the charger; par. 59).

Regarding claim 35, modified Odaohhara disclose a safety system as in claim 1, Odaohhara further disclose wherein the detection subsystem (par. 13, detecting means; par. 43, current detection circuit 64 and voltage detection circuit 63; par. 56, abnormal current detection table 73; fig.5) is integrated into an electronic system (fig. 1, 10, computer system; par. 29-30, electronic system can be a computer, such as a PC), but is silent on the particulars of a vehicle's electronic systems.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose a vehicle electronic system (par. 10, vehicle electrical storage device, battery). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claim 36, modified Odaohhara disclose a safety system as in claim 1, Odaohhara further disclose wherein the notification subsystem (par. 13, notification means; par. 52, notification unit 76) is integrated into an electronic system (fig. 1, 10, computer system; par. 29-30, electronic system can be a computer, such as a PC), but is silent on the particulars of a vehicle's electronic systems.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose a vehicle electronic system (par. 10, vehicle electrical storage device, battery). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claim 37, modified Odaohhara disclose a safety system as in claim 2, Odaohhara further disclose wherein the management subsystem (CPU 61)) is integrated into an electronic system (fig. 1, 10, computer system; par. 29-30, electronic system can be a computer, such as a PC), but is silent on the particulars of a vehicle's electronic systems.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose a vehicle electronic system (par. 10, vehicle electrical storage device, battery). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

Regarding claim 38, modified Odaohhara disclose a safety system as in claim 1, wherein the detection subsystem, but Odaohhara is silent on a magnetometer.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose using a magnet for proper orientation (par. 59; par. 119). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).

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Regarding claim 40, modified Odaohhara disclose a safety system as in claim 1,Odaohhara further disclose wherein the detection subsystem (par. 13, detecting means; par. 43, current detection circuit 64 and voltage detection circuit 63; par. 56, abnormal current detection table 73; fig.5) is coupled with a charging subsystem of the charger (par. 12-13, charger for charging battery, implicitly has a charging subsystem), the detection subsystem taking as input operational parameters of the charging subsystem (par. 56-57, CPU in intelligent battery uses formulas to determine the operating parameters for the charger; par. 59), but Odaohhara is silent on determining presence of the object based on the operational parameters of the charging subsystem.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose determining presence of object based on operation parameters of charging system (par. 36, determine operating parameters of vehicle).
Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract -- Brown).

Regarding claim 41, modified Odaohhara disclose a safety system as in claim 2, but Odaohhara is silent on the particulars of wherein the management subsystem includes a surface configured to facilitate movement of the object.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose a surface configured to facilitate movement of an object (par. 77, surface, which is of different orientations, facilitates coupling to vehicle; par. 105-107, surface of ground facilitates movement of vehicle). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract -- Brown).

Regarding claim 42, modified Odaohhara disclose a safety system as in claim 2, but Odaohhara is silent on wherein the management subsystem includes a surface that moves so as to facilitate movement of the object.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose a surface that moves to facilitate movement of an object (par. 60, tracks, ball bearing, jackscrews, etc. provide a method of moving the apparatus, or object). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract -- Brown).

Regarding claim 43, modified Odaohhara disclose a safety system as in claim 2, but Odaohhara is silent on wherein the management subsystem includes a mechanism to sweep the object so as to cause it to move.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose a surface that moves to facilitate movement of an object (par. 46, moves in different directions; par. 60, tracks, ball bearing, jackscrews, etc. provide a method of moving the apparatus, or object). Modified Odaohhara is silent on the particulars of sweeping mechanism.
Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract -- Brown).
Further, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a sweeping mechanism for moving an object, since this is a well known practice in the art and the particulars are a matter of mere design choice.

Regarding claim 44, modified Odaohhara disclose a safety system as in claim 2, but Odaohhara is silent on wherein the management subsystem includes a mechanism to facilitate movement of the object using magnetism.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose using a magnet for proper orientation (par. 59; par. 119). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract -- Brown).

Regarding claim 46, modified Odaohhara disclose a safety system as in claim 1, Odaohhara further disclose wherein the detection subsystem and the notification subsystem are integrated (fig. 6, depicts the abnormal current detection table 73 integrated with malfunction notification unit 76; par. 51-52, fig. 6 is a block diagram of the intelligent battery which includes current detection table and malfunction notification unit).

Regarding claim 47, modified Odaohhara disclose a safety system as in claim 2, Odaohhara further disclose wherein the detection subsystem and the management subsystem are integrated (fig. 2, depicts CPU 61 and detection circuits 63, 64 within intelligent battery).

Regarding claim 48, modified Odaohhara disclose a safety system as in claim 2, Odaohhara further disclose wherein the notification system (fig. 6, malfunction notification unit 76 is within intelligent battery 52) and the management subsystem are integrated (fig. 2, CPU 61, is within intelligent battery 52).

Supplemental Box

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Continuation of:

Claims 3, 7, 26-27, 51, and 54 lack an inventive step under PCT Article 33(3) as being obvious over Odaohhara in view of Brown in further view of Bauerle et al., hereinafter referred to as Bauerle.

Regarding claims 3 and 51, modified Odaohhara disclose claims 1 and 49, respectively, but is Odaohhara is silent on wherein the detection subsystem includes a heat sensor.
However, Bauerle in discussing a system and method for charging a plug-in electric vehicle (title) disclose a heat sensor (par. 14, temperature sensor may sense the temperature of component that exhibits the most heat). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Bauerle with the invention of Odaohhara for the purpose of controlling the charging condition so that the vehicle battery is charged in an optimum fashion.

Regarding claims 7 and 54, modified Odaohhara disclose claims 2 and 50, respectively, but is silent on the particulars of wherein the management subsystem is configured to cool an area associated with the object.
However, determining whether to cool an area associated with an object is a well known practice in the art as evidenced by Bauerle. Bauerle in discussing a system and method for charging a plug-in electric vehicle (title) disclose cooling an area (par. 13, cooling unit 40 to reduce temperature of battery charger; par. 33, cooling unit 40). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Bauerle with the invention of Odaohhara for the purpose of controlling the charging condition so that the vehicle battery is charged in an optimum fashion.

Regarding claim 26, modified Odaohhara disclose a safety system as in claim 1, wherein the notification subsystem, but Odaohhara is silent on comprises a plurality of sensors, the notification subsystem being configured to detect presence of the object responsive to differential temperature indications from a subset of the plurality of sensors.
However, Brown in discussing a method and apparatus for automatic charging of an electrically powered vehicle (title) disclose a plurality of sensors (par. 118, different types of sensors); detect presence of object from subset of pluraity of sensors (par. 85, detect the vehicle is within distance of apparatus from sensor). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).
Modified Odaohhara is silent on the particulars of a differential temperature indication. Furthermore, Bauerle in discussing a system and method for charging a plug-in electric vehicle (title) disclose a differential temperature indication (par. 17, temperature sensors are collected to determine the average or collective temperature of entire battery unit, differential temperature). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Bauerle with the invention of Odaohhara for the purpose of controlling the charging condition so that the vehicle battery is charged in an optimum fashion.

Regarding claim 27, modified Odaohhara disclose a safety system as in claim 2, Odaohhara further disclose the management system (CPU 61), but Odaohhara is silent on a coolant dispenser configured to supply a coolant to an area associated with the object responsive to detection of the object.
However, Bauerle in discussing a system and method for charging a plug-in electric vehicle (title) disclose a coolant dispenser configured to supply a coolant to an area in response to a detection of an object (par. 13, cooling unit to reduce temperature of battery; par. 33, cooling unit reduces temperature of battery unit based on detected battery sensor temperatures). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Bauerle with the invention of Odaohhara for the purpose of controlling the charging condition so that the vehicle battery is charged in an optimum fashion.

Supplemental Box

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Continuation of:

Claims 5-6 lack an inventive step under PCT Article 33(3) as being obvious over Odaohhara in view of Brown in further view of Nakazawa et al., hereinafter referred to as Nakazawa.

Regarding claim 5, modified Odaohhara disclose a safety system as in claim 1, wherein the detection subsystem, but Odaohhara is silent on the particulars of comprising heat sensitive paint.
However, the use of heat sensitive paint is well known in the art as evidenced by Nakazawa. Nakazawa in discussing a method for discriminating between used and unused gas generators for air bags during car scrapping process (title) disclose using heat sensitive paint (col. 5, lns. 32, heat sensitive paint; col. 5, lns. 66-67, check heat sensitive paints). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Nakazawa with the invention of Odaohhara for the purpose of allowing the vehicle to be readily distinguishable by worker (col. 3, lns. 53-57, Nakazawa).

Regarding claim 6, modified Odaohhara disclose a safety system as in claim 1, wherein the notification subsystem, but Odaohhara is silent on the particulars of comprising heat sensitive paint.
However, the use of heat sensitive paint is well known in the art as evidenced by Nakazawa. Nakazawa in discussing a method for discriminating between used and unused gas generators for air bags during car scrapping process (title) disclose using heat sensitive paint (col. 5, lns. 32, heat sensitive paint; col. 5, lns. 66-67, check heat sensitive paints). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Nakazawa with the invention of Odaohhara for the purpose of allowing the vehicle to be readily distinguishable by worker (col. 3, lns. 53-57, Nakazawa).

Supplemental Box

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Continuation of:

Claims 10-12, 17, 34, and 39 lacks an inventive step under PCT Article 33(3) as being obvious over Odaohhara in view of Brown in further view of Kurs et al., hereinafter referred to as Kurs.

Regarding claim 10, modified Odaohhara disclose a safety system as in claim 1, Odaohhara further disclose the charger (par. 12, charger), and the detection subsystem (fig. 2, items 63, 64, detection circuit) , but Odaohhara is silent on charger containing a source resonator and detection subsystem is integrated with the source resonator.
However, the integrating of a source resonator within various devices is well known in the art as evidenced by Kurs. Kurs in discussing wireless energy transfer (title) disclose a source resonator (par. 8, source resonators; par. 13, source resonator; par. 385, source resonator). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the source resonator of Kurs with the charger and detection subsystem of Odaohhara for the purpose of enabling useful energy transfer over greater distances and alignment offsets than those realized with traditional induction schemes, but without the limitations and risks inherent in radioactive transmission schemes (par. 7 – Kurs).

Regarding claim 11, modified Odaohhara disclose a safety system as in claim 1, Odaohhara further disclose the charger (par. 12, charger), and the notification subsystem (par. 13, notification means; par. 52, notification unit 76), but Odaohhara is silent on the charger includes a source resonator, wherein the notification subsystem is integrated with the source resonator.
However, the integrating of a source resonator within various devices is well known in the art as evidenced by Kurs. Kurs in discussing wireless energy transfer (title) disclose a source resonator (par. 8, source resonators; par. 13, source resonator; par. 385, source resonator). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the source resonator of Kurs with the charger and detection subsystem of Odaohhara for the purpose of enabling useful energy transfer over greater distances and alignment offsets than those realized with traditional induction schemes, but without the limitations and risks inherent in radioactive transmission schemes (par. 7 – Kurs).

Regarding claim 12, modified Odaohhara disclose a safety system as in claim 2, Odaohhara further disclose the charger (par. 12, charger), and management subsystem (CPU 61; par. 51-52, based on the CPU 61 it is determined whether to continue or abort operation of charger), but Odaohhara is silent on wherein the charger includes a source resonator, wherein the management subsystem is integrated with the source resonator.
However, the integrating of a source resonator within various devices is well known in the art as evidenced by Kurs. Kurs in discussing wireless energy transfer (title) disclose a source resonator (par. 8, source resonators; par. 13, source resonator; par. 385, source resonator). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the source resonator of Kurs with the charger and detection subsystem of Odaohhara for the purpose of enabling useful energy transfer over greater distances and alignment offsets than those realized with traditional induction schemes, but without the limitations and risks inherent in radioactive transmission schemes (par. 7 – Kurs).

Regarding claim 17, modified Odaohhara disclose a safety system as in claim 1,but Odaohhara is silent on wherein the detection subsystem includes a sensor integrated with a device resonator of a vehicle.
However, Brown in discussing a method and apparatus for automatic charging of electrically powered vehicle (title) disclose a sensor using a resonator (par. 80,vehicle has a receiver responsive to a resonant induction to improve power transfer) of a vehicle (par. 85, on-board sensor that detects within some distance of charging). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Brown with the invention of Odaohhara for the purpose of providing an automatic method of charging an electrically powered vehicle (abstract – Brown).
Modified Odaohhara is silent on the particulars of a sensor integrated with a device resonator. Kurs in discussing a wireless energy transfer system (title) disclose a sensor integrated with a device resonator (par. 475, sensor is powered with device resonator). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the source resonator of Kurs with the charger and detection subsystem of Odaohhara for the purpose of enabling useful energy transfer over greater distances and alignment offsets than those realized with traditional induction schemes, but without the limitations and risks inherent in radioactive transmission schemes (par. 7 – Kurs).

Regarding claim 34, modified Odaohhara disclose a safety system as in claim 33, Odaohhara further disclose wherein the operational parameter (par. 56-57, formulas are used to determine parameters; par. 59), but Odaohhara is silent on relating to selection of a subset of plural resonators.
However, the use of resonators is well known in the art as determined by Kurs. Kurs in discussing a wireless energy transfer (title) disclose parameters relating to a selection of resonators (par. 70, magnetic resonator with tunable impedance network….may be adjusted in response to data measured by port parameters; par. 122; par. 128-129). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the source resonator of Kurs with the charger and detection subsystem of Odaohhara for the purpose of enabling useful energy transfer over greater distances and alignment offsets than those realized with traditional induction schemes, but without the limitations and risks inherent in radioactive transmission schemes (par. 7 – Kurs).

Regarding claim 39, modified Odaohhara disclose a safety system as in claim 1, wherein the detection subsystem (par. 13, detecting means; par. 43, current detection circuit 64 and voltage detection circuit 63; par. 56, abnormal current detection table 73; fig.5), but Odaohhara is silent on includes a magnetometer integrated with a resonator.
However, Kurs in discussing a wireless energy transfer (title) disclose a magnetometer integrated with a resonator (par. 165-170, magnetic resonators). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the source resonator of Kurs with the charger and detection subsystem of Odaohhara for the purpose of enabling useful energy transfer over greater distances and alignment offsets than those realized with traditional induction schemes, but without the limitations and risks inherent in radioactive transmission schemes (par. 7 – Kurs).

Supplemental Box

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Continuation of:

Claim 18 lacks an inventive step under PCT Article 33(3) as being obvious over Odaohhara in view of Brown in further view of Flaugher.

Regarding claim 18, modified Odaohhara disclose a safety system as in claim 1, but Odaohhara is silent on wherein the detection subsystem includes an ambient sensor not significantly responsive to whether the object is hot, the detection subsystem configured to use output from the ambient sensor for calibration.
However, Flaugher in discussing battery chargers and methods for extended battery life (title) disclose an ambient sensor not significantly responsive to whether an object is hot (par. 10-11, monitor ambient temperature of batteries based on time period; par. 41, ambient temperature monitors temp of batteries or battery environment; par. 50, measure ambient temperature at or near battery), use output from an ambient sensor for calibration (par. 10-11, based on ambient temperature determine best time for charging battery; fig. 5, item 520; par. 68). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Flaugher with the invention of Odaohhara for the purpose of reducing the heat which causes faster electrolyte dry out and faster positive grid growth, par. 5-6, Flaugher).

Claims 28-30 lack an inventive step under PCT Article 33(3) as being obvious over Odaohhara in view of Brown in further view of Bauerle in view of Kurs et al., hereinafter referred to as Kurs.

Regarding claim 28, modified Odaohhara disclose a safety system as in claim 27, but Odaohhara is silent on wherein the coolant dispenser is further configured to provide movement of debris.
However, Bauerle in discussing a system and method for charging a plug-in electric vehicle (title) disclose a coolant dispenser (par. 13, cooling unit 40 to reduce temperature of battery; par. 33, cooling unit reduces temperature of battery unit based on detected battery sensor temperatures). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Bauerle with the invention of Odaohhara for the purpose of controlling the charging condition so that the vehicle battery is charged in an optimum fashion.
Modified Odaohhara is silent on the providing movement of debris. Furthermore, moving debris is a well known practice in the art as evidenced by Kurs. Kurs in discussing a wireless energy transfer system (title) disclose removing debris (par. 491, preventing debris accumulation). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the source resonator of Kurs with the charger and detection subsystem of Odaohhara for the purpose of enabling useful energy transfer over greater distances and alignment offsets than those realized with traditional induction schemes, but without the limitations and risks inherent in radioactive transmission schemes (par. 7 – Kurs).

Regarding claim 29, modified Odaohhara disclose a safety system as in claim 27, but Odaohhara is silent on wherein the coolant dispenser is further configured to move the object.
However, Bauerle in discussing a system and method for charging a plug-in electric vehicle (title) disclose a coolant dispenser (par. 13, cooling unit 40 to reduce temperature of battery; par. 33, cooling unit reduces temperature of battery unit based on detected battery sensor temperatures). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Bauerle with the invention of Odaohhara for the purpose of controlling the charging condition so that the vehicle battery is charged in an optimum fashion.
Furthermore, Kurs in discussing a wireless energy transfer system (title) disclose moving an object (par. 504, moving an object to provide for optimal power transmission). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the source resonator of Kurs with the charger and detection subsystem of Odaohhara for the purpose of enabling useful energy transfer over greater distances and alignment offsets than those realized with traditional induction schemes, but without the limitations and risks inherent in radioactive transmission schemes (par. 7 – Kurs).

Regarding claim 30, modified Odaohhara disclose a safety system as in claim 27, but Odaohhara is silent on wherein the coolant dispenser is integrated with a source resonator of the charger.
However, Bauerle in discussing a system and method for charging a plug-in electric vehicle (title) disclose a coolant dispenser integrated within a charger (par. 11, cooling unit 40 is within battery charger 14). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Bauerle with the invention of Odaohhara for the purpose of controlling the charging condition so that the vehicle battery is charged in an optimum fashion.
Modified Odaohhara is silent on the particulars of a coolant dispenser being integrated with a source resonator. Furthermore, the integrating of a source resonator within various devices is well known in the art as evidenced by Kurs. Kurs in discussing wireless energy transfer (title) disclose a source resonator (par. 8, source resonators; par. 13, source resonator; par. 385, source resonator). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the source resonator of Kurs with the charger and detection subsystem of Odaohhara for the purpose of enabling useful energy transfer over greater distances and alignment offsets than those realized with traditional induction schemes, but without the limitations and risks inherent in radioactive transmission schemes (par. 7 – Kurs).

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Continuation of:

Claim 45 lacks an inventive step under PCT Article 33(3) as being obvious over Odaohhara in view of Brown in further view of Nilson et al., hereinafter referred to as Nilson.

Regarding claim 45, modified Odaohhara disclose a safety system as in claim 2, but Odaohhara is silent on wherein the management subsystem includes a drain configured for fluid handling proximate to the object.
However, the draining of fluids is notoriously well known in the art as evidenced by Nilson. Nilson in discussing a battery charging assembly for use on a locomotive (title) disclose a drain configured for fluid handling (par. 24, drain valve for oil). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Nilson with the invention of Odaohhara for the purpose of providing a battery charging assembly which provides an electrical power output which is operable to, on the one hand, maintain the electrical charge of batteries, which are utilized on the locomotive, and further, can be employed to energize electrical devices for remotely controlling the operation of the locomotive (par. 1- Nilson).

Claims 1-56 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

Search History:

Limited Classification Search

The Patent Analyst performed a limited classification search within the following US, IPC, ECLA, or F-Term classification areas:

U.S. Class/Subclass(es): 180/65.29; 307/104; 320/108, 109, 149, 152

IPC (8) Class/Subclass(es): B60L 11/18; B60Q 1/52; G01R 31/36; H02J 7/00, 7/02; H04B 5/00; H04M 10/44 (2012.01)

See Global Search Results.

Global Patent Literature Text Search

The Patent Analyst performed the following global text search, which was not limited by classification but may or may not have been limited by other criteria:

PATBASE http://patbase.com/default.asp?nsessionlog=on

- 1) pn=us2010/0277121 (1)
- 2) pn=us2011/0074346 (1)
- 3) pd<20101006 (100000)
- 4) ctb 2 (216)
- 5) 4 and 3 (208)
- 6) 5 and (wireless w3 power) (119)
- 7) 6 and (notif* and indic*) (10)
- 8) PN=(US2010248622 OR US2009286504 OR US2010235006 OR WO10051477 OR US2010109445) (5)
- 9) pn=(us20100156355 or us20020167294) (2)
- 10) (heat w3 paint*) (3904)
- 11) (heat sensitive paint) (100)
- 12) 11 and (wireless power) (1)
- 13) 11 and (detection system) (1)
- 14) 11 and sensor (19)
- 15) pn=us2011/0025264 (1)
- 16) pn=us20070024246 (1)
- 17) (vehicle) and (debris or trash or refuse or garbage) and (cool*) and (drain*) (2842)
- 18) 17 and (remov* w2 (debris or trash or garbage or refuse)) (863)
- 19) 18 and (wireless power) (0)
- 20) 18 and (sensor*) (526)
- 21) 20 and charger (6)
- 22) 18 and charger (11)
- 23) pn=us20060214626 (1)

- 24) IC=("H02J7/02") (10705)
- 25) IC=("H04B5/00") (8781)
- 26) IC=("B60L11/18") (14183)
- 27) IC=("B60Q1/52") (4853)
- 28) IC=("H01M10/44") (18655)
- 29) IC=("H02J7/00") (51447)
- 30) IC=("G01R31/36") (14225)
- 31) IC=("G01R31/36") (14225)
- 32) 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 (96682)
- 33) 32 and 3 (83829)
- 34) 33 and (wireless w3 (power or energy)) (752)
- 35) 34 and (vehicle or car or automobile) (201)
- 36) 35 and (sensor* or detector*) (117)
- 37) 36 and charger (53)
- 38) UC=("320/109") (483)
- 39) UC=("307/104") (1331)
- 40) UC=("320/108") (672)
- 41) UC=("180/65.29") (462)
- 42) UC=("320/149") (312)
- 43) UC=("320/152") (285)
- 44) 38 or 39 or 40 or 41 or 42 or 43 (3314)
- 45) 44 and 3 (2773)
- 46) 45 and charger (984)
- 47) 46 and (sensor* or detector*) (506)
- 48) 47 and (vehicle or car or automobile) (296)
- 49) 48 and (heat or hot or temperat*) w2 (sens*) (121)
- 50) 49 and (fluid or drain) (27)

GOOGLE PATENT http://www.google.com/advanced_patent_search

No. of Hits	Text String
11900	wireless energy distribution system
90	wireless energy distribution system "paint"
24	wireless energy distribution system "paint" resonator
14	wireless vehicle charger paint
791	VEHICLE CHARGER SAFETY SYSTEM AND METHOD
15,300	(detection system) (notification system) (wireless power)
444	monitoring system battery-charger heat-sensor (wireless power) ambient

Computer Accessed Text Databases Searched

The Patent Analyst searched the following computer accessed text databases:

Database: Google Scholar http://scholar.google.com/schhp?hl=en&as_sdt=0,23

No. of Hits	Text String
402	wireless energy distribution system "paint" resonator
10,800	VEHICLE CHARGER SAFETY SYSTEM AND METHOD
30,100	(detection system) (notification system) (wireless power)
12	monitoring system battery-charger heat-sensor (wireless power) ambient

Date search was completed: 12 January 2012

ED/JM

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

MONOCELLO III, JOHN A.

GTC LAW GROUP LLP & AFFILIATES C/O CPA GLOBAL
P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference WTCY-0046-PWO	Date of mailing *(day/month/year)* 28 NOVEMBER 2012 (28.11.2012) **FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. **PCT/US2012/040184**	International filing date *(day/month/year)* **31 MAY 2012 (31.05.2012)**

Applicant

WITRICITY CORPORATION et al

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 . 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.
In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19months.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the PCT Applicant's Guide, National Chapters.

Name and mailing address of the ISA/KR Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer COMMISSIONER Telephone No. 82-42-481-8754

Form PCT/ISA/220 (July 2010)

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for three months from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => PCT Services => PCT Services

ID : PCT international application number
PW : **5QKTYUP4**

Inquiries related to PCT International Search Report or Written Opinion prepared by KIPO as an International Searching Authority can be answered not only by KIPO but also through IPKC (Intellectual Property Korea Center), located in Vienna, VA, which functions as a PCT Help Desk for PCT applicants.

Homepage: http://www.ipkcenter.com
Email: ipkc@ipkcenter.com
Phone: +1 703 388 1066
Fax: +1 703 388 1084

Notes to Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
WTCY-0046-PWO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2012/040184	**31 MAY 2012 (31.05.2012)**	06 JUNE 2011 (06.06.2011)

Applicant

WITRICITY CORPORATION et al

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of **4** sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. **22A**
      ☒ as suggested by the applicant.
      ☐ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/040184

A. CLASSIFICATION OF SUBJECT MATTER

H02J 17/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H02J 17/00; G01S 3/80; H01F 38/14; H02J 7/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: wireless power, medical, repeater, temperature

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	WO 2010-104569 A1 (NEURDS INC. et al.) 16 September 2010 See the abstract; paragraphs [0057],[0123],[0124]; claims 1-7; figures 1-14.	1,5-8 9-14,18 2-4,15-17
Y A	US 2010-0181845 A1 (FIORELLO RON et al.) 22 July 2010 See the abstract; claims 1-10; figrues 1-37.	9-14,18 1-8,15-17
A	US 2010-0109445 A1 (KURS ANDRE B. et al.) 06 May 2010 See the abstract; claims 1-20; figures 1-40.	1-18
A	WO 2011-061388 A1 (NOKIA CORPORATION et al.) 26 May 2011 See the abstract; claims 1-27; figures 1-5.	1-18

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 NOVEMBER 2012 (27.11.2012)	**28 NOVEMBER 2012 (28.11.2012)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea	WEE Jae Woo
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-8540

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2012/040184

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010-104569 A1	16.09.2010	EP 2406655 A1	18.01.2012
US 2010-0181845 A1	22.07.2010	AU 2009-296413 A1	01.04.2010
		AU 2010-213557 A1	19.08.2010
		CA 2738654 A1	01.04.2010
		CA 2752573 A1	19.08.2010
		CN 102239633 A	09.11.2011
		CN 102439669 A	02.05.2012
		JP 2012-504387 A	16.02.2012
		JP 2012-518382 A	09.08.2012
		KR 10-2011-0074761 A	01.07.2011
		KR 10-2011-0127203 A	24.11.2011
		US 2010-0109445 A1	06.05.2010
		US 2010-0141042 A1	10.06.2010
		US 2010-0164296 A1	01.07.2010
		US 2010-0164297 A1	01.07.2010
		US 2010-0164298 A1	01.07.2010
		US 2010-0171368 A1	08.07.2010
		US 2010-0181843 A1	22.07.2010
		US 2010-0201203 A1	12.08.2010
		US 2010-0219694 A1	02.09.2010
		US 2010-0231340 A1	16.09.2010
		US 2010-0237709 A1	23.09.2010
		US 2010-0259108 A1	14.10.2010
		US 2010-0259110 A1	14.10.2010
		US 2010-0264747 A1	21.10.2010
		US 2010-0277121 A1	04.11.2010
		US 2010-0308939 A1	09.12.2010
		US 2011-0043047 A1	24.02.2011
		US 2011-0043048 A1	24.02.2011
		US 2011-0043049 A1	24.02.2011
		US 2011-0074346 A1	31.03.2011
		US 2011-0095618 A1	28.04.2011
		US 2011-0121920 A1	26.05.2011
		US 2011-0193416 A1	11.08.2011
		US 2012-0032522 A1	09.02.2012
		US 2012-0062345 A1	15.03.2012
		US 2012-0139355 A1	07.06.2012
		US 2012-0280765 A1	08.11.2012
		US 8035255 B2	11.10.2011
		US 8106539 B2	31.01.2012
		US 8304935 B2	06.11.2012
		WO 2010-036980 A1	01.04.2010
		WO 2010-093997 A1	19.08.2010
		WO 2011-112795 A1	15.09.2011
		WO 2012-037279 A1	22.03.2012
US 2010-0109445 A1	06.05.2010	AU 2009-296413 A1	01.04.2010
		AU 2010-213557 A1	19.08.2010

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2012/040184

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		CA 2738654 A1	01.04.2010
		CA 2752573 A1	19.08.2010
		CN 102239633 A	09.11.2011
		CN 102439669 A	02.05.2012
		EP 2340611 A1	06.07.2011
		JP 2012-504387 A	16.02.2012
		JP 2012-518382 A	09.08.2012
		KR 10-2011-0074761 A	01.07.2011
		KR 10-2011-0127203 A	24.11.2011
		US 2010-0141042 A1	10.06.2010
		US 2010-0164296 A1	01.07.2010
		US 2010-0164297 A1	01.07.2010
		US 2010-0164298 A1	01.07.2010
		US 2010-0171368 A1	08.07.2010
		US 2010-0181843 A1	22.07.2010
		US 2010-0181845 A1	22.07.2010
		US 2010-0201203 A1	12.08.2010
		US 2010-0219694 A1	02.09.2010
		US 2010-0231340 A1	16.09.2010
		US 2010-0237709 A1	23.09.2010
		US 2010-0259108 A1	14.10.2010
		US 2010-0259110 A1	14.10.2010
		US 2010-0264747 A1	21.10.2010
		US 2010-0277121 A1	04.11.2010
		US 2010-0308939 A1	09.12.2010
		US 2011-0043047 A1	24.02.2011
		US 2011-0043048 A1	24.02.2011
		US 2011-0043049 A1	24.02.2011
		US 2011-0074346 A1	31.03.2011
		US 2011-0095618 A1	28.04.2011
		US 2011-0121920 A1	26.05.2011
		US 2011-0193416 A1	11.08.2011
		US 2012-0032522 A1	09.02.2012
		US 2012-0062345 A1	15.03.2012
		US 2012-0139355 A1	07.06.2012
		US 2012-0280765 A1	08.11.2012
		US 8035255 B2	11.10.2011
		US 8106539 B2	31.01.2012
		US 8304935 B2	06.11.2012
		WO 2010-036980 A1	01.04.2010
		WO 2010-093997 A1	19.08.2010
		WO 2011-112795 A1	15.09.2011
		WO 2012-037279 A1	22.03.2012
WO 2011-061388 A1	26.05.2011	US 2011-0115430 A1	19.05.2011

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
MONOCELLO III, JOHN A.

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**28 NOVEMBER 2012 (28.11.2012)**
Applicant's or agent's file reference WTCY-0046-PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2012/040184	**31 MAY 2012 (31.05.2012)**	06 JUNE 2011 (06.06.2011)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i

Applicant

WITRICITY CORPORATION et al

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	27 NOVEMBER 2012 (27.11.2012)	WEE Jae Woo Telephone No.82-42-481-8540

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/040184

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

MONOCELLO, III JOHN A.

GTC LAW GROUP LLP & AFFILIATES C/O CPA GLOBAL
P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference WTCY-0061-PWO	Date of mailing *(day/month/year)* 23 JANUARY 2013 (23.01.2013) **FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. **PCT/US2012/049777**	International filing date *(day/month/year)* **06 AUGUST 2012 (06.08.2012)**

Applicant

WITRICITY CORPORATION et al

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:

   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

   For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 . 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.
In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19months.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the PCT Applicant's Guide, National Chapters.

Name and mailing address of the ISA/KR Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer COMMISSIONER Telephone No. 82-42-481-8754

Form PCT/ISA/220 (July 2010)

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for three months from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => PCT Services => PCT Services

ID : PCT international application number
PW : **TN47X8MH**

Inquiries related to PCT International Search Report or Written Opinion prepared by KIPO as an International Searching Authority can be answered not only by KIPO but also through IPKC (Intellectual Property Korea Center), located in Vienna, VA, which functions as a PCT Help Desk for PCT applicants.

Homepage: http://www.ipkcenter.com
Email: ipkc@ipkcenter.com
Phone: +1 703 388 1066
Fax: +1 703 388 1084

Notes to Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
WTCY-0061-PWO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2012/049777	**06 AUGUST 2012 (06.08.2012)**	04 AUGUST 2011 (04.08.2011)

Applicant

WITRICITY CORPORATION et al

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of **4** sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. **25**
      ☒ as suggested by the applicant.
      ☐ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/049777

A. CLASSIFICATION OF SUBJECT MATTER

H02J 17/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H02J 17/00; H02M 3/335; H01F 38/14; H02J 7/10; H02M 3/28; H01M 10/44

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: wireless power transfer, DC power, rectifier, inverter, amplifier

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2002-010535 A (MATSUSHITA ELECTRIC WORKS LTD.) 11 January 2002 See abstract, claims 1-25, and figures 1-26.	1-24
A	JP 10-164837 A (SONY CORP.) 19 June 1998 See abstract, claims 1-5, and figures 1-8.	1-24
A	US 2010-0109445 A1 (ANDRE B. KURS et al.) 6 May 2010 See abstract, claims 1-46, and figures 1-51.	1-24
A	JP 09-298847 A (SONY CORP.) 18 November 1997 See abstract, claims 1-3, and figures 1-2.	1-24
A	JP 2001-309580 A (MATSUSHITA ELECTRIC WORKS LTD.) 02 November 2001 See abstract, claims 1-13, and figures 1-13.	1-24
A	WO 2009-062438 A1 (CITY UNIVERSITY OF HONG KONG et al.) 22 May 2009 See abstract, claims 1-12, and figures 1-12.	1-24

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 JANUARY 2013 (22.01.2013)	**23 JANUARY 2013 (23.01.2013)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea	PARK, Hye Lyun
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-3463

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2012/049777

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2002-010535 A	11.01.2002	JP 4135299 B2	20.08.2008
JP 10-164837 A	19.06.1998	None	
US 2010-0109445 A1	06.05.2010	AU 2009-296413 A1	01.04.2010
		AU 2010-213557 A1	19.08.2010
		CA 2738654 A1	01.04.2010
		CA 2752573 A1	19.08.2010
		CN 102239633 A	09.11.2011
		CN 102439669 A	02.05.2012
		EP 2340611 A1	06.07.2011
		JP 2012-504387 A	16.02.2012
		JP 2012-518382 A	09.08.2012
		KR 10-2011-0074761 A	01.07.2011
		KR 10-2011-0127203 A	24.11.2011
		US 2010-0141042 A1	10.06.2010
		US 2010-0164296 A1	01.07.2010
		US 2010-0164297 A1	01.07.2010
		US 2010-0164298 A1	01.07.2010
		US 2010-0171368 A1	08.07.2010
		US 2010-0181843 A1	22.07.2010
		US 2010-0181845 A1	22.07.2010
		US 2010-0201203 A1	12.08.2010
		US 2010-0219694 A1	02.09.2010
		US 2010-0231340 A1	16.09.2010
		US 2010-0237709 A1	23.09.2010
		US 2010-0259108 A1	14.10.2010
		US 2010-0259110 A1	14.10.2010
		US 2010-0264747 A1	21.10.2010
		US 2010-0277121 A1	04.11.2010
		US 2010-0308939 A1	09.12.2010
		US 2011-0043047 A1	24.02.2011
		US 2011-0043048 A1	24.02.2011
		US 2011-0043049 A1	24.02.2011
		US 2011-0074346 A1	31.03.2011
		US 2011-0095618 A1	28.04.2011
		US 2011-0121920 A1	26.05.2011
		US 2011-0193416 A1	11.08.2011
		US 2012-0032522 A1	09.02.2012
		US 2012-0062345 A1	15.03.2012
		US 2012-0139355 A1	07.06.2012
		US 2012-0280765 A1	08.11.2012
		US 8035255 B2	11.10.2011
		US 8106539 B2	31.01.2012
		US 8304935 B2	06.11.2012
		US 8324759 B2	04.12.2012
		WO 2010-036980 A1	01.04.2010
		WO 2010-093997 A1	19.08.2010
		WO 2011-112795 A1	15.09.2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		WO 2012-037279 A1	22.03.2012
JP 09-298847 A	18.11.1997	None	
JP 2001-309580 A	02.11.2001	JP 4140169 B2	27.08.2008
WO 2009-062438 A1	22.05.2009	CN 101971458 A	09.02.2011
		US 2009-0121675 A1	14.05.2009
		US 8228025 B2	24.07.2012

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
MONOCELLO, III JOHN A.

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**23 JANUARY 2013 (23.01.2013)**
Applicant's or agent's file reference WTCY-0061-PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2012/049777	**06 AUGUST 2012 (06.08.2012)**	04 AUGUST 2011 (04.08.2011)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i

Applicant

WITRICITY CORPORATION et al

1. This opinion contains indications relating to the following items:

- [X] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [X] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [X] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	22 JANUARY 2013 (22.01.2013)	PARK, Hye Lyun Telephone No.82-42-481-3463

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/049777

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/049777

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-24	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	1-24	YES
	Claims	NONE	NO
Industrial applicability (IA)	Claims	1-24	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: JP 2002-010535 A (MATSUSHITA ELECTRIC WORKS LTD.) 11 January 2002
D2: JP 10-164837 A (SONY CORP.) 19 June 1998
D3: US 2010-0109445 A1 (ANDRE B. KURS et al.) 6 May 2010
D4: JP 09-298847 A (SONY CORP.) 18 November 1997
D5: JP 2001-309580 A (MATSUSHITA ELECTRIC WORKS LTD.) 02 November 2001
D6: WO 2009-062438 A1 (CITY UNIVERSITY OF HONG KONG et al.) 22 May 2009

2.1. Novelty and Inventive step

2.1.1. Independent Claim 1
The subject matter of claim 1 differs from these prior art documents in a rectifier control configured to control a switching characteristic of switching elements of the rectifier to regulate a characteristic of an output presented to a load, the rectifier control communicatively coupled to a source amplifier, wherein an amplifier control provides a substantially fixed switching frequency to the switching elements of the amplifier. And they are not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 1 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

2.1.2. Dependent Claims 2-20
Claims 2-20 are dependent on claim 1 and therefore meet the requirements of PCT Article 33(2) and (3).

2.1.3. Independent Claim 21
The subject matter of claim 21 differs from these prior art documents in adjusting a duty cycle of a rectifier to meet a power demand at an output of the rectifier and adjusting a duty cycle of an amplifier to obtain a substantially 50% duty cycle at switching elements of the rectifier. And they are not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 21 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

2.1.4. Dependent Claims 22-24
Claims 22-24 are dependent on claim 21 and therefore meet the requirements of PCT Article 33(2) and (3).

2.2. Industrial Applicability
Claims 1-24 are industrially applicable under PCT Article 33(4).

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/049777

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 24 has a typographical error,"currant" seems to be a misprint of "current".

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 02-097005
(43)Date of publication of application : 09.04.1990

(51)Int.Cl. H01F 21/06

(21)Application number : 63-249463
(22)Date of filing : 03.10.1988

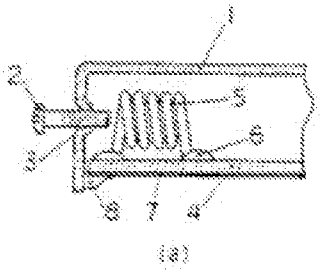
(71)Applicant : TOKYO COSMOS ELECTRIC CO LTD
(72)Inventor : OSADA SHOICHIRO
TAKEUCHI MAKOTO
ICHIKURA MANABU

(54) VARIABLE INDUCTANCE

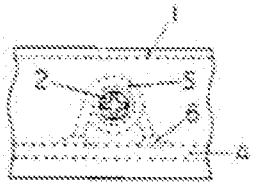
(57)Abstract:

PURPOSE: To obtain an improved highly reliable high frequency coil capable of stable and precision frequency setting and facilitating adjustment operation by providing a support member having a threaded hole coaxial with an air-core coil and rotatably mounting an adjusting screw in the threaded hole.

CONSTITUTION: A support member 1 having a threaded hole 3 is provided coaxially with an air-core coil 5 and an adjusting screw 2 is rotatably mounted in the threaded hole 3. For example, by using a shielding case 1 for the support member for the adjusting screw 2, the air-core coil 5 is designed beforehand to be disposed in the vicinity of the shielding case 1. The air-core coil 5 is fixed to a circuit board 4 at a soldering part 6, and further, copper foil 7 on the rear surface of the circuit board 4 and the shielding case 1 are fixed to each other by soldering 8. Then, the threaded hole 3 is provided at the point where the extension of the central axis of the air-core coil 5 intersects the shielding case 1, and the electrically conductive adjusting screw 2 is inserted into the threaded hole 3 and the spacing between the front end of the screw and the nearest winding end of the air-core coil 5 is changed from the outside by rotating the adjusting screw 2 utilizing a screwdriver.



(a)



(b)

⑲日本国特許庁（JP）　⑪特許出願公開

⑫公開特許公報（A）　平2－97005

⑤Int. Cl.⁵　識別記号　庁内整理番号　⑬公開　平成2年(1990)4月9日
H 01 F 21/06　D　6447－5E

審査請求　未請求　請求項の数 1　（全4頁）

⑭発明の名称　可変インダクタンス

⑳特　願　昭63－249463
㉒出　願　昭63(1988)10月3日

㉑発明者　長田　尚一郎　神奈川県座間市相武台2－268　東京コスモス電機株式会社神奈川工場内
㉑発明者　竹内　誠　東京都八王子市戸吹町1387番地　東京コスモス電機株式会社内
㉑発明者　市倉　学　東京都八王子市戸吹町1387番地　東京コスモス電機株式会社内
㉑出願人　東京コスモス電機株式会社　東京都八王子市戸吹町1387番地

明　細　書

1．発明の名称　　可変インダクタンス

2．特許請求の範囲

空芯コイルのコイル同軸方向の延長線上に、ネジ穴を施した支持体を設け、調整ネジが前記ネジ穴に回動自在に取付けられた事を特徴とする可変インダクタンス。

3．発明の詳細な説明

〔産業上の利用分野〕

この発明は可変インダクタンスに関し、更に詳しくは、短波帯、超短波、極超短波帯の発振、同調、及び共振回路に用いられる高周波用可変インダクタンスに関する。

〔従来の技術〕

一般に短波帯以下の高周波用のコイルにおいては、鉄芯やフェライトコア等、空芯コイルの場合に比して透磁率の高い物質を設けることにより、コイル内部の磁束密度を増加させることで小型のコイルでも十分なインダクタンスを得ることができる。この場合、インダクタンスの調整においてはコイル内のコアの位置を変更することにより、磁束密度が変化するため、容易に調整できる。

短波帯以上になると鉄芯などのバルク材においては渦電流による反磁界、フェライトにおいては磁気余効の効果のため、磁束密度は必ずしも増加しない。そのため100MHz以上の周波数では専ら空芯コイルが用いられ、比較的少ない巻数でも十分なインダクタンスが得られる。

共振や同調、発振などの用途で高周波コイルを用いる場合、コイルとコンデンサでタンク回路を構成する。周知の通り、タンク回路の周波数fは次式で与えられる。

$$f = 1 / (2\pi \sqrt{LC})$$

ここでLはコイルのインダクタンス、Cはコンデンサの容量である。

周波数調整においてはコイルのインダクタンスLを一定にして、コンデンサの容量Cをトリマコ

ンデンサなどで可変することが一般的である。

また一方、コンデンサの容量Cを一定にし、コイルのインダクタンスLを変化させることによって周波数調整を行う方式がある。短波帯以下の場合はコイル内部のコアの位置を変えることによって容易に調整できるが、短波帯以上の空芯コイルではこの手段を用いることができないため、巻数や巻径、ピッチなどコイルの形状に関する点を変更する方法がある。

高周波コイルの調整として一般的な空芯コイルのピッチを変える方法について第2図を用いて説明する。第2図（a）のように雑音除去の目的で回路をシールドケース1で包囲している場合は調整用ドライバ9が出入りできる程度の調整穴10を設けておく。調整用ドライバ9をコイルの巻線間に挿入し、第2図（b）の様に巻線の間隔を広げることにより、インダクタンスを減少させることができる。

［発明が解決しようとする問題］

近年、伝送線路が大幅に短縮できることから、高周波回路にも高密度実装方式が取り入れられており、トリマコンデンサは比較的大きな部品のため、高密度実装を行う上で不都合である。このため、短波帯以上の高周波回路ではインダクタンスLを可変にする方式が有利である。

コイルのインダクタンスLを変化させることによって周波数調整を行う方式では、空芯コイルの巻数、巻径、ピッチなどコイルの形状に関する点を変更せざるをえず、正確な調整が困難で手間がかかり、経時変化も大きい等の問題がある。

例えばコイルの巻径、巻数を変えて調整する方法では、一旦基板に装着したコイルを外し、巻径や巻数が適切なコイルに取り替える必要がある。ところが、コイル部品はインダクタンスのバラツキが大きいため、この方法を行うと取り替え作業の手間が大きく、精密な調整も困難である。

コイルのピッチを変える方法によればコイルを取り替える必要はないが、精密な調整には熟練を要す。またコイルを無理に変形させるため、ピッチの戻りが現れ調整周波数がずれ、不安定要因となるばかりでなく、振動、衝撃に対しても変動が生じる。

この発明はこの問題を克服すべく考案されたもので、高周波用空芯コイルにインダクタンス調整機構を設けることにより、周波数設定を安定かつ精密に行うことができ、併せて調整作業を簡単化できることにより、信頼性の高い優れた高周波コイルを提供することを目的とする。

［問題を解決するための手段］

この発明は、空芯コイルのコイル同軸方向の延長線上にネジを支え、さらに固定するための支持体を設け、コイルの同軸中心に対向する部分にネジ穴を施し、ネジ穴に金属などの導電性のネジを差し込み、ネジの先端がコイルに対向する配置を構成する。

［作用］

上記のように構成したこの発明によれば、コイルから発生される高周波交番磁界によって、導電体でできたネジの内部に渦電流が生じ、反抗磁界を発生する。渦電流による反磁界は短波帯以上の周波数帯域では無視できない大きさになるため、コイルに鎖交する磁束密度は減少する。これによりコイルのインダクタンスが減少するため、発振周波数は上昇する。

ネジとコイルの相対位置を変化させることにより、周波数上昇分を正確に調整することができ、また、調整後はネジを接着剤や半田、溶接などで支持体に固定することにより、外部環境の変動に対しても安定に動作するようになる。

この発明によれば、通信機器をはじめとする高周波の発振周波数が安定し、製品相互間のバラツキも少なくなり、ひいては色々の機器の作動における高い信頼性が得られるといった優れた効果を奏する高周波コイルを提供することができる。

［実施例］

以下この発明の実施例を図面に基づいて説明する。第一図に本発明の実施例を示し、同図（a）にその断面図、同図（b）に正面図を示す。

この実施例は調整ネジ2の支持体として、高周波発振回路の雑音対策に使われるシールドケース

1で代用している。

予め空芯コイル5をシールドケース1の近辺に配置されるように設計しておく。空芯コイル5は回路基板4に半田付け部6によって固定し、更に回路基板4の裏面の銅箔7とシールドケース1とを半田付け8で固定することにより、空芯コイル5に及ぼす周囲の影響を固定する。

空芯コイル5の同軸中心の延長線とシールドケース1の交差する点にネジ穴3を設ける。ネジ穴3は貫通穴にめねじを切っても良いし、ナットを接着固定しても良い。このネジ穴は導電性の調整ネジ2を挿入し、支持することを目的とする。これによって、外部から調整ネジ2のネジ頭をドライバで回すことでネジの先端部と空芯コイル5の巻口との距離を変えることができる。

[発明の効果]

調整ネジを空芯コイルに近付けると発振周波数は上昇し、遠ざけると下降する。調整ネジを取り去った場合が最も発振周波数が低くなるため、この状態で目標とする発振周波数を越えないよう、予め空芯コイルのインダクタンスを大きめに設計することが必要である。

金属ネジを取付ける支持体は、高周波回路によく用いられるシールドケースで代用することができ、特に局部発振回路等の外部雑音を除外したい用途に用いることができる。ネジ頭がケース外部に突出するため、回路をケースに封入した後、金属ケースの影響でインダクタンスが変動しても再調整が行える利点を持つ。さらに、この場合、トリマコンデンサ等で調整する場合に比べて、シールドケースにドライバが通る程度の調整用の穴を設ける必要がなく、完全密閉することができるため外部雑音の侵入を防止することができる。よって、VCOのように外部雑音を極度に嫌い、安定性、高精度の設定性が求められる高周波発振回路に適している。

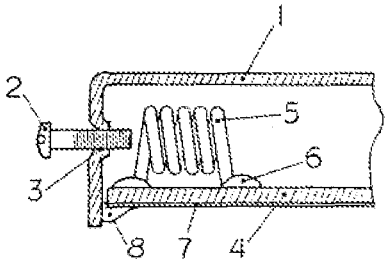
第1図の実施例では、目標とする発振周波数を360MHzとして、調整ネジ1回転で約1MHzの調整が可能で、10KHzの精度での精密調整が可能となった。

なお調整ネジに鉄等の磁性体を用いた場合、非線形歪みやバルクハウゼン雑音等の影響により不要輻射が増加し、C/N比やS/N比に劣化を来すため、黄銅等の非磁性体を用いることで良好な結果が得られる。

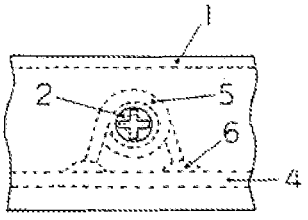
4．図面の簡単な説明

第1図は本発明の実施例を示す図で、同図(a)は部分断面図、同図(b)は正面図である。第2図は、来の調整方法を示す部分断面図で、同図(a)は調整前の状態、同図(b)は調整後の状態を示す。

1…シールドケース、2…調整ネジ、3…ネジ穴、4…回路基板、5…空芯コイル、6…半田付け部、7…銅箔、8…半田付け部、9…調整用ドライバ、10…調整穴



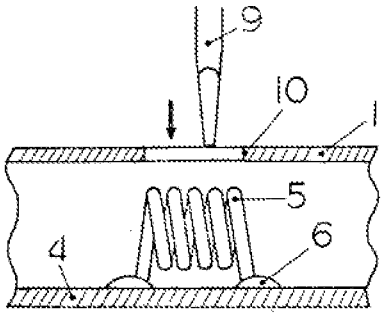
(a)



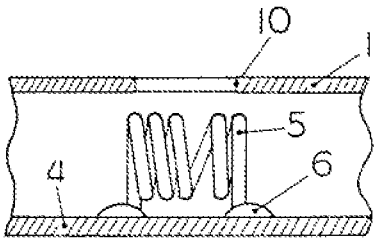
(b)

第1図

特許出願人　東京コスモス電機株式会社



(a)



(b)

第2図

80157. E29w01

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
JOHN H. NORTRUP
STRATEGIC PATENTS, P.C.
C/O INTELLEVATE
P.O. BOX 52050
MINNEAPOLIS, MN 55402

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

	Date of mailing *(day/month/year)* 14 MAY 2010
Applicant's or agent's file reference WTCY0014PWO	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/US 10/24199	International filing date *(day/month/year)* 13 February 2010 (13.02.2010)
Applicant WITRICITY CORPORATION	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 8270

   For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/220 (January 2004) *(See notes on accompanying sheet)*

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PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference WTCY0014PWO	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US 10/24199	International filing date *(day/month/year)* 13 February 2010 (13.02.2010)	(Earliest) Priority Date *(day/month/year)* 13 February 2009 (13.02.2009)
Applicant WITRICITY CORPORATION		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 7 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language**, the international search was carried out on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

   ☒ the text is approved as submitted by the applicant.

   ☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

   ☒ the text is approved as submitted by the applicant.

   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

   a. the figure of the **drawings** to be published with the abstract is Figure No. 1

   ☒ as suggested by the applicant.

   ☐ as selected by this Authority, because the applicant failed to suggest a figure.

   ☐ as selected by this Authority, because this figure better characterizes the invention.

   b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 10/24199

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - H01F 27/42 (2010.01)
USPC - 307/104
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8): H01F 27/42 (2010.01)
USPC: 307/104

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8): H01F 27/42 (2010.01) (text search)
USPC: 307/104; 340/855.8 (text search)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST (PGPB, USPT, EPAB, JPAB); Google Patent; Google Scholar: Search Terms: wireless power transmission coil magnetic field capacitive coupling dielectric ring electric conductive wire loop wireless resonant ferromagnetic medium contact-less power frequency amplitude

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2007/0222542 A1 (Joannopoulos) 27 September 2007 (27.09.2007), entire document, especially; para. [0001] through [0045], Fig. 1-6B	1-11, 16-26, 31 --- 12-15, 27-30
X --- Y	US 2008/0012569 A1 (Hall et al.) 17 January 2008 (17.01.2008), entire document, especially; para. [0034] through [0055], Fig. 1-14	32, 33 --- 14, 15, 29, 30
Y	US 2008/0030415 A1 (Homan et al.) 07 February 2008 (07.02.2008), para. [0005], [0042] through [0073], Fig. 9, 10	12, 13, 27, 28
A	US 2008/0278264 A1 (Karalis et al.) 13 November 2008 (13.11.2008), entire document	1 - 33
A	US 2009/0015075 A1 (Cook et al.) 15 January 2009 (15.01.2009), entire document	1 - 33

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
03 May 2010 (03.05.2010)	14 MAY 2010
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: JOHN H. NORTRUP
STRATEGIC PATENTS, P.C.
C/O INTELLEVATE
P.O. BOX 52050
MINNEAPOLIS, MN 55402

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	14 MAY 2010
Applicant's or agent's file reference WTCY0014PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US 10/24199	13 February 2010 (13.02.2010)	13 February 2009 (13.02.2009)

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - H01F 27/42 (2010.01)
USPC - 307/104

Applicant WITRICITY CORPORATION

1. This opinion contains indications relating to the following items:

- [X] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [X] Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer:
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	03 May 2010 (03.05.2010)	Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2009)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 10/24199

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

      ☐ on paper

      ☐ in electronic form

   b. (time)

      ☐ in the international application as filed

      ☐ together with the international application in electronic form

      ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 10/24199

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	12-15, 27-30	YES
	Claims	1-11, 16-26, 31-33	NO
Inventive step (IS)	Claims	None.	YES
	Claims	1 - 33	NO
Industrial applicability (IA)	Claims	1 - 33	YES
	Claims	None.	NO

2. Citations and explanations:

Claims 1-11, 16-26 and 31 lack novelty under PCT Article 33(2) as being anticipated by US 2007/0222542 A1 (Joannopoulos).

Regarding claim 1, Joannopoulos discloses a wireless power transfer system (source 1 and device 2; loop 10, loop 12, of N coils of radius r of conducting wire with circular cross-section, para. [0015], [0024], [0025], [0028], Fig. 1, 3) comprising: at least one source magnetic resonator (source 1; loop 10, para. [0015], [0024], [0025], [0028], Fig. 1, 3) comprising a capacitively-loaded conducting loop (capacitively-loaded conducting-wire loop, para. [0019], [0025], Fig. 3) coupled to a power source (external power supply, para. [0005], [0006]) and configured to generate an oscillating magnetic field (long-lived oscillatory resonant electromagnetic modes, resonant frequency/Omega, para. [0002], [0013], [024], [0025], [0026], [0031]); and at least one device magnetic resonator (device 2; loop 12, para. [0015], [0024], [0025], [0028], Fig. 1, 3), distal from said source resonators (distances D, para. [0034], Fig. 1, 3), comprising a capacitively-loaded conducting loop (capacitively-loaded conducting-wire loop, para. [0019], [0025], Fig. 3) configured to convert said oscillating magnetic fields into electrical energy (para. [0012], Fig. 6A, 6B); wherein at least one said resonator has a keep-out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) around the resonator that surrounds the resonator with a layer of non-lossy material (air, para. [0017], [0018], [0020], [0024], [0025], [0032], [0037], Fig. 2A, 2B).

Regarding claim 2, Joannopoulos discloses the system of claim 1, wherein the keep-out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) extends at a symmetric distance around the resonator (air, supports high-Q whispering-gallery modes, para. [0008], [0017], [0018], [0020], Fig. 2A).

Regarding claim 3, Joannopoulos discloses the system of claim 1, wherein the keep-out zone (near field, para. [0014], [0018], [0021], [0026], [0027]) extends at a asymmetric distance around the resonator (air, supports high-Q whispering-gallery modes, dielectric waveguides, can support guided modes, para. [0008], [0017], [0018], [0020], [0024], Fig. 2B).

Regarding claim 4, Joannopoulos discloses the system of claim 3, wherein the keep-out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) is largest around regions of the resonator where the electric fields are the largest (proximal cavity 20, para. [0008], [0020], [0024], Fig. 2B)

Regarding claim 5, Joannopoulos discloses the system of claim 1, wherein the smallest keep-out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) exceeds 0.25 mm (microwave regime; appropriate for meter-range coupling applications; radial modal decay length, which determines the coupling strength, is on the order of the wavelength, para. [0008], [0021], [0022], [0023]).

Regarding claim 6, Joannopoulos discloses the system of claim 1, wherein the smallest keep-out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) exceeds 1 cm (microwave regime; appropriate for meter-range coupling applications; radial modal decay length, which determines the coupling strength, is on the order of the wavelength, para. [0008], [0021], [0022], [0023]).

Regarding claim 7, Joannopoulos discloses the system of claim 1, wherein the smallest keep-out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) exceeds 10 cm (microwave regime; appropriate for meter-range coupling applications; radial modal decay length, which determines the coupling strength, is on the order of the wavelength, para. [0008], [0021], [0022], [0023]).

Regarding claim 8, Joannopoulos discloses the system of claim 1, wherein the smallest keep-out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) is approximately 1.0 per-cent of the characteristic size of the resonator (characteristic size L.sub.1, L.sub.2; distance between the two resonators can be larger than the characteristic size of each resonator; D/r; rough estimate in the microwave, one can use one coil (N=1) of copper wire and then for r=1 cm and .alpha.=1 mm, appropriate for example for a cell phone; r=30 cm for a laptop or a household robot; for r=1 m source loop on a room ceiling; r=30 cm and .alpha.=2 mm for a laptop or a household robot, para. [0005], [0016], [0027], [0028]).

Continued in supplemental boxes.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

V.2. Citations and explanations:

Regarding claim 9, Joannopoulos discloses the system of claim 1, wherein the smallest keep-out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) is approximately 0.1 per-cent of the characteristic size of the resonator (characteristic size L.sub.1, L.sub.2; distance between the two resonators can be larger than the characteristic size of each resonator; D/r; rough estimate in the microwave, one can use one coil (N=1) of copper wire and then for r=1 cm and .alpha.=1 mm, appropriate for example for a cell phone; r=30 cm for a laptop or a household robot; for r=1 m source loop on a room ceiling; r=30 cm and .alpha.=2 mm for a laptop or a household robot, para. [0005], [0016], [0027], [0028]).

Regarding claim 10, Joannopoulos discloses the system of claim 1, wherein the magnetic resonator further comprises a magnetic material (metallodielectric photonic crystals, para. [0022]).

Regarding claim 11, Joannopoulos discloses the system of claim 1, wherein at least one magnetic resonator has an intrinsic Q greater than 100 (Q.sub.rad = 1988, 1258, 702, 226; Q.sub.abs = 312530, 86980, 21864, 1662, para. [0034]).

Regarding claim 16, Joannopoulos discloses the system of claim 10, wherein at least one magnetic resonator is located inside a living creature (human, para. [0012], [0032], [0038] through [0041]).

Regarding claim 17, Joannopoulos discloses a method for wireless power transfer (source 1 and device 2; loop 10, loop 12, of N coils of radius r of conducting wire with circular cross-section, para. [0015], [0024], [0025], [0028], Fig. 1, 3) comprising: energizing at least one source magnetic resonator (source 1; loop 10, para. [0015], [0024], [0025], [0028], Fig. 1, 3) comprising a capacitively-loaded conducting loop (capacitively-loaded conducting-wire loop, para. [0019], [0025], Fig. 3) to generate an oscillating magnetic field (long-lived oscillatory resonant electromagnetic modes, resonant frequency/Omega, para. [0002], [0013], [024], [0025], [0026], [0031]); and providing at least one device magnetic resonator (device 2; loop 12, para. [0015], [0024], [0025], [0028], Fig. 1, 3), distal from said source resonators (distances D, para. [0034], Fig. 1, 3), comprising a capacitively-loaded conducting loop (capacitively-loaded conducting-wire loop, para. [0019], [0025], Fig. 3) configured to convert said oscillating magnetic fields into electrical energy (para. [0012], Fig. 6A, 6B); maintaining a keep-out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) around at least one resonator to maintain a separation distance between the resonator and lossy material of the environment (background dielectric (free space/air, para. [0024], [0025]).

Regarding claim 18, Joannopoulos discloses the method of claim 17, wherein the keep-out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) extends at a symmetric distance around the resonator (air, supports high-Q whispering-gallery modes, para. [0008], [0017], [0018], [0020], Fig. 2A).

Regarding claim 19, Joannopoulos discloses the method of claim 17, wherein the keep-out zone (near field, para. [0014], [0018], [0021], [0026], [0027]) extends at an asymmetric distance around the resonator (air, supports high-Q whispering-gallery modes, dielectric waveguides, can support guided modes, para. [0008], [0017], [0018], [0020], [0024], Fig. 2B).

Regarding claim 20, Joannopoulos discloses the method of claim 17, wherein the smallest keep out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) exceeds 0.25 mm (microwave regime; appropriate for meter-range coupling applications; radial modal decay length, which determines the coupling strength, is on the order of the wavelength, para. [0008], [0021], [0022], [0023]).

Regarding claim 21, Joannopoulos discloses the method of claim 17, wherein the smallest keep out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) exceeds 1 cm (microwave regime; appropriate for meter-range coupling applications; radial modal decay length, which determines the coupling strength, is on the order of the wavelength, para. [0008], [0021], [0022], [0023]).

Regarding claim 22, Joannopoulos discloses the method of claim 17, wherein the smallest keep out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) exceeds 10 cm (microwave regime; appropriate for meter-range coupling applications; radial modal decay length, which determines the coupling strength, is on the order of the wavelength, para. [0008], [0021], [0022], [0023]).

Regarding claim 23, Joannopoulos discloses the method of claim 17, wherein the smallest keep out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) is approximately 1.0 per-cent of the characteristic size of the resonator (characteristic size L.sub.1, L.sub.2; distance between the two resonators can be larger than the characteristic size of each resonator; D/r; rough estimate in the microwave, one can use one coil (N=1) of copper wire and then for r=1 cm and .alpha.=1 mm, appropriate for example for a cell phone; r=30 cm for a laptop or a household robot; for r=1 m source loop on a room ceiling; r=30 cm and .alpha.=2 mm for a laptop or a household robot, para. [0005], [0016], [0027], [0028]).

See Continuation sheet.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

V.2. Citations and explanations:

Regarding claim 24, Joannopoulos discloses the method of claim 17, wherein the smallest keep out zone (omnidirectional stationary (non-lossy) nature of the near field, para. [0014], [0018], [0021], [0026], [0027]) is approximately 0.1 per-cent of the characteristic size of the resonator (characteristic size L.sub.1, L.sub.2; distance between the two resonators can be larger than the characteristic size of each resonator; D/r; rough estimate in the microwave, one can use one coil (N=1) of copper wire and then for r=1 cm and .alpha.=1 mm, appropriate for example for a cell phone; r=30 cm for a laptop or a household robot; for r=1 m source loop on a room ceiling; r=30 cm and .alpha.=2 mm for a laptop or a household robot, para. [0005], [0016], [0027], [0028]).

Regarding claim 25, Joannopoulos discloses the method of claim 17, wherein the magnetic resonator further comprises a magnetic material (metallodielectric photonic crystals, para. [0022]).

Regarding claim 26, Joannopoulos discloses the method of claim 17, wherein at least one magnetic resonator has an intrinsic Q greater than 100 (Q.sub.rad = 1988, 1258, 702, 226; Q.sub.abs = 312530, 86980, 21864, 1662, para. [0034]).

Regarding claim 31, Joannopoulos discloses the method of claim 26, wherein at least one magnetic resonator is located inside a living creature (human, para. [0012], [0032], [0038] through [0041]).

Claims 32 and 33 lack novelty under PCT Article 33(2) as being anticipated by US 2008/0012569 A1 to Hall et al. (hereinafter 'Hall').

Regarding claim 32, Hall discloses a source for wireless power transfer in a shaft (component 200, para. [0041], Fig. 3, 3A) comprising a capacitively-loaded conducting loop (coil 303, comprise between 5 and 40 wire strands 602 and between 1 and 15 coil turns para. [0041], [0042], [0043], Fig. 7, 8) wrapped around a core of magnetic material (magnetic coupler 302 also comprises a coil 303 and an annular trough 404 made of magnetic material, para. [0042], [0043], [0045], Fig. 5, 6) and coupled to a power source (first coupler 304 may be optimized for the transfer of power; electronic device 210 is a power source 1301, para. [0041], [0049]) and configured to generate an oscillating magnetic field (magnetic coupler and the adjacent magnetic coupler may then be adapted to induce magnetic fields in each other when their coils are electrically energized; inductive couplers 302, 1102 may act as band pass filters due to their inherent inductance, capacitance and resistance such that a first frequency is allowed to pass at a first resonant frequency, and a second frequency is allowed to pass at a second resonant frequency, para. [0014], [0046], [0047]); wherein the conducting loops are oriented to be coaxial with length of the shaft (pin end 203 of downhole component 200, para. [0041], Fig.3).

Regarding claim 33, Hall discloses the source of claim 32, further comprising a plurality of capacitively-loaded conducting loops (magnetic coupler 302 comprises a coil 303 having a plurality of windings 601 of wire strands 602, para. [0043], Fig. 6) wrapped around cores of magnetic material (annular trough 404 made of magnetic material, para. [0042], [0043], [0045], Fig. 5, 6) arranged around the diameter of the shaft (pin end 203 of downhole component 200, para. [0041], Fig.3).

Claims 12, 13, 27 and 28 lack an inventive step under PCT Article 33(3) as being obvious over Joannopoulos, in view of US 2008/0030415 A1 to Homan et al. (hereinafter 'Homan').

Regarding claim 12, Joannopoulos discloses the system of claim 10, wherein at least one magnetic resonator is immersed a dielectric medium (background dielectric; free space/air, para. [0024], [0025]), yet fails to disclose wherein the magnetic resonator is immersed in water. Homan discloses a magnetic resonator (axial or tilted coil or antenna; toroidal strip 1200, para. [0042], [0043], [0073], Fig. 9, 10) immersed in water (water; electrical conductivity (or its inverse, resistivity) is an important property of subsurface formations in geological surveys and in prospecting for oil, gas, and water, para. [0005], [0073]). Since both references are directed toward wireless power transmission systems, it would have been obvious to one of skill in the art to combine the system of Joannopoulos within the dielectric medium application of Homan, since such a combination would result in a down hole system with greater accuracy. (Homan: para. [0005]).

Regarding claim 13, Joannopoulos discloses the system of claim 10, wherein at least one magnetic resonator is immersed a dielectric medium (background dielectric; free space/air, para. [0024], [0025]), yet fails to disclose wherein the at least one magnetic resonator is immersed in oil. Homan discloses a magnetic resonator (axial or tilted coil or antenna; toroidal strip 1200, para. [0042], [0043], [0073], Fig. 9, 10) immersed in oil (oil; electrical conductivity (or its inverse, resistivity) is an important property of subsurface formations in geological surveys and in prospecting for oil, gas, and water, para. [0005], [0073]). Since both references are directed toward wireless power transmission systems, it would have been obvious to one of skill in the art to combine the system of Joannopoulos within the dielectric medium application of Homan, since such a combination would result in a down hole system with greater accuracy. (Homan: para. [0005]).

Regarding claim 27, Joannopoulos discloses the method of claim 26, wherein at least one magnetic resonator is immersed a dielectric medium (background dielectric; free space/air, para. [0024], [0025]), yet fails to disclose wherein the magnetic resonator is immersed in water. Homan discloses a magnetic resonator (axial or tilted coil or antenna; toroidal strip 1200, para. [0042], [0043], [0073], Fig. 9, 10) immersed in water (water; electrical conductivity (or its inverse, resistivity) is an important property of subsurface formations in geological surveys and in prospecting for oil, gas, and water, para. [0005], [0073]). Since both references are directed toward wireless power transmission systems, it would have been obvious to one of skill in the art to combine the system of Joannopoulos within the dielectric medium application of Homan, since such a combination would result in a down hole system with greater accuracy. (Homan: para. [0005]).

See Continuation sheet.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
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V.2. Citations and explanations:

Regarding claim 28, Joannopoulos discloses the method of claim 26, wherein at least one magnetic resonator is immersed a dielectric medium (background dielectric; free space/air, para. [0024], [0025]), yet fails to disclose wherein the at least one magnetic resonator is immersed in oil. Homan discloses a magnetic resonator (axial or tilted coil or antenna; toroidal strip 1200, para. [0042], [0043], [0073], Fig. 9, 10) immersed in oil (oil; electrical conductivity (or its inverse, resistivity) is an important property of subsurface formations in geological surveys and in prospecting for oil, gas, and water, para. [0005], [0073]). Since both references are directed toward wireless power transmission systems, it would have been obvious to one of skill in the art to combine the system of Joannopoulos within the dielectric medium application of Homan, since such a combination would result in a down hole system with greater accuracy. (Homan: para. [0005]).

Claims 14, 15, 29 and 30 lack an inventive step under PCT Article 33(3) as being obvious over Joannopoulos, in view of Hall.

Regarding claim 14, Joannopoulos discloses the system of claim 10, wherein at least one magnetic resonator is immersed a dielectric medium (background dielectric; free space/air, para. [0024], [0025]), yet fails to disclose wherein the at least one magnetic resonator is immersed in earthen materials. Hall discloses a source for wireless power transfer in a shaft (component 200, para. [0041], Fig. 3, 3A) comprising a magnetic resonator (coil 303, comprise between 5 and 40 wire strands 602 and between 1 and 15 coil turns para. [0041], [0042], [0043], Fig. 7, 8) immersed in earthen materials (formation 18, para. [0043], Fig. 1). Since both references are directed toward wireless power transmission systems, it would have been obvious to one of skill in the art to combine the system of Joannopoulos within the earthen material application of Hall, since such a combination would result in a down hole system with greater power efficiency. (Hall: para. [0048]).

Regarding claim 15, Joannopoulos discloses the system of claim 10, wherein at least one magnetic resonator is immersed a dielectric medium (background dielectric; free space/air, para. [0024], [0025]), yet fails to disclose wherein the at least one magnetic resonator is located in a well. Hall discloses a source for wireless power transfer in a shaft (component 200, para. [0041], Fig. 3, 3A) comprising a magnetic resonator (coil 303, comprise between 5 and 40 wire strands 602 and between 1 and 15 coil turns para. [0041], [0042], [0043], Fig. 7, 8) immersed in well (formation 18 to form a borehole 20, para. [0043], Fig. 1). Since both references are directed toward wireless power transmission systems, it would have been obvious to one of skill in the art to combine the system of Joannopoulos within the well application of Hall, since such a combination would result in a down hole system with greater power efficiency. (Hall: para. [0048]).

Regarding claim 29, Joannopoulos discloses the method of claim 26, wherein at least one magnetic resonator is immersed a dielectric medium (background dielectric; free space/air, para. [0024], [0025]), yet fails to disclose wherein the at least one magnetic resonator is immersed in earthen materials. Hall discloses a source for wireless power transfer in a shaft (component 200, para. [0041], Fig. 3, 3A) comprising a magnetic resonator (coil 303, comprise between 5 and 40 wire strands 602 and between 1 and 15 coil turns para. [0041], [0042], [0043], Fig. 7, 8) immersed in earthen materials (formation 18, para. [0043], Fig. 1). Since both references are directed toward wireless power transmission systems, it would have been obvious to one of skill in the art to combine the system of Joannopoulos within the earthen material application of Hall, since such a combination would result in a down hole system with greater power efficiency. (Hall: para. [0048]).

Regarding claim 30, Joannopoulos discloses the method of claim 26, wherein at least one magnetic resonator is immersed a dielectric medium (background dielectric; free space/air, para. [0024], [0025]), yet fails to disclose wherein the at least one magnetic resonator is located in a well. Hall discloses a source for wireless power transfer in a shaft (component 200, para. [0041], Fig. 3, 3A) comprising a magnetic resonator (coil 303, comprise between 5 and 40 wire strands 602 and between 1 and 15 coil turns para. [0041], [0042], [0043], Fig. 7, 8) immersed in well (formation 18 to form a borehole 20, para. [0043], Fig. 1). Since both references are directed toward wireless power transmission systems, it would have been obvious to one of skill in the art to combine the system of Joannopoulos within the well application of Hall, since such a combination would result in a down hole system with greater power efficiency. (Hall: para. [0048]).

Claims 1 - 33 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*.

In these Notes, "Article," "Rule" and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report and the written opinion of the International Searching Authority, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only (see *PCT Applicant's Guide*, Annex B).

The attention of the applicant is drawn to the fact that amendments to the claims under Article 19 are not allowed where the International Searching Authority has declared, under Article 17(2), that no international search report would be established (see *PCT Applicant's Guide*, International Phase, paragraph 296).

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Preliminary Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet or sheets containing a complete set of claims in replacement of all the claims previously filed must be submitted.

Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively in Arabic numerals (Section 205(a)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

SEQUENCE LISTINGS AND TABLES RELATED THERETO IN INTERNATIONAL APPLICATIONS FILED IN THE U.S. RECEIVING OFFICE

The Administrative Instructions (AIs) under the Patent Cooperation Treaty (PCT), in force as of **July 1, 2009**, contain important changes relating to the manner of filing, and applicable fees for, sequence listings and/or tables related thereto (sequence-related tables) in international applications. The complete text may be accessed at http://www.wipo.int/pct/en/texts/index.htm.

Effective July 1, 2009, Part 8 and Annex C-*bis* will no longer form part of the AIs. Part 8 was introduced in 2001 as a temporary solution to problems arising from the filing of very large sequence listings on paper and provided for a *sequence listing forming part of the international application* to be filed in electronic form on physical medium (*e.g.*, CD), together with the remainder of the application on paper. In 2002, Part 8 was expanded to include sequence-related tables and Annex C-*bis* was added to provide technical requirements. All applicants may now file complete international applications in electronic form, eliminating the need for these temporary provisions.

I. AIS PART 8 AND ANNEX C-*BIS* DELETED AS OF JULY 1, 2009

A) **Sequence-related tables cannot be filed as a separate part of the description or in text format.** They must be provided as an integral part of the international application either:
- in PDF format as part of an international application filed in electronic form via EFS-Web; or
- on paper as part of an international application filed on paper.

B) A ***sequence listing forming part of an international application*** may be provided either:
- in electronic form, as part of an international application filed in electronic form via EFS-Web, in
  - Annex C/ST.25 text format (preferred), or
  - PDF format; or
- on paper as part of an international application filed on paper.

C) A ***sequence listing not forming part of the international application*** **(for search under PCT Rule 13*ter*) in Annex C/ST.25 text format**
- is not required where the *sequence listing forming part of the international application* was filed in Annex C/ST.25 text format as part of an international application filed in electronic form via EFS-Web
- is required for search where the *sequence listing forming part of the international application* was filed in PDF
- is required for search on physical medium (*e.g.*, CD) where the *sequence listing forming part of the international application* was filed on paper as part of an international application filed on paper.

II. CALCULATION OF THE INTERNATIONAL FILING FEE AND FEE REDUCTION UNDER AI § 707

A) **A sequence-related table** must form an integral part of the international application and will incur FULL page fees with no upper limit.

B) A ***sequence listing forming part of an international application*** filed:
- via EFS-Web in Annex C/ST.25 text format will incur NO page fees;
- on paper or in PDF format will incur FULL page fees with no upper limit.

III. AVAILABILITY OF SEQUENCE LISTINGS SUBMITTED FOR SEARCH UNDER PCT RULE *13TER*

International Searching Authorities will be required to transmit to the International Bureau a copy of an Annex C/ST.25 text format sequence listing provided for search under PCT Rule 13*ter*. Any such sequence listing will be made available on PATENTSCOPE® (*sequence listings forming part of the international application* are already available).

IV. JULY 2009 REQUEST (PCT/RO/101)

The Request now has two options for the last sheet: one for paper filings; and one for EFS-Web filings. The July 2009 Request may be accessed at http://www.wipo.int/pct/en/forms/index.htm.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
JOHN H. NORTRUP
STRATEGIC PATENTS, P.C.
C/O INTELLEVATE
P.O. BOX 52050
MINNEAPOLIS, MN 55402

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

	Date of mailing *(day/month/year)*
Applicant's or agent's file reference WTCY0014PWO	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/US 10/24199	International filing date *(day/month/year)* 13 February 2010 (13.02.2010)
Applicant WITRICITY CORPORATION	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 8270

   For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/220 (January 2004) *(See notes on accompanying sheet)*

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International Bureau

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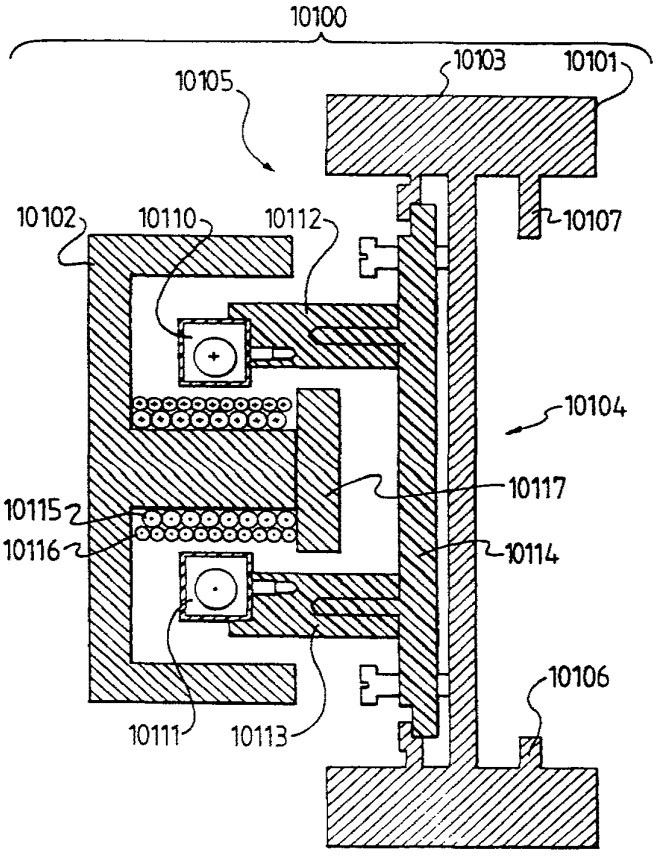
Published
With international search report.
With amended claims.

(54) Title: INDUCTIVE POWER DISTRIBUTION SYSTEM

(57) Abstract

A contactless inductive power distribution system operating at 10 KHz has a self tuning resonant power supply connected to a resonant primary conductive path (10110, 10111) comprising a pair of parallel litz wire conductors (10110, 10111) each encapsulated within an insulated sheath and supported on a structural monorail beam (10101) on which a plurality of electric vehicles can run. Each vehicle has an electric motor (not shown) capable of deriving power from a resonant pick-up coil (10115) wound on a ferrite core (10102) mounted on the vehicle in close proximity to the primary conductors (10110, 10111). Each vehicle also has switching means (10116) capable of preventing a lightly loaded vehicle from presenting a reduced load to the resonant primary. As shown, this comprises an isolating coil (10116) having a switch (not shown) to switch the coil between an open circuit and a short circuit, so that when the switch is switched from one state to another state the power coupled between the primary conductive path (10110, 10111) and the pick-up coil (10115) is changed.



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INDUCTIVE POWER DISTRIBUTION SYSTEM

FIELD OF THE INVENTION

This invention relates to the distribution, then transmission across a space by wire-less inductive means, of electric power to one or more electrical devices. These devices will in most cases be mobile or portable consumers of electrical power (such as vehicles, portable electrical appliances, electrical hand tools, portable electrical machinery, battery chargers, or portable light fittings) capable of deriving at least some power from fixed conductor(s) arranged along the route or sites along which said devices may be located. It has particular application to an inductive power transportation system in which inductive power is distributed to a plurality of vehicles some or all of which may be moving or stopped at points along a path associated with said conductor(s).

BACKGROUND

Although this invention may be applied in a variety of situations its main application is expected to be in conjunction with vehicles requiring some on-board electrical power and in particular to electrically driven vehicles. The application of this invention to materials handling systems and in particular to monorail and conveyor systems has been licensed to DAIFUKU CO, LTD., of 2-11, Mitejima 3-Chome, Nishiyodogawa-ku, Osaka 555, Japan which is believed to be one of the largest manufacturers of conveyors and materials handling systems in the world.

Guided vehicle technology is of growing importance in automated warehouses, robotic and computer-controlled assembly lines and the like. Electric passenger transport has been widely used for many years but the usual overhead conductors present many problems including aesthetics, danger, cost, installation, maintenance, and the collectors attached to the moving vehicles (such as pantographs or carbon block devices) frequently come off the wires and disrupt other traffic. Vehicles tied to such wires cannot pass one another. Wiping surface contacts are prone to interruption as a result of contamination.

Inductive power transfer appears in theory to offer an attractive alternative to pantograph or brush contact devices by eliminating the risk of sparking or mechanical problems associated with faulty contacts. However, prior art proposals have not resulted in the practical distribution of power to electric vehicles.

PRIOR ART

In the 19th century many patents were published in the United States concerning inductive transfer of electrical (telegraphic) signals from moving railway vehicles and the like to rail side conductors. These did not involve the transfer of significant amounts of energy. There were also a number of patents dealing with motive energy transfer, even by high-voltage capacitative means (TESLA US 514,972) but the only relevant historical patent to this work is that of HUTIN and LeBLANC (US 527,857) of 1894, in which the use of approximately a 3 KHz alternating current, induction is suggested. More recently theoretical work of OTTO (NZ 167,422) in 1974, suggested the use of a series resonant secondary winding, operating in the range of 4 to 10 KHz, for a vehicle such as a bus.

OBJECT

It is an object of the present invention to provide an improved system for the distribution and transfer of electric power, or at least to provide the public with a useful choice.

STATEMENT OF THE INVENTION

In one aspect the invention provides an inductive power distribution system comprising:
an electric power supply;
a primary conductive path connected to said electric power supply;
one or more electrical devices for use in conjunction with said primary conductive path;
the or each device capable of deriving at least some power from a magnetic field associated with said primary conductive path;
the or each device having at least one pick-up coil comprising a resonant circuit having a pick-up resonant frequency, and at least one output load capable of being driven by electric power induced in the pick-up coil,

CHARACTERISED-IN-THAT there is means for preventing the or each device from presenting a reduced load to the primary conductive path.

In one form of the invention, the means for preventing the or each device from presenting a reduced load to the primary conductive path, comprises means for maintaining the output load above a predetermined threshold.

In a more preferred form of the invention the means for preventing the or each device from presenting a reduced load to the primary conductive path comprises means for changing the power coupled between the primary conductive path and the pick-up coil.

Preferably the one or more electrical devices are mobile or portable devices.

In one of the optional forms of this invention the output load comprises a battery charger supplying power to one or more batteries.

In its most preferred form the invention is concerned with one or more vehicles capable of moving along a primary conductive path.

In another aspect the invention provides an inductive power transportation system comprising: an electric power supply; a primary conductive path connected to said electric power supply; one or more vehicles for use in conjunction with said primary conductive path; the or each vehicle capable of deriving at least some of its power from a magnetic field associated with said primary; the or each vehicle having at least one pick-up coil comprising a resonant circuit having a pick-up resonant frequency, and at least one electric motor capable of being driven by electric power induced in the pick-up coil, wherein there is means for controlling the power coupled between the primary and pick-up coil.

Preferably the primary conductive path comprises a primary resonant circuit.

Preferably the transportation system provides means for supplying inductively coupled power from a pair of spaced apart substantially parallel conductors, supplied with an alternating current, to a pickup coil on a vehicle capable of traveling along said pair of parallel conductors, wherein said pickup coil is tuned to maximise the power coupled

between the alternating current in the parallel conductors, and the pickup coil.

In another aspect, the invention provides means for supplying inductive power from a pair of spaced apart substantially parallel conductors, supplied with an alternating current, to a pickup coil on a vehicle capable of traveling along said pair of parallel conductors, wherein said pickup coil is tuned to maximise the power coupled between the alternating current in the parallel conductors, and the pickup coil, and wherein a second shielding isolated coil is optionally provided on the vehicle between the pair of parallel conductors and the pickup coil.

Preferably a switch is provided on the shielding coil, so that if the switch is closed the isolating coil can be short circuited, to reduce the coupling between the pair of parallel conductors and the pickup coil.

Alternatively the switch may be provided on the main pickup coil, to allow or prevent resonant current from flowing in the main pick-up coil. In a preferred arrangement the switch is in parallel with a capacitor in the pick-up coil so that if the switch is closed the capacitor can be short circuited, to define the pickup coil and reduce the power coupling. In a less preferred arrangement the switch can be in series with the capacitor so that when the switch is opened the resonant circuit is broken.

In yet another aspect the invention provides for optimising the current/voltage ratios, construction of, and placement of the fixed primary conductors.

In a particular aspect the invention provides for the generation of electric power in a sine wave alternating form, relatively free of electromagnetic radiation, by an electrically tunable, resonant DC-AC converter.

In a yet further aspect the invention provides means for collecting an effective amount of electric power on board the vehicle from said primary conductors by means of the induction principle and a resonant secondary winding.

In another aspect the invention provides a high frequency resonant DC-AC power converter.

Preferably the power supply comprises means for the conversion of a supply of electric power into an alternating current at a nominal frequency between 50 Hz and 1 MHz, said conversion means being adapted for use with a resonant load. More preferably the nominal frequency is between 1 KHz and 50 KHz, and in the examples reference will be made to the currently most preferred frequency of 10KHz.

In another aspect the invention provides a maximum power AC-DC converter capable of converting power from an inductive pickup coil.

In a still further and particular aspect the invention provides for maximised power transfer from the said resonant secondary winding by means to sense the output coil voltage and inhibit the instantaneous drain of current from the coil while the mean coil voltage is beneath a preset threshold.

An immediate application of the present invention is expected in rail-based storage systems for warehouses and the like. Systems embodying this invention may be seen as direct competitors in many applications to conventional conveyor belt systems but with some important advantages such as low cost, control flexibility, and smooth operation. In addition, it is free from dangerous moving belts, and is suitable for operating in hazardous environments owing to the lack of exposed conductors, its spark free construction and the potential to be totally enclosed against water penetration. It may be safely used where pedestrian traffic abounds. The rail storage system consists of a number (potentially hundreds) of self propelled vehicles traveling on rails, with each vehicle deriving its power through an inductive coupling from a conducting loop energised at high frequency which resides beside the vehicle and parallel to the rails, as shown in Figure 1.

Non-vehicular applications include instances where it is required to energise electrical appliances or machinery without direct contact with live electrical conductors. For example this includes portable objects, such as lighting stands in a photographer's studio or equipment in an operating theatre, where it is desirable to be able to conveniently pick up the device then put it down in an immediately functional state, without attendant electric flexes. Lights may be placed in swimming pools equipped with concealed energising conducting loops. Safety is an important issue in all these applications.

DRAWINGS

The following is a description of preferred forms of the invention, given by way of example only, with reference to the accompanying drawings.

GENERAL

Figure 1: shows an inductively powered monorail conveyor.

Figure 2: is an illustration of some versions of the invention configured as a basic straight-line rail storage system.

POWER SUPPLY

Figure 3: is a circuit diagram showing an example of the resonant DC-AC power converter of the present invention.

Figure 4: is a circuit diagram showing an example of the current limiting controller for the resonant DC-AC power converter of the present invention.

Figure 5: is a circuit diagram showing an example of the resonant controller for the resonant DC-AC power converter of the present invention.

Figure 6: is a circuit diagram showing the principles of another embodiment of switching power supply or resonant DC-AC power converter of the present invention, having an isolated output.

Figure 7: shows how the resonant frequency of a DC-AC power converter may be altered by electrical commands.

TRACK

Figure 8: is a diagram showing inductive tuning means for adapting tracks of different lengths to a consistent inductance and hence a consistent resonant frequency.

Figure 9: is an enlarged cross-section on line AA of Figure 8.

Figure 10: shows the relationship of the vehicle and the primary conductors of a monorail system.

VEHICLE

Figure 11: is a circuit diagram showing the principles of the maximum-power AC-DC converter of the present invention.

Figure 12: is a circuit diagram showing the control circuitry for the switch mode power supply and coil controller AC-DC converter of the present invention.

Figure 13: is a circuit diagram showing the control circuitry for the maximum-power AC-DC converter of the present invention.

Figure 14: illustrates the circuit of Figure 12 in a simplistic manner.

Figure 15: is a circuit diagram showing the principles of the brushless DC motor drive used in one embodiment of the present invention.

Figure 16: illustrates a transmission line and tuned pickup coil.

Figure 17: illustrates the mutual coupling between the transmission line and the tuned circuit.

Figure 18: illustrates schematically the effect of the mutual coupling.

Figure 19: illustrates the effect of an additional short circuited coil.

Figure 20: illustrates the effect of control wiring mounted in the track.

Figure 21: illustrates a means for providing increased power in a section of the track.

Figure 22: illustrates a means for providing power to branch tracks or to other ancillary

equipment from the power in the primary inductive loop.

Figure 23: illustrates a switch in parallel with the capacitor of a pick-up coil.

Figure 24: illustrates a switch in series with the capacitor of a pick-up coil.

Figure 25: illustrates a complementary load circuit.

Figure 26: illustrates a battery charger.

Figure 27: illustrates an incandescent lighting installation

Figure 28: illustrates a fluorescent lighting installation.

PREFERRED EMBODIMENTS IN GENERAL

The novel principles described within this specification may be applied in a number of ways, having in common inductive electric power transfer from a fixed primary conductor across a void and into one or more secondary pickup coils, and subsequent electric power utilization generally but not always without storage. Many applications relate to supply of motive power to vehicles, but lighting, other types of motor drive, and the charging of batteries are also catered for.

An installation may comprise at least one resonant or a non-resonant primary circuit. Each primary circuit may be comprised of a pair of parallel conductors in the form of an elongated loop, or it may be comprised of a single conductor in an open loop. In most cases the primary conductors are to run uninterruptedly alongside the designated path or track taken by vehicles, although intermittent availability (e.g. at declared bus stops) and intermediate energy storage within the vehicle is an alternative.

The track may be comprised of a tangible structure such as a railway track, conveyer belt, or monorail, or it may be an invisible path defined in use by the field emanating from one or more concealed conductors within a roadway or floor.

The preferred operating frequency is generally in the region of from 10 to 50 KHz,

particularly reflecting limitations of the solid-state switches available - and also limitations imposed by conductor losses, though the principles may be applicable to a much wider range of frequencies, such as from 50 Hz to 1 MHz. Prototypes have been built with operating frequencies of the order of 10 KHz and available power levels of 150W and 500W, the latter supplied at 500V and capable of energising a 165 metre length of track.

Secondary pickup coils are preferably resonant and are, especially in the case of a varying load, preferably connected to the load through power conditioning means, either a maximum-power conversion device, or more preferably a combined pickup coil disengaging device together with a current limited output. These are relevant to both resonant and non-resonant primary conductors because of the disturbing effect that a lightly loaded pickup coil has on power propagation past its position.

Even larger installations may be constructed by scaling up the power-handling electronics, and the number of vehicles or the motor, and motor drive circuitry on each, without departing from the novel concepts described here. Given a real voltage limit, long tracks may preferably be divided into sections; each fed from one of a number of separate power supplies. Some options are illustrated in Figure 2.

PREFERRED EMBODIMENT 1

A first preferred embodiment particularly describes a medium-sized 500W prototype that employs an on-board induction motor to move a vehicle, or several similar vehicles, along a cantilevered track - as shown in Figure 1 - beside primary cables carrying resonating currents and energised by a switching power supply. While this system, with an approximate track length of up to 165 metres, has a feed voltage of the order of 500V and a circulating resonant current of the order of 60A the entire primary cable is further insulated by enclosure in an extruded plastic case. It is thus free of commutation sparks and may be acceptable for an explosive atmosphere, such as within a mine.

In Figure 1, 1100 is the cantilevered track which is an I-sectioned aluminium girder having a flat bearing surface 1101 and a pair of parallel conductors 1102 and 1103 supported from the recess on one side. 1104 is the entire vehicle, and comprises 1106

and 1107, supporting and driving wheels respectively, and 1105, a drive motor. The pickup coils for the vehicle are located adjacent to the drive motor 1105 and the conductors 1102 and 1103 and are not visible (for details of this, refer to Figure 10, for example).

Figure 2 illustrates several options for the power distribution system. A first version 2100 refers to a system running two vehicles 2101 and 2102. These vehicles run with flanged wheels upon a track, 2103 and 2104. An outgoing and an incoming loop of primary conductor 2105 and 2106 are connected at one end to a capacitor 2107 (an optional device, preferable for longer tracks) and at the other end to a capacitor 2108 and also to a high-frequency power source, an alternator 2109 driven by external motive power.

A second version 2200 is shown with just one vehicle 2201. This version is non-resonant; its primary inductor, which might comprise several turns of cable, is driven from a switching power supply 2202 through a step-down transformer 2203. It is likely that the current within the primary inductor 2204 is non-sinusoidal.

A third version 2300 is shown with just one vehicle 2301. This version is resonant; it is driven from a switching power supply 2302 which includes a tuned circuit comprised of a capacitor 2303 and an inductance 2304 which also serves as the primary of an isolating transformer 2304. In this case, circulating current is present within the transformer 2304 as well as within the capacitor 2303, so the transformer needs to have a VA rating capable of accommodating the resonant power circulating within the primary conductor 2305 as well as the available power to be fed in or drawn off the resonant circuit. The power circulating within the resonant circuit is substantially sinusoidal. Although the primary inductor of the system could be driven with any alternating power the use of a sine wave current delivered at the average resonant frequency of all associated tuned circuits is preferable. Sinusoidal current minimises the emanation of radio-frequency emission by harmonics and enhances the efficiency of transfer of circulating power to dependent tuned circuits.

A fourth and preferred version 2400 is also shown with a single vehicle. In this version, the capacitor 2403 together with the inherent inductance of the primary inductor 2405 constitutes the resonant circuit and all other components of the power

supply 2402 need be rated for only the feed power and not for the greater levels of resonating power. The power within the resonant circuit is substantially sinusoidal. Additional inductors, as shown in Figure 8, may be inserted between the power supply and the track in order to maintain a consistent inductance between installations of different length. Additional capacitance may be included at the end of the track for longer tracks. The power supply 2402, which now comprises a switching power supply slaved to the resonant frequency of the track 2405 and the capacitor 2403 is described in more detail in the next section.

A fifth version resembles that of the fourth, except the terminating capacitor is omitted. This configuration may be preferable in shorter track length installations to reduce the cost.

HIGH FREQUENCY DC-AC POWER CONVERSION - BY SWITCHING POWER SUPPLY OR RESONANT DC-AC CONVERTER

Output Characteristics.

The resonant system for passing power to mobile vehicles would be made to run at a high frequency for the sake of minimal component size, yet as the frequency rises radiative, adjacent-conductor eddy current, and skin-effect losses also rise within for instance the distributed primary conductors which both detract from efficiency and also cause electromagnetic interference. With presently available semiconductors, 10 KHz is a reasonable design figure, though it should not be regarded as the only possible choice. Frequency may rise as far as 50 KHz, but skin-effect losses within conductors become relatively significant above this frequency. It may be preferable in some cases to use 400Hz power as this is an industry standard, particularly within the aircraft industry, where otherwise (as on airport ground transport installations) particular frequencies such as 28.5 KHz may be selected for having no harmonics potentially interfering with navigational or communications equipment. The upper operating voltage is at present practically limited to about 600V, both by capacitor ratings and by voltage limits on semiconductors.

The circuit for this device is illustrated in Figures 3 to 7, where Figures 3-5 are detailed circuit diagrams for an embodiment corresponding to 2402 in Figure 2, and Figures 6 and 7 illustrate a different embodiment.

In Figure 3, 3100 indicates a source of raw DC power; in this case a three-phase bridge rectifier is shown fed from a 400V mains supply via a step-down transformer 3105. The transformer also provides electrical isolation of the primary conductor from the mains supply. 3L1 and 3L2 improve the input power factor and protect against conducted interference propagating from the high-frequency section, 3103. 3101 is a soft-start device including a power device 3Q3 and 3102 is a converter, involving the diode 3106 and the inductor 3L3, conventionally controlled from the current-limiting controller 3107, with its power supply 3108. The 3LEM device senses the supplied DC current.

The primary resonant circuit of this system comprises the capacitor 3C2 - which may include frequency-adjusting supplementary capacitors (see Figure 7) - and the primary inductive distribution conductor itself together with optional additional inductances, having a preferred total inductance of 133 microhenries. Circulating resonant current, which may be of the order of 60 A, normally flows only through the primary inductor, connections to the power supply, and through 3C2. It does not flow through 3L4, (where a few mA only of AC current have been measured during use) and this balanced phase-splitting transformer may be constructed without an air gap. As it carries no more than the DC component of the added power, it may be relatively small. Resonant current does not flow through the switching transistors 3Q1 and 3Q2 either, though the preferred insulated-gate bipolar transistors (IGBT) are capable of absorbing the circulating energy as a transient in the early stages of a developing fault - such as a short-circuit on the track).

Although the converter includes a pair of hard-driven on/off switches as the primary power-handling elements, by reason of its connection to a resonating or tank circuit it is in effect a DC to AC converter having a sine wave alternating current output. It maintains a resonating current by switching 3Q1 and 3Q2 in a complementary manner from a low to high impedance state, at the moment the capacitor voltage is zero (detected through the inputs labelled 301 and 302). Apart from the cases of a special startup and a special power-down mode, the switching converter imposes no particular frequency (subject to upper frequency limits as a consequence of device physics) on the resonating current; it is simply a slave driver that operates at the natural ringing frequency of the circuit.

Startup and power-down situations are managed by arranging that the reserve charge in the power supplies to the control circuits significantly anticipates and outlasts that of the main energy supply for conversion, so that the controllers function both before and after resonant power exists in the track, and at those times the resonant power controller emits 10 KHz pulses based on its own clock activity.

Since loading on the track may cause the operating frequency to shift significantly from the design frequency and so reduce the effectiveness of inductive coupling, optional means for tuning the resonant frequency during operation may be provided, as indicated in Figure 7. The main switching transistors are indicated by 7S1 and 7S2. A series of paired and preferably matched capacitors, indicated as 7Ca, Ca', Cb, Cb', and Cc, Cc' are shown, capable of being switched into or out of circuit instantaneously by control signals applied to the accompanying solid-state switches, 7S20, S20', S21, S21', and S22 with S22'. Clearly these devices will carry a fraction of the circulating currents and should have adequate heat sinks, and they will also need to have suitable voltage ratings for this application. In addition, Figure 8 shows inductive tuning arrangements suitable for trimming the resonant circuit at the time of installation.

Figure 4 illustrates the current-limiting controller. The lower section 4102 is the soft-start section, and the current-limiting section is 4101. In the soft-start section, the resistor 4R11 and the capacitor 4C4 set the time delay. The first comparator 4103 determines the moment after power application at which the charge in 4C4 exceeds the 10V reference applied to its (-) input. The output of 4103 is applied to the gate of 4Q3 which is identical with the device 3Q3 in Figure 3. The upper section 4101 accepts and amplifies the signal from a "LEM" current-sensing device and applies it to comparator 4104 to be judged against an approximately 5 volt threshold, modified - to provide hysteresis - by the wired OR output of comparator 4105 and comparator 4104. The fourth comparator 4106 inverts the above output and applies it - in the absence of too much current - to a drive circuit of transistors 4Q1 and 4Q2 for application via resistor 4R15 to the gate of the transistor 3Q4 in Figure 3.

In Figure 5, 5100 represents the section for detection of the voltages developed by the resonating currents within the inductor. It comprises 1/2 of an LM319 comparator with the opposing voltages fed to opposite inputs. The output is therefore a reflection of the (+)ve input, summed with the complement of the (-)ve input. 5101 shows the section

responsible for determining the amplitude of the resonating capacitor voltage, and for enabling the supply of internally generated pulses at the design centre frequency from section 5102 should the amplitude be low (as for example at start-up). The input signal is rectified by diodes D3, D2 and compared to a reference voltage. If the detected AC is too small, the internal clock 5102; a simple trimmable RC oscillator about a binary divider is activated. Section 5103 shows gates to drive the pair of ICL 7667 gate drive devices with a complementary, phase-linked current which in turn control the power switching transistors or commonly IGBT devices (2Q1 and 2Q2 of Figure 2).

PRIMARY INDUCTOR CABLE - TUNING

Our preferred use of the actual track as the inductive part of the primary resonant circuit requires, as a result of there being a preferred resonant frequency for supplied modules such as vehicles, that the resonant frequency of the track be substantially constant between installations. An inductance value of 133 microhenries is preferred regardless of actual track length. Figures 8 and 9 illustrate a system for tuning the track to a particular resonant frequency. In order to combat the effects of differing track lengths a set of discrete or modular inductances 8100 may be installed between the power supply side 8101, 8103, and the track side 8102, 8104 and conveniently these may be a number of individual gapped toroidal ferrite cores 8105, preferably of a low permeability in order to avoid saturation. Such toroids have a preferred thickness of 40 mm, an internal aperture of 20 mm, and an external diameter of 60 mm. The air gap 8106 is preferably 0.67 mm. (8108 is a support plate.) Each toroid when placed about one conductor 8107 presents substantially the same inductance as one metre of track. At the time of installation the track length is measured, and should it be less than 165 metres the track inductance is raised by threading each litz wire conductor through one toroid per metre of the shortfall in the track length. On activation the actual resonant frequency may be measured and the toroid chain supplemented or reduced in order to fine tune the resonant frequency to its target value.

The primary inductive loop may carry a heavy circulating alternating current of the order of 60A at a frequency of 10 KHz. The inductive energy (magnetic flux) radiated from this current at this high rate of change tends to cause eddy currents both within the conductor and also within conductive and particularly within ferromagnetic materials within the flux field. The primary loop, used to distribute the power along the path or

paths taken by the moving vehicles consists of a separated, parallel pair of cables (see Figure 1, 1101 and 1102) each preferably constructed of a cable composed of multiple thin insulated wires (known generically as "Litzendraht" or litz wire) to reduce skin-effect and particularly adjacent-conductor eddy-current conduction losses. One preferred type of commercially manufactured litz wire is made of around 10,240 strands of 40 gauge enamelled copper wire within a diameter of approximately 13 mm. Another option is the use of telephone cable of the type having multiple insulated conductors. The spacing of the cables is a compromise. If they are too close together their fields will cancel each other and the coupling to the vehicle pickup coils will be poor. Conversely, if they are too far apart the track inductance rises significantly, requiring a greater drive voltage and the pickup coil losses will be unnecessarily high as there will then be a significant bridging portion of the pickup coil carrying current yet not being cut by the fields. The practical limit of 600 volts, as determined by device ratings, drives about 200 metres of track @ 60A. This length can be approximately doubled by placing a second, series capacitor in the cable to reduce the reactive power requirement, as depicted in Figure 2 - 2100 and 2400.

Conveniently, the litz wire 9110 and 9111 may be contained within a duct comprised of a plastic extrusion having a goblet-like section, as illustrated sectionally in Figure 9.

Figure 10 illustrates the actual primary-void-secondary relationships of this embodiment, in section. The scale of this drawing is approximately 120 mm along the back of the ferrite "E"-section 10102, and the cantilevered monorail of Figure 1 is based on this section.

10100 illustrates the combination of a strong support member 10101, typically an aluminium extrusion of an "I"-section shape, having an upper load-bearing surface 10103 upon which vehicle wheels may run. The side 10104 is adapted with extensions 10106 and 10107 for mounting of the support member. The side 10105 is adapted to bear the supports for the primary conductors. 10110 and 10111 are the two parallel primary conductors preferably of litz wire. They are supported within ducts on standoffs 10112 and 10113 as described with reference to Figure 9. The standoffs are supported on a sheet 10114.

Preferably all materials are either non-conducting, such as plastics, or are non-ferrous

metals such as aluminium. If ferrous material has to be situated adjacent to one or more of the primary conductors or to the vehicle's secondary pickup coils, it has been found advantageous to shield such ferrous material with an aluminium coating of several millimetres depth, whereupon in use the eddy current generated serve to block the further penetration of magnetic flux, and so minimise the loss of energy due to hysteresis within the ferromagnetic material.

The preferred ferrite core 10102 of the pickup coil is composed of a number of stacked E-shaped ferrite blocks together with plates 10117 bolted on the central shaft. The central limb is preferably 20 mm thick and the total length of the pickup coil assembly is typically 260 mm. Preferably an occasional block is deleted from the stack to allow for air cooling of the secondary coil, which in use may carry 20A of circulating current. The pickup coil 10115 together with one or more optional accessory coils as 10116 are wound about the central leg of the ferrite core. The coupling of flux from primary conductor 10110 and 10111 to the ferrite is relatively efficient as the primary conductor is almost fully enclosed by the ferrite.

The vehicle (not shown) exists to the left of the ferrite 10102, to which it may be directly attached by bolts or the like (even if made of cast iron) as the varying flux is substantially contained within the ferrite itself.

The pickup coil, of which there may be one or more on a given vehicle, comprises a tuned circuit resonant at the design frequency of the primary inductive loop. Preferably the pickup coil comprises a number of turns of litz wire wound around the central leg of a core composed of ferrite material, the core providing a flux-concentrating function to enhance the efficiency of inductive coupling. In use, the presence of high resonant currents together with multiple turns of conductor causes quite a high magnetic field within the vicinity of the coil. Preferably the resonating capacitor (which may provide for additional capacitance units in order to adjust the resonant frequency) is in parallel connection with the coil, and rectifying means (preferably fast power rectifier diodes) are wired in series with the load across the capacitor. It is desirable to have a high Q pickup coil because more power can be extracted from it, but because an increase of the coil Q tends to increase its size and cost, a compromise is required. Moreover, a high Q pickup coil may pose tuning problems for small variations in operating frequency.

The number of turns, and the associated resonating capacitor may be selected for the voltage/current ratio required for optimum matching to subsequent circuits. As shown in Figure 11, the core for the pickup coil is located so as to maximise the interception of magnetic flux from the primary loop.

A second pickup coil may also be installed on the ferrite stack, to act as a decoupling means to shield the main pickup coil from the magnetic flux. Its operation will be described in relation to the controller. (See "Tuned pickup coil and operational features" - later).

A further auxiliary pickup coil may also be provided, preferably at a site not coupled to the main pickup coil, to separately energise the on-board electronic circuits.

DETAIL OF SWITCH MODE POWER SUPPLY - Figure 12 & Figure 14

A simplified schematic of the switch mode controller is shown in Figure 14. The voltage across the coil tuning capacitor (14112) is rectified by (14114) and filtered by (14121) and (14122) to produce a DC voltage. Comparator (14117) monitors this voltage and compares against a reference (14118). If the load power is less than the maximum power able to be sourced from the pickup coil, then the capacitor voltage will increase. This will cause the comparator to turn on switch (14113) thereby effectively shorting the pickup coil. Diode (14122) prevents the DC output capacitor from also being shorted. The result of this action is the power transferred from the pickup coil is virtually zero. Consequently, the DC voltage across (14115) will decrease until the point where the comparator will turn off the switch again. The rate at which this switching occurs is determined by the hysteresis about the comparator, the size of capacitor (14115) and the difference between the load power and the maximum coil output power.

Figure 12 shows in some more detail the switch mode controller.

In this figure, the pickup coil is connected at 12P1 between terminals 1 and 3. An array of capacitors 12CT1, 12CT2, and the remaining of the series (for typically five are required to reach 1.1 μF) are the resonating capacitors. A bridge rectifier comprised of the four fast-recovery diodes 12D4-D7 rectifies the incoming power to 12L1,

comprising a choke-input filter for the capacitors 12C7 and 12C8. The DC power is fed to the load at terminals 1 and 3 of connector 12P2. The DC voltage is monitored by 12R1 and buffered by 12IC1:A. If it exceeds a reference value as determined by 12REF3 then comparator 12IC1:B will turn on 12T1, a high-current FET device which serves to short circuit pickup coil. The preferred rate of this switching action is nominally 30Hz. 12T2 provides current-limiting protection for the FET and varistor 12V1 provides voltage protection.

If the load power exceeds the maximum possible from the pickup coil the output voltage will always be below the reference set by 12REF3, and switch 12T1 will always be off. If the load is an inverter driven AC motor then this can occur during high acceleration rates. The controller in Figure 12 provides a means of maintaining maximum power transfer in such instances by generating an optically coupled control signal that can be used to instruct the inverter to reduce its acceleration rate. The signal is produced by comparing the voltage at 12P2 with a triangular carrier imposed just below the reference level set by 12REF3. The triangular carrier is produced by a relaxation oscillator 12IC1:C, while 12IC1:D performs the comparison. The optical isolation is provided by 12IC2.

Thus the circuit in Figure 12 attempts to maintain the output voltage between an upper and a lower limit, and maintains the resonant current within the pickup coil below an upper limit.

TUNED PICKUP COIL and OPERATIONAL FEATURES

It has been found that particularly but not exclusively in installations wherein the primary loop is in a resonant state that a lightly loaded vehicle can block power from reaching other vehicles distal to the lightly loaded vehicle. This effect appears as a result of high levels of current circulating through the lightly loaded pickup coil, which interact with the resonant power in the primary inductors. Therefore a controller or vehicle power conditioner has been developed which combines two separate vehicle functions; namely disengagement or disabling of the pickup coil whenever the coil output voltage rises above a preset threshold, and also limiting of the output current whenever the output current drain rises above a second threshold. This system is a preferred power control method as, unlike the maximum-power approach it can provide

conversion efficiencies of over 80%.

Disengagement of the pickup coil can be provided mechanically, by causing a physical separation of the coil away from an optimum [position close to the primary conductors]. Disengagement can also be provided electrically. For example it may be implemented by a series switch within the resonant circuit, which may be opened to interrupt current flow. For regulation purposes it may be opened repetitively (for example at around 20-100 Hz) so as to provide an output voltage fluctuating about a target value. For movement control purposes it may be held open for the desired duration. This approach has the disadvantage that the switch, which must be a bidirectional switch, shows a series voltage drop of over 2 volts at the observed resonant current levels in the pickup coil, resulting in a loss of perhaps 50 to 100W. A second, preferred though perhaps surprising option is to short out the pickup coil by closing a switch across the capacitor, thereby removing the resonating element from the system. This closed switch does not carry much current, for the circuit is no longer resonant, so losses are small and in any case do not impair load-carrying modes. At the moment of closing the switch the stored charge within the resonant circuit is small. If the intended output is a high-current, low-voltage option there will still be a significant loss in this switch when sorted, so a third preferred option is to provide a secondary pickup coil having a relatively greater number of turns. When such a coil is shorted, the current flow through the switch is relatively small.

In the operation of a vehicle system, using an inductive pickup, the output power demanded from the motor can vary over a wide range. In consequence, the electrical power demand can also vary quite widely. For lightly loaded applications, a problem occurs, since the impedance reflected back to the parallel wire transmission line will also vary widely. In this example, the pair of parallel conductors described above should be considered as a transmission line, as shown in Figure 16.

In Figure 16, Reff represents the effective motor load presented to the tuned circuit, of the pickup coil. This corresponds to the inductive pickup coil of Figure 13. If the transmission line is driven by a voltage source, then the effective mutual coupling is shown by the circuit illustrated in Figure 17.

The effect of the mutual coupling M is to transfer an equivalent resistance to the

primary side, and this is represented by the circuit shown in Figure 18. Referring to Figure 9, if ω is high, low values for M (ie low coupling factors) may be used, and yet still allow a good power transfer capability.

An overloaded motor corresponds to an Reff = infinity, whereas a lightly loaded motor corresponds to Reff ~ 0. Thus in the overloaded case ω^2M^2/Reff -> 00 so that no power is transferred, while in the lightly loaded case ω^2M^2/Reff -> infinity, so that it becomes increasingly difficult to maintain the current in the parallel wire transmission line. This last feature is highly undesirable, as one lightly loaded vehicle can then block the power flow to other vehicles on the same line.

It is preferable that a high frequency alternating current is supplied to the transmission line. Such a high frequency current may be generated by a high frequency alternator, or more preferably it may be generated by a power electronic circuit, as described above. In the case of a power electronic circuit, the frequency of oscillation will be determined by the continued reactive load on the link, and the effect of lightly loaded vehicles is to shift the operating frequency away from the preferred operating frequency of 10kHz by several hundred Hertz. In doing so, this solves the ω^2M^2/Reff -> infinity problem as off tune circuits reflect lower (reactive) impedance but the off-tune nature again restricts power flow to the other vehicles.

This problem can be minimised by reducing the coupling between the transmission line and the tuned pickup coil. This solution is based on the observation that the term ω^2M^2/Reff has essentially only one variable - the mutual inductance, corresponding to the coupling factor between the two magnetic circuits. If this coupling factor - usually considered to be constant - can in fact be reduced, then the interaction can be reduced.

One proposed solution is illustrated in Figure 19. An additional coil is placed between the transmission line and the pickup coil. This additional coil has a switch S, which if open means that the additional coil has no effect. But if the switch 19S is closed, then this short circuited coil prevents flux paths from crossing it thereby reducing the coupling, and reducing M. The positioning of the additional coil is not critical - provided it intercepts some flux, it will work. It is particularly preferred that the additional coil intercepts the flux while affecting the inductance as little as possible. In practice, this is not difficult to achieve. Switch 19S may be a power electronic switch

of any one of a number of well known configurations.

In operation, the voltage across the tuned circuit V_T is monitored and if it goes too high, then the circuit is too lightly loaded, and switch S is turned on to reduce it. If the voltage V_T is low switch S is left open.

This circuit is compatible with the overload circuitry, which also uses V_T to implement control of the rectifier.

PREFERRED EMBODIMENT 2 - 150W VERSION

This preferred embodiment particularly describes a small-scale 150W prototype that employs an onboard brushless DC motor to move a vehicle, or several similar vehicles, along a track above energised primary cables running at 10 KHz. This entire system is thus free of commutation sparks and may be suitable for an explosive atmosphere, such as in a mine.

HIGH FREQUENCY DC-AC POWER CONVERSION

The circuit for the power source for this device is illustrated schematically in Figure 6.

The current fed into the high frequency cable 6101 and 6102 is generated using a solid-state switching converter 6100 operating in a resonant mode to produce a near-perfect 10kHz sinusoidal waveform. Consequently, the radio-frequency interference transmitted from the conductor is negligible as the harmonic content of the power is low, - under 1% - and the system would be suitable for operating in communication-intensive locations such as airports.

The resonant circuit in this embodiment is contained within the centre-tapped inductor 6L1 and the capacitor 6C1 within the power supply, thus these components must be capable of supporting the intensity of the resonating current. The inductive conductor is preferably also resonant at the same frequency. Because this design provides electrical isolation at the transformer 6L1 it is particularly amenable to small-scale systems, where safety is important, and also to situations in which a relatively high supply voltage from 6Edc may be transformed to a different voltage.

To provide the necessary current step-up in the track and to minimize the effect of load changes on the operating frequency of the converter, the turns ratio of the ferrite pot-cored high frequency transformer is made high in this preferred embodiment by placing only one turn on the secondary side. To further minimize the effects of loading on the frequency the impedance of the high frequency tuned circuit ($Z = \sqrt{(L1/C1)}$) is deliberately made to be low. However, a compromise must be made when choosing Z since low values result in a high primary circulating current that reduces the efficiency and increases the cost and size of the converter owing to the higher C1 capacitance required. The primary side transformer winding (L1) should be constructed of multiple strands of insulated, narrow diameter wire to reduce losses due to skin effect, while the input inductor Ls can be wound with ordinary solid wire since essentially only DC current flows in it.

The resonant converter shown schematically in Figure 6 is controlled by alternately gating the two switches 6S1 and 6S2 on for 180° of the ringing period of 6L1 and 6C1, using a circuit such as that of Figure 5. If the input voltage 6Edc is below a certain level (such as occurs at start up) gating is controlled by an oscillator running at approximately the resonant frequency for the circuit of $f = 1/\sqrt{(L1C1)}$. Once the voltage Edc has exceeded this set level and a few further milliseconds have elapsed, the fixed oscillator is switched out and S1 and S2 are instead gated at the damped resonant frequency by detecting the C1 voltage zero crossings and switching at those times. This ensures that under all load conditions S1 and S2 turn on and off with zero voltage across them, minimizing the switching loss in the two devices.

The two power switches 6S1 and 6S2 are shown as MOSFETs, but they could equally be bipolar transistors, IGBTs or GTOs (gate turnoff thyristors), or any other solid-state switch designed to handle the power levels that may be required in a particular application. Their gates are driven by a controller such as that described in Figure 5.

The process for capacitative tuning, described above in relation to Figure 7, also applied to this type of resonant controller.

HIGH FREQUENCY CABLE

In this embodiment also, the high frequency cable that distributes the power along the

route(s) taken by the moving vehicles consists of a separated and substantially parallel pair of cables each preferably constructed of multiple thin insulated wires of the type known as litz wire to reduce skin-effect and adjacent-conductor conduction losses. One preferred type of commercially manufactured litz wire contains around 10,000 strands of 40 gauge enamelled copper wire in a diameter of approximately 13 mm, yet is inexpensive. The spacing of the cables is not particularly critical, however if they are too close together their fields will cancel each other and the coupling to the vehicle pickup coils will be poor. Conversely, if they are too far apart then the pickup coil losses will be unnecessarily high as there will then be a significant portion of the pickup coil carrying current yet not being cut by the fields. In addition, the inductance of the track will increase which means more voltage has to be put across it in order to circulate the required current. While this problem can be alleviated to some extent by placing series capacitors in the cable to reduce the reactive power requirement, as depicted in Figure 2, it does add additional cost and bulk to the cable.

INDUCTIVE PICKUP COIL

One form of the pickup coil comprises several turns of multiple strand wire on a non-ferrous former of preferably rectangular shape, whose width is approximately the same as the high-frequency cable. The multiple strand wire is preferably litz wire (as described above). In this embodiment, a ferromagnetic core has not been used. The coil is connected in parallel with a capacitor whose value is chosen to produce a resonant circuit and tune the coil to the frequency of the distributed power (i.e. 10kHz). It is desirable to have a high Q pickup coil because more power can be extracted from it. Because an increase of the coil Q tends to increase its size and cost - and pose tuning difficulties, a compromise is required. An auxiliary pickup coil is also provided, to energise and synchronise the controller for the maximum-power converter.

MAXIMUM POWER AC-DC CONVERTER

In principle any suitable motor even an AC motor such as an induction motor could be used to drive the trolley if suitable power conversion stages were added after the maximum-power converter. The motor tested in one prototype system is a brushless DC type which has the advantages of being low in cost, light weight, requires low maintenance and is suitable for operating in hazardous environments.

The maximum power AC-DC converter is shown generally in Figure 11, with details of its controller being shown in Figure 13.

To procure maximum power transfer from the pickup coil under low to medium Q conditions, a buck type converter shown schematically in Figure 13 is employed and controlled in a manner that ensures the loaded pickup coil 13L2 has a Q that is preferably never below half that of the unloaded case. The controller for 13S3 (circuit given in Figure 14) is switched to maintain the peak voltage 13V1 at the level which delivers maximum power. If V1 exceeds $V1_{ref}$ (in Figure 11) then the device 13S3 is turned "on" the next time the voltage across 13C2 goes through a zero crossing. If during a half cycle 13V1 does not exceed $V1_{ref}$ then at the next zero crossing 13S3 is turned "off". By employing this integral half cycle control switching loss is minimized and so is the radiated radio frequency interference.

Figure 13 shows a control circuit capable of driving the gate of 11S3, via the output driver, 13102, an ICL 7667. 13106 is a power supply fed by the auxiliary coil which produces a 10V output at 13101.

13104 is a zero-crossing detector, locked to the phase of the detected high-frequency current. Its output is passed through a pulse-shaping circuit, 13105 to convert it to spikes, and then to close a D-flipflop, 13107 which energises the gate driver, so long as the comparator 13100 indicates that the supply is in a startup mode threshold *(see the time constant at its input)* and thereby admits control pulses through the gate 13108. 13103 is the primary sensor of the coil voltage level, and enables 13109.

MOTOR DRIVE

Figure 15 illustrates one type of motor drive which may be fed with DC, and provide an output torque in proportion to the supplied voltage 15Vo. (In principle any suitable motor even an AC motor such as an induction motor could be used to drive the vehicle if suitable power conversion stages were added after the maximum-power converter). The motor adopted in a prototype system is a brushless DC type which has the advantages of being low in cost, light weight, requires low maintenance and being spark-free is suitable for operating in hazardous environments. A reduction gearbox couples the motor to the vehicle wheels in order to produce useful driving torque at

reduced speed. In the preferred embodiment the vehicle's inertia is such that speed of the motor can also be controlled by simply inhibiting the motor commutating switches 15S4, S5, and S6, in accordance with a defined duty cycle. The speed control circuitry is beyond the scope of this specification and has not been included. The prototype vehicle incorporated simple limit switches at each end of the track to reverse the motor.

15101 comprises an electronic brake; means to tie the motor windings together through the diodes 15102.

POWER CONTROL IN and FROM THE TRACK

It is preferable to be able to control on the vehicle the power to achieve the tasks that the vehicle has to do. However, there are also occasions when control from the track is useful. For near-zero available power the control wiring can be mounted on or in close association with the track and short-circuited as shown in Figure 21. When switch S is open-circuit it has no effect. When it is closed the vehicles cannot pass this part of the track but they can operate normally on either side of it.

For increased power in a section of the track a coil can be used and energised as shown in Figure 21. In this drawing the coil is energised by the top conductor. Trolleys passing over this coil see twice the track current *2I* and can therefore operate at twice the power level. Values greater than two are easily achieved.

In this and other simple ways, simple loops and coils around the track can be used to control the vehicles. The coil can also be used to sense a vehicle as in Figure 20 since if the switch S is open-circuit the output voltage rises when a vehicle covers the coil. Then, if required the switch can be closed to stop a vehicle at a precise spot. There are many other extensions to these simple techniques, for example, sense coils can be used to control vehicles at intersections so that collisions cannot occur.

VARIATIONS

Figure 22 shows how secondary tracks 2210, 2211 may be powered from the primary track 2212 using pickup coils directly connected to the secondary track conductors, and inductively coupled to the primary track conductors. If a different current magnitude or

frequency is required in the secondary track then an additional power converter may be used as shown in 2213.

Figure 23 shows a switch 2301 in parallel with the capacitor 2302 of the pick-up coil 2303. Closing the switch 2301 renders the circuit non-resonant and thus reduces the power coupled between the primary (not shown) and the pick-up coil 2303.

By suitably controlling the operation of the switch, the amount of power received by the pick-up coil can be controlled.

Figure 24 shows a less preferred arrangement in which a switch 2401 is in series with capacitor 2402 and an inductor 2403 so that when the switch is opened, resonant current is prevented from flowing.

Figure 25 shows a complementary load circuit. This has a pick-up coil 2501 having a controller 2502 supplying a DC output to a main device 2503 (such as an electric motor).

A complementary load in the form of a resistor 2504 is controlled by a switch 2505. This can be a pulse width modulated device to control the amount of time that the resistor 2504 is switched on to ensure that the pick-up will always experience a full load, even though the main device 2503 may be lightly loaded. Such an arrangement is useful at lower power applications but becomes inefficient at higher power applications as the primary power supply has to supply full power all the time.

Figures 26-28 show other variations, including a battery charger (Figure 26), an incandescent lighting installation (Figure 27) and a fluorescent lighting installation (Figure 28). Primary conductors 2601, 2701, 2801 supply power to movable devices 2602, 2702, 2802 which can be moved towards and away from the primary conductors to charge the power coupled to each device.

The battery charger can provide constant current to the batteries 2603 by means of the controller 2604 which can be the same as the vehicle controller described above.

Similarly Figure 27 shows an incandescent lamp 2703 in place of the batteries. The

lamp can be supplied with the required DC voltage to correspond to the local mains (AC) voltage. Hence the output could be set to 230V DC for New Zealand to make use of lighting fittings adapted for the local 230V AC power supply.

It is preferred that the incandescent lamp is supplied with DC to avoid problems which might occur with the inductance of the lamp at the power supply frequency. By moving the light fitting towards or away from the primary, the amount of power coupled to the pick-up coil can be varied.

Figure 28 shows a fluorescent light fitting 2801 supplied by the high frequency AC received by the pick-up coil 2802.

Various alterations and modifications may be made to the foregoing without departing from the scope of this invention, as set forth in the following claims.

CLAIMS:

1. An inductive power distribution system comprising:
an electric power supply;
a primary conductive path connected to said electric power supply;
one or more electrical devices for use in conjunction with said primary conductive path; the or each device capable of deriving at least some power from a magnetic field associated with said primary conductive path;
the or each device having at least one pick-up coil comprising a resonant circuit having a pick-up resonant frequency, and at least one output load capable of being driven by electric power induced in the pick-up coil,
CHARACTERISED-IN-THAT there is means for preventing the or each device from presenting a reduced load to the primary conductive path.

2 An inductive power distribution system as claimed in claim 1, CHARACTERISED-IN-THAT the means for preventing the or each device from presenting a reduced load to the primary conductive path, comprises means for maintaining the output load above a predetermined threshold.

3. An inductive power distribution system as claimed in claim 2, CHARACTERISED-IN-THAT the output load comprises main load means and additional load means in parallel with the main load means, and the means for maintaining the output load above a predetermined threshold includes control means capable of switching on or off the additional load means.

4. An inductive power distribution system as claimed in claim 1, CHARACTERISED-IN-THAT the one or more electrical devices are mobile or portable devices.

5. An inductive power distribution system as claimed in claim 1, CHARACTERISED-IN-THAT the means for preventing the or each device from presenting a reduced load to the primary conductive path comprises means for changing the power coupled between the primary conductive path and the pick-up coil.

6. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the output load comprises a battery charger supplying power to one or more batteries.

7. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the primary conductive path comprises a resonant circuit having a primary resonant frequency substantially the same as the pick-up resonant frequency.

8. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the means for changing the power coupled between the primary conductive path and the pick-up coil is mounted on the device, or where there is more than one device, similar means is mounted on each device.

9. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the means for changing the power coupled between the primary conductive path and the pick-up coil comprises means for physically moving the pick-up coil away from or towards the primary conductive path.

10. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the means for changing the power coupled between the primary conductive path and the pick-up coil comprises an isolating coil, said isolating coil having a switch to switch the coil between an open circuit and a short circuit, so that when the switch is switched from one state to another state the power coupled between the primary conductive path and the pick-up coil is changed.

11. An inductive power distribution system as claimed in claim 10, CHARACTERISED-IN-THAT the isolating coil is mounted on or in close proximity to the primary conductive path .

12. An inductive power distribution system as claimed in claim 10, CHARACTERISED-IN-THAT an isolating coil is mounted on the or each device.

13. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the pick-up resonant circuit comprises a capacitor and an inductor, and the means for changing the power coupled between the primary conductive path and the pick-up coil comprises a switch in series with the capacitor to switch the circuit between a resonant circuit and an open circuit, so that when the switch is open circuited, resonant current is prevented from flowing in the pick-up coil.

14. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the means for changing the power coupled between the primary conductive path and the pick-up coil comprises a switch in the pick-up coil to switch the pick-up coil between a resonant circuit and a short circuit, so that when the coil is short circuited, resonant current is prevented from flowing in the pick-up coil.

15. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the power supply is electrically tunable.

16. An inductive power distribution system as claimed in claim 7, CHARACTERISED-IN-THAT the power supply in combination with the primary resonant circuit is adapted to produce a sinusoidal alternating current of a frequency substantially the same as that of the primary resonant frequency.

17. An inductive power distribution system as claimed in claim 16, CHARACTERISED-IN-THAT the power supply comprises a switching converter having at least one switch, means for detecting a phase of the power in the resonant primary conductive path, and means for controlling said switch connected to said means for detecting the phase in the resonant primary conductive path, whereby in use the at least one switch is phase locked to the phase of the resonant power in the resonant primary conductive path.

18. An inductive power distribution system as claimed in claim 17, CHARACTERISED-IN-THAT the power supply is a single phase power supply, and said at least one switch comprises at least one pair of complementary switches.

19. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the pick-up resonant circuit is a series resonant circuit having at least one capacitor and at least one inductor.

20. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the pick-up resonant circuit is a parallel resonant circuit having at least one capacitor and at least one inductor.

21. An inductive power distribution system as claimed in claim 20, CHARACTERISED-IN-THAT the inductor has a magnetically permeable core.

22. An inductive power distribution system as claimed in claim 5, CHARACTERISED-IN-THAT the device is selected from the group comprising vehicles, electrical appliances, electrical hand tools, electrical machinery, battery chargers, or light fittings.

23. An inductive power distribution system comprising:
an electric power supply;
a primary conductive path connected to said electric power supply;
one or more vehicles for use in conjunction with said primary conductive path; the or each vehicle capable of deriving at least some of its power from a magnetic field associated with said primary conductive path;
the or each vehicle having at least one pick-up coil comprising a resonant circuit having a pick-up resonant frequency, and at least one output load capable of being driven by electric power induced in the pick-up coil,
CHARACTERISED-IN-THAT there is means for changing the power coupled between the primary conductive path and the pick-up coil.

24. An inductive power distribution system as claimed in claim 23, CHARACTERISED-IN-THAT the at least one output load comprises an electrical appliance mounted on said vehicle.

25. An inductive power distribution system as claimed in claim 23, CHARACTERISED-IN-THAT the at least one output load comprises means for levitating said vehicle relative to said primary conductive path.

26. An inductive power distribution system as claimed in claim 23, CHARACTERISED-IN-THAT the at least one output load comprises at least one electric motor on said vehicle.

27. An inductive power distribution system as claimed in claim 26, CHARACTERISED-IN-THAT the pick-up resonant circuit is a series resonant circuit having at least one capacitor and at least one inductor.

28. An inductive power distribution system as claimed in claim 26, CHARACTERISED-IN-THAT the pick-up resonant circuit is a parallel resonant circuit having at least one capacitor and at least one inductor.

29. An inductive power distribution system as claimed in claim 28, CHARACTERISED-IN-THAT the means for changing the power coupled between the primary conductive path and the pick-up coil comprises an isolating coil on the vehicle, said isolating coil having a switch to switch the isolating coil between an open circuit and a short circuit, so that when the switch is switched from one state to another state the power coupled between the primary conductive path and the pick-up coil is changed.

30. An inductive power distribution system as claimed in claim 29, CHARACTERISED-IN-THAT there is means for controlling said switch and means for monitoring the voltage across the capacitor and the inductor, so that if (a) the voltage exceeds an upper predetermined value, the control means switches the switch from an open circuit state to a short circuit state to allow the voltage to drop below the upper predetermined value, or if (b) the voltage falls below a lower predetermined value, the control means switches the switch from a short circuit state to an open circuit state.

31. An inductive power distribution system as claimed in claim 28, CHARACTERISED-IN-THAT the means for changing the power coupled between the primary conductive path and the pick-up coil comprises a switch in the pick-up coil to switch the pick-up coil between a resonant state and a non-resonant state.

32. An inductive power distribution system as claimed in claim 31, CHARACTERISED-IN-THAT there is means for controlling said switch and means for monitoring the voltage across the capacitor and the inductor, so that if (a) the voltage exceeds an upper predetermined value, the control means switches the switch from a resonant state to a non-resonant state to allow the voltage to drop below the upper predetermined value, or if (b) the voltage falls below a lower predetermined value, the control means switches the switch from a non-resonant state to a resonant state.

33. An inductive power distribution system as claimed in claim 31, CHARACTERISED-IN-THAT the switch is in series with said capacitor and said inductor.

34. An inductive power distribution system as claimed in claim 31, CHARACTERISED-IN-THAT the switch is in parallel with said capacitor and said inductor.

35. An inductive power distribution system as claimed in claim 23, CHARACTERISED-IN-THAT the power supply comprises means for the conversion of a supply of electric power into an alternating current at a nominal frequency between 50 Hz and 1 MHz, said conversion means being adapted for use with a resonant load.

36. An inductive power distribution system as claimed in claim 23, CHARACTERISED-IN-THAT the power supply provides alternating current at a nominal frequency between 1 KHz and 50 KHz.

37. An inductive power distribution system as claimed in claim 23, CHARACTERISED-IN-THAT the power supply comprises a DC-AC converter for the generation of electric power as an alternating current.

38. An inductive power distribution system as claimed in claim 37, CHARACTERISED-IN-THAT the power supply comprises a resonant DC-AC converter adapted for the maintenance of a resonating sinusoidal current within a resonant circuit.

39. An inductive power distribution system as claimed in claim 23, CHARACTERISED-IN-THAT the power supply is electrically tunable.

40. An inductive power distribution system as claimed in claim 23, CHARACTERISED-IN-THAT the primary conductive path comprises a single primary conductor.

41. An inductive power distribution system as claimed in claim 23, CHARACTERISED-IN-THAT the primary conductive path comprises a pair of spaced apart substantially parallel conductors.

42. An inductive power distribution system as claimed in claim 35 or claim 36, CHARACTERISED-IN-THAT the or each primary conductor comprises one or more strands of elongate conductive material having a relatively large surface area available for the carriage of high-frequency current.

43. An inductive power distribution system as claimed in claim 41, CHARACTERISED-IN-THAT the pair of primary conductors are mounted on or in close proximity to a rail, and the or each vehicle is adapted to travel along the rail.

44. An inductive power distribution system as claimed in claim 41, CHARACTERISED-IN-THAT the or each vehicle can travel along a path and pick up power from one or more pairs of conductors.

45. An inductive power distribution system as claimed in claim 41, CHARACTERISED-IN-THAT the primary conductive path includes one or more regions having additional primary conductors so that in use said regions possess enhanced magnetic fields.

46. An inductive power distribution system as claimed in claim 23, CHARACTERISED-IN-THAT the primary conductive path comprises a primary resonant circuit having a primary resonant frequency substantially the same as the pick-up resonant frequency, said primary resonant circuit comprises a pair of spaced apart elongate conductors connected to at least one capacitor to form a

closed loop.

47. An inductive power distribution system as claimed in claim 46, CHARACTERISED-IN-THAT the primary conductive path is terminated by an additional capacitor.

48. An inductive power distribution system as claimed in claim 46, CHARACTERISED-IN-THAT the primary conductive path is terminated by a conductive element.

49. An inductive power distribution system as claimed in claim 46, CHARACTERISED-IN-THAT there is means for tuning the primary resonant frequency to a particular frequency, said tuning means comprising one or more magnetically permeable bodies which may be moved into close proximity to or removed from close proximity to the primary conductive path to change the inductance of the primary resonant circuit.

50. An inductive power distribution system as claimed in claim 49, CHARACTERISED-IN-THAT the tuning means comprises one or more substantially annular magnetically permeable bodies.

51. A vehicle capable of deriving some of its power from a magnetic field associated with a primary conductive path supplied by a varying electric current, said vehicle having at least one pick-up coil comprising a pick-up coil comprising a resonant circuit having a pick-up resonant frequency, and at least one output load capable of being driven by electric power induced in the pick-up coil,
CHARACTERISED-IN-THAT there is means for changing the power coupled between the primary conductive path and the pick-up coil.

52. A vehicle as claimed in claim 51, CHARACTERISED-IN-THAT the at least one output load comprises an electrical appliance mounted on said vehicle.

53. A vehicle as claimed in claim 51, CHARACTERISED-IN-THAT the at least one output load comprises means for levitating said vehicle relative to said primary conductive path.

54. A vehicle as claimed in claim 51, CHARACTERISED-IN-THAT the at least one output load comprises at least one electric motor on said vehicle.

55. A vehicle as claimed in claim 54, CHARACTERISED-IN-THAT the or each motor comprises an induction motor adapted to provide traction for said vehicle.

56. A vehicle as claimed in claim 54, CHARACTERISED-IN-THAT the or each motor comprises a brushless DC motor adapted to provide traction for said vehicle.

57. A vehicle as claimed in claim 51, CHARACTERISED-IN-THAT the means for changing the power coupled between the primary conductive path and the pick-up coil comprises means for physically moving the pick-up coil away from or towards the primary conductive path.

58. A vehicle as claimed in claim 51, CHARACTERISED-IN-THAT the pick-up resonant circuit is a parallel resonant circuit having at least one capacitor and at least one inductor.

59. A vehicle as claimed in claim 51, CHARACTERISED-IN-THAT the inductor has a magnetically permeable core.

60. A vehicle as claimed in claim 51, CHARACTERISED-IN-THAT the means for changing the power coupled between the primary conductive path and the pick-up coil comprises an isolating coil on the vehicle, said isolating coil having a switch, to switch the coil between an open circuit and a short circuit, so that when the coil is short circuited, the power coupled between the primary conductive path and the pick-up coil is changed.

61. A vehicle as claimed in claim 51, CHARACTERISED-IN-THAT the means for changing the power coupled between the primary conductive path and the pick-up coil comprises a switch in the pick-up coil to switch the pick-up coil between a resonant circuit and a short circuit, so that when the coil is short circuited, resonant current is prevented from flowing in the pick-up coil.

62. A vehicle as claimed in claim 61, CHARACTERISED-IN-THAT the switch is in series with said capacitor and said inductor.

63. A vehicle as claimed in claim 61, CHARACTERISED-IN-THAT the switch is in parallel with said capacitor and said inductor.

64. A vehicle as claimed in claim 61, CHARACTERISED-IN-THAT there is means for controlling said switch and means for monitoring the voltage across the capacitor and the inductor, so that if the voltage exceeds a predetermined value, the control means temporarily causes the switch to change state until the voltage drops below the predetermined value, and if the voltage falls below a predetermined value, the control means temporarily causes the switch to change to another state until the voltage exceeds the predetermined value.

65. A vehicle as claimed in claim 51, CHARACTERISED-IN-THAT the means for changing the power coupled between the primary conductive path and the pick-up coil comprises an isolating coil on the vehicle, said isolating coil having a switch, to switch the coil between an open circuit and a short circuit, so that when the coil is short circuited, the power coupled between the primary conductive path and the pick-up coil is changed.

AMENDED CLAIMS

[received by the International Bureau on 14 August 1992 (14.08.92); original claims 1,2,5,8-10,13,14,23,29,31,51,57,60,61 and 65 amended; other claims unchanged (12 pages)]

1. An inductive power distribution system comprising:
an electric power supply;
a primary conductive path connected to said electric power supply;
one or more electrical devices for use in conjunction with said primary conductive path; the or each device capable of deriving at least some power from a magnetic field associated with said primary conductive path;
the or each device having at least one pick-up coil comprising a resonant circuit having a pick-up resonant frequency, and at least one output load capable of being driven by electric power induced in the pick-up coil,
CHARACTERISED IN THAT there is means for substantially decoupling the or each device from the primary conductive path.

2, An inductive power distribution system as claimed in claim 1, CHARACTERISED IN THAT there is means for maintaining the output load above a predetermined threshold.

3. An inductive power distribution system as claimed in claim 2, CHARACTERISED IN THAT the output load comprises main load means and additional load means in parallel with the main load means, and the means for maintaining the output load above a predetermined threshold includes control means capable of switching on or off the additional load means.

4. An inductive power distribution system as claimed in claim 1, CHARACTERISED IN THAT the one or more electrical devices are mobile or portable devices.

5. An inductive power distribution system comprising:
an electric power supply;
a primary conductive path connected to said electric power supply;

one or more electrical devices for use in conjunction with said primary conductive path; the or each device capable of deriving at least some power from a magnetic field associated with said primary conductive path;
the or each device having at least one pick-up coil comprising a resonant circuit having a pick up resonant frequency, and at least one output load capable of being driven by electric power induced in the pick-up coil,
CHARACTERISED IN THAT there is means for substantially decoupling the or each device from the primary conductive path.

6. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the output load comprises a battery charger supplying power to one or more batteries.

7. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the primary conductive path comprises a resonant circuit having a primary resonant frequency substantially the same as the pick-up resonant frequency.

8. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the means for substantially decoupling the or each device from the primary conductive path is mounted on the device, or where there is more than one device, similar means is mounted on each device.

9. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the means for substantially decoupling the or each device from the primary conductive path comprises means for physically moving the pick-up coil away from or towards the primary conductive path.

10. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the means for substantially decoupling the or each device from the primary conductive path comprises an isolating coil, said isolating coil having a switch to switch the coil between an open circuit and a short circuit, so that when the switch is switched from one state to another state the power coupled between the primary conductive path and the pick-up coil is changed from a "coupled state" to a "substantially decoupled state".

11. An inductive power distribution system as claimed in claim 10, CHARACTERISED IN THAT the isolating coil is mounted on or in close proximity to the primary conductive path.

12 An inductive power distribution system as claimed in claim 10, CHARACTERISED IN THAT an isolating coil is mounted on the or each device.

13. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the pick-up resonant circuit comprises a capacitor and an inductor, and the means for substantially decoupling the or each device from the primary conductive path comprises a switch in series with the capacitor to switch the circuit between a resonant circuit and an open circuit, so that when the switch is open circuited, resonant current is prevented from flowing in the pick-up coil.

14. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the means for substantially decoupling the or each device from the primary conductive path comprises a switch in the pick-up coil to switch the pick-up coil between a resonant circuit and a short circuit, so that when the coil is short circuited, resonant current is prevented from flowing in the pick-up coil.

15. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the power supply is electrically tunable.

16. An inductive power distribution system as claimed in claim 7, CHARACTERISED IN THAT the power supply in combination with the primary resonant circuit is adapted to produce a sinusoidal alternating current of a frequency substantially the same as that of the primary resonant frequency.

17. An inductive power distribution system as claimed in claim 16, CHARACTERISED IN THAT the power supply comprises a switching converter having at least one switch, means for detecting a phase of the power in the resonant primary conductive path, and means for controlling said switch connected to said means for detecting the phase in the resonant primary conductive path, whereby in use the at least one switch is phase locked to the phase of the resonant power in the resonant primary conductive path.

18. An inductive power distribution system as claimed in claim 17, CHARACTERISED IN THAT the power supply is a single phase power supply, and said at least one switch comprises at least one pair of complementary switches.

19. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the pick-up resonant circuit is a series resonant circuit having at least one capacitor and at least one inductor.

20. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the pick-up resonant circuit is a parallel resonant circuit having at least one capacitor and at least one inductor.

21. An inductive power distribution system as claimed in claim 20, CHARACTERISED IN THAT the inductor has a magnetically permeable core.

22. An inductive power distribution system as claimed in claim 5, CHARACTERISED IN THAT the device is selected from the group comprising vehicles, electrical appliances, electrical hand tools, electrical machinery, battery chargers or light fittings.

23. An inductive power distribution system comprising:
an electric power supply;
a primary conductive path connected to said electric power supply;
one or more vehicles for use in conjunction with said primary conductive path; the or each vehicle capable of deriving at least some of its power from a magnetic field associated with said primary conductive path;
the or each vehicle having at least one pick-up coil comprising a resonant circuit having a pick-up frequency, and at least one output load capable of being driven by electric power induced by the pick-up coil,
CHARACTERISED IN THAT there is means for substantially decoupling the or each vehicle from the primary conductive path.

24. An inductive power distribution system as claimed in claim 23, CHARACTERISED IN THAT the at least one output load comprises an electrical appliance mounted on said vehicle.

25. An inductive power distribution system as claimed in claim 23, CHARACTERISED IN THAT the at least one output load comprises means for levitating said vehicle relative to said primary conductive path.

26. An inductive power distribution system as claimed in claim 23, CHARACTERISED IN THAT the at least one output load comprises at least one electric motor on said vehicle.

27. An inductive power distribution system as claimed in claim 26, CHARACTERISED IN THAT the pick-up resonant circuit is a series resonant circuit having at least one capacitor and at least one inductor.

28. An inductive power distribution system as claimed in claim 26, CHARACTERISED IN THAT the pick-up resonant circuit is a parallel resonant circuit having at least one capacitor and at least one inductor.

29. An inductive power distribution system as claimed in claim 28 CHARACTERISED IN THAT the means for substantially decoupling the or each vehicle from the primary conductive path comprises an isolating coil on the vehicle, said isolating coil having a switch to switch the isolating coil between an open circuit and a short circuit, so that when the switch is switched from one state to another state the power coupled between the primary conductive path and the pick-up coil is changed.

30. An inductive power distribution system as claimed in claim 29, CHARACTERISED IN THAT there is means for controlling said switch and means for monitoring the voltage across the capacitor and the inductor, so that if (a) the voltage exceeds an upper predetermined value, the control means switches the switch from an open circuit state to a short circuit state to allow the voltage to drop below the upper predetermined value, or if (b) the voltage falls below a lower predetermined value, the control means switches the switch from a short circuit state to an open circuit state.

31. An inductive power distribution system as claimed in claim 28, CHARACTERISED IN THAT the means for substantially decoupling the or each vehicle from the primary conductive path comprises a switch in the pick-up coil to switch the pick-up coil between a resonant state and a non-resonant state.

32. An inductive power distribution system as claimed in claim 31, CHARACTERISED IN THAT there is means for controlling said switch and means for monitoring the voltage across the capacitor and the inductor, so that if (a) the voltage exceeds an upper predetermined value, the control means switches the switch from a resonant state to a non-resonant state to allow the voltage to drop below the upper predetermined value, or if (b) the voltage falls below a lower predetermined value the control means switches the switch from a non-resonant state to a resonant state.

33. An inductive power distribution system as claimed in claim 31, CHARACTERISED IN THAT the switch is in series with said capacitor and said inductor.

34. An inductive power distribution system as claimed in claim 31, CHARACTERISED IN THAT the switch is in parallel with, said capacitor and said inductor.

35. An inductive power distribution system as claimed in claim 23, CHARACTERISED IN THAT the power supply comprises means for the conversion of a supply of electric power into an alternating current at a nominal frequency between 50 Hz and 1 MHz, said conversion means being adapted for use with a resonant load.

36. An inductive power distribution system as claimed in claim 23, CHARACTERISED IN THAT the power supply provides alternating current at a nominal frequency between 1 KHz and 50 KHz.

37. An inductive power distribution system as claimed in claim 23, CHARACTERISED IN THAT the power supply comprises a DC-AC converter for the generation of electric power as an alternating current.

38. An inductive power distribution system as claimed in claim 37, CHARACTERISED IN THAT the power supply comprises a resonant DC-AC converter adapted for the maintenance of a resonating sinusoidal current within a resonant circuit.

39. An inductive power distribution system as claimed in claim 23, CHARACTERISED IN THAT the power supply is electrically tunable.

40. An inductive power distribution system as claimed in claim 23, CHARACTERISED IN THAT the primary conductive path comprises a single primary conductor.

41. An inductive power distribution system as claimed in claim 23, CHARACTERISED IN THAT the primary conductive path comprises a pair of spaced apart substantially parallel conductors.

42. An inductive power distribution system as claimed in claim 35 or claim 36, CHARACTERISED IN THAT the or each primary conductor comprises one or more strands of elongate conductive material having a relatively large surface area available for the carriage of high-frequency current.

43. An inductive power distribution system as claimed in claim 41, CHARACTERISED IN THAT the pair of primary conductors are mounted on or in close proximity to a rail, and the or each vehicle is adapted to travel along the rail.

44. An inductive power distribution system as claimed in claim 41, CHARACTERISED IN THAT the or each vehicle can travel along a path and pick up power from one or more pairs of conductors.

45. An inductive power distribution system as claimed in claim 41, CHARACTERISED IN THAT the primary conductive path includes one or more regions having additional primary conductors so that in use said regions possess enhanced magnetic fields.

46. An inductive power distribution system as claimed in claim 23, CHARACTERISED IN THAT the primary conductive path comprises a primary resonant circuit having a primary resonant frequency substantially the same as the pick-up resonant frequency, said primary resonant circuit comprises a pair of spaced apart elongate conductors connected to at least one capacitor to form a closed loop.

47. An inductive power distribution system as claimed in claim 46, CHARACTERISED IN THAT the primary conductive path is terminated by an additional capacitor.

48. An inductive power distribution system as claimed in claim 46, CHARACTERISED IN THAT the primary conductive path is terminated by a conductive element.

49. An inductive power distribution system as claimed in claim 46, CHARACTERISED IN THAT there is means for tuning the primary resonant frequency to a particular frequency, said tuning means comprising one or more magnetically permeable bodies which may be moved into close proximity to or removed from close proximity to the primary conductive path to change the inductance of the primary resonant circuit.

50. An inductive power distribution system as claimed in claim 49, CHARACTERISED IN THAT the tuning means comprises one or more substantially annular magnetically permeable bodies.

51. A vehicle capable of deriving some of its power from a magnetic field associated with a primary conductive path supplied by a varying electric current, said vehicle having at least one pick-up coil

comprising a pick-up coil comprising a resonant circuit having a pick-up resonant frequency, and at least one output load capable of being driven by electric power induced in the pick-up coil,
CHARACTERISED IN THAT there is means for substantially decoupling the or each vehicle from the primary conductive path.

52. A vehicle as claimed in claim 51, CHARACTERISED IN THAT the at least one output load comprises an electrical appliance mounted on said vehicle.

53. A vehicle as claimed in claim 51, CHARACTERISED IN THAT the at least one output load comprises means for levitating said vehicle relative to said primary conductive path.

54. A vehicle as claimed in claim 51, CHARACTERISED IN THAT the at least one output load comprises at least one electric motor on said vehicle.

55. A vehicle as claimed in claim 54, CHARACTERISED IN THAT the or each motor comprises an induction motor adapted to provide traction for said vehicle.

56. A vehicle as claimed in claim 54, CHARACTERISED IN THAT the or each motor comprises a brushless DC motor adapted to provide traction for said vehicle.

57. A vehicle as claimed in claim 51, CHARACTERISED IN THAT the means for substantially decoupling the or each vehicle from the primary conductive path comprises means for physically moving the pick-up coil away from or towards the primary conductive path.

58. A vehicle as claimed in claim 51, CHARACTERISED IN THAT the pick-up resonant circuit is a parallel resonant circuit having at least one capacitor and at least one inductor.

59. A vehicle as claimed in claim 51, CHARACTERISED IN THAT the inductor has a magnetically permeable core.

60. A vehicle as claimed in claim 51, CHARACTERISED IN THAT the means for substantially decoupling the or each vehicle from the primary conductive path comprises an isolating coil on the vehicle, said isolating coil having a switch, to switch the coil between an open circuit and a short circuit, so that when the coil is short circuited, the power coupled between the primary conductive path and the pick-up coil is changed.

61. A vehicle as claimed in claim 51, CHARACTERISED IN THAT the means for substantially decoupling the or each vehicle from the primary conductive path comprises a switch in the pick-up coil to switch the pick-up coil between a resonant circuit and a short circuit, so that when the coil is short circuited, resonant current is prevented from flowing in the pick-up coil.

62. A vehicle as claimed in claim 61, CHARACTERISED IN THAT the switch is in series with said capacitor and said inductor.

63 A vehicle as claimed in claim 61, CHARACTERISED IN THAT the switch is in parallel with said capacitor and said inductor.

64. A vehicle as claimed in claim 61, CHARACTERISED IN THAT there is means for controlling said switch and means for monitoring the voltage across the capacitor and the inductor, so that if the voltage exceeds a predetermined value the control means temporarily causes the switch to change state until the voltage drops below the predetermined value and if the voltage falls below a predetermined value the control means temporarily causes the switch to change to another state until the voltage exceeds the predetermined value.

65. A vehicle as claimed in claim 51, CHARACTERISED IN THAT the means for substantially decoupling the or each vehicle from the primary conductive path comprises an isolating coil on the vehicle, said isolating coil having a switch to switch the coil between an open circuit and a short circuit, so that when the coil is short-circuited the power coupled between the primary conductive path and the pick-up coil is changed.

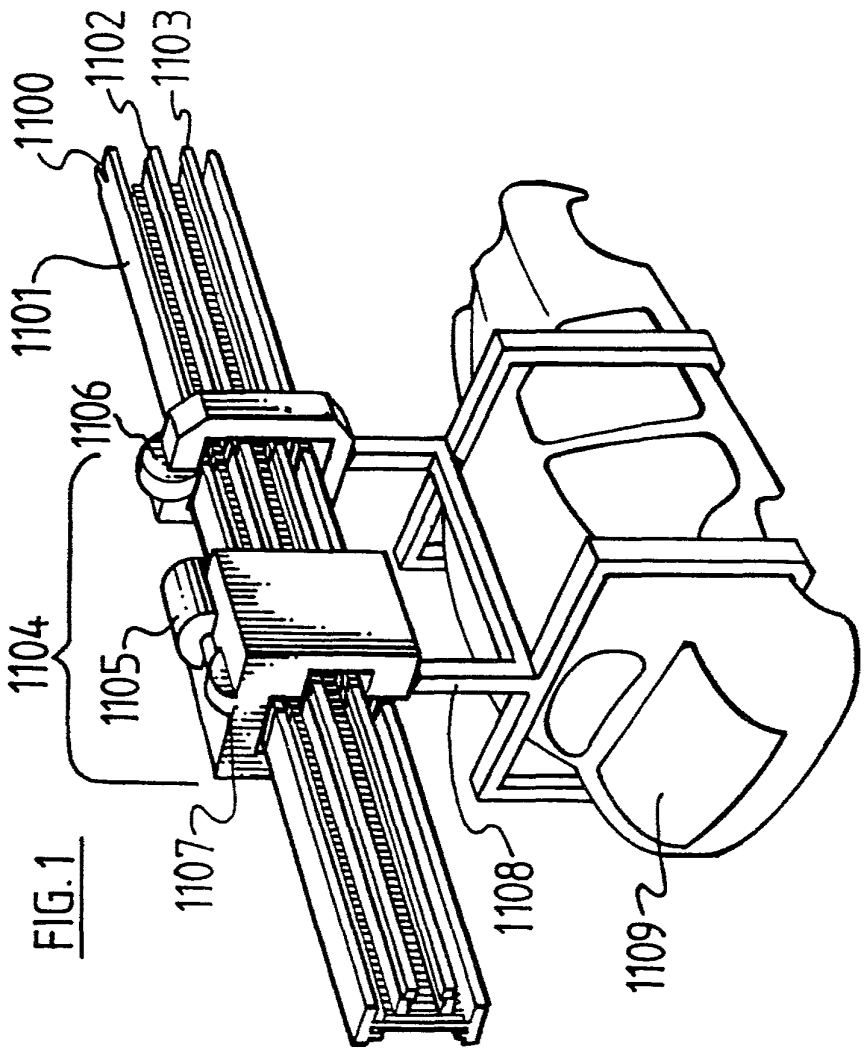
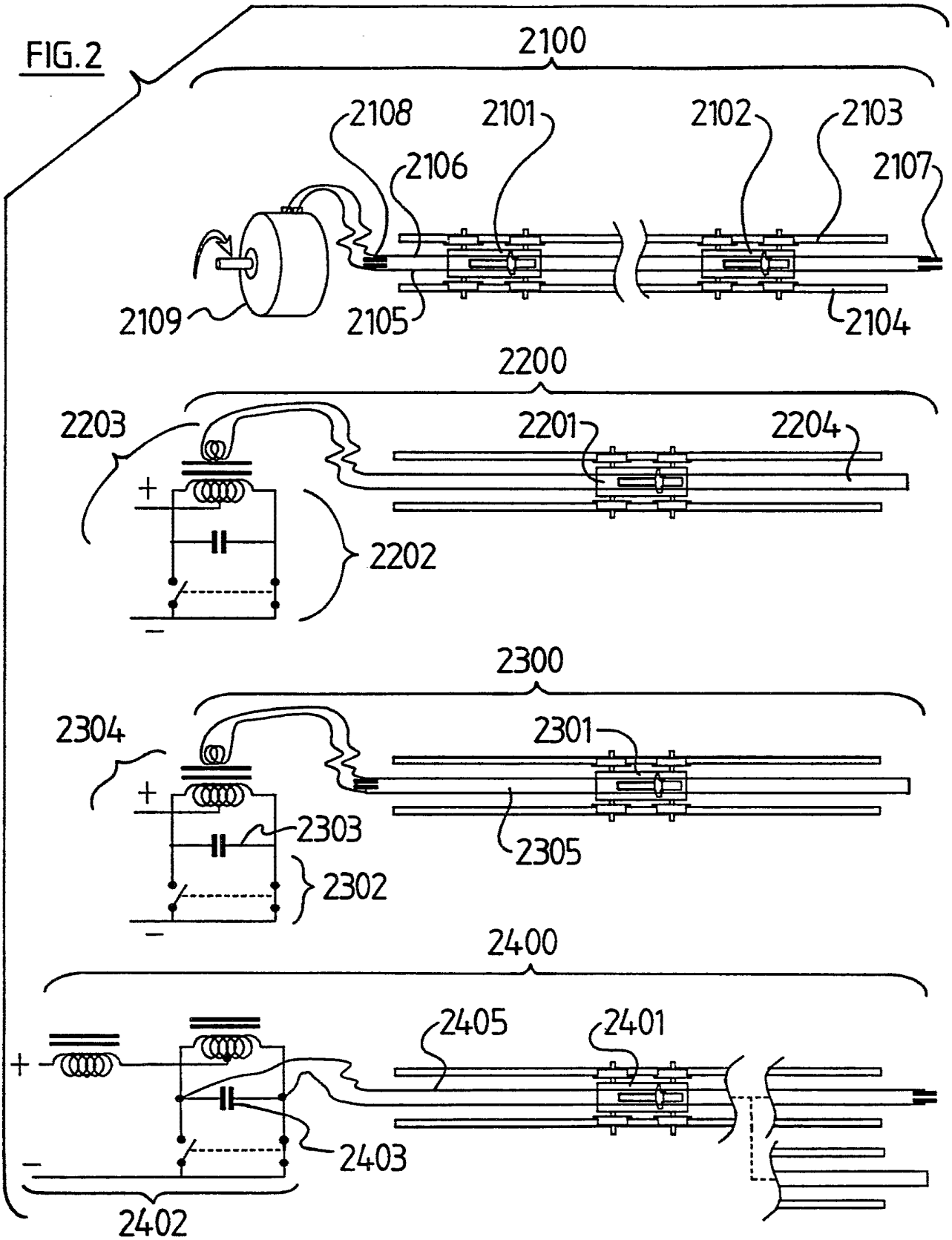


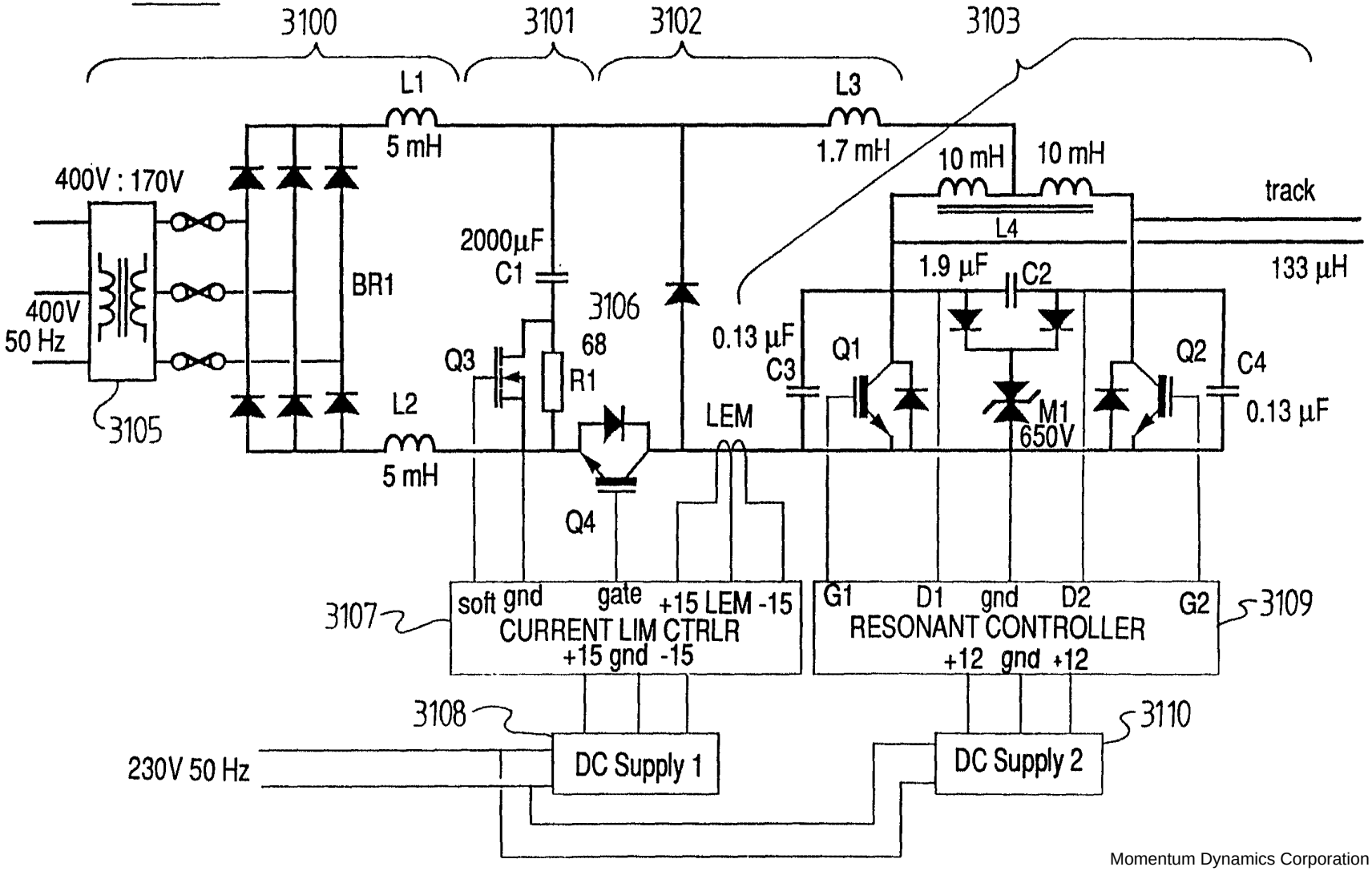
FIG. 1

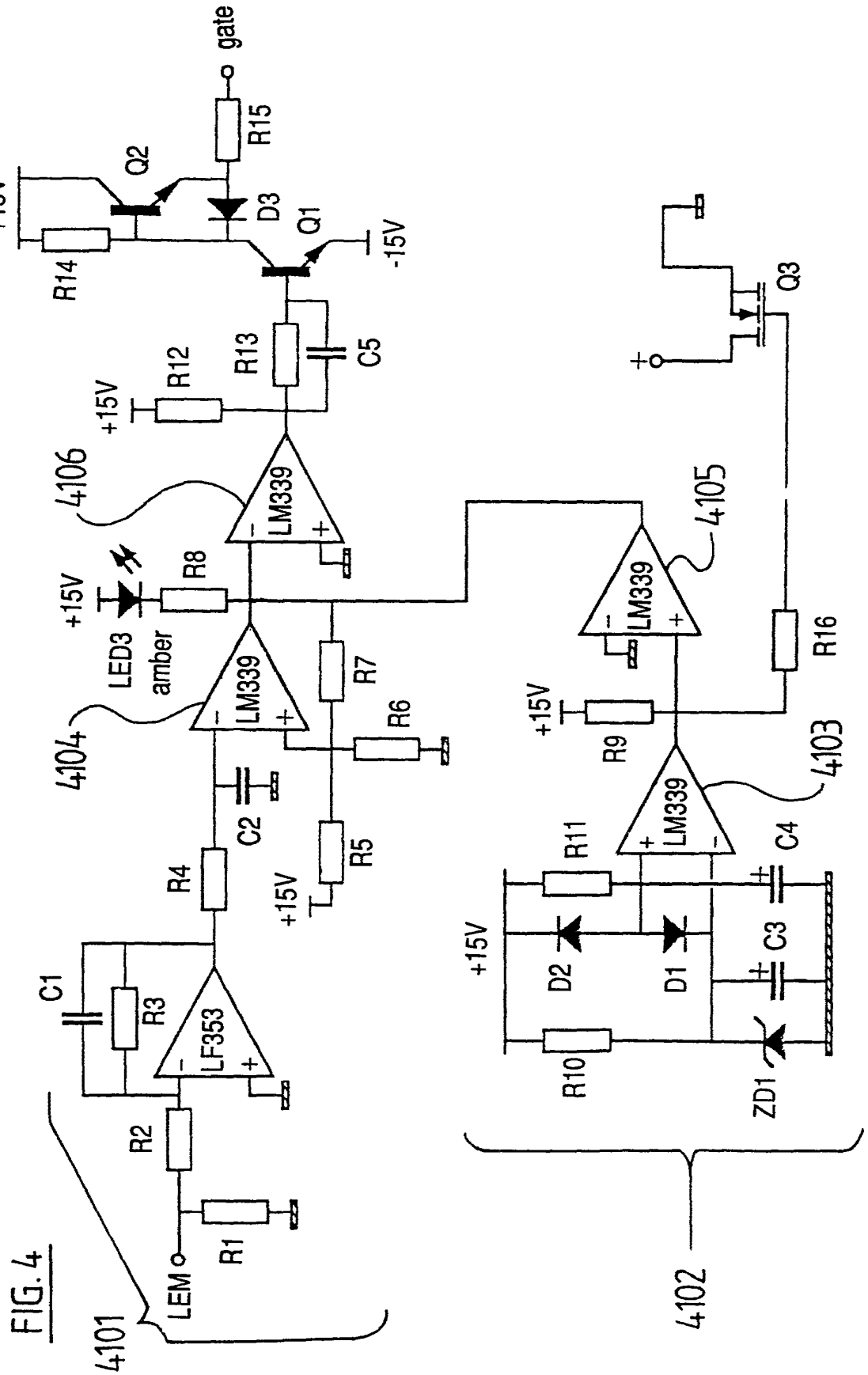
FIG.2



SUBSTITUTE SHEET

FIG. 3





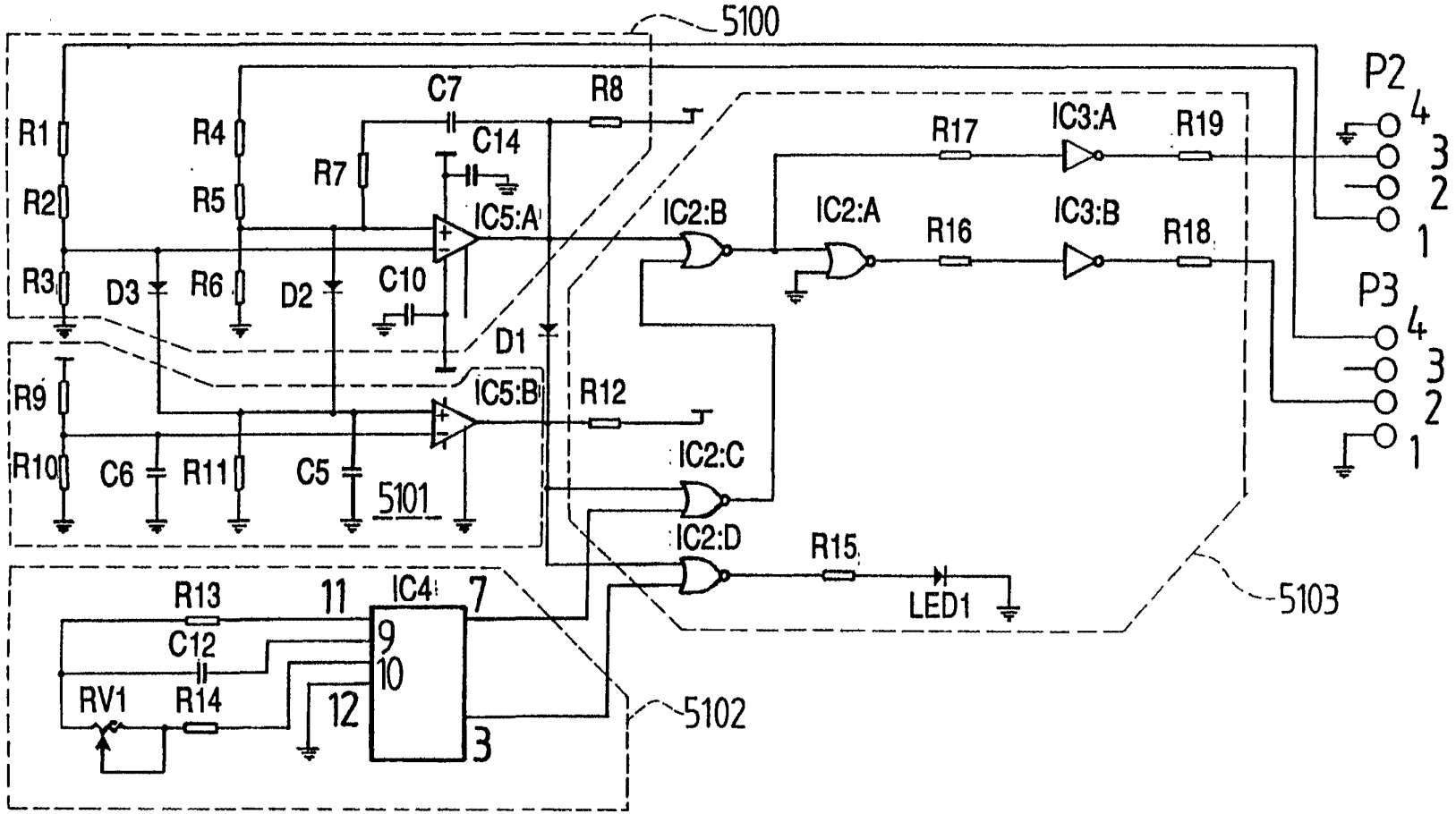


FIG.5

FIG. 6

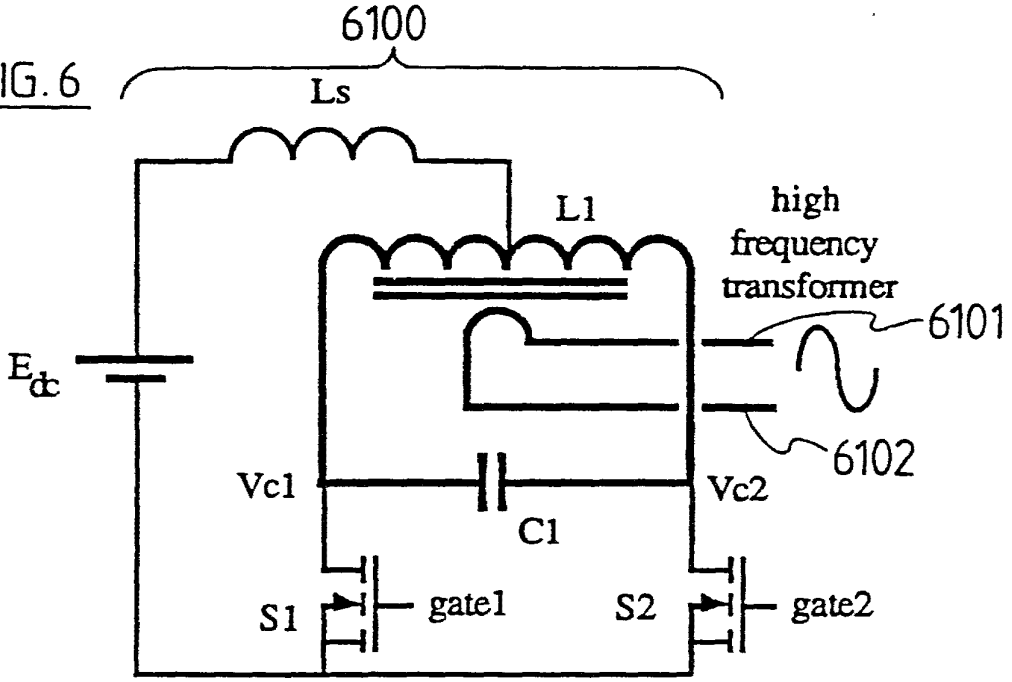


FIG. 7

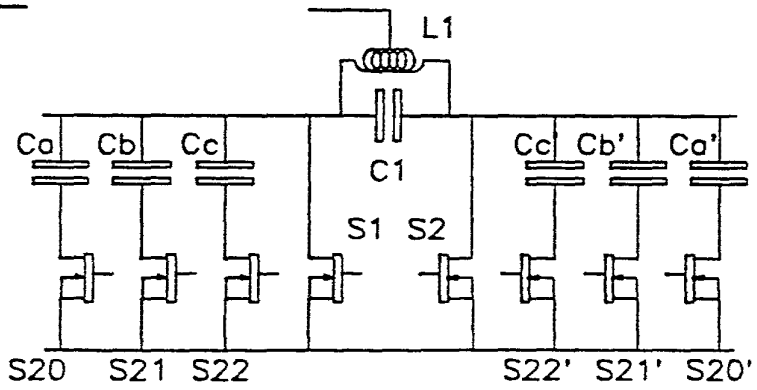


FIG. 8

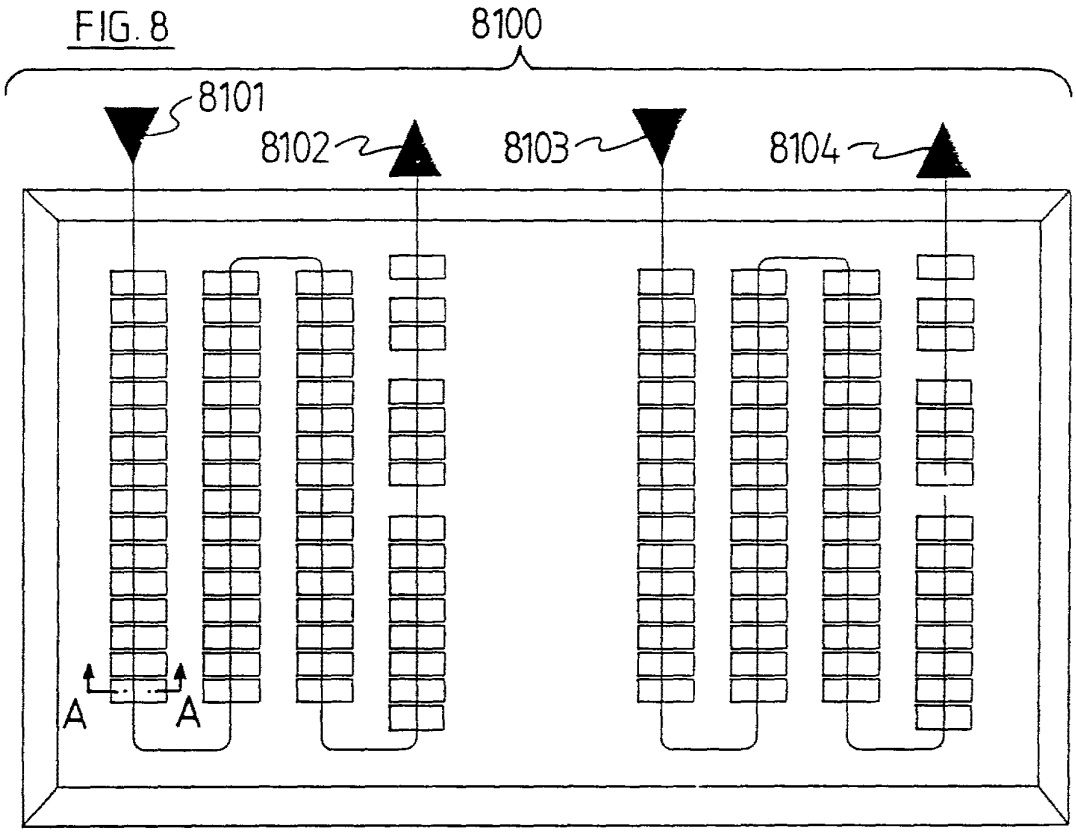


FIG. 9

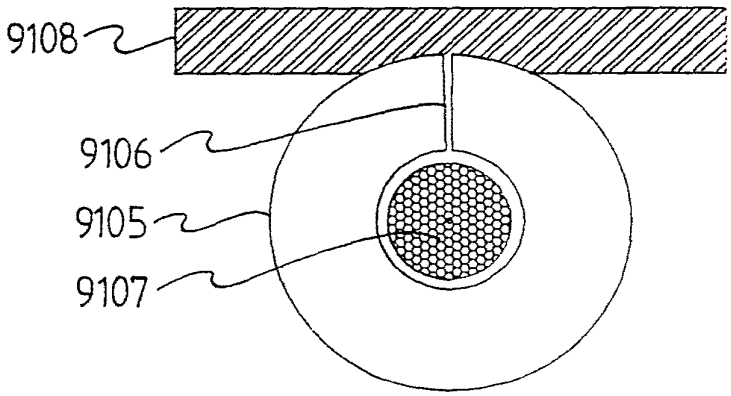
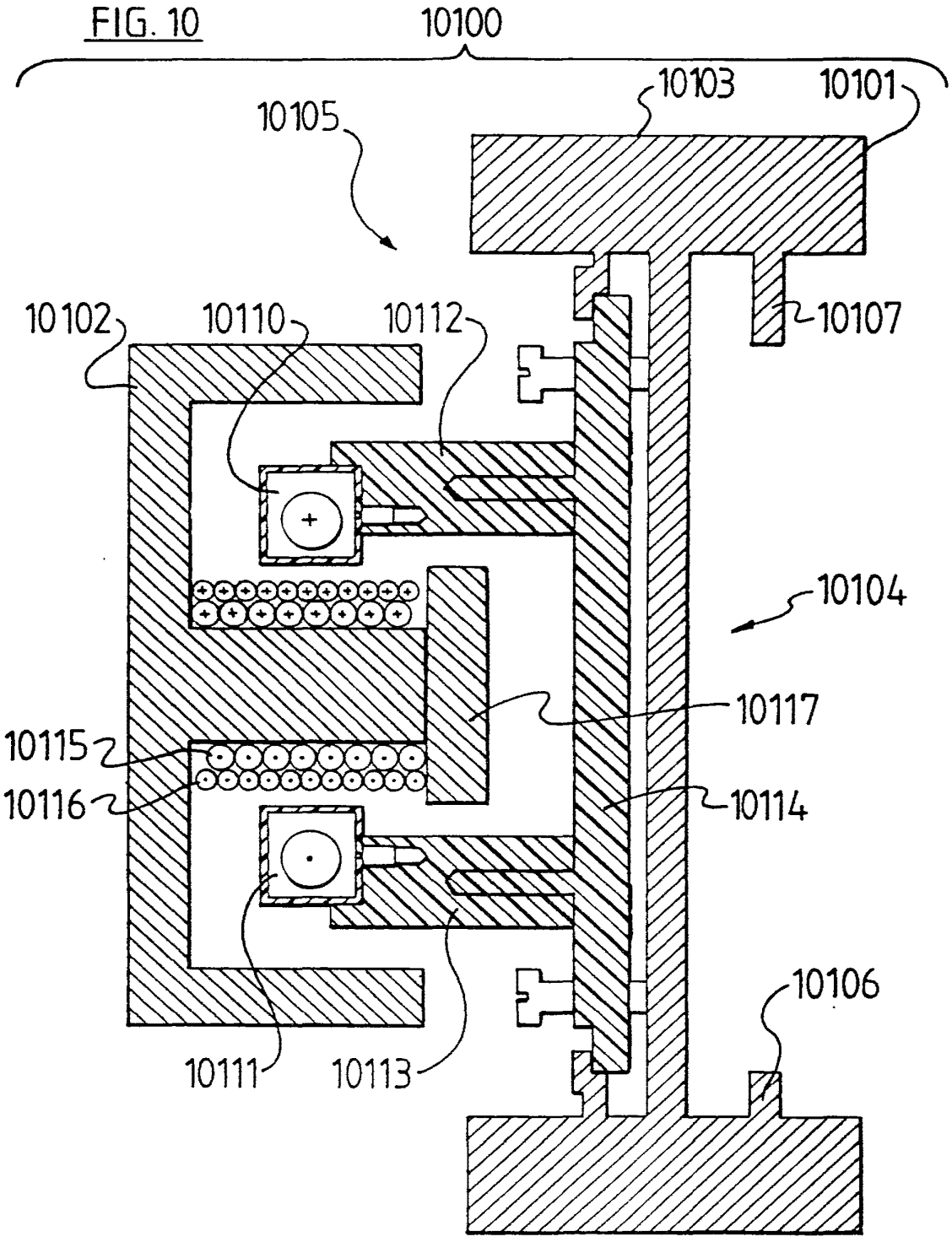


FIG. 10



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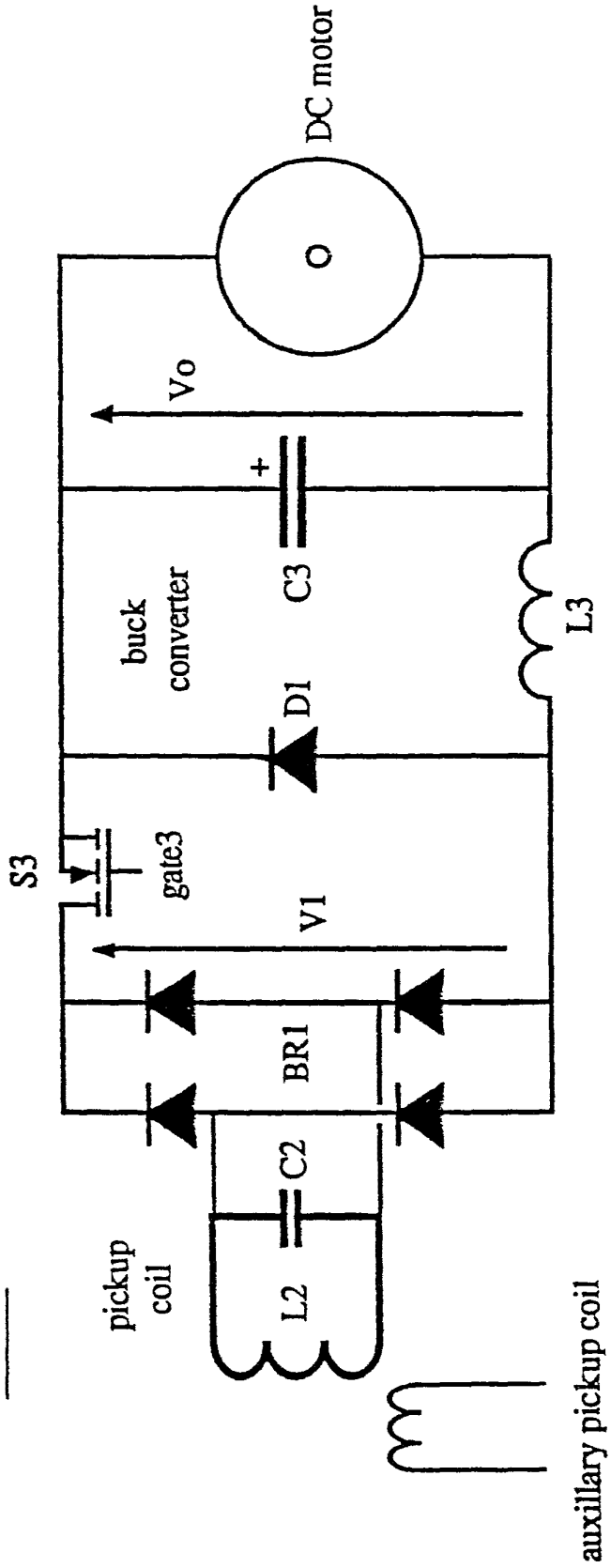

FIG. 11

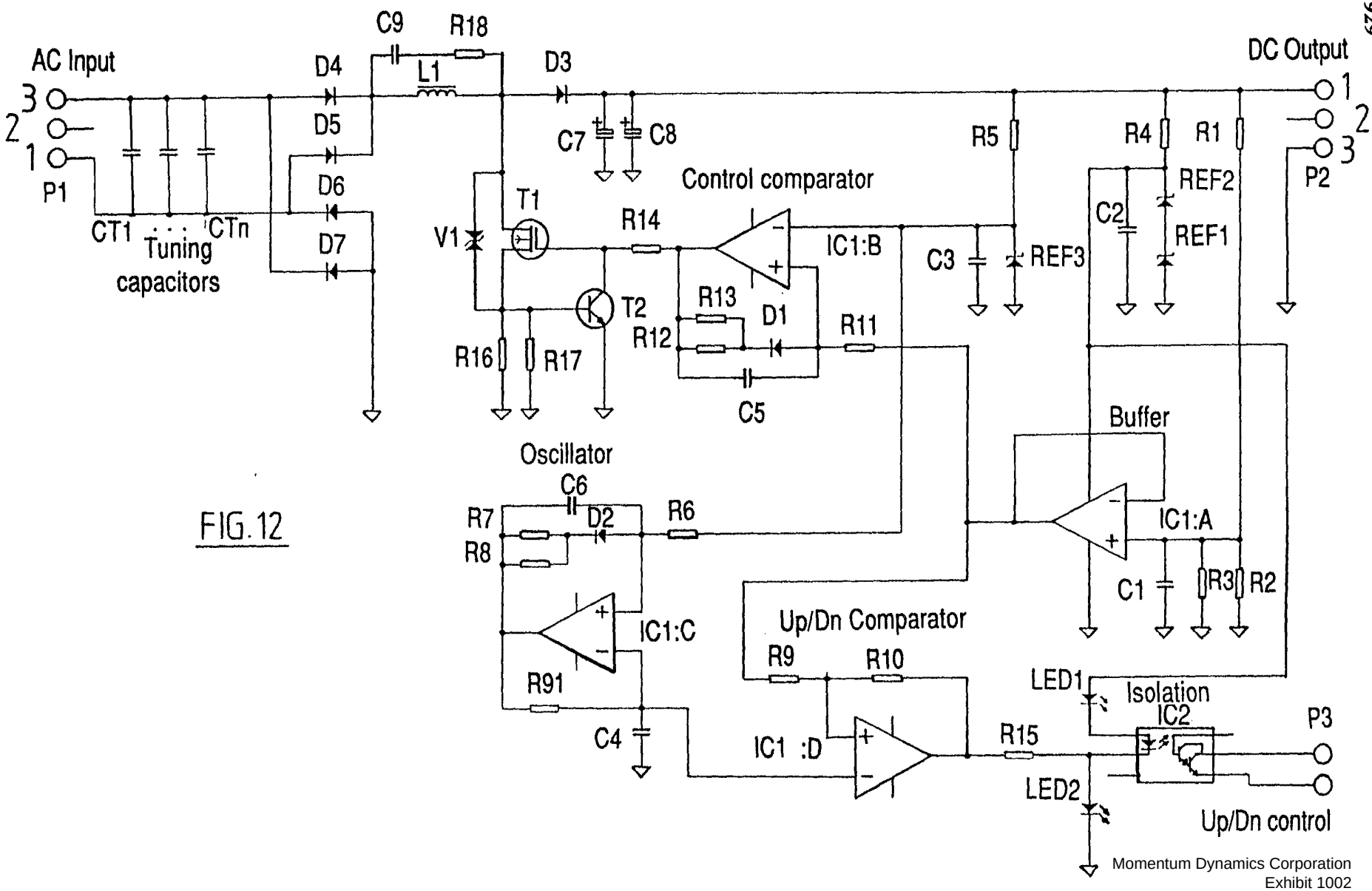
AC Input
3
2
1
P1
CT1
CTn
Tuning capacitors
D4
D5
D6
D7
C9
R18
L1
D3
C7
C8
T1
V1
R14
T2
R16
R17
Control comparator
IC1:B
R13
D1
R12
R11
C5
R5
C3
REF3
R4
R1
REF2
REF1
C2
DC Output
1
2
3
P2
Buffer
IC1:A
C1
R3
R2
Oscillator
C6
R7
R8
D2
R6
IC1:C
R91
C4
Up/Dn Comparator
R9
R10
IC1 :D
R15
LED1
Isolation
IC2
P3
LED2
Up/Dn control

FIG.12

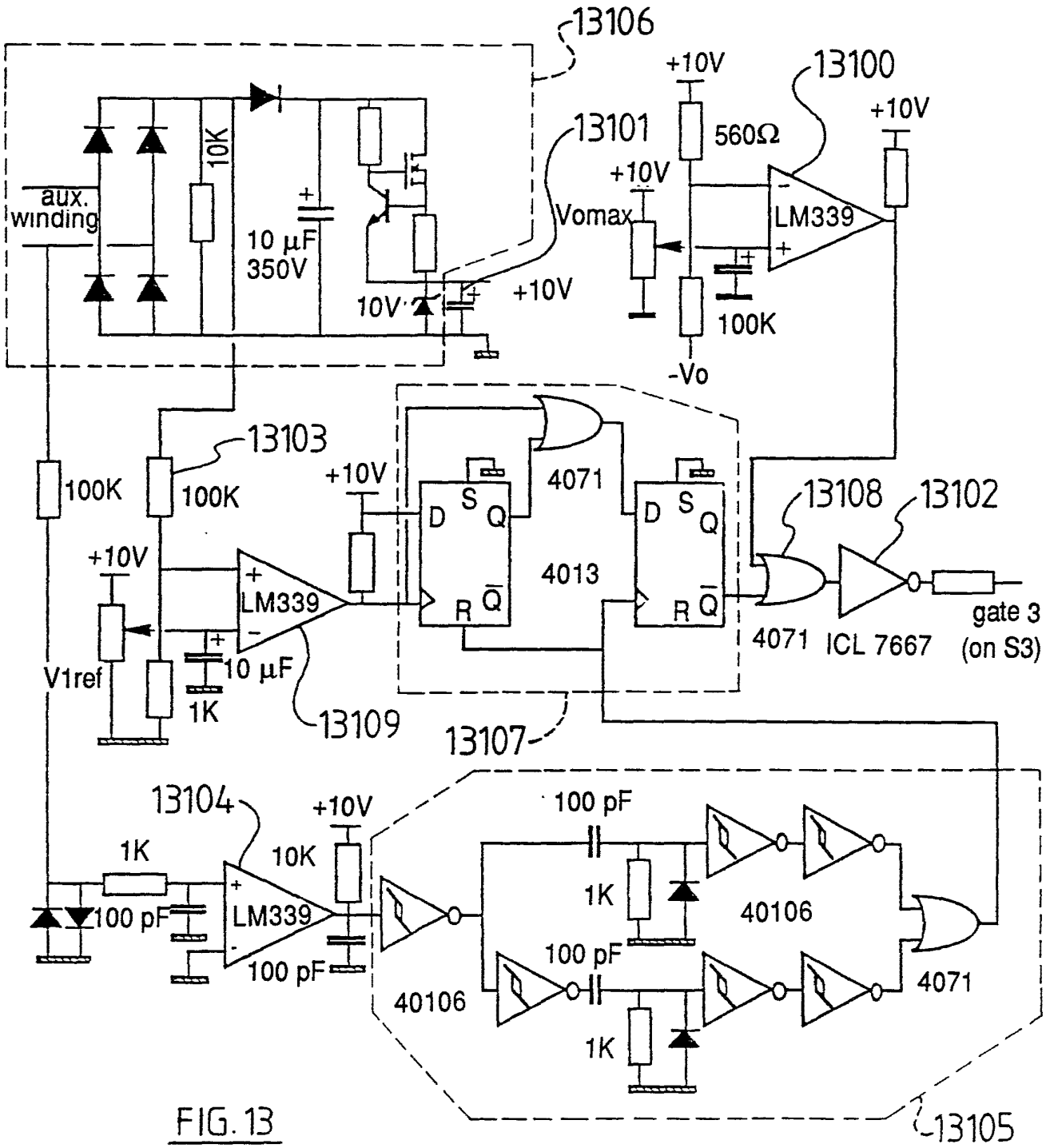

FIG. 13

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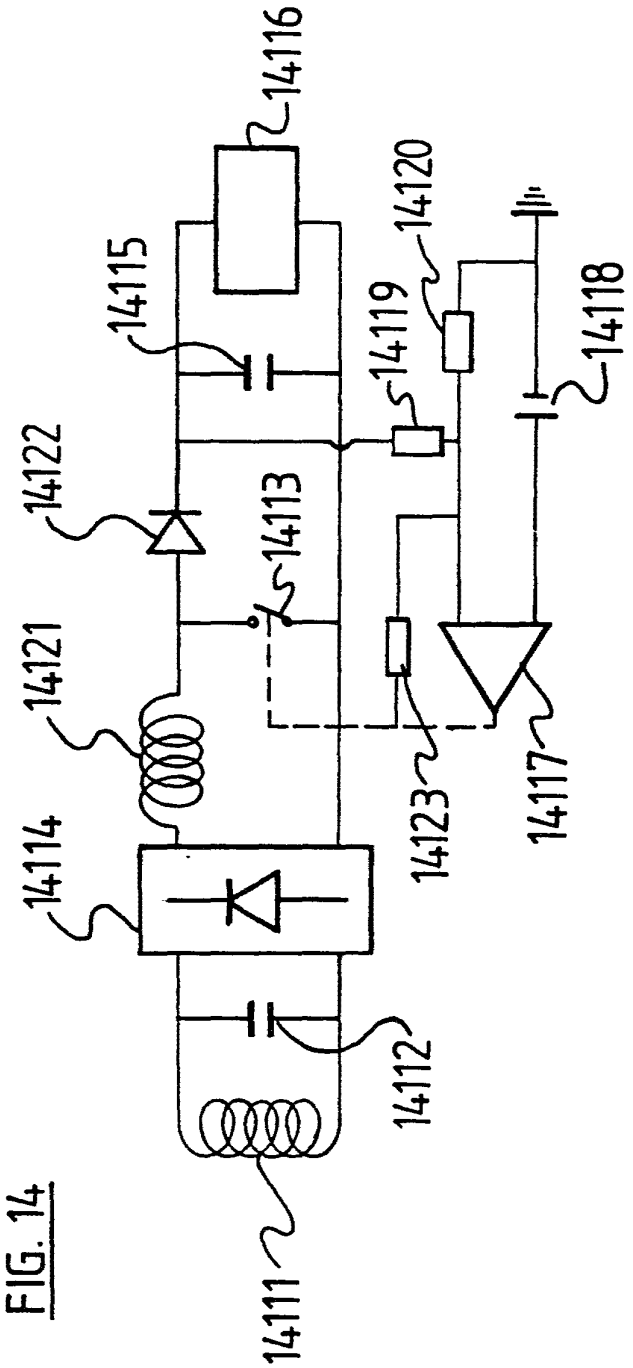

FIG. 14

FIG.15

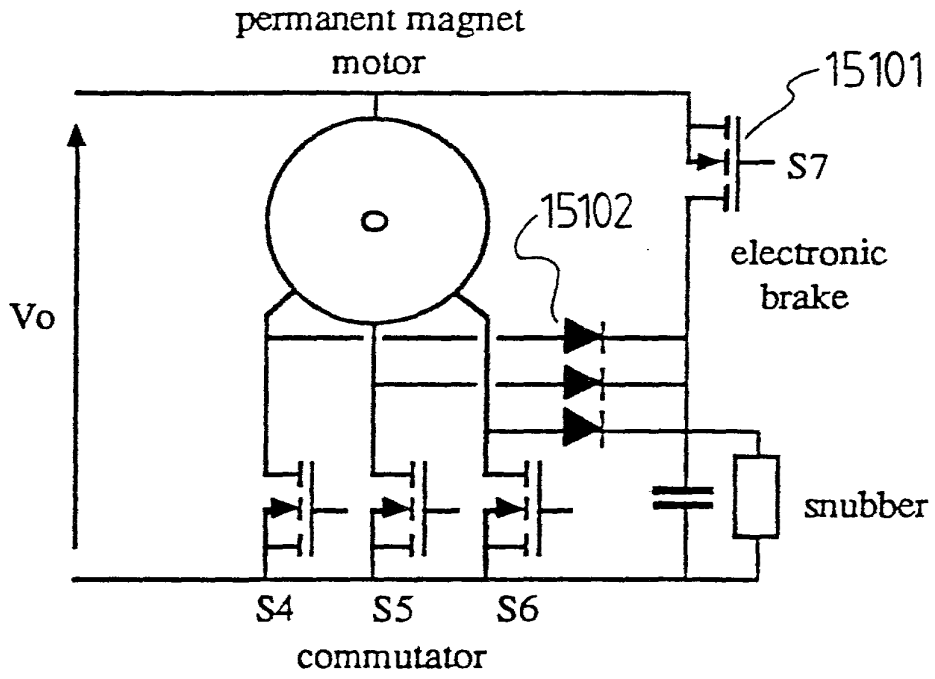

FIG. 16

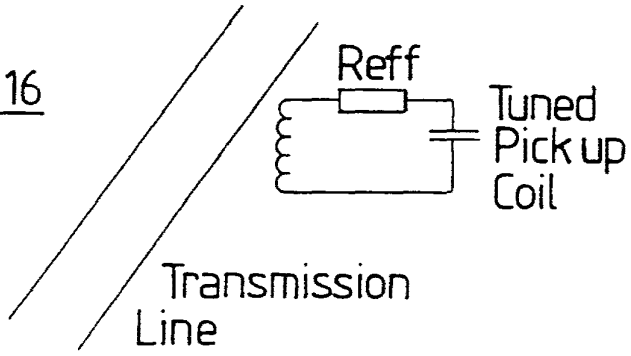

FIG. 17

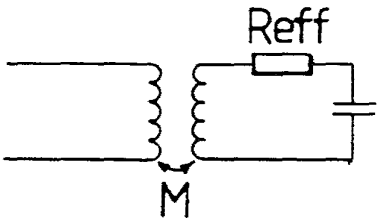

FIG. 18

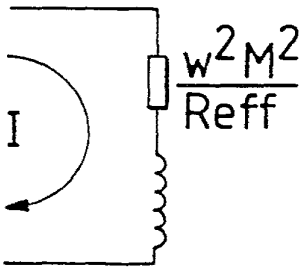

FIG. 19

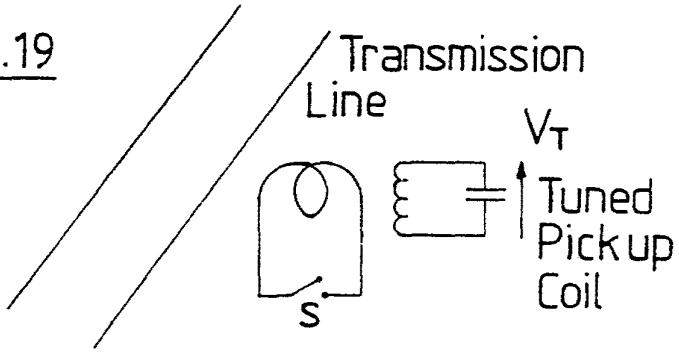

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FIG. 20

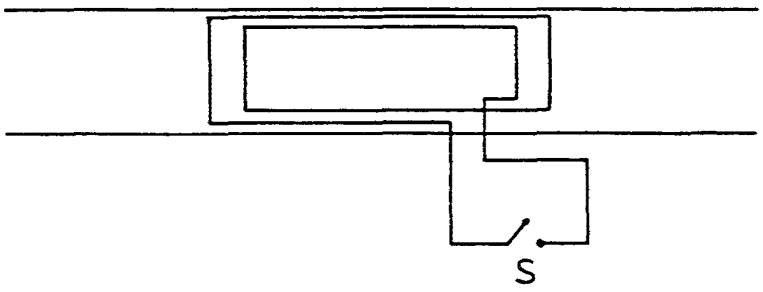


FIG. 21

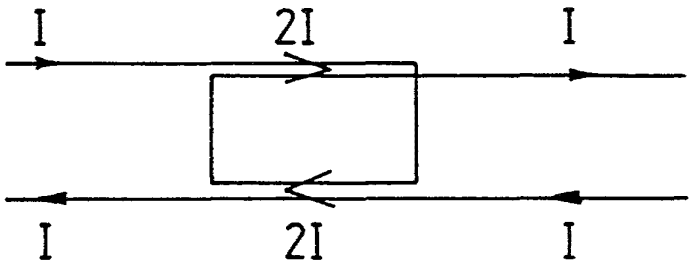


FIG. 22

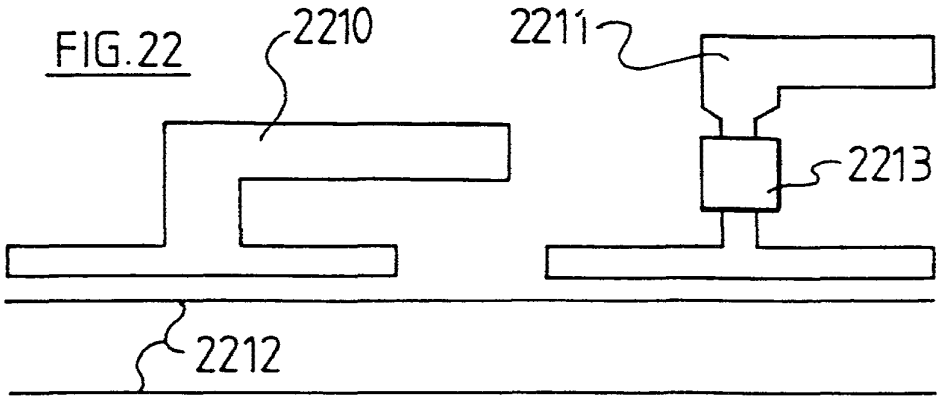


FIG. 23

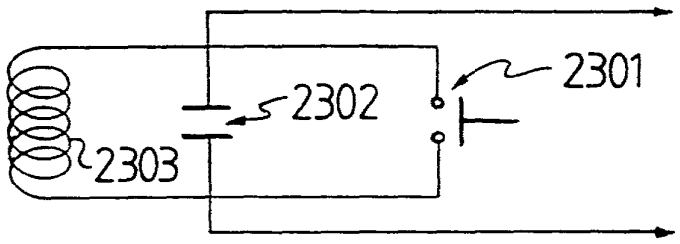


FIG. 24

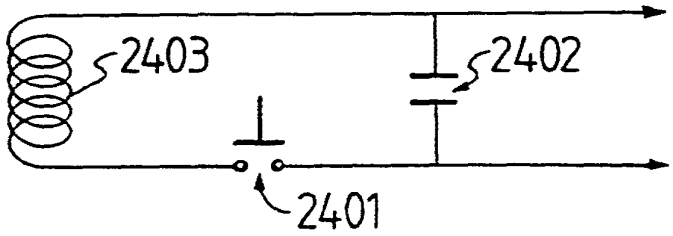


FIG. 25

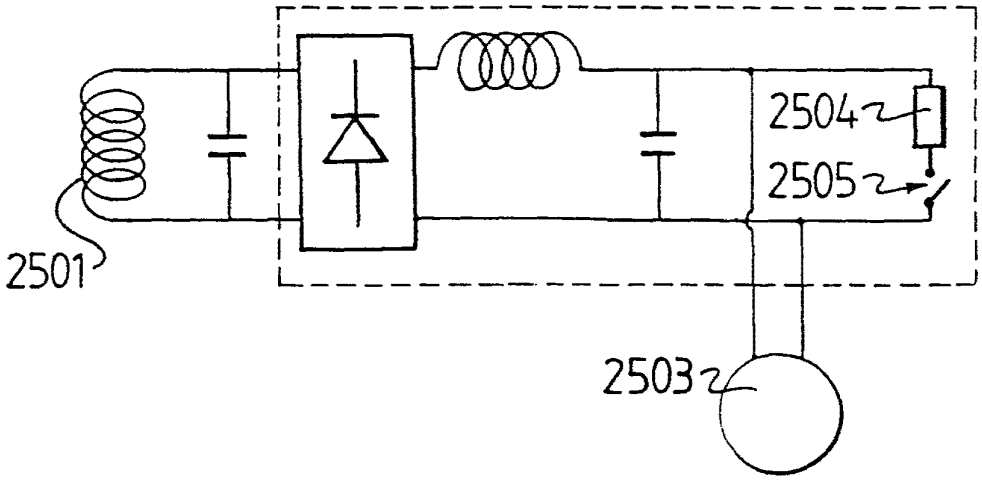


FIG. 26

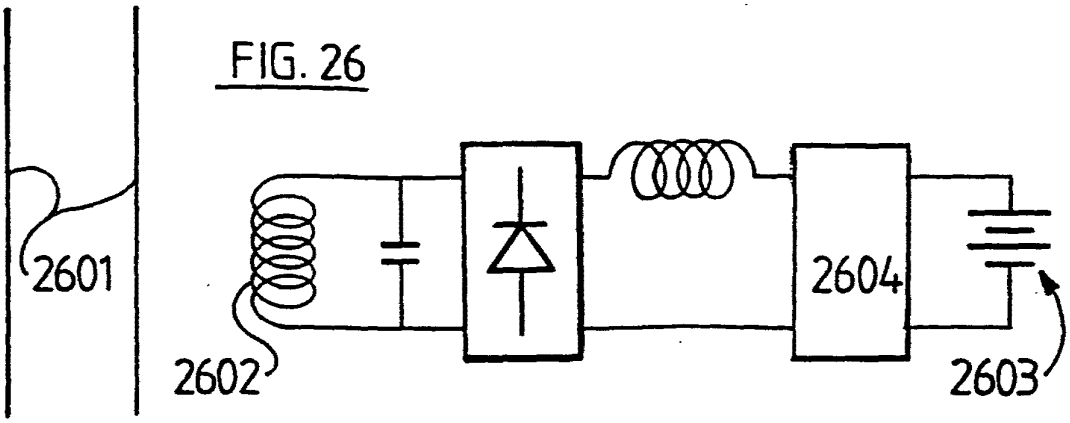


FIG. 27

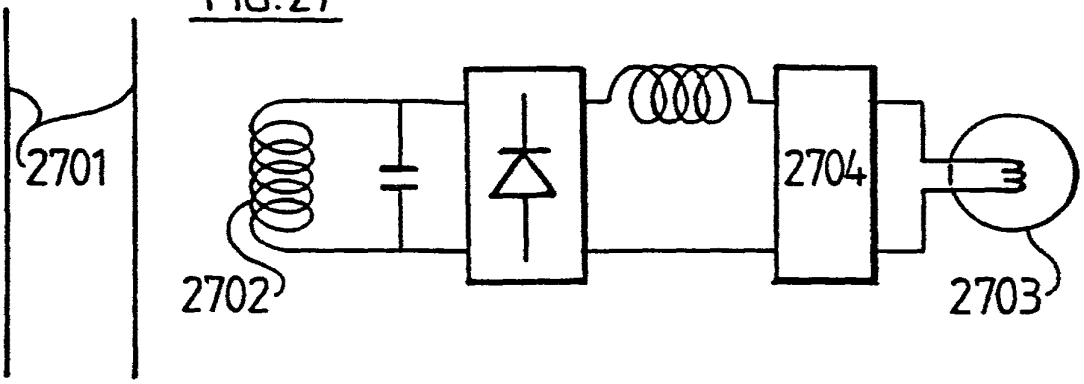
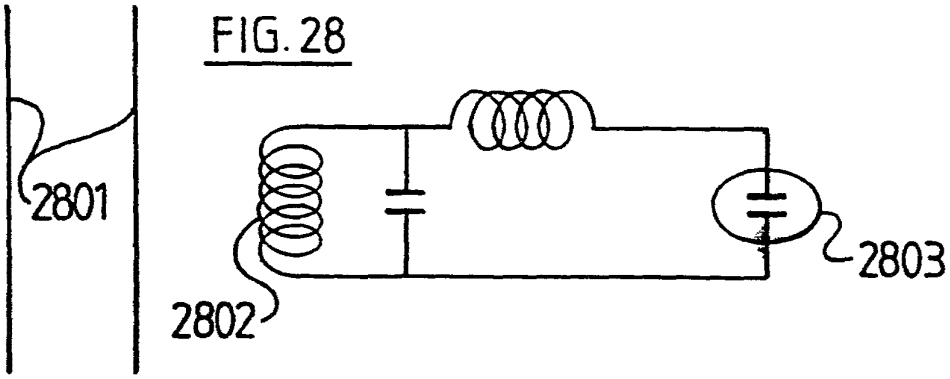


FIG. 28



INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 92/00220

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 H02J5/00

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	H02J ; H02H

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category °	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
X	40TH IEEE VEHICULAR TECHNOLOGY CONFERENCE 6 May 1990, ORLANDO, FLORIDA pages 100 - 104; MANOCHEHR EGHTESADI: 'Inductive Power Transfer to an Electric Vehicle - Analytical Model' see the whole document	1-6,8, 19,20, 22-24, 26-28, 37,41, 43,44,51 52,54, 56,58
X	US,A,4 914 539 (TURNER ET AL.) 3 April 1990 see abstract; claim 1; figures 1,2	1,2,5,7, 8,16,20, 22
A	GB,A,1 418 128 (DONALD VINCENT OTTO) 17 December 1975	1,23,51

-/--

° Special categories of cited documents :[10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
18 MAY 1992	16.06.92
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	BOURBON R.

Form PCT/ISA/210 (second sheet) (January 1985)

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	US,A,3 532 934 (BALLMAN) 6 October 1970 see column 2, line 27 - line 47; figure 3 ---	10,29, 60,65

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. GB 9200220 SA 56252

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 18/05/92
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-4914539	03-04-90	None	
GB-A-1418128	17-12-75	None	
US-A-3532934	06-10-70	None	

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Andre B. Kurs
Serial No.: 13/752,169
Filed: January 28, 2013
Title: WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

Art Unit: 2821
Examiner: Not Yet Assigned
Conf. No. 6134

MAIL STOP MISSING PARTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NOTICE TO FILE MISSING PARTS OF NON-PROVISIONAL APPLICATION

Dear Sir:

In response to the Notice to File Missing Parts of Non-Provisional Application under 37 CFR §1.53(b) mailed February 21, 2013, the Commissioner is hereby authorized to charge $2,580 to Deposit Account No. 50-5087.

No additional fees are believed to be due, however, the Commissioner is hereby authorized to charge any fees that may be due in connection with this application to Deposit Account No. 50-5087, Attorney Docket No. WTCY-0075-P01.

Respectfully submitted,

ANDRE B. KURS ET AL.

Customer No. 87084

Date: April 12, 2013

By: /Jeffrey Ambroziak/
Jeffrey Ambroziak
Reg. No. 47,387

Electronic Patent Application Fee Transmittal

Application Number:	13752169
Filing Date:	28-Jan-2013
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Filer:	Jeffrey R. Ambroziak/Jennifer Sammartin
Attorney Docket Number:	WTCY-0075-P01

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720
Pages:				
Claims:				
Independent claims in excess of 3	1201	2	420	840
Miscellaneous-Filing:				
Late Filing Fee for Oath or Declaration	1051	1	140	140

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**2580**

Electronic Acknowledgement Receipt

EFS ID:	15499600
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	87084
Filer:	Jeffrey R. Ambroziak/Jennifer Sammartin
Filer Authorized By:	Jeffrey R. Ambroziak
Attorney Docket Number:	WTCY-0075-P01
Receipt Date:	12-APR-2013
Filing Date:	28-JAN-2013
Time Stamp:	00:29:06
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2580
RAM confirmation Number	7082
Deposit Account	505087
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	WTCY-0075-P01_RMP.pdf	67683 6b1b6ba8d66bf83b1fe405de45b2e50f523f0538	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	38755 f922a8fcb7e48ced4fafb44a6fbc4f005c84d793	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	106438		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Andre B. Kurs
Serial No.: 13/752,169
Filed: January 28, 2013
Title: WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

Art Unit: 2821
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Respectfully submitted,

ANDRE B. KURS ET AL.

Customer No. 87084

Date: April 12, 2013

By: /Jeffrey Ambroziak/
Jeffrey Ambroziak
Reg. No. 47,387

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/752,169

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	600
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 80 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	5 minus 3 =	* 2				x 420 =	840
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	2440

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/752,169	01/28/2013	Andre B. Kurs	WTCY-0075-P01

CONFIRMATION NO. 6134

87084
GTC Law Group LLP & Affiliates
c/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402

NOTICE

OC000000060530693

Date Mailed: 04/23/2013

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
  All
  Applicant may submit the inventor's oath or declaration at any time before the Notice of Allowance and Fee(s) Due, PTOL-85, is mailed.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/752,169	01/28/2013	2821	2580	WTCY-0075-P01	20	5

CONFIRMATION NO. 6134

87084
GTC Law Group LLP & Affiliates
c/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402

UPDATED FILING RECEIPT

OC000000060530692

Date Mailed: 04/23/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Andre B. Kurs, Chestnut Hill, MA;
Morris P. Kesler, Bedford, MA;
Katherine L. Hall, Arlington, MA;
Aristeidis Karalis, Boston, MA;
Simon Verghese, Arlington, MA;
Volkan Efe, Watertown, MA;
Marin Soljacic, Belmont, MA;
Alexander P. McCauley, Cambridge, MA;
Maria Empar Rollano Hijarrubia, Cambridge, MA;

Applicant(s)

WiTricity Corporation, Watertown, MA

Assignment For Published Patent Application

WITRICITY CORPORATION, Watertown, MA

Power of Attorney: None

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/590,856 01/26/2012

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

If Required, Foreign Filing License Granted: 02/16/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/752,169**

Projected Publication Date: Perfected

Non-Publication Request: No

Early Publication Request: No

Title

WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

Preliminary Class

343

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 13/752,169

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280
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EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 80 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	5 minus 3 =	* 2				x 420 =	840
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MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	2440

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
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	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/752,169	01/28/2013	Andre B. Kurs	WTCY-0075-P01

CONFIRMATION NO. 6134

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c/o CPA Global
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NOTICE

Date Mailed: 04/30/2013

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/752,169	01/28/2013	2821	2580	WTCY-0075-P01	20	5

CONFIRMATION NO. 6134

87084
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UPDATED FILING RECEIPT

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Inventor(s)

Andre B. Kurs, Chestnut Hill, MA;
Morris P. Kesler, Bedford, MA;
Katherine L. Hall, Arlington, MA;
Aristeidis Karalis, Boston, MA;
Simon Verghese, Arlington, MA;
Volkan Efe, Watertown, MA;
Marin Soljacic, Belmont, MA;
Alexander P. McCauley, Cambridge, MA;
Maria Empar Rollano Hijarrubia, Cambridge, MA;

Applicant(s)

WiTricity Corporation, Watertown, MA

Assignment For Published Patent Application

WITRICITY CORPORATION, Watertown, MA

Power of Attorney: None

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/590,856 01/26/2012

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

If Required, Foreign Filing License Granted: 02/16/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/752,169**

Projected Publication Date: 08/08/2013

Non-Publication Request: No

Early Publication Request: No

Title

WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

Preliminary Class

343

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13/752,169
Filing Date	Jan 28, 2013
First Named Inventor	Andre B. Kurs
Art Unit	2836
Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	6232841	B1	2001-05-15	Bartlett, James L., et al.	
	2	6238387	B1	2001-05-29	Miller, III	
	3	7193418	B2	2007-03-20	Freytag, Nicolas	
	4	7554316	B2	2009-06-30	Stevens, Michael C., et al.	
	5	7923870	B2	2011-04-12	Jin, Mikimoto	
	6	7952322	B2	2011-05-31	Partovi, Afshin et al.	
	7	8400017	B2	2013-03-19	Kurs, Andre B., et al.	
	8	8410636	B2	2013-04-02	Kurs, Andre B., et al.	
	9	8441154	B2	2013-05-14	Karalis, Aristeidis et al.	
	10	8461719	B2	2013-06-11	Kesler, Morris P., et al.	
	11	8461720	B2	2013-06-11	Kurs, Andre B., et al.	
	12	8461721	B2	2013-06-11	Karalis, Aristeidis et al.	

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	13	8461722	B2	2013-06-11	Kurs, Andre B., et al.	
	14	8466583	B2	2013-06-18	Karalis, Aristeidis et al.	
	15	8471410	B2	2013-06-25	Karalis, Aristeidis et al.	

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	16	20030071034	A1	2003-04-17	Thompson, Leslie L., et al.	
	17	20080272860	A1	2008-11-06	Pance, Kristi D.	
	18	20090188396	A1	2009-07-30	Hofmann, Matthias C., et al.	
	19	20090322158	A1	2009-12-31	Stevens, Michael C., et al.	
	20	20110115431	A1	2011-05-19	Dunworth, Jeremy D., et al.	
	21	20110128015	A1	2011-06-02	Dorairaj, Hariharakumaran et al.	
	22	20110248573	A1	2011-10-13	Kanno, Hiroshi et al.	
	23	20130057364	A1	2013-03-07	Kesler, Morris P., et al.	

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Attorney Docket Number	WTCY-0075-P01

	24	20130062966	A1	2013-03-14	Verghese, Simon et al.	
	25	20130069441	A1	2013-03-21	Verghese, Simon et al.	
	26	20130069753	A1	2013-03-21	Kurs, Andre B., et al.	
	27	20130099587	A1	2013-04-25	Herbert, Lou T.	

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	28	04265875	JP	A	1992-09-22	Chiba, Tokuo et al.	English Abstract Submitted	☐
	29	11075329	JP	A	1999-03-16	Makuuchi, Masami et al.	English Abstract Submitted	☐
	30	2003179526	JP	A	2003-06-27	Kobayashi, Miyuki et al.	English Abstract Submitted	☐
	31	2004166459	JP	A	2004-06-10	Yamamoto, Kitao et al.	English Abstract Submitted	☐
	32	2004201458	JP	A	2004-07-15	Kojima, Hideki	English Abstract Submitted	☐
	33	2005057444	JP	A	2005-03-03	Yoshida, mitsunobu et al.	English Abstract Submitted	☐
	34	1020080007635	KR	A	2008-01-22	Womac, Michael D., et al.	English Abstract Submitted	☐
	35	2008206231	JP	A	2008-09-04	Onishi, Kota et al.	English Abstract Submitted	☐
	36	1020090122072	KR	A	2009-11-26	Kim, Moon et al.	English Abstract Submitted	☐
	37	2011072074	JP	A	2011-04-07	Kitamura, Hiroyasu et al.	English Abstract Submitted	☐
	38	1020110050920	KR	A	2011-05-17	Park, Eun S., et al.	English Abstract Submitted	☐
	39	2011061821	WO	A1	2011-05-26	Ueno, Takeshi et al.		☐

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Attorney Docket Number	WTCY-0075-P01

	40	2357716	EP	A2	2011-08-17	Jung, Chun-Kil et al.		☐
	41	2013036947	WO	A2	2013-03-14	Verghese, Simon et al.		☐
	42	2013020138	WO	A3	2013-04-04	Karalis, Aristeidis et al.		☐
	43	2013059441	WO	A1	2013-04-25	Lou, Herbert et al.		☐
	44	2013036947	WO	A3	2013-05-02	Verghese, Simon et al.		☐
	45	2013067484	WO	A1	2013-05-10	Verghese, Simon et al.		☐
	46	2013013235	WO	A3	2013-05-30	Karalis, Aristeidis et al.		☐

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	47	Extended European Search Report for 11184066.6 mailed 3-28-2013", Massachusetts Institute of Technology, 7 pages	☐
	48	International Application Serial No. PCT/US2011/051634, International Preliminary Report on Patentability mailed 03-28-13, 8 pages	☐
	49	International Application Serial No. PCT/US2012/047844, International Search Report and Written Opinion mailed 03-25-13, 9 pages	☐
	50	International Application Serial No. PCT/US2012/054490, International Search Report and Written Opinion mailed 02-28-13, 8 pages	☐

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Art Unit	2836
Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

	51	International Application Serial No. PCT/US2012/060793, International Search Report and Written Opinion mailed 03-08-13, 13 pages	☐
	52	International Application Serial No. PCT/US2012/063530, International Search Report and Written Opinion mailed 03-13-13, 16 pages	☐

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.
[4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Art Unit	2836
Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e) (1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e) (2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jeffrey R. Ambroziak/	**Date (YYYY-MM-DD)**	2013-06-20
Name/Print	Jeffrey R. Ambroziak	**Registration Number**	47387

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING
TRANSMITTAL OF COPY OF INTERNATIONAL
PRELIMINARY REPORT ON PATENTABILITY
(CHAPTER I OF THE PATENT COOPERATION
TREATY)
(PCT Rule 44bis.1(c))

To:

MONOCELLO, John, A. III
GTC Law Group LLP & Affiliates
c/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402
ETATS-UNIS D'AMERIQUE

Date of mailing *(day/month/year)*
28 March 2013 (28.03.2013)

Applicant's or agent's file reference
WTCY-0048-PWO

IMPORTANT NOTICE

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2011/051634	14 September 2011 (14.09.2011)	14 September 2010 (14.09.2010)

Applicant
WITRICITY CORPORATION et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. +41 22 338 82 70

Authorized officer
Agnès Wittmann-Regis

e-mail: pt06.pct@wipo.int

Form PCT/IB/326 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference WTCY-0048-PWO	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/US2011/051634	International filing date *(day/month/year)* 14 September 2011 (14.09.2011)	Priority date *(day/month/year)* 14 September 2010 (14.09.2010)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant WITRICITY CORPORATION		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 19 March 2013 (19.03.2013)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Agnès Wittmann-Regis e-mail: pt06.pct@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To: JOHN MONOCELLO III
GTC LAW GROUP LLP & AFFILIATES
C/O CPA GLOBAL
P.O. BOX 52050
MINNEAPOLIS, MN 55402

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	06 JAN 2012
Applicant's or agent's file reference WTCY-0048-PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2011/051634	14 September 2011	14 September 2010

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - H02J 17/00 (2011.01)
USPC - 307/104

Applicant WITRICITY CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer:
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	22 December 2011	Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2011/051634

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

      ☐ on paper

      ☐ in electronic form

   b. (time)

      ☐ in the international application as filed

      ☐ together with the international application in electronic form

      ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2011/051634

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-27	YES
	Claims	None	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-27	NO
Industrial applicability (IA)	Claims	1-27	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1-27 lack an inventive step under PCT Article 33(3) as being obvious over Schatz et al., hereinafter referred to as Schatz, in view of Cook et al., hereinafter referred to as Cook.

Regarding claim 1, Schatz disclose a system (par. 10, system) for wireless energy distribution over a defined area (par. 9, wireless energy transfer scheme the is capable of transmitting power over mid-range distance; abstract, wireless power transfer within refrigerator; par. 645-646, wireless power transfer system integrated in the refrigerator door), the system (par. 10, system) comprising: a source resonator (par. 10, source resonator) coupled to an energy source (par. 10, resonator connected to power source) and generating an oscillating magnetic field with a frequency (par. 23, generate an oscillating magnetic field; par. 29-30, generating magnetic field with resonant frequency), at least one repeater resonator (par. 14, designed as repeater resonators; par. 141, multiple resonators daisy chained together) in proximity to the source resonator (par. 141, resonators maybe positioned in daisy chain fashion for exchanging energy from source in particular area); and at least two other repeater resonators (par. 14, designed as repeater resonators, which plurality implies multiple or at least two; par. 396, multiple repeaters; par. 141, multiple resonators daisy chained together) in proximity to at least one of the repeater resonators (par. 141, multiple resonators are daisy chained together, which implies in proximity to one another), wherein the repeater resonators provide an effective wireless energy transfer area (par. 141-142, repeater resonators transfer energy over a distances; par. 646-647, additional resonators within the refrigerator provide for wireless energy transfer within the area), but is silent on the particulars of at least one repeater positioned in a defined area and in proximity to the source, and having a resonant frequency; and at least two other repeater with a resonant frequency positioned in the defined area and in proximity to at least one of the repeater resonators, wherein the repeater resonators provide an effective wireless energy transfer area at least one of within or equal to the defined area.
However, Cook in discussing wireless power range increase using parasitic antennas (title) disclose at least one repeater (120, parasitic antenna; par. 28, parasitic antenna that re-radiates) positioned in a defined area (par. 23, antennas are positioned within a room) and in proximity to a source (100, main antenna; fig. 1, depicts 120 in proximity to 100), and having a resonant frequency (par. 26, antenna 100 having a resonant frequency); and at least two repeaters (120, 130) positioned in a defined area (par. 23, antennas are positioned within a room) and in proximity to at least one of a repeater resonators (fig. 1, depicts 120 and 130 within proximity of each other), wherein a repeater provides an effective wireless energy transfer area at least one of within or equal to the defined area (par. 29-32, parasitic antennas 120, 130 transmit within area). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Cook with the invention of Schatz for the purpose of providing a local areas where power is more efficiently received (abstract – Cook) .

Regarding claim 2, modified Schatz disclose the system of claim 1, Schatz further disclose wherein the defined area covered is at least 2 square meters (par. 483, the defined area could be a floor, which inherently is greater in size that 2 square meters).

Regarding claim 3, modified Schatz disclose the system of claim 1, Schatz further disclose wherein the defined area covered is at least 10 square centimeters (par. 646, the defined area is refrigerator, which inherently is greater in size than 10 centimeters).

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2011/051634

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Regarding claim 4, modified Schatz disclose the system of claim 1, Schatz further disclose comprising at least one additional source resonator (par. 519, utilize source resonators; par. 600, source resonators; par. 646, another source resonator) that generates an oscillating magnetic field with the frequency (par. 23, generating an oscillating magnetic field; par. 113, inherently a resonator oscillates with a frequency), wherein the at least one additional source resonator is positioned in proximity to defined area (par. 646, additional source resonator can be integrated into the body of the refrigerator; par. 519, source resonators that are arranged in various configurations within an area).

Regarding claim 5, modified Schatz disclose the system of claim 4, Schatz further disclose wherein the frequency and relative phase of the oscillating fields generated by the sources of the system are synchronized (par. 594, oscillating magnetic fields of resonators are driven in-phase).

Regarding claim 6, modified Schatz disclose the system of claim 4, Schatz further disclose wherein the relative phase of the oscillating fields generated by the different sources of the system is adjustable (par. 594, oscillating field of multiple resonators can be adjusted either in-phase or out of phase).

Regarding claim 7, modified Schatz disclose the system of claim 4, Schatz further disclose wherein at least one repeater resonator, comprises a capacitively loaded conducting loop (par. 166, capacitively-loaded loop inductor; par. 179, capacitively-loaded conductive loops).

Regarding claim 8, modified Schatz disclose the system of claim 4, Schatz further disclose wherein at least one of the repeater resonators have an adjustable resonant frequency (par. 113, angular resonant frequency, varies based on resonant period; par. 173, resonant frequency of the resonator is tunable by changing the inductance or capacitor of the resonator).

Regarding claim 9, modified Schatz disclose the system of claim 8, Schatz further disclose wherein the resonant frequency of the repeater resonators may be detuned from the frequency of the magnetic fields generated by the source resonators to change the distribution of the magnetic fields in the defined area (par. 593, resonators may be detuned from other resonators).

Regarding claim 10, modified Schatz disclose the system of claim 9, Schatz further disclose wherein some repeaters are detuned to maximize the magnetic fields in a region of the defined area (par. 593-594, detuned resonators in order to create specific hotspot areas of concentrated magnetic energy).

Regarding claim 11, modified Schatz disclose the system of claim 10, Schatz further disclose wherein the detuning of repeaters is performed according to a network routing algorithm (par.593-597, detuning performed based on the drive signal to appropriately tune the resonator as it is activated in the bank, adjustments are also made based on a sharing algorithm; par. 387, power levels, frequencies and input impedances for resonators may be adjusted based on algorithm; par. 403, processor adjusts the resonator through algorithms).

Regarding claim 12, modified Schatz disclose the system of claim 10, Schatz further disclose comprising a communication channel (4204, wireless communication channel) between the resonators of the system (par. 431, wireless communication channel may allow resonators 102 to exchange information).

Regarding claim 13, modified Schatz disclose the system of claim 12, Schatz further disclose wherein the communication channel is used to coordinate detuning of the repeater resonators of the system to achieve a specific magnetic field distribution (par. 431-433, communication channel communicates controls to the resonator, which could include detuning of the resonator to achieve specific distribution).

Regarding claim 14, modified Schatz disclose the system of claim 1, Schatz further disclose wherein the repeater resonators have a quality factor Q>100 (par. 19, Q sub1 and sub2 are greater than 100; par. 26, resonator with quality factor Q greater than one hundred; par. 235, quality factor, Q, of 100 or higher and even Q of 1000 or higher; par. 239, quality factor, Q, of order of 1000 or higher).

Regarding claim 15, modified Schatz disclose the system of claim 10, modified Schatz further disclose wherein the repeater resonators further comprise pressure sensors (par. 533, pressure sensors) and wherein the information from the pressure sensors is used to change the magnetic field distribution (par. 533-534, information from sensors, such as pressure sensors, help to optimize magnetic field direction and resonator alignment).

Regarding claim 16, modified Schatz disclose the system of claim 1, wherein the defined area is a floor (par. 17, applications could include under the floor; par. 232-233, active area on the floor).

Regarding claim 17, modified Schatz disclose the system of claim 16, wherein the resonators are integrated into flooring material (par. 233, integrated into a floor).

Regarding claim 18, modified Schatz disclose the system of claim 1, modified Schatz further disclose wherein the defined area is a wall (par. 17, applications could include in the walls of a room; par. 232, walls).

Regarding claim 19, modified Schatz disclose the system of claim 1, Schatz further disclose wherein the defined area is a ceiling (par. 17, applications could include on the ceiling; par. 232, ceilings).

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2011/051634

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Regarding claim 20, Schatz disclose a wireless energy transfer flooring system (par. 483, wireless energy transfer may be integrated into the floor) comprising: at least one source resonator (par. 10, source resonator) coupled to an energy source (par. 10, resonator connected to power source) and generating an oscillating magnetic field with a frequency (par. 23, generate an oscillating magnetic field; par. 29-30, generating magnetic field with resonant frequency), at least one repeater resonator (par. 14, designed as repeater resonators; par. 141, multiple resonators daisy chained together) in proximity to the source resonator (par. 141, resonators maybe positioned in daisy chain fashion for exchanging energy from source in particular area); and at least two other repeater resonators (par. 14, designed as repeater resonators, which plurality implies multiple or at least two; par. 396, multiple repeaters; par. 141, multiple resonators daisy chained together) in proximity to at least one of the repeater resonators (par. 141, multiple resonators are daisy chained together, which implies in proximity to one another), wherein the resonant frequency of at least one of resonators is detuned from the frequency of the oscillating magnetic field of the at least one source to change the distribution of magnetic fields in the defined area (par. 589, in order to maximize distribution of magnetic fields around source operating parameters of resonators is adjusted, which implies detuned), but is silent on the particulars of at least one repeater positioned in a defined area and in proximity to the source, and having a resonant frequency; and at least two other repeater with a resonant frequency positioned in the defined area and in proximity to at least one of the repeater resonators, wherein the resonant frequency of at least one of the repeater resonators is detuned from the frequency of the oscillating magnetic field of the at least one source to change the distribution of magnetic fields in the defined area.
However, Cook in discussing wireless power range increase using parasitic antennas (title) disclose at least one repeater (120, parasitic antenna; par. 28, parasitic antenna that re-radiates) positioned in a defined area (par. 23, antennas are positioned within a room) and in proximity to a source (100, main antenna; fig. 1, depicts 120 in proximity to 100), and having a resonant frequency (par. 26, antenna 100 having a resonant frequency); and at least two repeaters (120, 130) positioned in a defined area (par. 23, antennas are positioned within a room) and in proximity to at least one of a repeater resonators (fig. 1, depicts 120 and 130 within proximity of each other), wherein the resonant frequency of at least one of the repeaters is detuned from a frequency of an oscillating magnetic field of a source (par. 68, detuning of resonant frequency of antennas, including parasitic antenna; par. 78, detuning of antenna to influence resonant frequency). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Cook with the invention of Schatz for the purpose of providing a local areas where power is more efficiently received (abstract – Cook) .

Regarding claim 21, modified Schatz disclose the system of claim 20, Schatz further disclose comprising a communication channel (4204, wireless communication channel) between the resonators of the system (par. 431, wireless communication channel may allow resonators 102 to exchange information).

Regarding claim 22, modified Schatz disclose the system of claim 21, Schatz further disclose wherein the communication channel is used to coordinate detuning of the repeater resonators of the system to achieve a specific magnetic field distribution (par. 431-433, communication channel communicates controls to the resonator, which could include detuning of the resonator to achieve specific distribution).

Regarding claim 23, modified Schatz disclose the system of claim 20, Schatz further disclose wherein the resonators are integrated into flooring material (par. 233, resonators maybe integrated into a floor).

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2011/051634

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Regarding claim 24, Schatz disclose a method of distributing wireless energy from at least one source resonator to a specific location within an area (abstract, source resonator distributing wireless energy to a refrigerator) having tunable repeater resonators (par. 20, resonators are tunable), the method comprising: determining a closest resonator to a specific location (par. 533, based on position and location information finding a nearby wireless power transmission source); tuning the resonant frequency of the repeater resonators to provide for an energy transfer path from the source (par. 538, the frequency is tuned to resonant frequency in order in order to transmit wireless power; par. 582-583, the source and device resonators are adjusted as move closer to each other), but is silent on determining a closest repeater resonators, and tuning the resonant frequency of the repeater resonators to provide for an energy transfer path to the closest repeater resonators.
However, Cook in discussing wireless power range increase using parasitic antennas (title) disclose determining a closest repeater (par. 28-30, parasitic antennas radiate within certain area based on location; fig. 1, depicts receivers 125-128 receiving power from there respective antennas), and tuning the resonant frequency of a repeater to provide for an energy transfer path to closest repeater (par. 26, parasitic, repeaters, are tuned to create areas of maximum power). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the aforementioned improvements of Cook with the invention of Schatz for the purpose of providing a local areas where power is more efficiently received (abstract – Cook) .

Regarding claim 25, modified Schatz disclose the method of claim 24, Schatz further disclose comprising detuning resonators (par. 250, detuning resonators; par. 593, detune resonators) that are not in the energy transfer path (par. 593, detune non-active resonators, which implies those not in energy path).

Regarding claim 26, modified Schatz disclose the method of claim 24, Schatz further disclose wherein the energy transfer path is determined by a shortest path algorithm (par. 582, close to each other, power transfer efficiency; par. 596, devices are powered by resonators which are closer to them).

Regarding claim 27, modified Schatz disclose the method of claim 24, wherein the energy transfer path is determined by a central control (par. 533, central station or database is in communication with source, which guides the user to the source; par. 537, central authority authenticates sources and devices).

Claims 1-27 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

MONOCELLO, III JOHN A.

GTC LAW GROUP LLP & AFFILIATES C/O CPA GLOBAL
P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference WTCY-0034-PWO	Date of mailing *(day/month/year)* 25 MARCH 2013 (25.03.2013) **FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. **PCT/US2012/047844**	International filing date *(day/month/year)* **23 JULY 2012 (23.07.2012)**
Applicant **WITRICITY CORPORATION et al**	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:

   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

   For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 . 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.
In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19months.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the PCT Applicant's Guide, National Chapters.

Name and mailing address of the ISA/KR Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer COMMISSIONER Telephone No. 82-42-481-8256

Form PCT/ISA/220 (July 2010)

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for three months from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => PCT Services => PCT Services

ID : PCT international application number
PW : **8F785X7J**

Inquiries related to PCT International Search Report or Written Opinion prepared by KIPO as an International Searching Authority can be answered not only by KIPO but also through IPKC (Intellectual Property Korea Center), located in Vienna, VA, which functions as a PCT Help Desk for PCT applicants.

Homepage: http://www.ipkcenter.com
Email: ipkc@ipkcenter.com
Phone: +1 703 388 1066
Fax: +1 703 388 1084

Notes to Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
WTCY-0034-PWO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2012/047844	**23 JULY 2012 (23.07.2012)**	21 JULY 2011 (21.07.2011)

Applicant

WITRICITY CORPORATION et al

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. **21**
      ☒ as suggested by the applicant.
      ☐ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/047844

A. CLASSIFICATION OF SUBJECT MATTER

H02J 17/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H02J 17/00; G01R 27/00; H01F 38/00; H02J 7/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: wireless energy transfer, impedance matching network, resonator tuning, temporary resistor, target impedance, simulate loading

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-2011-0050920 A (SAMSUNG ELECTRONICS CO., LTD.) 17 May 2011 See abstract, paragraphs [0013], [0020], [0071] and figures 3-5	1-17
A	US 2011-0115431 A1 (JEREMY D. DUNWORTH et al.) 19 May 2011 See abstract, paragraphs [0026], [0028], [0032], claim 6 and figures 1-2, 4-5.	1-17
A	WO 2011-061821 A1 (KABUSHIKI KAISHA TOSHIBA et al.) 26 May 2011 See abstract, paragraphs [0032]-[0044], claims 1-9 and figures 4-5, 8.	1-17
A	US 2009-0243397 A1 (NIGEL P. COOK et al.) 01 October 2009 See abstract, claims 1, 11, 17-18 and figures 15-20.	1-17
A	KR 10-2009-0122072 A (KOREA UNIVERSITY RESEARCH AND BUSINESS FOUNDATION) 26 November 2009 See abstract and claims 1-2, 6-7.	1-17

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 MARCH 2013 (21.03.2013)	**25 MARCH 2013 (25.03.2013)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

CHOI, Jeong Yoon

Telephone No. 82-42-481-8153

Form PCT/ISA/210 (second sheet) (July 2009)

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-2011-0050920 A	17.05.2011	EP 2499717 A2	19.09.2012
		US 2011-0109167 A1	12.05.2011
		US 8334620 B2	18.12.2012
		WO 2011-056039 A2	12.05.2011
US 2011-0115431 A1	19.05.2011	EP 2441150 A1	18.04.2012
		EP 2502324 A1	26.09.2012
		EP 2502326 A2	26.09.2012
		EP 2502327 A2	26.09.2012
		EP 2502328 A2	26.09.2012
		KR 10-2012-0036955 A	18.04.2012
		KR 10-2012-0093356 A	22.08.2012
		KR 10-2012-0093364 A	22.08.2012
		KR 10-2012-0095969 A	29.08.2012
		KR 10-2012-0103637 A	19.09.2012
		KR 10-2013-0006700 A	17.01.2013
		US 2010-0323616 A1	23.12.2010
		US 2011-0115432 A1	19.05.2011
		US 2011-0119135 A1	19.05.2011
		US 2011-0119144 A1	19.05.2011
		WO 2010-144885 A1	16.12.2010
		WO 2011-063053 A2	26.05.2011
		WO 2011-063054 A1	26.05.2011
		WO 2011-063057 A2	26.05.2011
		WO 2011-063058 A2	26.05.2011
WO 2011-061821 A1	26.05.2011	None	
US 2009-0243397 A1	01.10.2009	CN 101978746 A	16.02.2011
		EP 2269408 A2	05.01.2011
		JP 2011-514781 A	06.05.2011
		KR 10-2010-0130618 A	13.12.2010
		KR 10-2012-0083517 A	25.07.2012
		KR 10-2013-0020721 A	27.02.2013
		WO 2009-111597 A2	11.09.2009
KR 10-2009-0122072 A	26.11.2009	None	

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
MONOCELLO, III JOHN A.

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**25 MARCH 2013 (25.03.2013)**
Applicant's or agent's file reference WTCY-0034-PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2012/047844	**23 JULY 2012 (23.07.2012)**	21 JULY 2011 (21.07.2011)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i

Applicant

WITRICITY CORPORATION et al

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	21 MARCH 2013 (21.03.2013)	CHOI, Jeong Yoon Telephone No.82-42-481-8153

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/047844

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/047844

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-17	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	1-17	YES
	Claims	NONE	NO
Industrial applicability (IA)	Claims	1-17	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: KR 10-2011-0050920 A (SAMSUNG ELECTRONICS CO., LTD.) 17 May 2011
D2: US 2011-0115431 A1 (JEREMY D. DUNWORTH et al.) 19 May 2011
D3: WO 2011-061821 A1 (KABUSHIKI KAISHA TOSHIBA et al.) 26 May 2011
D4: US 2009-0243397 A1 (NIGEL P. COOK et al.) 01 October 2009
D5: KR 10-2009-0122072 A (KOREA UNIVERSITY RESEARCH AND BUSINESS FOUNDATION) 26

1. Novelty and Inventive Step

1.1 Claims 1-9

The subject matter of claim 1 differs from these prior art documents in adjusting a component value of an additional electrical component until an actual impedance of combined components is within a predetermined range of the target impedance, wherein the combined components includes a temporary matching resistor connected in series with an inductive loop of a magnetic resonator. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 1 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 2-14 are dependent on claim 1 and therefore meet the requirements of PCT Article 33(2) and (3).

(Continued on Supplemental Box)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Box No. V

1.2 Claims 15-17

The subject matter of claim 15 differs from these prior art documents in connecting a temporary resistor in series with an inductive loop, wherein the temporary resistor chosen to simulate the loading of at least one additional resonator. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 15 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 16-17 are dependent on claim 15 and therefore meet the requirements of PCT Article 33(2) and (3).

2. Industrial Applicability

Claims 1-17 are industrially applicable under PCT Article 33(4).

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

MONOCELLO III JOHN A.

GTC LAW GROUP LLP & AFFILIATES C/O CPA GLOBAL
P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing *(day/month/year)* 28 FEBRUARY 2013 (28.02.2013)	
Applicant's or agent's file reference WTCY-0064-PWO	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. **PCT/US2012/054490**	International filing date *(day/month/year)* **10 SEPTEMBER 2012 (10.09.2012)**
Applicant **WITRICITY CORPORATION et al**	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 . 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.
In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19months.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the PCT Applicant's Guide, National Chapters.

Name and mailing address of the ISA/KR Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea	Authorized officer COMMISSIONER
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-8754

CPA GLOBAL MAR 11 2013 RECEIVED Verified

Form PCT/ISA/220 (July 2010)

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for three months from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => PCT Services => PCT Services

ID : PCT international application number
PW : **JBN7TEPX**

Inquiries related to PCT International Search Report or Written Opinion prepared by KIPO as an International Searching Authority can be answered not only by KIPO but also through IPKC (Intellectual Property Korea Center), located in Vienna, VA, which functions as a PCT Help Desk for PCT applicants.

Homepage: http://www.ipkcenter.com
Email: ipkc@ipkcenter.com
Phone: +1 703 388 1066
Fax: +1 703 388 1084

Notes to Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
WTCY-0064-PWO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2012/054490	**10 SEPTEMBER 2012 (10.09.2012)**	09 SEPTEMBER 2011 (09.09.2011)

Applicant

WITRICITY CORPORATION et al

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☒ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 6
      ☒ as suggested by the applicant.
      ☐ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2011-072074 A	07.04.2011	CN 102598167 A	18.07.2012
		EP 2482294 A1	01.08.2012
		TW 201126860 A	01.08.2011
		US 2012-0146580 A1	14.06.2012
		WO 2011-036863 A1	31.03.2011
EP 2357716 A2	17.08.2011	CN 101919139 A	15.12.2010
		EP 2426808 A1	07.03.2012
		EP 2426809 A2	07.03.2012
		JP 2012-511891 A	24.05.2012
		KR 10-0971701 B1	22.07.2010
		KR 10-0971705 B1	22.07.2010
		KR 10-0971714 B1	21.07.2010
		US 2011-0140538 A1	16.06.2011
		US 2011-0260549 A1	27.10.2011
		US 2011-0260550 A1	27.10.2011
		WO 2010-068062 A2	17.06.2010
		WO 2010-068062 A3	23.09.2010
		WO 2010-068062 A3	17.06.2010
		WO 2012-061220 A1	10.05.2012
JP 04-265875 A	22.09.1992	None	
JP 2008-206231 A	04.09.2008	JP 4413236 B2	10.02.2010
		JP 4413236 B2	27.11.2009
		US 2008-0200119 A1	21.08.2008
		US 8064825 B2	22.11.2011
US 2011-0128015 A1	02.06.2011	EP 2317625 A2	04.05.2011
US 2009-0322158 A1	31.12.2009	CN 101414765 A	22.04.2009
		CN 101414765 B	05.10.2011
		CN 101488676 A	22.07.2009
		CN 101488677 A	22.07.2009
		EP 1751834 A1	14.02.2007
		EP 1751834 B1	02.12.2009
		EP 2148404 A2	27.01.2010
		EP 2148404 A3	16.05.2012
		EP 2372863 A2	05.10.2011
		EP 2372863 A3	14.03.2012
		EP 2375532 A2	12.10.2011
		EP 2375532 A3	14.03.2012
		GB 0509663 D0	15.06.2005
		GB 2414121 A	16.11.2005
		GB 2414121 B	02.04.2008
		JP 04-741583 B2	13.05.2011
		JP 05-069780 B2	24.08.2012
		JP 2007-537688 A	20.12.2007
		JP 2007-537688 T	20.12.2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		JP 2011-030422 A	10.02.2011
		JP 4741583 B2	03.08.2011
		KR 10-1179002 B1	31.08.2012
		KR 10-2010-0054885 A	25.05.2010
		US 2007-0216392 A1	20.09.2007
		US 2007-0228833 A1	04.10.2007
		US 2009-0134713 A1	28.05.2009
		US 2011-0006613 A1	13.01.2011
		US 2011-0285214 A1	24.11.2011
		US 2012-0068536 A1	22.03.2012
		US 7554316 B2	30.06.2009
		US 7605496 B2	20.10.2009
		US 7868587 B2	11.01.2011
		US 8035340 B2	11.10.2011
		US 8039995 B2	18.10.2011
		WO 2005-109597 A1	17.11.2005
		WO 2005-109598 A1	17.11.2005

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
MONOCELLO III JOHN A.

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**28 FEBRUARY 2013 (28.02.2013)**
Applicant's or agent's file reference WTCY-0064-PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2012/054490	**10 SEPTEMBER 2012 (10.09.2012)**	09 SEPTEMBER 2011 (09.09.2011)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i

Applicant

WITRICITY CORPORATION et al

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [x] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Facsimile No. 82-42-472-7140	27 FEBRUARY 2013 (27.02.2013)	PARK, Hye Lyun Telephone No.82-42-481-3463

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/054490

Box No. 1 Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/054490

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos. 11

because:

☐ the said international application, or the said claims Nos. _____ relate to the following subject matter which does not require an international search *(specify)*:

☒ the description, claims or drawings *(indicate particular elements below)* or said claims Nos. 11 are so unclear that no meaningful opinion could be formed *(specify)*:

The number of a claim that dependent claim 11 is to quote is omitted, thereby rendering the definition of the subject matter of dependent claim 11 so unclear. (PCT Article 6)

☐ the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed *(specify)*:

☒ no international search report has been established for said claims Nos. 11

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Istructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Istructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13ter.1(a) or (b).

☐ See Supplemental Box for further details.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

AMBROZIAK JEFFREY

GTC LAW GROUP LLP & AFFILIATES C/O CPA GLOBAL
P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference WTCY-0070-PWO	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. **PCT/US2012/060793**	International filing date *(day/month/year)* **18 OCTOBER 2012 (18.10.2012)**
Applicant **WITRICITY CORPORATION**	

Date of mailing *(day/month/year)* 08 MARCH 2013 (08.03.2013)

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 . 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19months.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the PCT Applicant's Guide, National Chapters.

Name and mailing address of the ISA/KR Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea	Authorized officer COMMISSIONER
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-8754

CPA GLOBAL MAR 18 2013 RECEIVED Coded Verified

Form PCT/ISA/220 (July 2010)

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for three months from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => PCT Services => PCT Services

ID : PCT international application number
PW : **KS957WGV**

Inquiries related to PCT International Search Report or Written Opinion prepared by KIPO as an International Searching Authority can be answered not only by KIPO but also through IPKC (Intellectual Property Korea Center), located in Vienna, VA, which functions as a PCT Help Desk for PCT applicants.

Homepage: http://www.ipkcenter.com
Email: ipkc@ipkcenter.com
Phone: +1 703 388 1066
Fax: +1 703 388 1084

Notes to Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
WTCY-0070-PWO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2012/060793	**18 OCTOBER 2012 (18.10.2012)**	18 OCTOBER 2011 (18.10.2011)

Applicant

WITRICITY CORPORATION

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 20
      ☒ as suggested by the applicant.
      ☐ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/060793

A. CLASSIFICATION OF SUBJECT MATTER

H02J 17/00(2006.01)i, H02N 6/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H02J 17/00; H04B 5/00; H03H 7/38; H01F 27/42; G08B 1/08; H04B 1/10

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: wireless energy transfer, dynamic, impedance matching

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2011-112795 A1 (WITRICITY CORPORATION et al.) 15 September 2011 See abstract, paragraphs [0011], [0031], [0104], [0118]-[0119], [0133]-[0134]	1-8,10-25
A	, [0142] and figure 4.	9
A	US 2009-0085408 A1 (BRUHN ALFRED) 02 April 2009 See abstract, paragraphs [0017]-[0018], [0031] and figure 19.	1-25
A	US 2011-0248573 A1 (KANNO HIROSHI et al.) 13 October 2011 See abstract, paragraphs [0050]-[0053] and figure 7.	1-25
A	KR 10-2008-0007635 A (MICROTUNE (TEXAS), L. P.) 22 January 2008 See page 6, lines 7-35 and figure 1.	1-25
A	US 2008-0036588 A1 (ROD IVERSON et al.) 14 February 2008 See paragraphs [0005], [0019] and figure 3.	1-25

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 MARCH 2013 (07.03.2013)	**08 MARCH 2013 (08.03.2013)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea	CHOI, Jeong Yoon
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-8153

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2012/060793

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2011-112795 A1	15.09.2011	AU 2009-296413 A1	01.04.2010
		AU 2010-213557 A1	19.08.2010
		CA 2738654 A1	01.04.2010
		CA 2752573 A1	19.08.2010
		CA 2792256 A1	15.09.2011
		CN 102239633 A	09.11.2011
		CN 102439669 A	02.05.2012
		JP 2012-504387 A	16.02.2012
		JP 2012-518382 A	09.08.2012
		KR 10-2011-0074761 A	01.07.2011
		KR 10-2011-0127203 A	24.11.2011
		US 2010-0109445 A1	06.05.2010
		US 2010-0141042 A1	10.06.2010
		US 2010-0164296 A1	01.07.2010
		US 2010-0164297 A1	01.07.2010
		US 2010-0164298 A1	01.07.2010
		US 2010-0171368 A1	08.07.2010
		US 2010-0181843 A1	22.07.2010
		US 2010-0181845 A1	22.07.2010
		US 2010-0201203 A1	12.08.2010
		US 2010-0219694 A1	02.09.2010
		US 2010-0231340 A1	16.09.2010
		US 2010-0237709 A1	23.09.2010
		US 2010-0259108 A1	14.10.2010
		US 2010-0259110 A1	14.10.2010
		US 2010-0264747 A1	21.10.2010
		US 2010-0277121 A1	04.11.2010
		US 2010-0308939 A1	09.12.2010
		US 2011-0043047 A1	24.02.2011
		US 2011-0043048 A1	24.02.2011
		US 2011-0043049 A1	24.02.2011
		US 2011-0074346 A1	31.03.2011
		US 2011-0095618 A1	28.04.2011
		US 2011-0121920 A1	26.05.2011
		US 2011-0193416 A1	11.08.2011
		US 2012-0032522 A1	09.02.2012
		US 2012-0062345 A1	15.03.2012
		US 2012-0139355 A1	07.06.2012
		US 2012-0280765 A1	08.11.2012
		US 8035255 B2	11.10.2011
		US 8106539 B2	31.01.2012
		US 8304935 B2	06.11.2012
		US 8324759 B2	04.12.2012
		WO 2010-036980 A1	01.04.2010
		WO 2010-093997 A1	19.08.2010
		WO 2012-037279 A1	22.03.2012
US 2009-0085408 A1	02.04.2009	CA 2639155 A1	01.03.2009
		CN 101431259 A	13.05.2009

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2012/060793

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		EP 2031731 A1	04.03.2009
		JP 2009-111977 A	21.05.2009
		KR 10-2009-0023540 A	05.03.2009
		US 7999414 B2	16.08.2011
US 2011-0248573 A1	13.10.2011	EP 2428970 A1	14.03.2012
		WO 2011-125328 A1	13.10.2011
KR 10-2008-0007635 A	22.01.2008	EP 1875621 A2	09.01.2008
		US 2006-0246848 A1	02.11.2006
		US 2009-0289735 A1	26.11.2009
		US 7376407 B2	20.05.2008
		US 7792512 B2	07.09.2010
		WO 2006-115869 A2	02.11.2006
		WO 2006-115869 A3	02.11.2006
US 2008-0036588 A1	14.02.2008	US 7671736 B2	02.03.2010
		WO 2007-150070 A2	27.12.2007
		WO 2007-150070 A3	27.12.2007
		WO 2007-150070 A3	24.04.2008

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
AMBROZIAK JEFFREY

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**08 MARCH 2013 (08.03.2013)**
Applicant's or agent's file reference WTCY-0070-PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2012/060793	**18 OCTOBER 2012 (18.10.2012)**	18 OCTOBER 2011 (18.10.2011)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i, H02N 6/00(2006.01)i

Applicant

WITRICITY CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	07 MARCH 2013 (07.03.2013)	CHOI, Jeong Yoon Telephone No.82-42-481-8153

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/060793

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/060793

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	4-11,15-20,25	YES
	Claims	1-3,12-14,21-24	NO
Inventive step (IS)	Claims	9	YES
	Claims	1-8,10-25	NO
Industrial applicability (IA)	Claims	1-25	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: WO 2011-112795 A1 (WITRICITY CORPORATION et al.) 15 September 2011
D2: US 2009-0085408 A1 (BRUHN ALFRED) 02 April 2009
D3: US 2011-0248573 A1 (KANNO HIROSHI et al.) 13 October 2011
D4: KR 10-2008-0007635 A (MICROTUNE (TEXAS), L. P.) 22 January 2008
D5: US 2008-0036588 A1 (ROD IVERSON et al.) 14 February 2008

1. Novelty and Inventive Step

1.1 Claims 1-11

1.1.1 Independent claim 1

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a method comprising the steps of converting electrical energy from a solar panel into oscillating magnetic fields by a resonator (See paragraphs [0011], [0104] in D1), configuring impedance matching networks and resonator coils (See paragraphs [0119], [0134], figure 4 in D1), wherein power may be delivered to the load at a maximum possible efficiency, when the input impedance of the load is equal to the complex conjugate of the internal impedance of the power supply (See paragraph [0118] in D1). As all of the features of claim 1 are disclosed in D1, this claim is anticipated by D1. Therefore, claim 1 lacks novelty under PCT Article 33(2).

1.1.2 Dependent claims 2-11

The additional feature of claim 2 is identical to the feature of D1 in that the electrical energy from the at least one receiving magnetic resonator is used to energize the at least one transferring magnetic resonator to generate the second oscillating magnetic field (See paragraph [0011] in D1). As all of the features of claim 2 are disclosed in D1, this claim is anticipated by D1. Therefore, claim 2 lacks novelty under PCT Article 33(2).

The additional feature of claim 3 is identical to the feature of D1 in the step of adjusting the impedance of said source in response to a change in the environmental conditions (See paragraphs [0118], [0142] in D1). As all of the features of claim 3 are disclosed in D1, this claim is anticipated by D1. Therefore, claim 3 lacks novelty under PCT Article 33(2).

(Continued on Supplemental Box)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/060793

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The phrase "configuring said source" of claims 10-11 is considered to be a typo for "configuring the impedance of said source"
The phrase "renewable energy system" of claims 21-25 is not disclosed in the description.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of :

Box No. V

Claims 4-8 further specify the step of configuring the impedance of said source in response to a change in electrical parameters such as current or voltage. However, the additional features of claims 4-8 are virtually suggested by the features of D1 considering the step of configuring an input impedance of the impedance matching network in response to a change in device power demands or components (See paragraph [0142] in D1). Accordingly, claims 4-8 would have been obvious over D1. Therefore, claims 4-8 lack an inventive step under PCT Article 33(3).

The additional feature of claim 9 differs from these prior art documents in that configuring an impedance further comprises adjusting a switching time of the wireless energy source. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 9 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

The additional features of claims 10-11 are identical to the features of D1 in the impedance matching networks and resonator coils that may include electrically controllable, variable, or tunable components such as capacitors, switches, inductors, and the like (See paragraph [0134] in D1).
Accordingly, claims 10-11 would have been obvious over D1. Therefore, claims 10-11 lack an inventive step under PCT Article 33(3).

1.2 Claims 12-20

1.2.1 Independent claim 12

Claim 12 relates to a photovoltaic energy system with a wireless energy transfer, but it shares the same technical features with claim 1. Accordingly, the same reasoning applies to claim 12. Therefore, claim 12 lacks novelty under PCT Article 33(2).

1.2.2 Dependent claims 13-20

Claim 13 relates to a wireless energy device, wherein the wireless energy device is configured to capture the oscillating magnetic field and convert the energy of the magnetic field to an electrical current at a voltage, but it shares similar technical features with claim 2. Accordingly, the same reasoning applies to claim 13. Therefore, claim 13 lacks novelty under PCT Article 33(2).

The additional feature of claim 14 is identical to the feature of D1 in that a Vbus controller may control the voltage output of an adjustable DC supply (See paragraph [0133] in D1). As all of the features of claim 14 are disclosed in D1, this claim is anticipated by D1. Therefore, claim 14 lacks novelty under PCT Article 33(2).

(Continued on Supplemental Box)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Box No. V

Claim 15 further specifies the wireless energy device that is adjustable to achieve a particular voltage at the output of the device. However, the additional feature of claim 15 is merely a matter of design option when the general knowledge in the relevant field of the art is used. Accordingly, claim 15 would have been obvious over D1. Therefore, claim 15 lacks an inventive step under PCT Article 33(3).

Claim 16 relates to the impedance of said source that is configurable in response to a change in electrical parameters of the photovoltaic module, but it shares the same technical features with claim 4. Accordingly, the same reasoning applies to claim 16. Therefore, claim 16 lacks an inventive step under PCT Article 33(3).

Claims 17, 19 further specify a plurality of wireless energy capture devices having similar output currents that are configured in a series connection or a parallel connection. However, the additional features of claims 17, 19 are virtually suggested by the features of D1 considering a plurality of resonators electrically interconnected and arranged in an array to form a composite resonator for a wireless power transfer (See paragraph [0031] in D1). Accordingly, claims 17, 19 would have been obvious over D1. Therefore, claims 17, 19 lack an inventive step under PCT Article 33(3).

Claims 18, 20 further specify the output current or voltage that is adjustable to maintain an expected voltage or current across the series connection or the parallel connection. However, the additional features of claims 18, 20 are merely matters of design option when the general knowledge in the relevant field of the art is used. Accordingly, claims 18, 20 would have been obvious over D1. Therefore, claims 18, 20 lack an inventive step under PCT Article 33(3).

1.3 Claims 21-25

1.3.1 Independent claim 21

D1, which is considered to be the closest prior art to the subject matter of claim 21, discloses a method of transferring energy comprising the steps of configuring a transferring magnetic resonator to generate a second oscillating magnetic field, configuring a receiving magnetic resonator to capture electrical energy received wirelessly through a first oscillating magnetic field (See paragraph [0011] in D1) and configuring impedance matching networks and resonator coils (See paragraphs [0119], [0134] in D1), wherein power may be delivered to the load at a maximum possible efficiency, when the input impedance of the load is equal to the complex conjugate of the internal impedance of the power supply (See paragraph [0118] in D1). As all of the features of claim 21 are disclosed in D1, this claim is anticipated by D1. Therefore, claim 21 lacks novelty under PCT Article 33(2).

(Continued on Supplemental Box)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of :

Box No. V

1.3.2 Dependent claims 22-25

Claim 22 relates to a method comprising the step of adjusting the impedance in response to a change in the environmental conditions for said renewable energy system, but it shares the same technical features with claim 3. Accordingly, the same reasoning applies to claim 22. Therefore, claim 22 lacks novelty under PCT Article 33(2).

The additional features of claims 23-24 are identical to the features of D1 in the energy source that may be a battery, a solar panel, the electrical mains, a wind or water turbine, an electromagnetic resonator, a generator, and the like (See paragraph [0104] in D1). As all of the features of claims 23-24 are disclosed in D1, these claims are anticipated by D1. Therefore, claims 23-24 lack novelty under PCT Article 33(2).

Claim 25 further specifies a renewable energy system that includes a thermal exchanger. However, the additional feature of claim 25 is merely a matter of design option when the general knowledge in the relevant field of the art is used. Accordingly, claim 25 would have been obvious over D1. Therefore, claim 25 lacks an inventive step under PCT Article 33(3).

2. Industrial Applicability

Claims 1-25 are industrially applicable under PCT Article 33(4).

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

AMBROZIAK JEFFREY

GTC LAW GROUP LLP & AFFILIATES C/O CPA GLOBAL
P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference WTCY-0071-PWO	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. **PCT/US2012/063530**	International filing date *(day/month/year)* **05 NOVEMBER 2012 (05.11.2012)**
Applicant **WITRICITY CORPORATION**	

Date of mailing *(day/month/year)* 13 MARCH 2013 (13.03.2013)

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 . 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19months.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the PCT Applicant's Guide, National Chapters.

Name and mailing address of the ISA/KR Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea	Authorized officer COMMISSIONER
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-8753

Form PCT/ISA/220 (July 2010)

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for three months from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => PCT Services => PCT Services

ID : PCT international application number
PW : **T2VYPXX7**

Inquiries related to PCT International Search Report or Written Opinion prepared by KIPO as an International Searching Authority can be answered not only by KIPO but also through IPKC (Intellectual Property Korea Center), located in Vienna, VA, which functions as a PCT Help Desk for PCT applicants.

Homepage: http://www.ipkcenter.com
Email: ipkc@ipkcenter.com
Phone: +1 703 388 1066
Fax: +1 703 388 1084

Notes to Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
WTCY-0071-PWO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2012/063530	**05 NOVEMBER 2012 (05.11.2012)**	04 NOVEMBER 2011 (04.11.2011)

Applicant

WITRICITY CORPORATION

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 7 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 63
      ☒ as suggested by the applicant.
      ☐ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/063530

A. CLASSIFICATION OF SUBJECT MATTER

H02J 17/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H02J 17/00; H05K 7/20; H01F 38/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: Wireless transfer, resonator, parameter, design, select

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 2010-0327660 A1 (KARALIS ARISTEIDIS et al.) 30 December 2010 See abstract, paragraphs [0176]-[0180] and figures 8A-8B.	1-4,6-8,12-15,17-19 5,9-11,16,20-22
Y A	US 2011-0121920 A1 (KURS ANDRE B. et al.) 26 May 2011 See abstract, paragraphs [0096]-[0097], [0105] and figures 3-4, 6A-6C.	1-4,6-8,12-15,17-19 5,9-11,16,20-22
A	US 2010-0201203 A1 (SCHATZ DAVID A. et al.) 12 August 2010 See abstract, paragraphs [0156]-[0157], [0417]-[0422], [0609]-[0610] and figures 1, 41-42, 65.	1-22
A	US 2010-0045114 A1 (SAMPLE ALANSON P. et al.) 25 February 2010 See paragraphs [0021]-[0037], claims 1-3 and figures 1a-1b.	1-22
A	US 2009-0072627 A1 (COOK NIGEL P. et al.) 19 March 2009 See abstract, paragraphs [0040]-[0041] and figure 5.	1-22

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 MARCH 2013 (12.03.2013)	**13 MARCH 2013 (13.03.2013)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	CHOI, Jeong Yoon Telephone No. 82-42-481-8153

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2012/063530

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0327660 A1	30.12.2010	AU 2006-269374 A1	18.01.2007
		AU 2006-269374 B2	08.10.2009
		AU 2006-269374 C1	25.03.2010
		AU 2007-349874 A1	02.10.2008
		AU 2007-349874 A2	02.10.2008
		CA 2615123 A1	18.01.2007
		CA 2682284 A1	02.10.2008
		CN 101258658 A0	03.09.2008
		CN 101682216 A	24.03.2010
		CN 101860089 A	13.10.2010
		CN 102255398 A	23.11.2011
		CN 102361358 A	22.02.2012
		EP 1902505 A2	26.03.2008
		EP 2130287 A1	09.12.2009
		EP 2306615 A2	06.04.2011
		EP 2306616 A2	06.04.2011
		EP 2418755 A2	15.02.2012
		JP 04-921466 B2	10.02.2012
		JP 2009-501510 A	15.01.2009
		JP 2011-177018 A	08.09.2011
		JP 2012-105537 A	31.05.2012
		JP 2012-502602 A	26.01.2012
		KR 10-1118710 B1	13.03.2012
		KR 10-1136889 B1	20.04.2012
		KR 10-1156616 B1	15.06.2012
		KR 10-2010-0015954 A	12.02.2010
		KR 10-2011-0117732 A	27.10.2011
		US 2007-0222542 A1	27.09.2007
		US 2008-0278264 A1	13.11.2008
		US 2009-0195332 A1	06.08.2009
		US 2009-0195333 A1	06.08.2009
		US 2009-0224856 A1	10.09.2009
		US 2009-0267709 A1	29.10.2009
		US 2009-0267710 A1	29.10.2009
		US 2010-0096934 A1	22.04.2010
		US 2010-0102639 A1	29.04.2010
		US 2010-0102640 A1	29.04.2010
		US 2010-0102641 A1	29.04.2010
		US 2010-0117455 A1	13.05.2010
		US 2010-0117456 A1	13.05.2010
		US 2010-0123353 A1	20.05.2010
		US 2010-0123354 A1	20.05.2010
		US 2010-0123355 A1	20.05.2010
		US 2010-0127573 A1	27.05.2010
		US 2010-0127574 A1	27.05.2010
		US 2010-0127575 A1	27.05.2010
		US 2010-0133918 A1	03.06.2010
		US 2010-0133919 A1	03.06.2010
		US 2010-0133920 A1	03.06.2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2010-0171370 A1	08.07.2010
		US 2010-0181844 A1	22.07.2010
		US 2010-0187911 A1	29.07.2010
		US 2010-0201205 A1	12.08.2010
		US 2010-0207458 A1	19.08.2010
		US 2010-0225175 A1	09.09.2010
		US 2010-0231053 A1	16.09.2010
		US 2010-0237706 A1	23.09.2010
		US 2010-0237707 A1	23.09.2010
		US 2010-0237708 A1	23.09.2010
		US 2010-0253152 A1	07.10.2010
		US 2010-0264745 A1	21.10.2010
		US 2010-0277005 A1	04.11.2010
		US 2010-0327661 A1	30.12.2010
		US 2011-0012431 A1	20.01.2011
		US 2011-0018361 A1	27.01.2011
		US 2011-0025131 A1	03.02.2011
		US 2011-0043046 A1	24.02.2011
		US 2011-0049996 A1	03.03.2011
		US 2011-0049998 A1	03.03.2011
		US 2011-0074218 A1	31.03.2011
		US 2011-0074347 A1	31.03.2011
		US 2011-0089895 A1	21.04.2011
		US 2011-0140544 A1	16.06.2011
		US 2011-0148219 A1	23.06.2011
		US 2011-0162895 A1	07.07.2011
		US 2011-0169339 A1	14.07.2011
		US 2011-0193419 A1	11.08.2011
		US 2011-181122 A1	28.07.2011
		US 2011-198939 A1	18.08.2011
		US 2011-221278 A1	15.09.2011
		US 2011-227528 A1	22.09.2011
		US 2011-227530 A1	22.09.2011
		US 2011-241618 A1	06.10.2011
		US 7741734 B2	22.06.2010
		US 7825543 B2	02.11.2010
		US 8022576 B2	20.09.2011
		US 8076800 B2	13.12.2011
		US 8084889 B2	27.12.2011
		US 8097983 B2	17.01.2012
		WO 2007-008646 A2	18.01.2007
		WO 2007-008646 A3	18.01.2007
		WO 2008-118178 A1	02.10.2008
		WO 2008-118178 A8	02.10.2008
US 2011-0121920 A1	26.05.2011	AU 2009-296413 A1	01.04.2010
		AU 2010-213557 A1	19.08.2010
		CA 2738654 A1	01.04.2010
		CA 2752573 A1	19.08.2010
		CA 2792256 A1	15.09.2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		CN 102239633 A	09.11.2011
		CN 102439669 A	02.05.2012
		JP 2012-504387 A	16.02.2012
		JP 2012-518382 A	09.08.2012
		KR 10-2011-0074761 A	01.07.2011
		KR 10-2011-0127203 A	24.11.2011
		US 2010-0109445 A1	06.05.2010
		US 2010-0141042 A1	10.06.2010
		US 2010-0164296 A1	01.07.2010
		US 2010-0164297 A1	01.07.2010
		US 2010-0164298 A1	01.07.2010
		US 2010-0171368 A1	08.07.2010
		US 2010-0181843 A1	22.07.2010
		US 2010-0181845 A1	22.07.2010
		US 2010-0201203 A1	12.08.2010
		US 2010-0219694 A1	02.09.2010
		US 2010-0231340 A1	16.09.2010
		US 2010-0237709 A1	23.09.2010
		US 2010-0259108 A1	14.10.2010
		US 2010-0259110 A1	14.10.2010
		US 2010-0264747 A1	21.10.2010
		US 2010-0277121 A1	04.11.2010
		US 2010-0308939 A1	09.12.2010
		US 2011-0043047 A1	24.02.2011
		US 2011-0043048 A1	24.02.2011
		US 2011-0043049 A1	24.02.2011
		US 2011-0074346 A1	31.03.2011
		US 2011-0095618 A1	28.04.2011
		US 2011-0193416 A1	11.08.2011
		US 2012-0032522 A1	09.02.2012
		US 2012-0062345 A1	15.03.2012
		US 2012-0139355 A1	07.06.2012
		US 2012-0280765 A1	08.11.2012
		US 8035255 B2	11.10.2011
		US 8106539 B2	31.01.2012
		US 8304935 B2	06.11.2012
		US 8324759 B2	04.12.2012
		WO 2010-036980 A1	01.04.2010
		WO 2010-093997 A1	19.08.2010
		WO 2011-112795 A1	15.09.2011
		WO 2012-037279 A1	22.03.2012
US 2010-0201203 A1	12.08.2010	AU 2009-296413 A1	01.04.2010
		AU 2010-213557 A1	19.08.2010
		CA 2738654 A1	01.04.2010
		CA 2752573 A1	19.08.2010
		CA 2792256 A1	15.09.2011
		CN 102239633 A	09.11.2011
		CN 102439669 A	02.05.2012
		JP 2012-504387 A	16.02.2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		JP 2012-518382 A	09.08.2012
		KR 10-2011-0074761 A	01.07.2011
		KR 10-2011-0127203 A	24.11.2011
		US 2010-0109445 A1	06.05.2010
		US 2010-0141042 A1	10.06.2010
		US 2010-0164296 A1	01.07.2010
		US 2010-0164297 A1	01.07.2010
		US 2010-0164298 A1	01.07.2010
		US 2010-0171368 A1	08.07.2010
		US 2010-0181843 A1	22.07.2010
		US 2010-0181845 A1	22.07.2010
		US 2010-0219694 A1	02.09.2010
		US 2010-0231340 A1	16.09.2010
		US 2010-0237709 A1	23.09.2010
		US 2010-0259108 A1	14.10.2010
		US 2010-0259110 A1	14.10.2010
		US 2010-0264747 A1	21.10.2010
		US 2010-0277121 A1	04.11.2010
		US 2010-0308939 A1	09.12.2010
		US 2011-0043047 A1	24.02.2011
		US 2011-0043048 A1	24.02.2011
		US 2011-0043049 A1	24.02.2011
		US 2011-0074346 A1	31.03.2011
		US 2011-0095618 A1	28.04.2011
		US 2011-0121920 A1	26.05.2011
		US 2011-0193416 A1	11.08.2011
		US 2012-0032522 A1	09.02.2012
		US 2012-0062345 A1	15.03.2012
		US 2012-0139355 A1	07.06.2012
		US 2012-0280765 A1	08.11.2012
		US 8035255 B2	11.10.2011
		US 8106539 B2	31.01.2012
		US 8304935 B2	06.11.2012
		US 8324759 B2	04.12.2012
		WO 2010-036980 A1	01.04.2010
		WO 2010-093997 A1	19.08.2010
		WO 2011-112795 A1	15.09.2011
		WO 2012-037279 A1	22.03.2012
US 2010-0045114 A1	25.02.2010	CN 102036157 A	27.04.2011
		US 2010-0052811 A1	04.03.2010
		US 2010-0081379 A1	01.04.2010
		US 2010-0187913 A1	29.07.2010
		US 8299652 B2	30.10.2012
		WO 2011-037777 A2	31.03.2011
		WO 2011-037777 A3	31.03.2011
US 2009-0072627 A1	19.03.2009	CN 101803109 A	11.08.2010
		EP 2188863 A1	26.05.2010
		JP 2010-539821 A	16.12.2010

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/063530

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		JP 2010-539821 T	16.12.2010
		KR20100063756A	11.06.2010
		US 2011-309685 A9	22.12.2011
		WO 2009-036405 A1	19.03.2009

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
AMBROZIAK JEFFREY

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**13 MARCH 2013 (13.03.2013)**
Applicant's or agent's file reference WTCY-0071-PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2012/063530	**05 NOVEMBER 2012 (05.11.2012)**	04 NOVEMBER 2011 (04.11.2011)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i

Applicant

WITRICITY CORPORATION

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	12 MARCH 2013 (12.03.2013)	CHOI, Jeong Yoon Telephone No.82-42-481-8153

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/063530

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of :

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/063530

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-22	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	5,9-11,16,20-22	YES
	Claims	1-4,6-8,12-15,17-19	NO
Industrial applicability (IA)	Claims	1-22	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: US 2010-0327660 A1 (KARALIS ARISTEIDIS et al.) 30 December 2010
D2: US 2011-0121920 A1 (KURS ANDRE B. et al.) 26 May 2011
D3: US 2010-0201203 A1 (SCHATZ DAVID A. et al.) 12 August 2010
D4: US 2010-0045114 A1 (SAMPLE ALANSON P. et al.) 25 February 2010
D5: US 2009-0072627 A1 (COOK NIGEL P. et al.) 19 March 2009

1. Novelty and Inventive Step

1.1 Claims 1-11

1.1.1 Independent claim 1

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a method of forming a wireless power system comprising determining a frequency of a resonant object (See paragraphs [0179]-[0180], figures 8A-8B in D1), measuring an efficiency of energy transfer from a source object to a device object (See paragraphs [0179]-[0180], figures 8A-8B in D1) and adjusting the geometric properties of the object (e.g. the height of a self-resonant coil, the capacitor plate spacing of a capacitively-loaded loop or coil, the dimensions of the inductor of an inductively-loaded rod, the shape of a dielectric disc, etc.) (See paragraphs [0179]-[0180], figures 8A-8B in D1).

Claim 1 differs from D1 in utilizing the derived one or more modeled values to design an impedance matching network. However, D2 discloses inserting appropriate networks or sets of elements such as capacitors, resistors, inductors, transformers, switches and the like, to form an impedance matching network (See paragraph [0105], figures 6A-6C in D2).

Accordingly, claim 1 would have been obvious over D1 and D2. Therefore, claim 1 lacks an inventive step under PCT Article 33(3).

(Continued on Supplemental Box)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Box No. V

1.1.2 Dependent claims 2-4, 6-8

Claims 2, 6 further specify that the one or more attributes of the source resonator comprises defining at least one source and device resonator parameter selected from the group consisting of a source resonator wire type, source resonator length, source resonator width, source resonator coil winding direction, source resonator coil number of turns and source resonator coil spacing between turns. However, the additional features of claims 2, 6 are virtually suggested by the feature of D1 considering the geometric properties of the object (e.g. the height of a self-resonant coil, the capacitor plate spacing of a capacitively-loaded loop or coil, the dimensions of the inductor of an inductively-loaded rod, the shape of a dielectric disc, etc.) (See paragraphs [0179]-[0180], figures 8A-8B in D1).

Claims 3, 7 further specify defining the one or more attributes of the source and device resonator via a user interface. However, the additional features of claims 3, 7 are virtually suggested by the feature of D2 considering that variations in any combination of three parameters may be used to tune the wireless power source to compensate for user initiated changes (See paragraph [0097] in D2).

Claims 4, 8 further specify receiving alerts indicative of one or more logical or physical incompatibilities. However, the additional features of claims 4, 8 are virtually suggested by the feature of D2 considering that monitoring current signals may cause a damage to components in the system or may yield undesirable operating conditions to trigger a shutdown of the microcontroller (See paragraphs [0096]-[0097], figures 3-4 in D2).

Accordingly, claims 2-4, 6-8 would have been obvious over D1 and D2. Therefore, claims 2-4, 6-8 lack an inventive step under PCT Article 33(3).

1.1.3 Dependent claims 5, 9-11

The additional features of claims 5, 9 differ from these prior art documents in retrieving a previously defined source resonator and device resonator.
The additional feature of claim 10 differs from these prior art documents in defining at least one system parameter selected from the group consisting of a sweep parameter and a source/device resonator separation distance.
The additional feature of claim 11 differs from these prior art documents in building a physical system, measuring at least one attribute of the physical system and repeating modeling the electromagnetic performance of the system to derive one or more modeled values.

(Continued on Supplemental Box)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of :

Box No. V

And these additional features are not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claims 5, 9-11 meet the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

1.2 Claims 12-22

1.2.1 Independent claim 12

D1, which is considered to be the closest prior art to the subject matter of claim 12, discloses resonators and their coupling characteristics system comprising determining a frequency of a resonant object (See paragraphs [0179]-[0180], figures 8A-8B in D1), measuring an efficiency of energy transfer from a source object to a device object (See paragraphs [0179]-[0180], figures 8A-8B in D1) and adjusting the geometric properties of the object (e.g. the height of a self-resonant coil, the capacitor plate spacing of a capacitively-loaded loop or coil, the dimensions of the inductor of an inductively-loaded rod, the shape of a dielectric disc, etc.) (See paragraphs [0179]-[0180], figures 8A-8B in D1).

Claim 12 differs from D1 in utilizing the derived one or more modeled values to design an impedance matching network. However, D2 discloses inserting appropriate networks or sets of elements such as capacitors, resistors, inductors, transformers, switches and the like, to form an impedance matching network (See paragraph [0105], figures 6A-6C in D2).

Accordingly, claim 12 would have been obvious over D1 and D2. Therefore, claim 12 lacks an inventive step under PCT Article 33(3).

1.2.2 Dependent claims 13-15, 17-19

(Continued on Supplemental Box)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Box No. V

Claims 13, 17 further specify that the one or more attributes of the source resonator comprise defining at least one source and device resonator parameter selected from the group consisting of a source resonator wire type, source resonator length, source resonator width, source resonator coil winding direction, source resonator coil number of turns and source resonator coil spacing between turns. However, the additional features of claims 13, 17 are virtually suggested by the feature of D1 considering the geometric properties of the object (e.g. the height of a self-resonant coil, the capacitor plate spacing of a capacitively-loaded loop or coil, the dimensions of the inductor of an inductively-loaded rod, the shape of a dielectric disc, etc.) (See paragraphs [0179]-[0180], figures 8A-8B in D1).

Claims 14, 18 further specify defining the one or more attributes of the source and device resonator via a user interface. However, the additional features of claims 14, 18 are virtually suggested by the feature of D2 considering that variations in any combination of three parameters may be used to tune the wireless power source to compensate for user initiated changes (See paragraph [0097] in D2).

Claims 15, 19 further specify receiving alerts indicative of one or more logical or physical incompatibilities. However, the additional features of claims 15, 19 are virtually suggested by the feature of D2 considering that monitoring current signals may cause a damage to components in the system or may yield undesirable operating conditions to trigger a shutdown of the microcontroller (See paragraphs [0096]-[0097], figures 3-4 in D2).

Accordingly, claims 13-15, 17-19 would have been obvious over D1 and D2. Therefore, claims 13-15, 17-19 lack an inventive step under PCT Article 33(3).

1.2.3 Dependent claims 16, 20-22

The additional features of claims 16, 20 differ from these prior art documents in retrieving a previously defined source resonator and device resonator.

The additional feature of claim 21 differs from these prior art documents in defining at least one system parameter selected from the group consisting of a sweep parameter and a source/device resonator separation distance.

The additional feature of claim 22 differs from these prior art documents in causing the computer to model the electromagnetic performance of the system utilizing least one measured attribute of a physical system.

(Continued on Supplemental Box)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of :

Box No. V

And these additional features are not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claims 16, 20-22 meet the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

2. Industrial Applicability

Claims 1-22 are industrially applicable under PCT Article 33(4).

Electronic Acknowledgement Receipt

EFS ID:	16093778
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	87084
Filer:	John A. Monocello/Sarah Trigg
Filer Authorized By:	John A. Monocello
Attorney Docket Number:	WTCY-0075-P01
Receipt Date:	20-JUN-2013
Filing Date:	28-JAN-2013
Time Stamp:	12:07:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	WTCY-0075-P01_IDS_CL_06-20-2013.pdf	41346 e34315beae1e7d470029cd3aa13cceaccde509ff	no	3

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	WTCY-0075-P01_IDS_06-20-2013.pdf	324042 2744837e41a2e6b526e81f52d36932e7670b67ff	no	6
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Warnings:					
Information:					
6	Foreign Reference	FR4_JP2004166459A_withAbstract.pdf	665976 5b61e76265a109d7210e20dbdea12a7db5935be4	no	10
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7	Foreign Reference	FR5_JP2004201458A_withAbstract.pdf	574154 4d93acffaac7694ac1b18ec3c359a3b5036d877e	no	9
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8	Foreign Reference	FR6_JP200557444A_withAbstract.pdf	452584 165736c449ee3bb8d9b560fa31f73641f8746aca	no	13
Warnings:					
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Warnings:					
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Warnings:					
Information:					
11	Foreign Reference	FR9_KR_1020090122072_with Abstract.pdf	689956 e0767d5c9fc97e8dd1190d0a4b52d4fc8ad4ff5b	no	17
Warnings:					
Information:					
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13	Foreign Reference	FR11_KR_1020110050920_with Abstract.pdf	671982 73eb406c2f54307075545c3f0de42a0529ad92f6	no	17
Warnings:					
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14	Foreign Reference	FR12_WO_2011061821_A1.pdf	1298434 8778ba2a9296ddbafefbc5393d5e0a02096d6b7b	no	40
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16	Foreign Reference	FR14_WO2013036947A3.pdf	51793 b42b385f762085d2a52a3e90875000390f0cdee1	no	6
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17	Foreign Reference	FR15_WO_2013020138_A3.pdf	181562 4343f83b5553caabc095630d8a0e920720bb20f5	no	5
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18	Foreign Reference	FR16_WO2013059441A1.pdf	5714152 5c13718b27eee9f85b9cbc4af138140146ca5e67	no	136
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19	Foreign Reference	FR17_WO_2013036947_A2.pdf	1223105 6870b174cd2061c297c1ab3ab0a5c41065888cb4	no	29

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20	Foreign Reference	FR18_WO2013067484A1.pdf	1638947 98353ecd1f3d4a35be6a50306e7a7636759fa827	no	171
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21	Foreign Reference	FR19_WO2013013235A3.pdf	51136 3ef50d5f575a470f51c2ed349080bc14b13bd7f9	no	3
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		Total Files Size (in bytes):	24882595		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Andre B. Kurs et al.	Examiner: Not Yet Assigned
Serial No.:	13/752,169	Group Art Unit: 2836
		Confirmation No.: 6134
Filed:	Jan 28, 2013	Docket No.: WTCY-0075-P01
Title:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS	

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Pursuant to the requirements of 37 C.F.R. § 1.97, Applicant hereby submits this Supplemental Information Disclosure Statement which includes completed Form(s) PTO/SB/08a.

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the referenced materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicants respectfully request that this Supplemental Information Disclosure Statement be entered and the documents listed on the attached Form(s) PTO/SB/08a be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicants request that a copy of the PTO/SB/08a form(s), initialed as being considered by the Examiner, be returned to the Applicants with the next official communication.

Applicant(s) has included copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R. 1.98(a)(2).

Further, Applicants respectfully direct the Examiner's attention to the below-listed related applications. These items, which refer to applications that, at this time and according to each application's current prosecution history, may be related to the prosecution of the present case. Applicants' reference to the co-pending applications is not an admission of the materiality of any application or the prosecution history thereof, nor is it an admission that any of the below co-pending applications constitute prior art.

Application Ser. No.	Filing Date:	Attorney Docket No.
13/534,966	Jun 27, 2012	WTCY-0076-P01
13/562,528	Jul 31, 2012	WTCY-0077-P01
13/562,553	Jul 31, 2012	WTCY-0078-P01
13/668,756	Nov 5, 2012	WTCY-0071-P01
13/737,708	Jan 9, 2013	WTCY-0074-P01
PCT/US13/23478	Jan 28, 2013	WTCY-0075-PWO
13/773,011	Feb 21, 2013	WTCY-0032-P02
13/773,022	Feb 21, 2013	WTCY-0032-P03 - TRACK 1
13/834,366	Mar 15, 2013	WTCY-0086-P01
13/834,428	Mar 15, 2013	WTCY-0086-P02
PCTUS2013033599	Mar 22, 2013	WTCY-0055-PWO
13/853,355	Mar 29, 2013	WTCY-0028-P02
13/912,723	Jun 7, 2013	WTCY-0020-P02

Pursuant to 37 C.F.R. §1.97(b), it is believed that no fee is required with the Supplemental Information Disclosure Statement. However, if an Office Action on the merits has been mailed, Applicant(s) hereby authorize the Commissioner to charge any additional fees to Deposit Account 50-3912 in order to have this Supplemental Information Disclosure Statement considered.

The Examiner is invited to contact the Applicants' Representative at the below-listed telephone number if there are any questions regarding this communication.

Respectfully submitted,

ANDRE B. KURS ET AL.

By their Representatives,

Customer No. 87084

Date June 20, 2013

By /Jeffrey R. Ambroziak/
Jeffrey R. Ambroziak
GTC Law Group LLP & Affiliates
Reg. No. 47387
Office: (203) 535-3879

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/752,169	01/28/2013	Andre B. Kurs	WTCY-0075-P01

CONFIRMATION NO. 6134

87084
GTC Law Group LLP & Affiliates
c/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402

PUBLICATION NOTICE

Title:WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

Publication No.US-2013-0200721-A1
Publication Date:08/08/2013

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13/752,169
Filing Date	Jan 28, 2013
First Named Inventor	Andre B. Kurs
Art Unit	2836
Examiner Name	Rexford N. Barnie
Attorney Docket Number	WTCY-0075-P01

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	5229652	A	1993-07-20	Hough, Wayne	
	2	5541604	A	1996-07-30	Meier, Herbert	
	3	5710413	A	1998-01-20	King, James et al.	
	4	5821728	A	1998-10-13	Schwind, John	
	5	5903134	A	1999-05-11	Takeuchi, Yasuo	
	6	6047214	A	2000-04-04	Mueller, Jeffrey S., et al.	
	7	6057668	A	2000-05-02	Chao, Wen-Chung	
	8	6356773	B1	2002-03-12	Rinot, Eyal	
	9	6406168	B1	2002-06-18	Whiting, William S.	
	10	6473028	B1	2002-10-29	Luc, Wuidart	
	11	6561975	B1	2003-05-13	Pool, Nancy P., et al.	
	12	6703921	B1	2004-03-09	Wuidart, Luc et al.	

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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	13	6803744	B1	2004-10-12	Sabo, Anthony	
	14	6988026	B2	2006-01-17	Breed, David S., et al.	
	15	7076206	B2	2006-07-11	Elferich, Reinhold et al.	
	16	D541322	S	2007-04-24	Garrett, David A., et al.	
	17	7221966	B2	2007-05-22	Birli, Joseph et al.	
	18	D545855	S	2007-07-03	Garrett, David A., et al.	
	19	7443135	B2	2008-10-28	Cho, Ki-Young	
	20	7471062	B2	2008-12-30	Bruning, Gert W.	
	21	7521890	B2	2009-04-21	Lee, Yeechun et al.	
	22	7545337	B2	2009-06-09	Guenther, Wulf	
	23	7825544	B2	2010-11-02	Jansen, Gerardus L., et al.	
	24	7844306	B2	2010-11-30	Shearer, John G., et al.	
	25	7880337	B2	2011-02-01	Farkas, Laszlo	

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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	26	7932798	B2	2011-04-26	Tolle, Tobias G., et al.	
	27	7948209	B2	2011-05-24	Jung, Chun-Kil	
	28	7963941	B2	2011-06-21	Wilk, Peter J.	
	29	7969045	B2	2011-06-28	Schmidt, Josef et al.	
	30	7994880	B2	2011-08-09	Chen, Chih-Jung et al.	
	31	8131378	B2	2012-03-06	Greenberg, Robert J., et al.	
	32	8193769	B2	2012-06-05	Azancot, Yossi et al.	
	33	8212414	B2	2012-07-03	Howard, Robert J., et al.	
	34	8260200	B2	2012-09-04	Shimizu, Kanjiro et al.	
	35	8400023	B2	2013-03-19	Joannopoulos, John D., et al.	
	36	8457547	B2	2013-06-04	Meskens, Werner	
	37	8461817	B2	2013-06-11	Martin, Donald C., et al.	
	38	8476788	B2	2013-07-02	Karalis, Aristeidis et al.	

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

	39	8482157	B2	2013-07-09	Cook, Nigel et al.	
	40	8482158	B2	2013-07-09	Kurs, Andre B., et al.	
	41	8487480	B2	2013-07-16	Kesler, Morris P., et al.	
	42	8497601	B2	2013-07-30	Hall, Katherine L., et al.	
	43	8552592	B2	2013-10-08	Schatz, David A., et al.	
	44	8569914	B2	2013-10-29	Karalis, Aristeidis et al.	
	45	8587153	B2	2013-11-19	Schatz, David A., et al.	
	46	8587155	B2	2013-11-19	Giler, Eric R., et al.	
	47	8598743	B2	2013-12-03	Katherine, Hall L., et al.	
	48	8618696	B2	2013-12-31	Karalis, Aristeidis et al.	
	49	8629578	B2	2014-01-14	Kurs, Andre B.	
	50	8643326	B2	2014-02-04	Campanella, Andrew J., et al.	

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	51	20040026998	A1	2004-02-12	Henriott, Jay M., et al.	
	52	20040130425	A1	2004-07-08	Dayan, Tal et al.	
	53	20050027192	A1	2005-02-03	Govari, Assaf et al.	
	54	20050116683	A1	2005-06-02	Cheng, Lily K., et al.	
	55	20050189945	A1	2005-09-01	Reiderman, Arcady	
	56	20060001509	A1	2006-01-05	Gibbs, Phillip R.	
	57	20060053296	A1	2006-03-09	Busboom, Axel et al.	
	58	20060219448	A1	2006-10-05	Grieve, Malcolm J., et al.	
	59	20060277666	A1	2006-12-14	Gertsch, Jeffrey H., et al.	
	60	20080051854	A1	2008-02-28	Bulkes, Cherik et al.	
	61	20080132909	A1	2008-06-05	Jascob, Bradley A., et al.	
	62	20080197802	A1	2008-08-21	Onishi, Kota et al.	

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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	63	20080238364	A1	2008-10-02	Weber, Charles F., et al.	
	64	20080255901	A1	2008-10-16	Carroll, John S., et al.	
	65	20080291277	A1	2008-11-27	Jacobsen, Jeffrey J., et al.	
	66	20090079387	A1	2009-03-26	Jin, Mikimoto et al.	
	67	20090115628	A1	2009-05-07	Dicks, Kent et al.	
	68	20090161078	A1	2009-06-25	Wu, Spencer et al.	
	69	20090218884	A1	2009-09-03	Soar, Roger J.	
	70	20090224723	A1	2009-09-10	Tanabe, Akihiro	
	71	20090273318	A1	2009-11-05	Rondoni, John C., et al.	
	72	20100015918	A1	2010-01-21	Liu, Yiming et al.	
	73	20100076524	A1	2010-03-25	Forsberg, John W., et al.	
	74	20100100997	A1	2010-04-29	Lee, Kang S., et al.	
	75	20100104031	A1	2010-04-29	Lacour, Gilles	

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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	76	20100179384	A1	2010-07-15	Hoeg, Hans D., et al.	
	77	20100181964	A1	2010-07-22	Huggins, Mark et al.	
	78	20100201312	A1	2010-08-12	Kirby, Miles A., et al.	
	79	20100234922	A1	2010-09-16	Forsell, Peter	
	80	20100244767	A1	2010-09-30	Turner, Jim et al.	
	81	20100256481	A1	2010-10-07	Mareci, Thomas H., et al.	
	82	20100314946	A1	2010-12-16	Budde, Wolfgang O., et al.	
	83	20100328044	A1	2010-12-30	Waffenschmidt, Eberhard et al.	
	84	20110031928	A1	2011-02-10	Soar, Roger J.	
	85	20110049995	A1	2011-03-03	Hashiguchi, Takaaki	
	86	20110215086	A1	2011-09-08	Yeh, Ming-Hsiang	
	87	20110266878	A9	2011-11-03	Cook, Nigel P., et al.	
	88	20110278943	A1	2011-11-17	Eckhoff, Philip A., et al.	

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

	89	20110282415	A1	2011-11-17	Eckhoff, Philip A., et al.	
	90	20120007435	A1	2012-01-12	Sada, Tomokazu et al.	
	91	20120025602	A1	2012-02-02	Boys, John T., et al.	
	92	20120038525	A1	2012-02-16	Monsalve Carcelen, Beatriz et al.	
	93	20130154389	A1	2013-06-20	Kurs, Andre B., et al.	
	94	20130159956	A1	2013-06-20	Verghese, Simon et al.	
	95	20130175874	A1	2013-07-11	Lou, Herbert T., et al.	
	96	20130175875	A1	2013-07-11	Kurs, Andre B., et al.	
	97	20130200716	A1	2013-08-08	Kesler, Morris P., et al.	
	98	20130221744	A1	2013-08-29	Hall, Katherine L., et al.	
	99	20130278073	A1	2013-10-24	Kurs, Andre B., et al.	
	100	20130278074	A1	2013-10-24	Kurs, Andre B., et al.	
	101	20130278075	A1	2013-10-24	Kurs, Andre B., et al.	

Modified PTO/SB/08a (01-10)
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Attorney Docket Number	WTCY-0075-P01

	102	20130300353	A1	2013-11-14	Kurs, Andre B., et al.	
	103	20130307349	A1	2013-11-21	Hall, Katherine L., et al.	
	104	20130320773	A1	2013-12-05	Schatz, David A., et al.	
	105	20130334892	A1	2013-12-19	Hall, Katherine L., et al.	
	106	20140002012	A1	2014-01-02	McCauley, Alexander P., et al.	
	107	20140021798	A1	2014-01-23	Kesler, Morris P., et al.	
	108	20140035378	A1	2014-02-06	Kesler, Morris P., et al.	
	109	20140035704	A1	2014-02-06	Efe, Volkan et al.	
	110	20140044281	A1	2014-02-13	Ganem, Steven J., et al.	
	111	20140044293	A1	2014-02-13	Ganem, Steven J., et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	112	09182323	JP	A	1997-07-11	Hayashi, Hiroshi	English Abstract Submitted	■
	113	2005-149238	JP	A	2005-06-09	Takahashi, Tetsuya	English Abstract Submitted	☐

Modified PTO/SB/08a (01-10)
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	Examiner Name	Rexford N. Barnie
	Attorney Docket Number	WTCY-0075-P01

	114	2007-505480	JP	T	2007-03-08	Splashpower Limited	Abstract of corresponding document: WO 2005/024865 (A2) Submitted	☐
	115	2007-537637	JP	A	2007-12-20	Vacuumschmelze GmbH & Co. KG	Abstract of corresponding document: WO 2005/112192 (A1) Submitted	☐
	116	2008-508842	JP	A	2008-03-21	JC Protek Co., LTD.	Abstract of corresponding document: WO 2006/011769 (A1) Submitted	☐
	117	2008-206327	JP	A	2008-09-04	Onishi, Kota et al.	English Abstract Submitted	☐
	118	2013/113017	WO	A1	2013-08-01	Kurs, Andre et al.		☐
	119	2013/142840	WO	A1	2013-09-26	Kesler, Morris et al.		☐
	120	2014/004843	WO	A1	2014-01-03	McCauley, Alexander P., et al.		☐

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	121	Machine Translation for Japanese Patent Application No. JPH09182323 which published on July 11, 1997, 8 pages	☐
	122	BUDHIA, MICKEL et al., "A New IPT Magnetic Coupler for Electric Vehicle Charging Systems", IECON 2010 - 36th Annual Conference on IEEE Industrial Electronics Society, Glendale, AZ, November 7-10, 2010, pp. 2487-2492	☐
	123	BUDHIA, MICKEL et al., "Development and Evaluation of Single Sided Flux Couplers for Contactless Electric Vehicle Charging", IEEE Energy Conversion Congress and Exposition (ECCE), Phoenix, AZ, September 17-22, 2011, pp. 614-621	☐

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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	Attorney Docket Number	WTCY-0075-P01

	124	BUDHIA, MICKEL et al., "Development of a Single-Sided Flux Magnetic Coupler for Electric Vehicle IPT Charging Systems", IEEE Transactions on Industrial Electronics, Vol. 60, No. 1, January 2013, pp. 318-328	☐
	125	International Application Serial No. PCT/US2012/040184, International Preliminary Report On Patentability and Written Opinion mailed 12-27-2013, Witricity Corporation, 7 pages	☐
	126	International Application Serial No. PCT/US2012/047844, International Preliminary Report on Patentability with Written Opinion mailed 01-30-2014", Witricity Corporation et al., 6 pages	☐
	127	International Application Serial No. PCT/US2013/023478, International Search Report and Written Opinion mailed 06-25-2013, Witricity Corporation, 15 pages	☐
	128	International Application Serial No. PCT/US2013/033599, International Search Report and Written Opinion mailed 07-25-2013, Witricity Corporation, 13 pages	☐
	129	International Application Serial No. PCT/US2013/048210, International Search Report mailed on 10-15-2013, Witricity Corporation, 12 pages	☐
	130	TANG, S.C et al., "Evaluation of the Shielding Effects on Printed-Circuit-Board Transformers Using Ferrite Plates and Copper Sheets", IEEE Transactions on Power Electronics, Vol. 17, No. 6, Nov 2002, pp. 1080-1088	☐
	131	VILLENEUVE, PIERRE R. et al., "Microcavities in Photonic Crystals: Mode Symmetry, Tunability, and Coupling Efficiency", Physical Review B, Vol. 54, No. 11, September 15, 1996, pp. 7837-7842	☐
EXAMINER SIGNATURE			

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13/752,169
Filing Date	Jan 28, 2013
First Named Inventor	Andre B. Kurs
Art Unit	2836
Examiner Name	Rexford N. Barnie
Attorney Docket Number	WTCY-0075-P01

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.
[4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Application Number	13/752,169
Filing Date	Jan 28, 2013
First Named Inventor	Andre B. Kurs
Art Unit	2836
Examiner Name	Rexford N. Barnie
Attorney Docket Number	WTCY-0075-P01

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e) (1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e) (2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jeffrey R. Ambroziak/	Date (YYYY-MM-DD)	2014-02-25
Name/Print	Jeffrey R. Ambroziak	Registration Number	47387

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING
TRANSMITTAL OF COPY OF INTERNATIONAL
PRELIMINARY REPORT ON PATENTABILITY
(CHAPTER I OF THE PATENT COOPERATION
TREATY)
(PCT Rule 44bis.1(c))

To:

MONOCELLO, John, A., III
GTC LAW GROUP LLP & AFFILIATES
C/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402
ETATS-UNIS D'AMERIQUE

Date of mailing *(day/month/year)*	
27 December 2013 (27.12.2013)	
Applicant's or agent's file reference WTCY-0046-PWO	**IMPORTANT NOTICE**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2012/040184	31 May 2012 (31.05.2012)	06 June 2011 (06.06.2011)

Applicant
WITRICITY CORPORATION et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Philippe Bécamel
Facsimile No. +41 22 338 82 70	e-mail: pt03.pct@wipo.int

Form PCT/IB/326 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference WTCY-0046-PWO	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/US2012/040184	International filing date *(day/month/year)* 31 May 2012 (31.05.2012)	Priority date *(day/month/year)* 06 June 2011 (06.06.2011)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant WITRICITY CORPORATION		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 10 December 2013 (10.12.2013)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Philippe Bécamel e-mail: pt03.pct@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
MONOCELLO III, JOHN A.

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)* **28 NOVEMBER 2012 (28.11.2012)**

Applicant's or agent's file reference
WTCY-0046-PWO

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2012/040184	**31 MAY 2012 (31.05.2012)**	06 JUNE 2011 (06.06.2011)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i

Applicant

WITRICITY CORPORATION et al

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	27 NOVEMBER 2012 (27.11.2012)	WEE Jae Woo Telephone No.82-42-481-8540

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/040184

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of :

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/040184

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	2-4,9-18	YES
	Claims	1,5-8	NO
Inventive step (IS)	Claims	2-4,15-17	YES
	Claims	1,5-14,18	NO
Industrial applicability (IA)	Claims	1-18	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: WO 2010-104569 A1 (NEURDS INC. et al.) 16 September 2010
D2: US 2010-0181845 A1 (FIORELLO RON et al.) 22 July 2010
D3: US 2010-0109445 A1 (KURS ANDRE B. et al.) 06 May 2010
D4: WO 2011-061388 A1 (NOKIA CORPORATION et al.) 26 May 2011

1. Novelty and Inventive step

1.1. Claims 1-8

1.1.1. Claims 1, 5-8

D1, which is considered to represent the most relevant state of the art, discloses a transmitting unit having a transmitting antenna circuit having a first resonant frequency and a high quality factor; a receiving unit having a receiving antenna circuit having a second resonant frequency and a high quality factor; a repeater(18) for detecting the electromagnetic field generated by the transmitting unit and generating an induced electric current, wherein the at least one repeater includes repeater antenna circuit for to produce a second electromagnetic field based on the induced current (See claims 1, 7, figure 1B). As all of the features of claim 1 are disclosed in D1, this claim is anticipated by D1. Therefore, claim 1 lacks novelty under PCT Article 33(2).

The additional feature of claims 5-6 depending on claim 1 is identical to the feature of D1 in the one or more repeaters(18) that may contain an antenna(20) which is tuned to a resonant frequency (See paragraph [0057]). Accordingly, claims 5-6 are substantially the same as D1. Therefore, claims 5-6 lack novelty under PCT Article 33(2).

The additional feature of claim 7 depending on claim 1 is identical to the feature of D1 in a cross section of a litz wire(213) (See paragraphs [0123]-[0124]). Accordingly, claim 7 is substantially the same as D1. Therefore, claim 7 lacks novelty under PCT Article 33(2).

The additional feature of claim 8 depending on claim 1 is identical to the feature of D1 in the transmitting antenna(13) and receiving antenna(15) that may have quality factors greater than 100 (See paragraph [0054]). Accordingly, claim 8 is substantially the same as D1. Therefore, claim 8 lacks novelty under PCT Article 33(2).

(Continued on Supplemental Box)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of :

Box V

1.1.2. Claims 2-4

The subject matter of claim 2 differs from these prior art document in that claim 2 includes the repeater being external to the patient. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 2 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claim 3 is dependant on claim 2 and therefore meets the requirements of PCT Article 33(2) and (3).

The subject matter of claim 4 differs from these prior art document in that claim 4 includes the repeater being internal to the patient. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 4 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

1.2. Claims 9-18

1.2.1. Claims 9-14, 18

D1, which is considered to be the closest prior art to the subject matter of claim 9, discloses a transmitting unit having a transmitting antenna circuit having a first resonant frequency and a high quality factor; a receiving unit having a receiving antenna circuit having a second resonant frequency and a high quality factor (See claims 1, 7, figure 1B). Claim 9 differs from D1 in that claim 9 includes a temperature sensor and a tunable component. However, it is well known from the parameter(resonant frequency) that are varied as a function of temperature in D2 (See paragraph [0459]). Accordingly, claim 9 would have been obvious over D1 in view of D2. Therefore, claim 9 lacks an inventive step under PCT Article 33(3).

The additional feature of claims 10-12 dependent on claim 9 is considered to be a minor difference over the disclosure of D1-D2, which falls under the general knowledge by a person skilled in the art. Therefore, claims 10-12 lack an inventive step under PCT Article 33(3).

The additional feature of claims 13-14 dependent on claim 9 is similar to the feature of tuning various electrical parameters such as the inductance or capacitance in D2 (See paragraph [0459]). Therefore, claims 13-14 lack an inventive step under PCT Article 33(3).

The additional feature of claim 18 depending on claim 9 is identical to the feature of D1 in the transmitting antenna(13) and receiving antenna(15) that may have quality factors greater than 100 (See paragraph [0054]). Therefore, claim 18 lacks an inventive step under PCT Article 33(3).

(Continued on Supplemental Box)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of :

Box V

1.2.2. Claims 15-17

The subject matter of claim 15 differs from these prior art document in that claim 15 includes the strength of the oscillating magnetic fields generated by the source resonator which is adjusted to maintain a substantially uniform level of power captured by the device resonator. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 15 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 16-17 are dependant on claim 15 and therefore meet the requirements of PCT Article 33(2) and (3).

2. Industrial Applicability

Claims 1-18 are industrially applicable under PCT Article 33(4).

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING
TRANSMITTAL OF COPY OF INTERNATIONAL
PRELIMINARY REPORT ON PATENTABILITY
(CHAPTER I OF THE PATENT COOPERATION
TREATY)
(PCT Rule 44bis.1(c))

To:

MONOCELLO, III, John, A.
GTC Law Group LLP & Affiliates
c/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402
ETATS-UNIS D'AMERIQUE

Date of mailing *(day/month/year)* 30 January 2014 (30.01.2014)	
Applicant's or agent's file reference WTCY-0034-PWO	**IMPORTANT NOTICE**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2012/047844	23 July 2012 (23.07.2012)	21 July 2011 (21.07.2011)

Applicant
WITRICITY CORPORATION et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. +41 22 338 82 70

Authorized officer
Athina Nickitas-Etienne

e-mail: pt04.pct@wipo.int

Form PCT/IB/326 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference WTCY-0034-PWO	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/US2012/047844	International filing date *(day/month/year)* 23 July 2012 (23.07.2012)	Priority date *(day/month/year)* 21 July 2011 (21.07.2011)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant WITRICITY CORPORATION		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 21 January 2014 (21.01.2014)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Athina Nickitas-Etienne e-mail: pt04.pct@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
MONOCELLO, III JOHN A.

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)* **25 MARCH 2013 (25.03.2013)**

Applicant's or agent's file reference
WTCY-0034-PWO

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2012/047844	**23 JULY 2012 (23.07.2012)**	21 JULY 2011 (21.07.2011)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i

Applicant

WITRICITY CORPORATION et al

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	21 MARCH 2013 (21.03.2013)	CHOI, Jeong Yoon Telephone No.82-42-481-8153

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/047844

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of :

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2012/047844

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-17	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	1-17	YES
	Claims	NONE	NO
Industrial applicability (IA)	Claims	1-17	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: KR 10-2011-0050920 A (SAMSUNG ELECTRONICS CO., LTD.) 17 May 2011
D2: US 2011-0115431 A1 (JEREMY D. DUNWORTH et al.) 19 May 2011
D3: WO 2011-061821 A1 (KABUSHIKI KAISHA TOSHIBA et al.) 26 May 2011
D4: US 2009-0243397 A1 (NIGEL P. COOK et al.) 01 October 2009
D5: KR 10-2009-0122072 A (KOREA UNIVERSITY RESEARCH AND BUSINESS FOUNDATION) 26

1. Novelty and Inventive Step

1.1 Claims 1-9

The subject matter of claim 1 differs from these prior art documents in adjusting a component value of an additional electrical component until an actual impedance of combined components is within a predetermined range of the target impedance, wherein the combined components includes a temporary matching resistor connected in series with an inductive loop of a magnetic resonator. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 1 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 2-14 are dependent on claim 1 and therefore meet the requirements of PCT Article 33(2) and (3).

(Continued on Supplemental Box)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of :

Box No. V

1.2 Claims 15-17

The subject matter of claim 15 differs from these prior art documents in connecting a temporary resistor in series with an inductive loop, wherein the temporary resistor chosen to simulate the loading of at least one additional resonator. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 15 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 16-17 are dependent on claim 15 and therefore meet the requirements of PCT Article 33(2) and (3).

2. Industrial Applicability

Claims 1-17 are industrially applicable under PCT Article 33(4).

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
AMBROZIAK JEFFREY

GTC LAW GROUP LLP & AFFILIATES C/O CPA GLOBAL
P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

	Date of mailing *(day/month/year)* 25 June 2013 (25.06.2013)
Applicant's or agent's file reference WTCY-0075-PWO	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. **PCT/US2013/023478**	International filing date *(day/month/year)* **28 January 2013 (28.01.2013)**
Applicant **WITRICITY CORPORATION**	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:

   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

   For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 . 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.
In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19months.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the PCT Applicant's Guide, National Chapters.

Name and mailing address of the ISA/KR Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea	Authorized officer COMMISSIONER
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-8754

Form PCT/ISA/220 (July 2010)

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for three months from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => PCT Services => PCT Services

ID : PCT international application number
PW : **6YRJ6E52**

Inquiries related to PCT International Search Report or Written Opinion prepared by KIPO as an International Searching Authority can be answered not only by KIPO but also through IPKC (Intellectual Property Korea Center), located in Vienna, VA, which functions as a PCT Help Desk for PCT applicants.

Homepage: http://www.ipkcenter.com

Email: ipkc@ipkcenter.com

Notes to Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference WTCY-0075-PWO	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. **PCT/US2013/023478**	International filing date *(day/month/year)* **28 January 2013 (28.01.2013)**	(Earliest) Priority Date *(day/month/year)* 26 January 2012 (26.01.2012)
Applicant **WITRICITY CORPORATION**		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 7 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. **38**
      ☒ as suggested by the applicant.
      ☐ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/023478

A. CLASSIFICATION OF SUBJECT MATTER

H02J 17/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H02J 17/00; H04B 5/00; H01F 38/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: wireless, power, transfer, resonator, capacitor

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011-0025131 A1 (ARISTEIDIS KARALIS et al.) 03 February 2011 See abstract, paragraphs [0053], [0117]-[0118], [0127], [0171] and claims 1, 12, 15.	1-20
A	US 2010-0237709 A1 (KATHERINE L. HALL et al.) 23 September 2010 See abstract, paragraphs [0156], [0185]-[0187] and figures 1, 6.	1-20
A	US 2010-0190435 A1 (NIGEL P. COOK et al.) 29 July 2010 See abstract, paragraphs [0043]-[0051] and figures 4, 16.	1-20
A	US 2011-0193416 A1 (ANDREW J. CAMPANELLA et al.) 11 August 2011 See abstract, claims 1-2 and figure 13.	1-20
A	US 2011-0266878 A9 (NIGEL P. COOK et al.) 03 November 2011 See abstract, claim 1 and figure 3.	1-20

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 June 2013 (25.06.2013)	**25 June 2013 (25.06.2013)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea	PARK, Hye Lyun
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-3463

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2013/023478

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011-0025131 A1	03.02.2011	AU 2006-269374 A1	18.01.2007
		AU 2006-269374 B2	08.10.2009
		AU 2006-269374 C1	25.03.2010
		AU 2007-349874 A1	02.10.2008
		AU 2007-349874 A2	02.10.2008
		CA 2615123 A1	18.01.2007
		CA 2682284 A1	02.10.2008
		CN 101258658 A0	03.09.2008
		CN 101258658 B	14.11.2012
		CN 101682216 A	24.03.2010
		CN 101860089 A	13.10.2010
		CN 102255398 A	23.11.2011
		CN 102361358 A	22.02.2012
		EP 1902505 A2	26.03.2008
		EP 2130287 A1	09.12.2009
		EP 2306615 A2	06.04.2011
		EP 2306616 A2	06.04.2011
		EP 2418755 A2	15.02.2012
		EP 2418755 A3	01.05.2013
		JP 04921466 B2	10.02.2012
		JP 05190108 B2	01.02.2013
		JP 2009-501510 A	15.01.2009
		JP 2011-177018 A	08.09.2011
		JP 2012-105537 A	31.05.2012
		JP 2012-502602 A	26.01.2012
		KR 10-1118710 B1	13.03.2012
		KR 10-1136889 B1	20.04.2012
		KR 10-1156616 B1	15.06.2012
		KR 10-2010-0015954 A	12.02.2010
		KR 10-2011-0117732 A	27.10.2011
		US 2007-0222542 A1	27.09.2007
		US 2008-0278264 A1	13.11.2008
		US 2009-0195332 A1	06.08.2009
		US 2009-0195333 A1	06.08.2009
		US 2009-0224856 A1	10.09.2009
		US 2009-0267709 A1	29.10.2009
		US 2009-0267710 A1	29.10.2009
		US 2010-0096934 A1	22.04.2010
		US 2010-0102639 A1	29.04.2010
		US 2010-0102640 A1	29.04.2010
		US 2010-0102641 A1	29.04.2010
		US 2010-0117455 A1	13.05.2010
		US 2010-0117456 A1	13.05.2010
		US 2010-0123353 A1	20.05.2010
		US 2010-0123354 A1	20.05.2010
		US 2010-0123355 A1	20.05.2010
		US 2010-0127573 A1	27.05.2010
		US 2010-0127574 A1	27.05.2010
		US 2010-0127575 A1	27.05.2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2010-0133918 A1	03.06.2010
		US 2010-0133919 A1	03.06.2010
		US 2010-0133920 A1	03.06.2010
		US 2010-0171370 A1	08.07.2010
		US 2010-0181844 A1	22.07.2010
		US 2010-0187911 A1	29.07.2010
		US 2010-0201205 A1	12.08.2010
		US 2010-0207458 A1	19.08.2010
		US 2010-0225175 A1	09.09.2010
		US 2010-0231053 A1	16.09.2010
		US 2010-0237706 A1	23.09.2010
		US 2010-0237707 A1	23.09.2010
		US 2010-0237708 A1	23.09.2010
		US 2010-0253152 A1	07.10.2010
		US 2010-0264745 A1	21.10.2010
		US 2010-0277005 A1	04.11.2010
		US 2010-0327660 A1	30.12.2010
		US 2010-0327661 A1	30.12.2010
		US 2011-0012431 A1	20.01.2011
		US 2011-0018361 A1	27.01.2011
		US 2011-0043046 A1	24.02.2011
		US 2011-0049996 A1	03.03.2011
		US 2011-0049998 A1	03.03.2011
		US 2011-0074218 A1	31.03.2011
		US 2011-0074347 A1	31.03.2011
		US 2011-0089895 A1	21.04.2011
		US 2011-0140544 A1	16.06.2011
		US 2011-0148219 A1	23.06.2011
		US 2011-0162895 A1	07.07.2011
		US 2011-0169339 A1	14.07.2011
		US 2011-0193419 A1	11.08.2011
		US 2011-181122 A1	28.07.2011
		US 2011-198939 A1	18.08.2011
		US 2011-221278 A1	15.09.2011
		US 2011-227528 A1	22.09.2011
		US 2011-227530 A1	22.09.2011
		US 2011-241618 A1	06.10.2011
		US 7741734 B2	22.06.2010
		US 7825543 B2	02.11.2010
		US 8022576 B2	20.09.2011
		US 8076800 B2	13.12.2011
		US 8084889 B2	27.12.2011
		US 8097983 B2	17.01.2012
		US 8395282 B2	12.03.2013
		US 8395283 B2	12.03.2013
		US 8400018 B2	19.03.2013
		US 8400019 B2	19.03.2013
		US 8400020 B2	19.03.2013
		US 8400021 B2	19.03.2013
		US 8400022 B2	19.03.2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 8400023 B2	19.03.2013
		US 8400024 B2	19.03.2013
		WO 2007-008646 A2	18.01.2007
		WO 2008-118178 A1	02.10.2008
		WO 2008-118178 A8	14.05.2009
US 2010-0237709 A1	23.09.2010	AU 2009-296413 A1	01.04.2010
		AU 2010-213557 A1	19.08.2010
		CA 2738654 A1	01.04.2010
		CA 2752573 A1	19.08.2010
		CA 2792256 A1	15.09.2011
		CN 102239633 A	09.11.2011
		CN 102439669 A	02.05.2012
		JP 2012-504387 A	16.02.2012
		JP 2012-518382 A	09.08.2012
		KR 10-2011-0074761 A	01.07.2011
		KR 10-2011-0127203 A	24.11.2011
		US 2010-0109445 A1	06.05.2010
		US 2010-0141042 A1	10.06.2010
		US 2010-0164296 A1	01.07.2010
		US 2010-0164297 A1	01.07.2010
		US 2010-0164298 A1	01.07.2010
		US 2010-0171368 A1	08.07.2010
		US 2010-0181843 A1	22.07.2010
		US 2010-0181845 A1	22.07.2010
		US 2010-0201203 A1	12.08.2010
		US 2010-0219694 A1	02.09.2010
		US 2010-0231340 A1	16.09.2010
		US 2010-0259108 A1	14.10.2010
		US 2010-0259110 A1	14.10.2010
		US 2010-0264747 A1	21.10.2010
		US 2010-0277121 A1	04.11.2010
		US 2010-0308939 A1	09.12.2010
		US 2011-0043047 A1	24.02.2011
		US 2011-0043048 A1	24.02.2011
		US 2011-0043049 A1	24.02.2011
		US 2011-0074346 A1	31.03.2011
		US 2011-0095618 A1	28.04.2011
		US 2011-0121920 A1	26.05.2011
		US 2011-0193416 A1	11.08.2011
		US 2012-0032522 A1	09.02.2012
		US 2012-0062345 A1	15.03.2012
		US 2012-0139355 A1	07.06.2012
		US 2012-0235500 A1	20.09.2012
		US 2012-0280765 A1	08.11.2012
		US 8035255 B2	11.10.2011
		US 8106539 B2	31.01.2012
		US 8304935 B2	06.11.2012
		US 8324759 B2	04.12.2012
		US 8410636 B2	02.04.2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		WO 2010-036980 A1	01.04.2010
		WO 2010-093997 A1	19.08.2010
		WO 2011-112795 A1	15.09.2011
		WO 2012-037279 A1	22.03.2012
		WO 2012-047779 A1	12.04.2012
		WO 2012-170278 A2	13.12.2012
US 2010-0190435 A1	29.07.2010	CN 102132292 A	20.07.2011
		CN 102144239 A	03.08.2011
		CN 102150340 A	10.08.2011
		EP 2332096 A1	15.06.2011
		EP 2332098 A1	15.06.2011
		EP 2342796 A2	13.07.2011
		JP 2012-501160 A	12.01.2012
		JP 2012-502612 A	26.01.2012
		JP 2012-503469 A	02.02.2012
		KR 10-1233015 B1	13.02.2013
		KR 10-1244513 B1	18.03.2013
		KR 10-2011-0050697 A	16.05.2011
		KR 10-2011-0051272 A	17.05.2011
		KR 10-2011-0053487 A	23.05.2011
		KR 10-2013-0025434 A	11.03.2013
		KR 10-2013-0027042 A	14.03.2013
		US 2010-0148723 A1	17.06.2010
		US 2010-0184371 A1	22.07.2010
		US 8432070 B2	30.04.2013
		WO 2010-025156 A1	04.03.2010
		WO 2010-028092 A1	11.03.2010
		WO 2010-028092 A8	04.11.2010
		WO 2010-033727 A2	25.03.2010
US 2011-0193416 A1	11.08.2011	AU 2009-296413 A1	01.04.2010
		AU 2010-213557 A1	19.08.2010
		CA 2738654 A1	01.04.2010
		CA 2752573 A1	19.08.2010
		CA 2792256 A1	15.09.2011
		CN 102239633 A	09.11.2011
		CN 102439669 A	02.05.2012
		JP 2012-504387 A	16.02.2012
		JP 2012-518382 A	09.08.2012
		KR 10-2011-0074761 A	01.07.2011
		KR 10-2011-0127203 A	24.11.2011
		US 2010-0109445 A1	06.05.2010
		US 2010-0141042 A1	10.06.2010
		US 2010-0164296 A1	01.07.2010
		US 2010-0164297 A1	01.07.2010
		US 2010-0164298 A1	01.07.2010
		US 2010-0171368 A1	08.07.2010
		US 2010-0181843 A1	22.07.2010
		US 2010-0181845 A1	22.07.2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2010-0201203 A1	12.08.2010
		US 2010-0219694 A1	02.09.2010
		US 2010-0231340 A1	16.09.2010
		US 2010-0237709 A1	23.09.2010
		US 2010-0259108 A1	14.10.2010
		US 2010-0259110 A1	14.10.2010
		US 2010-0264747 A1	21.10.2010
		US 2010-0277121 A1	04.11.2010
		US 2010-0308939 A1	09.12.2010
		US 2011-0043047 A1	24.02.2011
		US 2011-0043048 A1	24.02.2011
		US 2011-0043049 A1	24.02.2011
		US 2011-0074346 A1	31.03.2011
		US 2011-0095618 A1	28.04.2011
		US 2011-0121920 A1	26.05.2011
		US 2012-0032522 A1	09.02.2012
		US 2012-0062345 A1	15.03.2012
		US 2012-0139355 A1	07.06.2012
		US 2012-0235500 A1	20.09.2012
		US 2012-0280765 A1	08.11.2012
		US 8035255 B2	11.10.2011
		US 8106539 B2	31.01.2012
		US 8304935 B2	06.11.2012
		US 8324759 B2	04.12.2012
		US 8410636 B2	02.04.2013
		WO 2010-036980 A1	01.04.2010
		WO 2010-093997 A1	19.08.2010
		WO 2011-112795 A1	15.09.2011
		WO 2012-037279 A1	22.03.2012
		WO 2012-047779 A1	12.04.2012
		WO 2012-170278 A2	13.12.2012
US 2011-0266878 A9	03.11.2011	CN 101828300 A	08.09.2010
		EP 2201641 A1	30.06.2010
		JP 2010-539857 A	16.12.2010
		KR 10-2010-0067676 A	21.06.2010
		US 2009-079268 A1	26.03.2009
		WO 2009-039113 A1	26.03.2009

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
AMBROZIAK JEFFREY

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**25 June 2013 (25.06.2013)**
Applicant's or agent's file reference: WTCY-0075-PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2013/023478	**28 January 2013 (28.01.2013)**	26 January 2012 (26.01.2012)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i

Applicant
WITRICITY CORPORATION

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	25 June 2013 (25.06.2013)	PARK, Hye Lyun Telephone No. 82-42-481-3463

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2013/023478

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2013/023478

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-20	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	NONE	YES
	Claims	1-20	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following document:

D1: US 2011-0025131 A1 (ARISTEIDIS KARALIS et al.) 03 February 2011

1. Novelty and Inventive step

1.1 Claims 1-11

1.1.1 Independent claim 1

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a wireless power system comprising: a conducting coil; and a capacitor in series with said conducting coil (See claim 15). The subject matter of claim 1 differs from a system of D1 in an inductor. However, such a slight change in a conducting coil comes within the scope of the customary practice followed by a person skilled in the art. Accordingly, this claim would have been obvious over D1. Therefore, claim 1 lacks an inventive step under PCT Article 33(3).

1.1.2 Dependent claims 2-11

The additional feature of claim 2 is identical to the feature of D1 in that a quality factor is greater than about 5000 (See paragraph [0053]).

Claims 3-4 further specify a size of loops and a magnitude of diepoles. However, the additional features of claims 3-4 are merely matters of design option when the general knowledge in relevant field of the art is used.

Continued on Supplemental Box

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of : Box No. V

The additional features of claims 5-7 are identical to the features of D1 in a wireless energy transfer system (See paragraph [0127]).

Claims 8-9 further specify a type of loops. However, the additional feature of claims 8-9 is merely a matter of design option when the general knowledge in relevant field of the art is used.

The additional feature of claim 10 is identical to the feature of D1 in a capacitor having a variable capacitance (See claim 1).

Claim 11 further specifies a second capacitor. However, the additional feature of claim 11 is merely a matter of design option when the general knowledge in relevant field of the art is used.

Accordingly, claims 2-11 would have been obvious over D1. Therefore, claims 2-11 lack an inventive step under PCT Article 33(3).

1.2 Claims 12-13

1.2.1 Independent claim 12

D1, which is considered to be the closest prior art to the subject matter of claim 12, discloses a wireless power system comprising: conducting loops; and an electronic circuit that controls a variable inductor (See paragraph [0117], claim 12). The subject matter of claim 12 differs from a system of D1 in a control system. However, such a slight change in an electronic circuit comes within the scope of the customary practice followed by a person skilled in the art. Accordingly, this claim would have been obvious over D1. Therefore, claim 12 lacks an inventive step under PCT Article 33(3).

1.2.2 Dependent claim 13

The additional feature of claim 13 is identical to the feature of D1 in a subwavelength current loop (magnetic dipole) with h=0 (See paragraph [0171]). Accordingly, this claim would have been obvious over D1. Therefore, claim 13 lacks an inventive step under PCT Article 33(3).

Continued on The Next Page

Supplemental Box

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Continuation of: Previous Page

1.3 Claims 14-16

1.3.1 Independent claim 14

Claim 14 relates to a method for manufacturing a magnetic resonator, but it shares the same technical features with claim 12. Accordingly, the same reasoning as in claim 12 applies to claim 14. Therefore, claim 14 lacks an inventive step under PCT Article 33(3).

1.3.2 Dependent claims 15-16

Claim 15 further specifies altering at least one dipole moment. However, the additional feature of claim 15 is considered to be a minor difference over the disclosure of D1 that falls under the general knowledge of a person skilled in the art.

The additional feature of claim 16 is identical to the feature of D1 in a subwavelength current loop (magnetic dipole) with h=0 (See paragraph [0171]).

Accordingly, claims 15-16 would have been obvious over D1. Therefore, claims 15-16 lack an inventive step under PCT Article 33(3).

1.4 Claims 17-18

1.4.1 Independent claim 17

D1, which is considered to be the closest prior art to the subject matter of claim 17, discloses a wireless power system comprising: a first high-Q magnetic resonator; and a pair of conducting parallel plates (See claim 1, paragraph [0118]). The subject matter of claim 17 differs from a system of D1 in a position of a conducting plate. However, such a slight change in a parallel conducting plate comes within the scope of the customary practice followed by a person skilled in the art. Accordingly, this claim would have been obvious over D1. Therefore, claim 17 lacks an inventive step under PCT Article 33(3).

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Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of: Previous Page

1.4.2 Dependent claim 18

Claim 18 further specifies a position of the conducting plates. However, the additional feature of claim 18 is considered to be a minor difference over the disclosure of D1 that falls under the general knowledge of a person skilled in the art. Accordingly, this claim would have been obvious over D1. Therefore, claim 18 lacks an inventive step under PCT Article 33(3).

1.5 Claims 19-20

Claims 19-20 relate to a wireless power device, but they share the same technical features with claims 17-18, respectively. Accordingly, the same reasonings as in claims 17-18 apply to claims 19-20. Therefore, claims 19-20 lack an inventive step under PCT Article 33(3).

2. Industrial Applicability

Claims 1-20 are industrially applicable under PCT Article 33(4).

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
AMBROZIAK JEFFREY

GTC LAW GROUP LLP & AFFILIATES C/O CPA GLOBAL
P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing *(day/month/year)*	25 July 2013 (25.07.2013)
Applicant's or agent's file reference: WTCY-0055PWO	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No.: **PCT/US2013/033599**	International filing date *(day/month/year)*: **22 March 2013 (22.03.2013)**

Applicant

WITRICITY CORPORATION

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 . 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19months.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the PCT Applicant's Guide, National Chapters.

Name and mailing address of the ISA/KR: Korean Intellectual Property Office, 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea	Authorized officer: COMMISSIONER
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481

AUG 05 2013

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Form PCT/ISA/220 (July 2010)

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for three months from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => PCT Services => PCT Services

ID : PCT international application number
PW : **4M89ZA84**

Inquiries related to PCT International Search Report or Written Opinion prepared by KIPO as an International Searching Authority can be answered not only by KIPO but also through IPKC (Intellectual Property Korea Center), located in Vienna, VA, which functions as a PCT Help Desk for PCT applicants.

Homepage: http://www.ipkcenter.com

Email: ipkc@ipkcenter.com

Notes to Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference WTCY-0055PWO	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. **PCT/US2013/033599**	International filing date *(day/month/year)* **22 March 2013 (22.03.2013)**	(Earliest) Priority Date *(day/month/year)* 23 March 2012 (23.03.2012)

Applicant
WITRICITY CORPORATION

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 6 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of :
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43 6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 74(a)
      ☒ as suggested by the applicant.
      ☐ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/033599

A. CLASSIFICATION OF SUBJECT MATTER

H02J 17/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H02J 17/00; H03B 19/00; H04B 3/54; H04M 1/00; H01F 38/14; H03H 9/00; H04B 1/38

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: wireless power receiving, resonator, Q-factor, mobile, wire

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2010-036980 A1 (WITRICITY CORP. et al.) 01 April 2010 See paragraphs [0085]-[0111], claims 1,8, and figure 1.	1-9
A		10-21
Y	US 8022576 B2 ((JOHN D. JOANNOPOULOS et al.) 20 September 2011 See column 4, line 34-column 5, line 47, claims 1,44,59,92-93, and figure 1.	1-9
A		10-21
A	WO 2008-109489 A2 (NIGELPOWER LLC.) 12 September 2008 See claims 72-83 and figure 8.	1-21
A	US 2012-0068549 A1 (ARISTEIDIS KARALIS et al.) 22 March 2012 See abstract, claim 1, and figure 10.	1-21
A	US 2010-0104031 A1 (GILLES LACOUR) 29 April 2010 See paragraphs [0091]-[0108] and figure 4.	1-21

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 July 2013 (24.07.2013)	**25 July 2013 (25.07.2013)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. +82-42-472-7140	PARK Hye Lyun Telephone No. +82-42-481-3463

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2013/033599

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010-036980 A1	01/04/2010	AU 2009-296413 A1	01/04/2010
		AU 2010-213557 A1	19/08/2010
		CA 2738654 A1	01/04/2010
		CA 2752573 A1	19/08/2010
		CA 2792256 A1	15/09/2011
		CN 102239633 A	09/11/2011
		CN 102439669 A	02/05/2012
		CN 102870338 A	09/01/2013
		EP 2340611 A1	06/07/2011
		EP 2545654 A1	16/01/2013
		JP 2012-504387 A	16/02/2012
		JP 2012-518382 A	09/08/2012
		JP 2013-523066 A	13/06/2013
		KR 10-2011-0074761 A	01/07/2011
		KR 10-2011-0127203 A	24/11/2011
		KR 10-2013-0069561 A	26/06/2013
		US 2010-0109445 A1	06/05/2010
		US 2010-0141042 A1	10/06/2010
		US 2010-0164296 A1	01/07/2010
		US 2010-0164297 A1	01/07/2010
		US 2010-0164298 A1	01/07/2010
		US 2010-0171368 A1	08/07/2010
		US 2010-0181843 A1	22/07/2010
		US 2010-0181845 A1	22/07/2010
		US 2010-0201203 A1	12/08/2010
		US 2010-0219694 A1	02/09/2010
		US 2010-0231340 A1	16/09/2010
		US 2010-0237709 A1	23/09/2010
		US 2010-0259108 A1	14/10/2010
		US 2010-0259110 A1	14/10/2010
		US 2010-0264747 A1	21/10/2010
		US 2010-0277121 A1	04/11/2010
		US 2010-0308939 A1	09/12/2010
		US 2011-0043047 A1	24/02/2011
		US 2011-0043048 A1	24/02/2011
		US 2011-0043049 A1	24/02/2011
		US 2011-0074346 A1	31/03/2011
		US 2011-0095618 A1	28/04/2011
		US 2011-0121920 A1	26/05/2011
		US 2011-0193416 A1	11/08/2011
		US 2012-0032522 A1	09/02/2012
		US 2012-0062345 A1	15/03/2012
		US 2012-0139355 A1	07/06/2012
		US 2012-0235500 A1	20/09/2012
		US 2012-0280765 A1	08/11/2012
		US 8035255 B2	11/10/2011
		US 8106539 B2	31/01/2012
		US 8304935 B2	06/11/2012
		US 8324759 B2	04/12/2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 8410636 B2	02/04/2013
		US 8461719 B2	11/06/2013
		US 8461720 B2	11/06/2013
		US 8461721 B2	11/06/2013
		WO 2010-093997 A1	19/08/2010
		WO 2011-112795 A1	15/09/2011
		WO 2012-037279 A1	22/03/2012
		WO 2012-047779 A1	12/04/2012
		WO 2012-170278 A2	13/12/2012
US 8022576 B2	20/09/2011	AU 2006-269374 A1	18/01/2007
		AU 2006-269374 B2	08/10/2009
		AU 2006-269374 C1	25/03/2010
		AU 2007-349874 A1	02/10/2008
		AU 2007-349874 A2	02/10/2008
		AU 2010-200044 A1	28/01/2010
		CA 2615123 A1	18/01/2007
		CA 2682284 A1	02/10/2008
		CN 101258658 A0	03/09/2008
		CN 101258658 B	14/11/2012
		CN 101682216 A	24/03/2010
		CN 101860089 A	13/10/2010
		CN 101860089 B	06/02/2013
		CN 102255398 A	23/11/2011
		CN 102361358 A	22/02/2012
		CN 102983639 A	20/03/2013
		EP 1902505 A2	26/03/2008
		EP 2130287 A1	09/12/2009
		EP 2306615 A2	06/04/2011
		EP 2306616 A2	06/04/2011
		EP 2418755 A2	15/02/2012
		EP 2418755 A3	01/05/2013
		JP 04921466 B2	10/02/2012
		JP 05190108 B2	01/02/2013
		JP 2009-501510 A	15/01/2009
		JP 2011-177018 A	08/09/2011
		JP 2012-105537 A	31/05/2012
		JP 2012-502602 A	26/01/2012
		KR 10-1118710 B1	13/03/2012
		KR 10-1136889 B1	20/04/2012
		KR 10-1156616 B1	15/06/2012
		KR 10-2008-0031398 A	08/04/2008
		KR 10-2010-0015954 A	12/02/2010
		KR 10-2011-0117732 A	27/10/2011
		US 2007-0222542 A1	27/09/2007
		US 2008-0278264 A1	13/11/2008
		US 2009-0195332 A1	06/08/2009
		US 2009-0195333 A1	06/08/2009
		US 2009-0224856 A1	10/09/2009
		US 2009-0267709 A1	29/10/2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2009-0267710 A1	29/10/2009
		US 2010-0096934 A1	22/04/2010
		US 2010-0102639 A1	29/04/2010
		US 2010-0102640 A1	29/04/2010
		US 2010-0102641 A1	29/04/2010
		US 2010-0117455 A1	13/05/2010
		US 2010-0117456 A1	13/05/2010
		US 2010-0123353 A1	20/05/2010
		US 2010-0123354 A1	20/05/2010
		US 2010-0123355 A1	20/05/2010
		US 2010-0127573 A1	27/05/2010
		US 2010-0127574 A1	27/05/2010
		US 2010-0127575 A1	27/05/2010
		US 2010-0133918 A1	03/06/2010
		US 2010-0133919 A1	03/06/2010
		US 2010-0133920 A1	03/06/2010
		US 2010-0171370 A1	08/07/2010
		US 2010-0181844 A1	22/07/2010
		US 2010-0187911 A1	29/07/2010
		US 2010-0201205 A1	12/08/2010
		US 2010-0207458 A1	19/08/2010
		US 2010-0225175 A1	09/09/2010
		US 2010-0231053 A1	16/09/2010
		US 2010-0237706 A1	23/09/2010
		US 2010-0237707 A1	23/09/2010
		US 2010-0237708 A1	23/09/2010
		US 2010-0253152 A1	07/10/2010
		US 2010-0264745 A1	21/10/2010
		US 2010-0277005 A1	04/11/2010
		US 2010-0327660 A1	30/12/2010
		US 2010-0327661 A1	30/12/2010
		US 2011-0012431 A1	20/01/2011
		US 2011-0018361 A1	27/01/2011
		US 2011-0025131 A1	03/02/2011
		US 2011-0043046 A1	24/02/2011
		US 2011-0049996 A1	03/03/2011
		US 2011-0049998 A1	03/03/2011
		US 2011-0074218 A1	31/03/2011
		US 2011-0074347 A1	31/03/2011
		US 2011-0089895 A1	21/04/2011
		US 2011-0140544 A1	16/06/2011
		US 2011-0148219 A1	23/06/2011
		US 2011-0162895 A1	07/07/2011
		US 2011-0169339 A1	14/07/2011
		US 2011-0193419 A1	11/08/2011
		US 7741734 B2	22/06/2010
		US 7825543 B2	02/11/2010
		US 8076800 B2	13/12/2011
		US 8084889 B2	27/12/2011
		US 8097983 B2	17/01/2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 8395282 B2	12/03/2013
		US 8395283 B2	12/03/2013
		US 8400018 B2	19/03/2013
		US 8400019 B2	19/03/2013
		US 8400020 B2	19/03/2013
		US 8400021 B2	19/03/2013
		US 8400022 B2	19/03/2013
		US 8400023 B2	19/03/2013
		US 8400024 B2	19/03/2013
		WO 2007-008646 A2	18/01/2007
		WO 2007-008646 A3	28/02/2008
		WO 2008-118178 A1	02/10/2008
WO 2008-109489 A2	12/09/2008	CN 101720529 A	02/06/2010
		EP 2127105 A2	02/12/2009
		EP 2127105 A4	16/01/2013
		JP 2010-520716 A	10/06/2010
		JP 2012-135204 A	12/07/2012
		JP 2012-135205 A	12/07/2012
		JP 2012-143148 A	26/07/2012
		KR 10-1168619 B1	01/08/2012
		KR 10-1195798 B1	05/11/2012
		KR 10-1234924 B1	19/02/2013
		KR 10-2009-0118094 A	17/11/2009
		KR 10-2011-0110863 A	07/10/2011
		KR 10-2011-0110864 A	07/10/2011
		KR 10-2012-0099466 A	10/09/2012
		KR 10-2013-0008632 A	22/01/2013
		US 2008-0211320 A1	04/09/2008
		WO 2008-109489 A3	30/10/2008
US 2012-0068549 A1	22/03/2012	AU 2009-246310 A1	19/11/2009
		CA 2724341 A1	19/11/2009
		CN 102099958 A	15/06/2011
		EP 2281322 A1	09/02/2011
		EP 2281322 A4	28/03/2012
		JP 2011-523844 A	18/08/2011
		KR 10-2011-0014649 A	11/02/2011
		US 2009-0284083 A1	19/11/2009
		US 8076801 B2	13/12/2011
		WO 2009-140506 A1	19/11/2009
US 2010-0104031 A1	29/04/2010	CN 101663833 A	03/03/2010
		EP 2140565 A1	06/01/2010
		FR 2914512 A1	03/10/2008
		JP 2010-523030 A	08/07/2010
		KR 10-2010-0015517 A	12/02/2010
		RU 2009139632 A	10/05/2011
		WO 2008-125394 A1	23/10/2008

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
AMBROZIAK JEFFREY

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**25 July 2013 (25.07.2013)**
Applicant's or agent's file reference	**FOR FURTHER ACTION**
WTCY-0055PWO	See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2013/033599	**22 March 2013 (22.03.2013)**	23 March 2012 (23.03.2012)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i

Applicant

WITRICITY CORPORATION

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. +82-42-472-7140	24 July 2013 (24.07.2013)	PARK Hye Lyun Telephone No. +82-42-481-3463

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2013/033599

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of :

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2013/033599

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-21	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	10-21	YES
	Claims	1-9	NO
Industrial applicability (IA)	Claims	1-21	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: WO 2010-036980 A1 (WITRICITY CORP.) 01 April 2010
D2: US 8022576 B2 (JOHN D. JOANNOPOULOS et al.) 20 September 2011
D3: WO 2008-109489 A2 (NIGELPOWER LLC.) 12 September 2008
D4: US 2012-0068549 A1 (ARISTEIDIS KARALIS et al.) 22 March 2012
D5: US 2010-0104031 A1 (GILLES LACOUR) 29 April 2010

1. Novelty and Inventive step

1.1 Claim 1

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a system, comprising: a source resonator having a Q-factor Q_1 and a characteristic size X_1; a second resonator having a Q-factor Q_2 and a characteristic size x_2, wherein the source resonator and the second resonator are coupled to exchange energy wirelessly between the source resonator and the second resonator, and wherein $\sqrt{Q_1 Q_2} > 100$ (See claim 1 in D1). Claim 1 differs from D1 in that a device resonator is integrated in a mobile device. However, D2 discloses that a second resonator structure and a load are part of a mobile wireless receiver (See claim 92 in D2). Accordingly, this claim would have been obvious over D1 and D2. Therefore, claim 1 lacks an inventive step under PCT Article 33(3)

Continued on Supplemental Box

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of : Box No. V

1.2 Claims 2-9

The additional features of claims 2-4, 6-9 are merely matters of design option when the general technical knowledge about the state of the art is used. Accordingly, these claims would have been obvious over D1 and D2. Therefore, claims 2-4, 6-9 lack an inventive step under PCT Article 33(3).

The additional feature of claim 5 is virtually suggested by the feature of D1 considering a tunable circuit wherein the source resonator is coupled to the power generator through the tunable circuit with direct electrical connections (See claim 8 in D1). Accordingly, claim 5 would have been obvious over D1 and D2. Therefore, claim 5 lacks an inventive step under PCT Article 33(3).

1.3 Claims 10-17

The subject matter of claim 10 differs from these prior art documents in that a resonator is configured to capture power from an oscillating magnetic field and deliver power to the charging circuitry of the mobile device via a wireless power receiver coupled to the charging circuitry. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 10 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 11-17 are dependent on claim 10 and therefore meet the requirements of PCT Article 33(2) and (3).

1.4 Claims 18-21

The subject matter of claim 18 differs from these prior art documents in a method for supplying wireless power to a mobile electronic device, comprising: providing a wireless power receiver directly connected to the charging circuitry of the mobile electronic device; capturing power in a high-Q resonator when the high-Q resonator is in proximity to an oscillating magnetic field; and wirelessly transmitting said captured power to the wireless power receiver of the mobile electronic device. And these features are not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 18 meets the

Continued on The Next Page

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of : Previous Page

requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 19-21 are dependent on claim 18 and therefore meet the requirements of PCT Article 33(2) and (3).

2. Industrial Applicability

Claims 1-21 are industrially applicable under PCT Article 33(4).

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
AMBROZIAK, JEFFREY R.

GTC LAW GROUP LLP & AFFILIATES C/O CPA GLOBAL
P.O. BOX 52050 MINNEAPOLIS, MINNESOTA 55402 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing *(day/month/year)*	15 October 2013 (15.10.2013)
Applicant's or agent's file reference: WTCY-0096PWO	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No.: **PCT/US2013/048210**	International filing date *(day/month/year)*: **27 June 2013 (27.06.2013)**

Applicant

WITRICITY CORPORATION

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see *PCT Applicant's Guide*, International Phase, paragraphs 9.004 . 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. Following the expiration of 30 months from the priority date, these comments will also be made available to the public.

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19months.

For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the PCT Applicant's Guide, National Chapters.

Name and mailing address of the ISA/KR: Korean Intellectual Property Office, 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea	Authorized officer: COMMISSIONER
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-8753

Form PCT/ISA/220 (July 2010)

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for three months from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => PCT Services => PCT Services

ID : PCT international application number
PW : **6874UQ24**

Inquiries related to PCT International Search Report or Written Opinion prepared by KIPO as an International Searching Authority can be answered not only by KIPO but also through IPKC (Intellectual Property Korea Center), located in Vienna, VA, which functions as a PCT Help Desk for PCT applicants.

Homepage: http://www.ipkcenter.com

Email: ipkc@ipkcenter.com

Notes to Form PCT/ISA/220 (July 2010)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference WTCY-0096PWO	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. **PCT/US2013/048210**	International filing date *(day/month/year)* **27 June 2013 (27.06.2013)**	(Earliest) Priority Date *(day/month/year)* 27 June 2012 (27.06.2012)
Applicant **WITRICITY CORPORATION**		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title**,
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract**,
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 1
      ☐ as suggested by the applicant.
      ☒ as selected by this Authority, because the applicant failed to suggest a figure.
      ☐ as selected by this Authority, because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/048210

A. CLASSIFICATION OF SUBJECT MATTER

H02J 17/00(2006.01)i, H02J 7/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H02J 17/00; H04N 7/18; H01F 21/04; H02J 7/00; H04B 1/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: wireless energy transfer, rechargeable battery, resonator coil, wearable, helmet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2010-0201312 A1 (MILES ALEXANDER LYELL KIRBY et al.) 12 August 2010 See paragraphs [0105]-[0106], claims 30-32, and figure 18.	18-19
A		1-17,20-52
A	US 2011-0031928 A1 (ROGER J. SOAR) 10 February 2011 See abstract, paragraphs [0046],[0088]-[0096], and figure 11.	1-52
A	US 2011-0278943 A1 (PHILLIP ANDREW ECKHOFF et al.) 17 November 2011 See paragraphs [0057]-[0066], claim 1, and figure 1.	1-52
A	US 2008-0291277 A1 (JEFFREY J. JACOBSEN et al.) 27 November 2008 See paragraphs [0058]-[0062], claim 1, and figure 2.	1-52
A	US 7932798 B2 (TOBIAS GEORG TOLLE et al.) 26 April 2011 See abstract, claims 1,7, and figures 3-4.	1-52

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 October 2013 (15.10.2013)	**15 October 2013 (15.10.2013)**

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea
Facsimile No. +82-42-472-7140

Authorized officer
PARK Hye Lyun
Telephone No. +82-42-481-3463

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US2013/048210

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0201312 A1	12/08/2010	CN 102318161 A	11/01/2012
		CN 102318210 A	11/01/2012
		CN 102318211 A	11/01/2012
		CN 102318212 A	11/01/2012
		CN 102318213 A	11/01/2012
		EP 2396868 A2	21/12/2011
		JP 2012-517792 A	02/08/2012
		JP 2012-517793 A	02/08/2012
		JP 2012-517794 A	02/08/2012
		JP 2012-517795 A	02/08/2012
		JP 2012-517796 A	02/08/2012
		KR 10-2011-0114701 A	19/10/2011
		KR 10-2011-0114703 A	19/10/2011
		KR 10-2011-0114704 A	19/10/2011
		KR 10-2011-0117697 A	27/10/2011
		TW 201042878 A	01/12/2010
		TW 201042879 A	01/12/2010
		TW 201042880 A	01/12/2010
		TW 201042881 A	01/12/2010
		TW 201101640 A	01/01/2011
		TW 201130204 A	01/09/2011
		TW 201130205 A	01/09/2011
		US 2010-0201189 A1	12/08/2010
		US 2010-0201201 A1	12/08/2010
		US 2010-0201202 A1	12/08/2010
		US 2010-0201311 A1	12/08/2010
		US 2010-0201533 A1	12/08/2010
		US 2010-0289341 A1	18/11/2010
		US 2012-0019057 A9	26/01/2012
		US 2012-0153731 A9	21/06/2012
		US 2013-147429 A1	13/06/2013
		WO 2010-093719 A1	19/08/2010
		WO 2010-093721 A1	19/08/2010
		WO 2010-093723 A1	19/08/2010
		WO 2010-093724 A1	19/08/2010
		WO 2010-093728 A2	19/08/2010
		WO 2010-093728 A3	16/12/2010
		WO 2010-093729 A1	19/08/2010
		WO 2010-093730 A2	19/08/2010
		WO 2010-093730 A3	16/12/2010
US 2011-0031928 A1	10/02/2011	CA 2715937 A1	30/03/2011
		CA 2717533 A1	13/04/2011
		CA 2777596 A1	21/04/2011
		EP 2489110 A1	22/08/2012
		IL 219187 D0	28/06/2012
		US 2011-0018498 A1	27/01/2011
		US 2011-0089894 A1	21/04/2011
		US 2012-206097 A1	16/08/2012

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US2013/048210

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 7994752 B2	09/08/2011
		WO 2011-044695 A1	21/04/2011
US 2011-0278943 A1	17/11/2011	None	
US 2008-0291277 A1	27/11/2008	CN 101632033 A	20/01/2010
		CN 101632033 B	31/07/2013
		DE 112008000168 T5	03/12/2009
		GB 0913858 D0	16/09/2009
		GB 2459220 A	21/10/2009
		GB 2459220 B	05/09/2012
		JP 05190070 B2	24/04/2013
		JP 2010-516186 A	13/05/2010
		KR 10-2009-0101378 A	25/09/2009
		US 8378924 B2	19/02/2013
		WO 2008-088691 A2	24/07/2008
		WO 2008-088691 A3	02/10/2008
		WO 2008-140630 A2	20/11/2008
		WO 2008-140630 A3	26/03/2009
		WO 2008-140630 A8	25/06/2009
US 7932798 B2	26/04/2011	AT 441933 T	15/09/2009
		DE 602006008906 D1	15/10/2009
		EP 1861858 A2	05/12/2007
		EP 1861858 B1	02/09/2009
		JP 04804530 B2	02/11/2011
		JP 2008-536461 A	04/09/2008
		US 2008-0204181 A1	28/08/2008
		WO 2006-097870 A2	21/09/2006
		WO 2006-097870 A3	15/02/2007

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
AMBROZIAK, JEFFREY R.

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS, MINNESOTA
55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**15 October 2013 (15.10.2013)**
Applicant's or agent's file reference: WTCY-0096PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2013/048210	**27 June 2013 (27.06.2013)**	27 June 2012 (27.06.2012)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i, H02J 7/00(2006.01)i

Applicant
WITRICITY CORPORATION

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. +82-42-472-7140	15 October 2013 (15.10.2013)	PARK Hye Lyun Telephone No. +82-42-481-3463

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2013/048210

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of :

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2013/048210

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-52	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	1-17,20-52	YES
	Claims	18-19	NO
Industrial applicability (IA)	Claims	1-52	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: US 2010-0201312 A1 (MILES ALEXANDER LYELL KIRBY et al.) 12 August 2010
D2: US 2011-0031928 A1 (ROGER J. SOAR) 10 February 2011
D3: US 2011-0278943 A1 (PHILLIP ANDREW ECKHOFF et al.) 17 November 2011
D4: US 2008-0291277 A1 (JEFFREY J. JACOBSEN et al.) 27 November 2008
D5: US 7932798 B2 (TOBIAS GEORG TOLLE et al.) 26 April 2011

1. Novelty and Inventive step

1.1 Claims 1-8

The subject matter of claim 1 differs from these prior art documents in an assembly of at least two resonator coils comprising: a first resonator coil configured for wireless energy transfer via oscillating magnetic fields; and a second resonator coil configured for wireless energy transfer via oscillating magnetic fields. Therefore, claim 1 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 2-8 are dependent on claim 1 and therefore meet the requirements of PCT Article 33(2) and (3).

1.2 Claims 9-16

The subject matter of claim 9 differs from these prior art documents in a battery structure for wireless energy transfer comprising: a first battery-sized enclosure having a first magnetic

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box No. V

resonator configured for wireless energy transfer via oscillating magnetic fields, wherein the resonator is positioned asymmetrically in the battery enclosure such that when another battery structure is placed in near proximity, the resonators of the two structures have low coupling. Therefore, claim 9 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 10-16 are dependent on claim 9 and therefore meet the requirements of PCT Article 33(2) and (3).

1.3 Claim 17

The subject matter of claim 17 differs from these prior art documents in a wireless battery comprising: a cylindrical, battery-sized enclosure, symmetrical around an axis, the battery-sized enclosure having a first end and a second end with a positive terminal on the first end and a negative terminal on the second end; and a magnetic resonator configured for wireless energy transfer via oscillating magnetic fields, the resonator comprising a conductor forming loops that are coaxial with the symmetry axis of the battery-sized enclosure. Therefore, claim 17 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

1.4 Claims 18-28

1.4.1 Independent Claim 18

D1, which is considered to be the closest prior art to the subject matters of claim 18, discloses a wearable device, comprising: an energy storage module; and a transmit antenna positioned proximate to a storage area of the wearable device and configured to receive power from the energy storage module and wirelessly transmit power to a receive antenna coupled to a chargeable device positioned in the storage area (See claim 30 in D1).
The technical feature of a device in proximity to a wearable energy source is not explicitly disclosed in D1. However, said feature is virtually suggested by the same document considering that an energy storage module comprises at least one of a chargeable battery and a replaceable battery (See claim 32 in D1). Accordingly, claim 18 would have been obvious over D1. Therefore, claim 18 lacks an inventive step under PCT Article 33(3).

Continued on The Next Page

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Previous Page

1.4.2 Dependent claims 19-28

The additional feature of claim 19 is virtually suggested by the feature of D1 considering that an energy storage module comprises at least one of a chargeable battery and a replaceable battery (See claim 32 in D1). Accordingly, claim 19 would have been obvious over D1. Therefore, claim 19 lacks an inventive step under PCT Article 33(3).

The additional features of claims 20-27 differ from these prior art documents in at least one device resonator configured and positioned to interact with the oscillating magnetic field of the at least one source resonator and to generate electrical energy. And they are not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claims 20-27 meet the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

The additional feature of claim 28 differs from these prior art documents in that a source resonator is configured to capture energy from an external source and recharge the energy source. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 28 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

1.5 Claims 29-34

The subject matter of claim 29 differs from these prior art documents in a wearable source resonator, configured to receive electrical energy from a battery and generate an oscillating magnetic field; and a device resonator mounted to a helmet and configured and positioned to interact with the oscillating magnetic field of the source resonator and to generate electrical energy. Therefore, claim 29 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 30-34 are dependent on claim 29 and therefore meet the requirements of PCT Article 33(2) and (3).

Continued on The Next Page

Supplemental Box

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Continuation of: Previous Page

1.6 Claims 35-47

The subject matter of claim 35 differs from these prior art documents in a resonator coil structure for wireless energy transfer comprising: a block of magnetic material; a first electrical conductor wrapped around the block of magnetic material forming loops around the block of magnetic material; and a second electrical conductor wrapped around the block of magnetic material forming loops around the block of magnetic material. Therefore, claim 35 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 36-47 are dependent on claim 35 and therefore meet the requirements of PCT Article 33(2) and (3).

1.7 Claims 48-52

The subject matter of claim 48 differs from these prior art documents in a resonator coil structure for wireless energy transfer comprising: a substantially rectangular block of magnetic material, the block of magnetic material having an axis and a height dimension, the height dimension substantially orthogonal to the axis; and a first electrical conductor, the electrical conductor having a bend radius, the bend radius being larger than the height dimension. Therefore, claim 48 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

Claims 49-52 are dependent on claim 48 and therefore meet the requirements of PCT Article 33(2) and (3).

2. Industrial Applicability

Claims 1-52 are industrially applicable under PCT Article 33(4).

Electronic Acknowledgement Receipt

EFS ID:	18293900
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	87084
Filer:	Jeffrey R. Ambroziak/Chelsae Kosman
Filer Authorized By:	Jeffrey R. Ambroziak
Attorney Docket Number:	WTCY-0075-P01
Receipt Date:	25-FEB-2014
Filing Date:	28-JAN-2013
Time Stamp:	13:48:35
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	WTCY-0075-P01_SIDS_CL_02-25-14.pdf	100917 f1a58d474a5608b54ad51ec2f589c52eb7963a36	no	2

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Form (SB08)	WTCY-0075-P01_SIDS_02-25-14.pdf	189803 49eb7651d8de2bc383ab66a87299e2846c7d0c46	no	13
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Information:					
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3	Foreign Reference	JP_2005149238_with_Abstract.pdf	1022121 a1a14a328f1a2183e15b13e8208ff99c5d4fef5b	no	18
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Information:					
4	Foreign Reference	JP_2007505480_with_Abstract.pdf	609220 3bbb63e51c5ea008144470c9db75581cb9e25b59	no	18
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Information:					
5	Foreign Reference	JP_2007537637_with_Abstract.pdf	841434 fb428b970f153820219e7a7ede0d6b38a9856b14	no	17
Warnings:					
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6	Foreign Reference	JP_2008206327_with_Abstract.pdf	2010416 9926a5c04809d11e20e44bb123798bd7d9eb2eff	no	31
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Information:					
7	Foreign Reference	JP2008508842_withAbstract.pdf	871000 a5bded0bd5bcb580bbf04471c1c8bf5b00f2c5a4	no	20
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8	Foreign Reference	JPH09182323_with_Abstract.pdf	7942443 ed496e810c21d5b47e8a39acfbdbb0c2ed2c5af4	no	9
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9	Foreign Reference	WO2013113017A1.pdf	1250322 b461ef40ae1b450143cee0f98259fc52cd9078dc	no	139
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10	Foreign Reference	WO2013142840A1.pdf	5382845 15a20cbb8c02d7c7360683f3bc0dd9ac20935724	no	507

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12	Non Patent Literature	Budhia_A_New_IPT_Magnetic_Coupler.pdf	594150 0d1b400f0785b58b0094789b8ba9f990990d20ea	no	6
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13	Non Patent Literature	Budhia_Development_and_evaluation.pdf	1673659 18a316c7db4c821907f65ac7455caa1efd8a4718	no	8
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14	Non Patent Literature	Budhia_Development_of_a_single-sided.pdf	1324803 e0dfa78842a8e7972fb8fb56f6a2be0a9cdf818e	no	11
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Information:					
16	Non Patent Literature	PCTUS2012040184_IPRP.pdf	262784 5c2fae0c20dd2bfcfbc0a36c6ba43bfb6d719aec	no	7
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17	Non Patent Literature	PCTUS2012047844_IPRP.pdf	197875 1b2c72221d2f70c699c1235be4d3aa12f17ee05c	no	6
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18	Non Patent Literature	PCTUS2013023478_ISR_WO.pdf	5187941 fe78bcbaef0ee13c8ff41766a04507deb2cc9f47	no	15
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19	Non Patent Literature	PCTUS2013033599_ISR_WO.pdf	1662765 12797a1ec7b864b647be0d62c9d7e27ad011fe5d	no	13

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21	Non Patent Literature	Tang_Evaluation_of_the_shielding.pdf	1241176 20bd191da639fbe7699ddc7167c73c5d2cccb1ec	no	9
Warnings:					
Information:					
22	Non Patent Literature	Villeneuve_Microcavities.pdf	665577 a780d19820a8bfc43fd5a2025e4335c5d03fff16	no	6
Warnings:					
Information:					
		Total Files Size (in bytes):	35413755		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Andre B. Kurs, et al.	Examiner: Rexford N. Barnie
Serial No.:	13/752,169	Group Art Unit: 2836
		Confirmation No.: 6134
Filed:	Jan 28, 2013	Docket No.: WTCY-0075-P01
Title:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS	

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the referenced materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application.

Applicant(s) has included copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R. 1.98(a)(2).

Further, Applicant(s) respectfully direct the Examiner's attention to the below-listed related non-published applications. These items, which refer to non-published applications that, at this time and according to each application's current prosecution history, may be related to the prosecution of the present case. Related published applications are provided on the accompanying form SB08 where applicable. Applicants' reference to the co- applications is not an admission of the materiality of any application or the prosecution history thereof, nor is it an admission that any of the below or attached co-pending applications constitute prior art.

UN PUB. APPLICATION NO.	FILING DATE	ATTORNEY DOCKET NO.	STATUS
1. 13/834,428	Mar 15, 2013	WTCY-0086-P02	Pending
2. 13/912,723	Jun 7, 2013	WTCY-0020-P02	Pending
3. 13/946,070	Jul 19, 2013	WTCY-0040-P04	Pending
4. 14/031,737	Sep 19, 2013	WTCY-0062-P01	Pending
5. 14/063,718	Oct 25, 2013	WTCY-0084-P01	Pending

6. 14/073,667	Nov 6, 2013	WTCY-0032-P04	Pending
7. 14/090,224	Nov 26, 2013	WTCY-0042-P02	Pending
8. 14/140,446	Dec 24, 2013	WTCY-0034-P04	Pending
9. PCT/US2014/010716	Jan 8, 2014	WTCY-0074-PWO	Pending

Pursuant to 37 C.F.R. §1.97(b), it is believed that no fee is required with the Supplemental Information Disclosure Statement. However, if an Office Action on the merits has been mailed, Applicant(s) hereby authorize the Commissioner to charge any additional fees to Deposit Account 50-3912 in order to have this Supplemental Information Disclosure Statement considered.

The Examiner is invited to contact the Applicants' Representative at the below-listed telephone number if there are any questions regarding this communication.

Respectfully submitted,

ANDRE B. KURS, ET AL.

By their Representatives,

Customer No. 87084

Date February 25, 2014

By /Jeffrey R. Ambroziak/
Jeffrey R. Ambroziak
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Espacenet

Bibliographic data: JP2008508842 (A) — 2008-03-21

AN AMPLIFICATION RELAY DEVICE OF ELECTROMAGNETIC WAVE AND A RADIO ELECTRIC POWER CONVERSION APPARATUS USING THE ABOVE DEVICE

No documents available for this priority number.

Inventor(s):

Applicant(s):

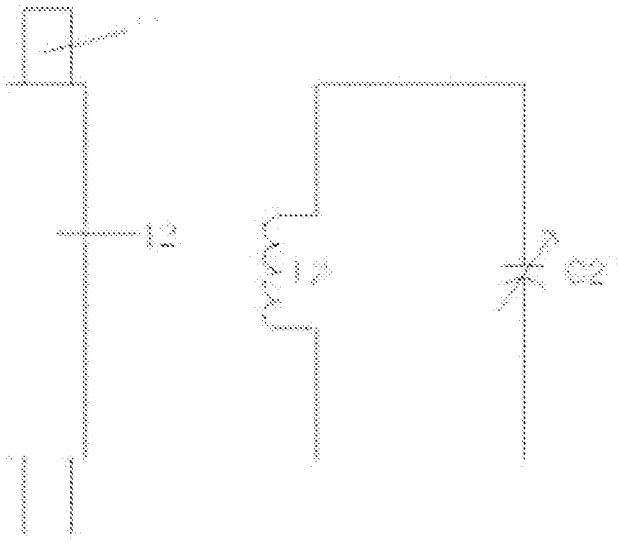
Classification: - international:***H02J17/00; H04B5/02; H04B7/14; H04B7/155***
- cooperative: H01F38/14; H02J5/005; H02J7/025; H04B5/0037; H04B7/15535

Application number: JP20070523481 20050729

Priority number(s): KR20040059562 20040729 ; WO2005KR02468 20050729

Also published as: WO2006011769 (A1) US2013099583 (A1) US2011176251 (A1) US8259429 (B2) US2008266748 (A1) more

Abstract not available for JP2008508842 (A)
Abstract of corresponding document: WO2006011769 (A1)



The present invention provides an amplifying repeater, which is constructed in such a manner that a ferrite core is inserted into a coil with a predetermined number of winds to increase an induced electromotive force caused by an increase in flux linkage using a time- varying magnetic field of electromagnetic waves at a position distant from various electromagnetic wave generating sources by a predetermined distance and the induction coil and a variable condenser for inducing resonance are connected to each other to increase current while reducing a resistant component existing in the induction coil to intensify and amplify the magnetic field of elec not tromagnetic waves. Furthermore, the present invention provides a wireless power conversion charging device using the magnetic field of electromagnetic waves, which is located between an electromagnetic wave generating source transmitter and a receiving coil or attached to the transmitter and receiving coil. The wireless power conversion charging device includes a rectifying diode for rectifying an electromotive force induced in a construction in which a resonance and impedance matching variable condenser is connected to a coil in series or in parallel in order to transmit maximum induced power to a charging battery that is a load using electromagnetic waves amplified by the amplifying repeater, and a smoothing condenser for smoothing the rectified voltage. Accordingly, charging power required for various small power electronic devices can be provided and power can be supplied to various loads.

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(33)優先権主張国　韓国 (KR)

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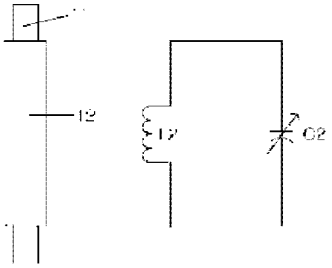
最終頁に続く

(54)【発明の名称】電磁波増幅中継器及びこれを用いた無線電力変換装置

(57)【要約】
本発明は、人為的に発生させたり、あるいは、様々な電磁波発生源から一定の距離に電磁波の時変電場を使用して鎖交磁束の増加による誘導起電力を増加させるために、一定の巻線数を巻回したスパイラルまたはソレノイドコイルにフェライトコアを挿入する構成において、前記誘導コイルと、共振を誘導するための可変コンデンサーとを結合させて誘導コイルに存在する抵抗成分を減らすとともに電流を増加させ、電磁波の磁場を強化、増幅して中継する磁場増幅中継器を形成し、電磁波発生源送信部と受信部コイルの一定の距離の間、あるいは送信部、受信部コイルに付着し、前記中継増幅器で増幅された磁場を使用して誘導電力を、最大に負荷の充電バッテリーに伝達するために、共振及びインピーダンスマッチング（整合）可変コンデンサーをコイルと並列または直列に結合した構造で遺棄された起電力を整流する整流用ダイオードと、整流された電圧を平滑するための平滑用コンデンサーとを有する電磁波磁場を使用した無線電力変換充電装置を実現することにより、様々な小電力の電子機器に必要な充電用電源及び様々な負荷に対する電力供



【特許請求の範囲】
【請求項１】
人為的または様々な電磁波発生源から発生した電磁波の磁場を増幅させて中継することができる電磁波増幅中継器において、
所定の太さを有するコイルにより所望の大きさと形態に所定の巻線数を巻回した誘導コイルと、
前記巻かれた誘導コイルと結合して、磁束の大きさを増加させるための一定の大きさと形態を有する磁性体と、
前記誘導コイルと連結され、共振回路を構成する可変コンデンサーとで構成されることを特徴とする電磁波磁場増幅中継器。
【請求項２】
前記所定の巻線数を巻回した誘導コイルは、ソレノイド形態またはスパイラル形態に設計、製作されることを特徴とする請求項１に記載の電磁波磁場増幅中継器。
【請求項３】
前記誘導コイルと結合して磁束を増加させる一定の大きさと形態を有する磁性体は、フェライトコアまたは磁性を有する磁性体で構成されることを特徴とする請求項１または請求項２に記載の電磁波磁場増幅中継器。
【請求項４】
前記所定の巻線数を巻回した誘導コイルを互いに並列または直列に締結し、誘導コイルの抵抗及びインダクタンスを制御し、電磁波の磁場を効率的に発生するように構成されることを特徴とする請求項３に記載の電磁波磁場増幅中継器。
【請求項５】
前記共振回路を構成する可変コンデンサーは、誘導コイルと並列または直列に締結され、電磁波の磁場を増幅するように構成されることを特徴とする請求項４に記載の電磁波磁場増幅中継器。
【請求項６】
人為的または様々な電磁波発生源から発生した電磁波の磁場を増幅させて中継することができる電磁波増幅中継器を用いた無線電力変換装置において、
一定の直径を有するコイルにより所望の大きさと形態に所定の巻線数を巻回した誘導コイルと、磁性体と、可変コンデンサーとで構成される電磁気波磁場増幅中継器と、前記増幅中継器に増幅された磁場を使用して誘導起電力を発生する誘導コイル及び磁性体と、
前記誘導コイルと結合して電力変換効率を高めるために、共振及びインピーダンス整合を行うための可変コンデンサーと、
前記誘導コイルと可変コンデンサーにより遺棄された電圧を整流する整流ダイオードと、
前記電圧を平滑し、必要な直流成分を有する電源に生成するコンデンサーを備える電磁気波磁場増幅中継器とを含むことを特徴とする無線電力変換装置。
【請求項７】
前記磁性体と結合された誘導コイルは、所望の形態及び大きさに所定の巻線数を巻回した誘導コイルを並列または直列に締結し、誘導コイルの抵抗及びインダクタンスを制御することによって電力変換効率を向上できるように構成した電磁波磁場増幅中継器を含むことを特徴とする請求項６に記載の無線電力変換装置。
【請求項８】
前記増幅中継器は、電磁波発生源送信コイル及び受信コイルと付着設置されるか、または電磁波発生源の送信コイルまたは受信コイルの一側に別に付着設置されることができ、電磁波発生源と受信コイルとの距離を考慮し、電磁波発生源の送信コイルと受信コイルとの間に増幅中継器が少なくとも１つ以上設置された電磁波磁場増幅中継器を用いることを特徴とする請求項６または請求項７に記載の無線電力変換装置。
【請求項９】
前記増幅中継器、送信コイル、及び受信コイルは、ソレノイドまたはスパイラル形態に

設計、製作される電磁波磁場増幅中継器を含むことを特徴とする請求項８に記載の無線電力変換装置。

【請求項１０】

前記中継増幅器と増幅中継器を備える無線電力変換装置は、電磁波を人為的に発生させるソレノイドまたはスパイラル形態の送信コイルが付着されている電磁波発生源をさらに付加した中継増幅器及び増幅中継器を含むことを特徴とする請求項６に記載の無線電力変換装置。

【請求項１１】

人為的な電磁波発生源に送信のための送信コイルを巻いたコアの一側に誘導コイルを巻いてキャパシタと結合させて増幅中継器を設置した構成と、受信のための受信コイルを巻いた一側に誘導コイルを巻いてキャパシタと結合させて増幅中継器を設置した構成と、送信コイル及び受信コイルのコア両側の全てに増幅中継器を設置した構成の中から１つを選んで構成することを特徴とする請求項６に記載の無線電力変換装置。

【請求項１２】

人為的な電磁波発生源に送信のためのスパイラルコイルの外郭にスパイラルコイルを巻いてキャパシタと結合させて増幅中継器を設置する構成と、受信のためのスパイラルコイルの外郭にスパイラルコイルを巻いてキャパシタと結合させて増幅中継器を設置する構成と、送信及び受信のためのスパイラルコイルの外郭にスパイラルコイルを巻いてキャパシタと結合させて増幅中継器を設置する構成の中から１つを選んで構成することを特徴とする請求項６に記載の無線電力変換装置。

【発明の詳細な説明】

【技術分野】

【０００１】

本発明は、電磁波発生源から一定の距離に電磁波の時変磁場を使用して鎖交磁束の増加に伴う誘導起電力を増加させるために、一定の巻線数を巻回したコイルにフェライトコアを挿入する構成において、前記誘導コイルと共振を誘導するための可変コンデンサーと結合して、電磁波の磁場を強化し、増幅させる増幅中継器を形成し、増幅中継器から一定の距離を置いて増幅中継器で増幅された磁場を使用して誘導電力を効率的に負荷に伝達するために、共振及びインピーダンスマッチング可変コンデンサーをコイルと結合し、ダイオードで整流し平滑することで、充電用バッテリーの電源、あるいは様々な負荷に対する電力供給のために使用することができる電磁波を用いた無線電力変換装置に関するものである。

【背景技術】

【０００２】

従来のファラデーの法則を利用して電磁波磁場の経時変化によって取得する誘導起電力は、誘導コイルの巻線数と鎖交磁束の経時的な変化率に比例して誘導起電力が発生するが、電磁波の発生源からの距離に応じて磁場の強さは急激に減少し、一定の距離以上では、誘導コイルに誘導起電力がほとんど誘導されなくなり、無線電力変換によるエネルギーを得ることができないという問題点があった。

【０００３】

また、従来は、電磁波の発生源から極めて短い距離の範囲内に設置しなければならないことから、設置位置が非常に制限されるという問題や、美観上の理由で設置できないなどの問題があった。

【発明の開示】

【発明が解決しようとする課題】

【０００４】

そこで、本発明は上記従来の問題点に鑑みてなされたものであって、本発明の目的は、電磁波発生源から一定の距離に電磁波の時変磁場を使用して鎖交磁束の増加による誘導起電力を増加させるために、一定の巻線数を巻回したコイルにフェライトコアを挿入した構成において、前記誘導コイルと共振を誘導するための可変コンデンサーと結合して誘導コ

イルに存在する抵抗成分を減らすとともに電流を極大化し、電磁波の磁場を強化し、増幅させて中継する増幅中継器を形成し、増幅中継器から一定の距離を置いて前記増幅中継器で増幅された電磁波を使用して誘導起電力を効率的に負荷に伝達するために、共振及びインピーダンスマッチング可変コンデンサーをコイルと並列に結合した構造で誘起された起電力を整流する整流用ダイオードと、整流された電圧を平滑する平滑用コンデンサーとを備える電磁気波を増幅中継する増幅中継器及び無線電力変換充電装置を実現することである。

【０００５】

また、本発明の他の目的は、電磁波発生源から極めて短い距離を置いて設置したり、あるいは無線電力変換装置と付着設置し、電磁波の磁場を強化し増幅させる増幅中継器を形成して、増幅された電磁波を用いる無線電力変換により、設置位置がより自由であり、かつ、磁場増幅中継器及び無線電力変換装置をより多様に応用できるようにすることである。

【課題を解決するための手段】

【０００６】

本発明は、ファラデーの法則を利用して電磁波発生源から一定の距離に電磁波の時変磁場を使用して鎖交磁束の増加による誘導起電力を増加させるために、一定の巻線数を巻回したコイルにフェライトまたは磁性体コアを挿入する構成において、前記誘導コイルと共振を誘導するための可変コンデンサーと結合して、誘導コイルに存在する抵抗成分を減らすとともに誘導電流を極大化し、電磁波の磁場を増幅させて中継する増幅中継器を形成し、増幅中継器から一定の距離を置いて設置したり、増幅中継器と無線電力変換装置を付着設置することにより、前記中継増幅器で増幅された電磁波を用いて誘導電力を、最大に負荷である充電バッテリーに伝達するために、一定の巻線数を巻回した誘導コイルにフェライトなどの磁性体コアを挿入し、挿入された誘導コイルと共振及びインピーダンスマッチングを調節するための可変コンデンサーを結合する構造で遺棄された起電力を整流する整流用ダイオードと、整流された電圧を平滑する平滑用コンデンサーとを備え、直流成分の一定の電圧と電流を有する受信コイルを含む無線電力変換装置に関するものである。本発明に係る具体的な実施形態を説明する。以下、本発明に係る具体的な実施形態を説明する。

【発明を実施するための最良の形態】

【０００７】

【実施例】

【０００８】

本発明は、ファラデーの法則を利用して無線で電力を受信する際に、経時的に変化するテレビジョンまたはモニター内部などで発生する電磁波、あるいは人為的に交流電力発生回路に対する負荷に送信コイルを連結して発生させる電磁波磁場を増幅中継器を介して増幅させ、電磁波発生源から一定の距離離れている地点で誘導コイルを用いて誘導起電力を得て、得られた誘導電圧と電流を極大化することができる構成に設計、製作することにより、高効率の電気エネルギーの変換を可能とする無線電力受信のための磁場増幅中継器とこれを用いた高効率の無線電力変換装置に関するものである。

【０００９】

以下、電磁波の誘導磁場を増幅させる増幅中継器の構成について具体的に説明する。本発明に係る電磁波の増幅中継器は、電磁波発生源から発生した電磁波を用いて誘導電力を得て、得られた誘導電力を空中に放射する原理で、コイルで一定の直径と大きさを有するボビン（内径１０ｍｍ、外径１５ｍｍ）に一定の巻線数を巻回し、巻かれたボビン中にフェライトコアを挿入して誘導コイルを設計し製作する。誘導コイルの直径、巻線数及び挿入されるフェライトコアの大きさなどは、誘導起電力を最大化できるように設計、製作されており、誘導コイルは、誘導コイルの抵抗値を考慮し、並列または直列に構成することができる。

【００１０】

本発明では、フェライトコアの直径は９ｍｍ、長さは１１０ｍｍとし、誘導コイルの直径は０．３ｍｍであり、巻回数を１６０回と同様にし、２つを並列に連結し、前記のような大きさを有するボビンに巻いて前記フェライトコアを挿入し、前記誘導コイルと並列に可変コンデンサーを連結して共振回路を構成することにより、誘導電力を極大化し、電磁波を放射できるように設計、製作する。

【００１１】

本発明に係る無線電力変換装置は、前記増幅中継器と一定の距離を置いて設置されるか、あるいは付着設置されており、フェライトコアの直径は９ｍｍ、長さは１１０ｍｍとし、誘導コイルは直径０．３ｍｍ、巻回数を１００回と同様にして２つを並列に連結し、前記のような大きさのボビンに巻いて前記フェライトコアを挿入し、前記誘導コイルと並列に可変コンデンサーを連結して、共振及び負荷側の電子回路とのインピーダンスマッチングを成すことで誘導起電力を極大化するように構成し、誘導された起電力をダイオードで整流し、整流された電圧を平滑する平滑コンデンサーで構成される。このように構成された無線電力変換装置は、一定の電流を有する直流電圧を発生するので、充電装置などの電源供給源として使用することができる。図１の左側は、本発明によって製作された磁場増幅中継器であり、右側は増幅中継器を構成する回路図である。図２は、前記増幅中継器を介して増幅発生された電磁波を用いて電気エネルギーを得ることができるように構成した無線電力変換装置の回路図である。（Ｌ１：受信コイル、Ｃ１：共振及び最大電力伝送のインピーダンスマッチング用キャパシタンス、Ｃ２：平滑用キャパシタンス、１．３Ｖ：充電用バッテリ電圧）

表１は、前記のように設計及び製作された磁場増幅中継器を使用せずに図２の無線電力変換装置を使用して、図３に示すように、電磁波発生源と一定の距離に位置させてから得られた充電電圧、充電電流及び充電電力を示したものであり、目盛り定規の距離が４ｃｍを超えると、充電電流と電力がほとんど誘導されないことが分かる。

【表１】

受信器無線電力装置負荷で測定した充電電圧、充電電流及び充電電力

距離（cm）	充電電圧（V）	充電電流（mA）	充電電力（mW）
0	1.3	27	35.1
1	1.3	18.4	23.9
2	1.3	10.7	13.9
3	1.3	4	5.2
4	1.3	0	0

【００１２】

図４は、本発明により設計、制作した磁場増幅中継器１つを電磁波発生源と隣接して設置し、磁場増幅中継器から距離に変化を与えながら、本発明に係る受信部の無線電力変化装置を使用して、充電電圧、充電電流及び充電電力を測定した構成図である。図４のように構成して測定した結果、表２に示すようなデータが得られた。表２に示すように、目盛り定規の距離が約１０ｃｍの地点でも充電電流と充電電力を得ることができた。

【表２】

増幅中継器と無線電力変換装置を用いて測定した充電電圧、充電電流及び充電電力

距離（cm）	充電電圧（V）	充電電流（mA）	充電電力（mW）
5	1.3	44.0	57.2
6	1.3	26.2	34.1
7	1.3	21.7	28.2
8	1.3	15.7	20.4
9	1.3	10.7	13.9
１０	1.3	4.9	6.4
１１	1.3	0	0
１２	1.3	0	0

【００１３】

図５は、本発明により設計、製作された磁場増幅中継器（２５、２６）２つを用いて、そのうちの１つは、電磁波発生源から一定の距離に設置し、もう１つは、受信器２２と無線電力変換装置と隣接して設置し、増幅中継器２６と受信器２２を一体にして距離に変化を与えながら実験したデータを示したものであり、表３は、図５のように構成して測定した充電電圧、充電電流及び充電電力を示す。測定結果、電磁波発生源から１２ｃｍ離れた地点でも一定の充電電流と充電電力を得ることができた。

【表３】

図５のように、増幅中継器（１、１′）及び受信器無線電力変換装置を用いて測定した充電電圧、充電電流及び充電電力

距離（cm）	充電電圧（V）	充電電流（mA）	充電電力（mW）
5	1.3	51.2	66.5
6	1.3	36.8	47.8
7	1.3	29.2	37.9
8	1.3	21.4	27.8
9	1.3	16.6	21.5
１０	1.3	12.7	16.5
１１	1.3	4.7	6.1
１２	1.3	1.2	1.6

【００１４】

図６は、本発明により設計、製作された磁場増幅中継器（２５、２７）の２つのうちの１つは、電磁波発生源と一定の距離に設置し、もう１つは、５ｃｍ地点に設置する。増幅中継器から距離に変化を与えながら、無線電力変換装置を用いて充電電圧、充電電流及び充電電力を測定するための構成図である。表４は、図６の構成図に基づいて充電電圧、充電電流及び充電電力を測定したデータを示す。測定結果、電磁波発生源から、多少増加した充電電力とともに、１３ｃｍ離れた地点でも一定の充電電流と充電電力を得ることができた。

【表４】

増幅中継器（２５、２７）及び無線電力変換装置を用いて測定した充電電圧、充電電流及び充電電力

距離（cm）	充電電圧（V）	充電電流（mA）	充電電力（mW）
１０	1.3	34	44.2
１１	1.3	22.3	29.0
１２	1.3	6.3	8.2
１３	1.3	1.7	2.2

【００１５】

図７は、電磁波発生源に隣接して前記使用されたコイルと同一の直径を有するコイルを、前記使用された同一の大きさのボビンに巻回数２００回を行い、２つの誘導コイルを並列に連結し、その中にフェライトコアを挿入し、誘導コイルと並列に可変コンデンサーを連結して共振回路を構成する形態であり、磁場増幅中継器２５を設計、製作し、電磁波発生源と一定の距離に位置させ、もう１つは、前記図３乃至図６で使用された増幅中継器２７を目盛り定規５ｃｍ離れた地点に設置した後、中継増幅器２８と受信器無線電力変換装置を隣接するように一体にして距離に変化を与えながら、充電電圧、充電電流及び充電電力を測定した構成図である。表５は、前記図７のように構成して測定した充電電圧、充電電流及び充電電力を示す。測定結果、電磁波発生源から１６ｃｍ離れた地点でも一定の充電電流及び充電電力が得られることが分かった。

【表５】

増幅中継器２５、増幅中継器２７、増幅中継器２８及び無線電力変換装置を用いて測定した充電電圧、充電電流及び充電電力

距離（cm）	充電電圧（V）	充電電流（mA）	充電電力（mW）
１０	1.3	41.0	53.3
１１	1.3	29.8	38.7
１２	1.3	20.2	26.2
１３	1.3	15.8	20.5
１４	1.3	10.7	13.9
１５	1.3	3.2	4.1
１６	1.3	1	1.3

【００１６】

本発明により、前記のように設計、製作された磁場増幅中継器と無線電力変換装置を用いて、図３乃至図７に示すように様々な実験を行った結果、図３のように、無線電力変換装置を単独で設置した場合には、表１のように、電磁波発生源から４ｃｍの距離で誘導コイルから発生する誘導起電力がほとんどないので、負荷の充電用バッテリーに充電電流が流れず、充電用バッテリーの電力はゼロを示した。図４のように、増幅中継器を加えた場合には、表２のように、電磁波発生源から５ｃｍの距離で最大の充電電流が４４ｍＡ、充電電力は５７．２ｍＷを示し、１０ｃｍの距離でも充電電力６．４ｍＷを示した。図５のように、増幅中継器１と同一の構造の中継器を無線電力変換装置とともに結合して設置する場合は、図４のように構成した場合と比較して、同一距離で充電電流と電力が増加していることが分かった。図６のように、増幅中継器を２つ使用した場合には、表４から分かるように、電磁波発生源から１０ｃｍ離れた地点で充電電力が４４．２ｍＷであり、図４で増幅中継器を１つ使用して得られた６．４ｍＷの充電電力と比べると、ほぼ７倍程度増加していることが分かる。さらに、電磁波発生源から目盛り定規で１２ｃｍ離れた地点でも充電電流及び充電電力を得ることができ、増幅中継器を使用せずに無線電力変換装置を単独で使用した場合と比較して、４倍遠い距離でも、無線電力を伝送して電気的エネルギー

に誘導変換し、負荷に伝達できることが分かった。図７のように、互いに異なる２つの増幅中継器（２５、２７）を設置し、中継器２８、受信コイル及び無線電力変換装置と付着結合した構成では、増幅中継器を備えない図６の場合と比較して、表５から分かるように、同一距離において増加された充電電流及び電力が測定されており、充電電流及び電力が得られる距離も１６ｃｍと増加することが分かった。

【００１７】

本発明に係るまた他の実施形態は、ＴＶ内部など自然的でない人為的な電磁気波発生源、つまり、交流電力発生回路部の負荷に送信部コイルを連結し、電力が２０Ｗであり、発生周波数１３０ｋＨｚの周波数を有する交流電力波形の発生源を備え、本実験に使用される送信コイル、中継器、受信器１及び受信器２などに使用されるコイルを表６のように構成し、目盛り定規の距離による受信電圧、受信電流及び受信電力を図２の無線電力変換装置により測定した。

【表６】

送信コイル、中継器、受信器１及び受信器２のコイル構成

区分	送信コイル	中継器	受信機１	受信機２
コイル種類	0.3	0.3	0.3	0.3
コア（mm）（直径×長さ）	9×55	7×15	7×45	7×15
巻回数	40回	40回	15回	上端受信機（10回）下端中継器（40回）

【００１８】

表６で、受信器１は、コアにコイルを巻いた一般のソレノイドコイルで構成され、受信器２は、１つの共通コアに、上端には受信用コイルを１０回巻き、下端には４０回巻いたコイルとキャパシタで共振回路を構成した中継器がある。

【００１９】

図１０は、電磁波増幅中継器が形成される共通コア上に、電磁気波発生源から発生された電力を出力する送信コイルを形成したり、電磁波を受信する受信コイルを形成したりして送信器と受信器を構成したものであり、このような構成は、増幅中継器の共振回路において電磁波の発生と受信を極大化することができることから、無線電力変換時に高い効率を得ることができる。

【００２０】

表７は、前記表６のように製作された送信コイル２９、増幅中継器３０及び受信器３１を使用して、図８に示すように、電磁波発生源と隣接して増幅中継器を設置し、電磁波受信機を電磁波発生源から５ｃｍ、１０ｃｍ及び１５ｃｍ距離だけ移動させながら、受信器の出力部下端（ＬＥＤ並列数十個程度）で測定した電圧、電流及び電力を示す。

【表７】

受信器１の出力端で測定した電圧、電流及び電力

距離（cm）	受信電圧（V）	受信電流（mA）	受信電力（mW）
5	3.9	1.900	7.410
１０	2.6	1.000	2.600
１５	1.4	0.200	0.280

【００２１】

表８は、前記表６のように製作された送信コイル、増幅中継器及び受信器２（３３、３４）を使用して、図９に示すように、電磁波発生源に隣接して増幅中継器を設置し、電磁波を発生させながら電磁波受信機を電磁波発生源から５ｃｍ、１０ｃｍ、１５ｃｍ及び２

０ｃｍ距離だけ移動させながら、受信器の出力部下端で測定した電圧、電流及び電力を示す。

【表８】

受信器２の出力部下端で測定した電圧、電流及び電力

距離（cm）	受信電圧（V）	受信電流（mA）	受信電力（mW）
5	4.6	3,500	16,100
１０	4.4	3,500	15,400
１５	2.7	1,700	4,590
２０	2.0	0,700	1,400

【００２２】

前記表７と表８から、同一の材質のコアに誘導コイルだけを巻いて製作した受信器１に比べて、１つの共通コアに誘導コイルと共振回路で構成された中継器を加えた受信器２を通じて得られた、距離による受信電圧、受信電流、及び受信電力がより優れていることが分かる。

【００２３】

また、本発明に係る他の実施形態は、電磁気波発生源の大きさと規模などを考慮し、様々な直径を有するコイルにより多様な大きさのボビンで巻線数を異にして誘導コイルを構成し、これを必要に応じて直列または並列に連結して形成した後、ボビンの内径に合う直径と長さを有するフェライトコアを挿入し、前記誘導コイルと可変コンデンサーを結合して共振回路を構成することにより、磁場増幅中継器を多様な大きさと形態に形成することができる。このようにして構成された増幅中継器と無線電力変換装置を使用して、多様な大きさの充電電圧、充電電流及び充電電力が得られる装置を実現することができる。

【００２４】

また、本発明に係る他の実施形態として、本発明の出願人が出願した韓国特許出願10-2004-0000528号に開示されたスパイラル構造を用いて送信コイル、中継器及び受信器を構成する場合について説明する。

【００２５】

電磁気波発生源は、ＡＣ２２０Ｖ、６０Ｈｚの使用電力をＡＣ-ＡＣアダプタを経由し、１２０ｋＨｚの周波数を有する交流電力波形でスパイラル形態の送信コイルに連結され、受信コイルは、充電用回路部に連結され、受信充電電流及び電圧を測定した。送信部コイルと受信部コイルとの間の距離は５ｃｍである。図１１に示すように、増幅中継器が送信部コイルの上に密着して設置される場合を説明する。

【００２６】

表９は、この実験のために使用されるスパイラル形態の送信コイル、中継コイル及び受信コイルの内径と外径、コイルの種類及び巻回数を示す。

【表９】

送信コイル、中継コイル及び受信コイルの内径と外径、コイルの種類及び巻回数

	内径（mm）	外径（mm）	コイル規格	巻回数
受信コイル	30	80	0.2×9	24
中継コイル	30	80	0.2×9	24
送信コイル	30	40	0.2×9	4

【００２７】

前記図１１で、電磁気波発生源の送信コイルを介して出力される送信電力は１６Ｗであり、図２の無線電力変換回路によって測定された充電電圧は１．４Ｖであり、充電電流は０．３６Ａであり、充電電力は０．５０Ｗである。前記表６のような規格を有するスパイラルコイルで、図１２のように、増幅中継器が送信コイルと受信器との中間に位置する場合、充電電圧は１．４Ｖであり、充電電流は０．４Ａであり、充電電力は０．５６Ｗと測定さ

れ、前記図１１のように、増幅中継器を送信部と密着させて上に付着設置した場合よりも、少し高い電流及び電力を得ることができた。さらに言えば、中継器を使用せずに、送信コイル５３と受信コイル５１からのみ構成し、距離を５ｃｍとした場合には、充電電圧は１．４Ｖであり、充電電流は０．０１Ａであり、充電電力は０．０１４Ｗと非常に微弱な検出結果が得られた。

【００２８】

図１３を参照して、増幅中継器が送信コイルを取り囲む場合を説明する。中継器と送信コイル部は有線で連結されていない。表１０は、この実験を行うために使用されるスパイラル形態の送信コイル、中継器及び受信器の内径と外径、コイルの種類及び巻回数を示す。

【表１０】

送信コイル、中継コイル及び受信コイルの内径と外径、コイルの種類及び巻回数

	内径（mm）	外径（mm）	コイル規格	巻回数
受信コイル	30	80	0.2×9	21
中継器	40	80	0.2×9	20
送信コイル	30	40	0.2×9	4

【００２９】

前記図１３に示すように、電磁気波発生源の送信コイルを介して出力される送信電力は１６Ｗであり、図２の無線電力変換回路により測定される充電電圧は１．４Ｖであり、充電電流は０．９Ａであり、充電電力は１．２６Ｗである。前記表１０と同一の規格を有するスパイラルコイルで図１４に示すように、増幅中継器が送信及び受信コイルを取り囲む構造を有するときの充電電圧は１．４Ｖであり、充電電流は１．０Ａ、充電電力は１．４Ｗと測定されており、スパイラルコイルを使用した実験で最も高い電流及び電力が得られた。

【００３０】

このとき、送信部コイルと受信部コイルとの間の距離は５ｃｍである。また、前記韓国特許出願10-2004-0000528号に開始されたスパイラルコイルの２線を同時に板状に巻いて上／下並列構造に位置させ、時間当たりの磁束鎖交による磁束数を高めるために、コイルの上側に中央が空いたドーナッツ形状の強磁性体を位置させる構造を形成し、可変コンデンサーを前記設計、製作したコイルと直列または並列に連結して共振回路を構成することで、高効率で誘導電圧及び電流を発生させ、これを整流ダイオードと平滑コンデンサーを用いて充電器に充電する無線充電装置を実現することができる。このとき、スパイラル形態の板状コイルと中央に位置するドーナッツ形状の強磁性体及び可変コンデンサーを用いて共振回路を構成して磁場増幅中継器を設計、製作することも可能であり、その具体的な構成方法は、前記韓国特許出願10-2004-0000528号に詳細に記載されている。

【産業上の利用可能性】

【００３１】

本発明は、電磁波発生源から一定の距離に磁場を増幅させて中継する磁場増幅中継器を構成し、増幅中継器から一定の距離を置いて前記増幅中継器で増幅された電磁波を用いて誘導電力を最大に誘導し、負荷に伝達するために、共振及びインピーダンスマッチング可変コンデンサーをコイルと並列に結合した構造で遺棄された起電力を整流する整流用ダイオードと、整流された電圧を平滑する平滑用コンデンサーを備える電磁波を増幅中継する増幅中継器と、無線電力変換充電装置を実現することで、電磁波発生源から少し離れた一定の近距離まで中継し、無線電力を変換して使用することができることから産業上の利用可用性が高い。例えば、小電力の電子機器に対する一定の空気または絶縁体の近距離における無接点無線バッテリ充電、あるいはリアルタイムの無線電力伝送等に活用することができる。

【００３２】

本発明は、電磁波の発生源から一定の距離に磁場増幅中継器を設置し、電磁波を用いて

無線電力変換装置を設置することができるので、無線電力変換装置の設置位置が多少自由であり、また、その応用分野が多様で産業上の利用可用性が高い。

【図面の簡単な説明】

【００３３】

【図１】本発明に係る増幅中継器の外形及び増幅中継器の構成回路図。

【図２】本発明に係る充電機能を有する無線電力変換装置を示す図。

【図３】増幅中継器を使用せずに、電磁波発生源の例（ＴＶ）から一定の距離内で無線電力変換装置のみ使用して、充電電圧、充電電流及び充電電力を測定するための構成図。

【図４】１つの磁場増幅中継器を電磁波発生源と一定の距離内に設置し、無線電力変換装置を使用して、充電電圧、充電電流及び充電電力を測定するための構成図。

【図５】２つの磁場増幅中継器のうちの１つは、電磁波発生源から一定の距離内に設置し、もう１つは、無線電力変換装置２２と隣接して設置して一体にして移動させながら充電電圧、充電電流及び充電電力を測定するための構成図。

【図６】２つの磁場増幅中継器を設置し、無線電力変換装置２２を単独で移動させながら、充電電圧、充電電流及び充電電力を測定するための構成図。

【図７】磁場増幅中継器２５と増幅中継器２７を設計、製作して設置し、中継増幅器２８と無線電力変換装置２２を隣接設置して一体にし、移動距離に変化を与えながら充電電圧、充電電流及び充電電力を測定するための構成図。

【図８】ＡＣ電力発生回路部２０の負荷に送信部コイル２９を連結して磁場を発生させ、隣接するように増幅中継器３０を設置し、受信コイル３１の電磁波受信機を距離を移動させながら受信器の出力端負荷で電圧、電流及び電力を測定するための構成図。

【図９】ＡＣ電力発生回路部２０の負荷に送信部コイル２９を連結して磁場を発生させ、隣接するように増幅中継器３２を設置し、１つの共通コア上端に受信コイル３３、下端に増幅中継器３４を構成した電磁波受信機を距離を移動しながら受信器の出力端負荷で電圧、電流及び電力を測定するための構成図。

【図１０】１つのコアに増幅中継器と送信コイルまたは受信コイルを巻いて構成される送信部及び受信部の構成図。

【図１１】スパイラル送信コイルにスパイラルコイルで構成される増幅中継器を上に密着させ、受信部コイル出力端で電圧、電流及び電力を測定するための構成図。

【図１２】スパイラルコイルで構成される増幅中継器を送信コイルと受信器との間の中間に位置させ、出力端で電圧、電流及び電力を測定するための構成図。

【図１３】送信コイルの外郭に増幅中継器を位置させ、受信部コイル出力端で電圧、電流及び電力を測定するための構成図。

【図１４】送信コイル及び受信コイルの外郭に増幅中継器を位置させ、受信部コイル出力端で電圧、電流及び電力を測定するための構成図。

【符号の説明】

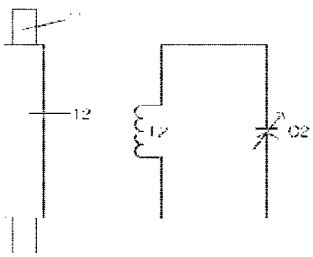
【００３４】

１１　コア
１２　誘導コイル
２０　ＡＣ電力発生部
２１　電磁気波発生源
２２　受信器
２３　出力端
２４　目盛り定規
２５、２６、２７、２８、３０、３２、３４　増幅中継器
２９　送信コイル
３１　受信器
３３　受信コイル
５１　スパイラル型受信コイル
５２　スパイラル型増幅中継器

５３　スパイラル型送信コイル
Ｌ１　受信コイル
Ｃ１　共振及び最大電力電送のインピーダンスマッチング用コンデンサー
Ｃ２　平滑用コンデンサー
１．３Ｖ　充電用バッテリ電圧

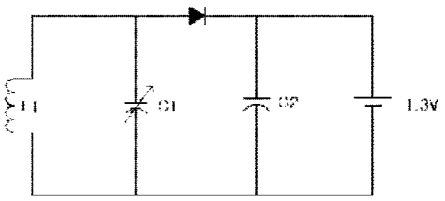
【図１】

[Fig. 1]



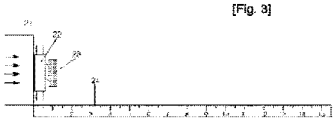
【図２】

[Fig. 2]



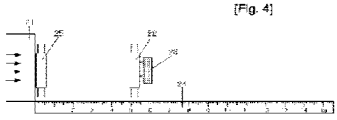
【図３】

[Fig. 3]



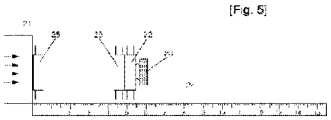
【図４】

[Fig. 4]



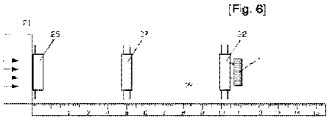
【図５】

[Fig. 5]



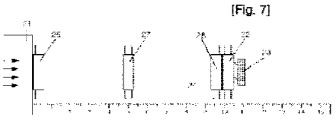
【図６】

[Fig. 6]



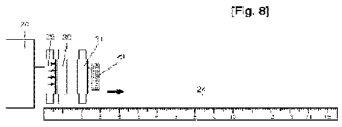
【図７】

[Fig. 7]



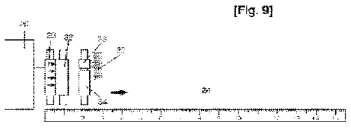
【図８】

[Fig. 8]



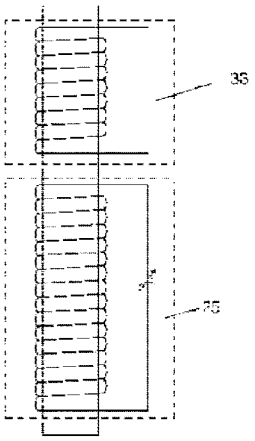
【図９】

[Fig. 9]



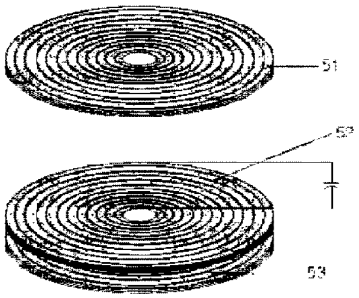
【図１０】

[Fig. 10]



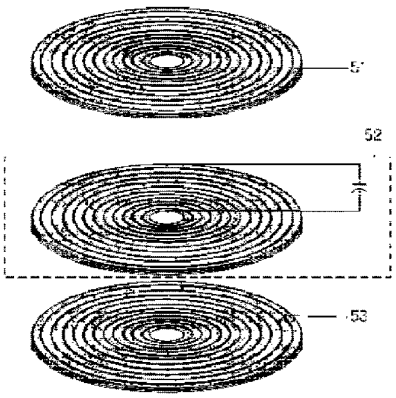
【図１１】

[Fig. 11]



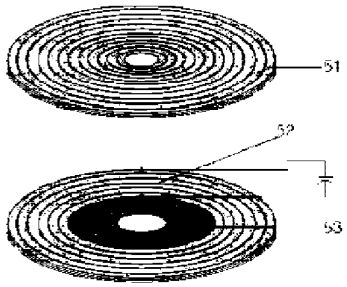
【図１２】

[Fig. 12]



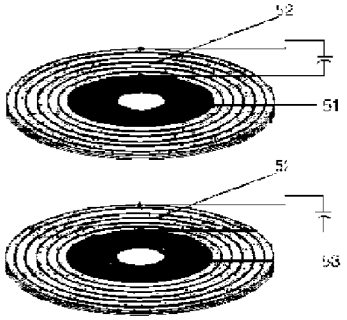
【図１３】

[Fig. 13]



【図１４】

[Fig. 14]



【国際調査報告】

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(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference PCT_E0502	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. **PCT/KR2005/002468**	International filing date *(day/month/year)* **29 JULY 2005 (29.07.2005)**	(Earliest) Priority Date *(day/month/year)* 29 JULY 2004 (29.07.2004)
Applicant **JC PROTEK CO.,LTD. et al**		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
      ☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
   b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 1
      ☒ as suggested by the applicant.
      ☐ because the applicant failed to suggest a figure.
      ☐ because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/002468

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H04B 7/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04B, H02J,H05F, H02M, G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
SEARCH TERMS : RECHAEGE, BATTERY, WIRELESS, POWER

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 533 247 A1 (ERICSSON RADIO SYSTEMS B.V.) 09-09-1992 SEE ABSTRACT; FIGURES 1&2; column 4;	1-5, 6
Y	JP 10-257697 (HITACHI ELECTRON SERVICE CO LTD) 25-09-1998 SEE THE WHOLE DOCUMENT	1-5, 6
Y	JP 2003-88005 A (SEIKO INSTR KK) 20-03-2003 SEE ABSTRACT; FIGURES 2; CLAIMS;	1-5, 6
A	US 2003/0048254 A1 (PRIMAX ELECTRONICS LTD) SEE ABSTRACT; FIGURES 1&2;	1-12

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 NOVEMBER 2005 (29.11.2005)	**29 NOVEMBER 2005 (29.11.2005)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer JANG, JIN HWAN Telephone No. 82-42-481-5711

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2005/002468

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0 533 247 A1	09-09-1992	DE 69207313 CO NL 9101590 A US 5367242	15-02-1996 16-04-1993 22-11-1994
JP 10-257697	25-09-1998	NONE	
JP 2003-88005 A	20-03-2003	EP 1263114 A2 US 20020190689 A1	04-12-2002 19-12-2002
US 2003/0048254	12-03-2003	DE 10253662 A1 TW 535341 B	27-05-2004 01-06-2003

Form PCT/ISA/210 (patent family annex) (April 2005)

フロントページの続き

(81)指定国 AP(BW,GH,GM,KE,LS,MW,MZ,NA,SD,SL,SZ,TZ,UG,ZM,ZW),EA(AM,AZ,BY,KG,KZ,MD,RU,TJ,TM),EP(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),OA(BF,BJ,CF,CG,CI,CM,GA,GN,GQ,GW,ML,MR,NE,SN,TD,TG),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,FI,GB,GD,GE,GH,GM,HR,HU,ID,IL,IN,IS,JP,KE,KG,KM,KP,KZ,LC,LK,LR,LS,LT,LU,LV,MA,MD,MG,MK,MN,MW,MX,MZ,NA,NG,NI,NO,NZ,OM,PG,PH,PL,PT,RO,RU,SC,SD,SE,SG,SK,SL,SM,SY,TJ,TM,TN,TR,TT,TZ,UA,UG,US,UZ,VC,VN,YU,ZA,ZM,ZW

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大韓民国 ７６０－７０４ キョンブク アンドン ズングファードン ヒュンジン エヴァーヴィル アパートメント ３０７－５０５

Ｆターム(参考) 5K012 AA01 AB03 AC06 AC12

【要約の続き】
給を提供することにその特徴がある。

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Andre B. Kurs	Art Unit	:	2836
Serial No.	:	13/752,169	Examiner	:	Rexford N. Barnie
Filed	:	January 28, 2013	Conf. No.	:	6134

Title : WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

MAIL STOP MISSING PARTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUBMISSION OF MISSING PARTS OF APPLICATION

In order to complete this application, applicant as a large entity submits herewith the following:

☒ Declaration in compliance with 37 CFR §1.63;

No fees are believed to be due at this time. Apply any necessary charges or credits to Deposit Account 06 1050, referencing the above attorney docket number. It is understood that this perfects the application and no additional papers or filing fees are required.

Respectfully submitted,

Date: September 22, 2014

/Marc M. Wefers Reg. No. 56,842/
Marc M. Wefers
Reg. No. 56,842

Customer Number 26161
Fish & Richardson P.C.
Telephone: (617) 542-5070
Facsimile: (877) 769-7945

23290619.doc

Electronic Acknowledgement Receipt

EFS ID:	20198798
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	87084
Filer:	Marc M. Wefers/Cheryl Forrest
Filer Authorized By:	Marc M. Wefers
Attorney Docket Number:	WTCY-0075-P01
Receipt Date:	22-SEP-2014
Filing Date:	28-JAN-2013
Time Stamp:	09:15:14
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SubmissionofDec.pdf	803410 9e4aa49988482f26b2fd38b504ca2709a4990495	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Oath or Declaration filed	2	10
Warnings:			
Information:			
	Total Files Size (in bytes):	803410	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

As the below named inventor, I hereby declare that:

This declaration is directed to:

[ ] The attached application, or

[X] United States application or PCT international application number 13/752,169

filed on January 28, 2013.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Maria Empar Rollano Hijarrubia Date (Optional): 09/17/2014

Signature:

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

PTO/AIA/01 (06-12)
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LEGAL NAME OF INVENTOR

Inventor: Aristeidis Karalis Date (Optional): July 29, 2014

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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LEGAL NAME OF INVENTOR

Inventor: Volkan Efe Date (Optional) : _____

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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LEGAL NAME OF INVENTOR

Inventor: Morris P. Kesler Date (Optional): 7-28-14

Signature: Morris P Kesler

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

PTO/AIA/01 (06-12)
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LEGAL NAME OF INVENTOR

Inventor: Alexander P. McCauley Date (Optional) : _____

Signature: _____

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

PTO/AIA/01 (06-12)
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LEGAL NAME OF INVENTOR

Inventor: Andre B. Kurs Date (Optional): July 29th, 2014

Signature:

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

PTO/AIA/01 (06-12)
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LEGAL NAME OF INVENTOR

Inventor: Katherine L. Hall Date (Optional): 8/6/2014

Signature: K L Hall

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

PTO/AIA/01 (06-12)
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LEGAL NAME OF INVENTOR

Inventor: Simon Verghese Date (Optional): 9/11/14

Signature:

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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filed on January 28, 2013.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Marin Soljacic Date (Optional): 6aug2014

Signature: Marin Soljacic

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: WiTricity Corporation

Application No./Patent No.: 13/752,169 Filed/Issue Date: January 28, 2013

Titled: WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

WiTricity Corporation, a CORPORATION
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of the option 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title and interest (check applicable box):

☐ The extent (by percentage) of its ownership interest is _____. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of the options A or B below):

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 033756, Frame 0916, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy *(i.e., a* true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Marc M. Wefers Reg. No. 56,842/	September 24, 2014
Signature	Date
Marc M. Wefers	56,842
Printed or Typed Name	Title or Registration Number

PTO/AIA/80 (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with the Customer Number: 26161

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name Registration	Number		Name Registration	Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒ The address associated with Customer Number: 26161

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:
WiTricity Corporation
149 Grove Street
Watertown, MA 02472

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	1/10/14
Name	Eric R. Giler	Telephone	857-228-1229
Title	Chief Executive Officer		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	20238647
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	87084
Filer:	Marc M. Wefers/Cheryl Forrest
Filer Authorized By:	Marc M. Wefers
Attorney Docket Number:	WTCY-0075-P01
Receipt Date:	25-SEP-2014
Filing Date:	28-JAN-2013
Time Stamp:	08:13:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	POA.pdf	205157 b8164d117b2bf2dfe8423eb1e354629654fb50af	no	3

Warnings:	
Information:	

Total Files Size (in bytes):	205157

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/752,169	01/28/2013	Andre B. Kurs	WTCY-0075-P01

CONFIRMATION NO. 6134

26161
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

POA ACCEPTANCE LETTER

OC000000071031660

Date Mailed: 09/30/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/25/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/ylueng/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 25236-0134001	Application No. 13/752,169
Information Disclosure Statement by Applicant (Use several sheets if necessary)		First Named Inventor Andre B. Kurs	
(37 CFR §1.98(b))		Filing Date January 28, 2013	Group Art Unit 2836

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	A1	4,180,795	12/25/1979	Matsuda et al.			
	A2	4,450,431	5/22/1984	Hochstein			
	A3	4,588,978	5/13/1986	Allen			
	A4	5,033,295	7/23/1991	Schmid et al.			
	A5	5,034,658	7/23/1991	Hiering et al.			
	A6	5,374,930	12/20/1994	Schuermann			
	A7	5,703,573	12/30/1997	Fujimoto et al.			
	A8	5,864,323	1/26/1999	Berthon			
	A9	5,959,245	9/28/1999	Moe et al.			
	A10	6,176,433	1/23/2001	Uesaka et al.			
	A11	6,459,218	10/1/2002	Boys et al.			
	A12	6,563,425	5/13/2003	Nicholson et al.			
	A13	6,650,227	11/18/2003	Bradin			
	A14	6,683,256	1/27/2004	Kao			
	A15	6,696,647	2/24/2004	Ono et al.			
	A16	6,839,035	1/4/2005	Addonisio et al.			
	A17	7,835,417	11/16/2010	Heideman et al.			
	A18	7,884,697	2/8/2011	Wei et al.			
	A19	8,178,995	5/15/2012	Amano et al.			
	A20	8,334,620	12/18/2012	Park et al.			
	A21	8,362,651	1/29/2013	Hamam et al.			
	A22	8,395,282	3/12/2013	Joannopoulos et al.			
	A23	8,395,283	3/12/2013	Joannopoulos et al.			
	A24	8,400,018	3/19/2013	Joannopoulos et al.			
	A25	8,400,019	3/19/2013	Joannopoulos et al.			
	A26	8,400,020	3/19/2013	Joannopoulos et al.			
	A27	8,400,021	3/19/2013	Joannopoulos et al.			

Examiner Signature	Date Considered
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 25236-0134001	Application No. 13/752,169
Information Disclosure Statement by Applicant (Use several sheets if necessary)		First Named Inventor Andre B. Kurs	
(37 CFR §1.98(b))		Filing Date January 28, 2013	Group Art Unit 2836

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	A28	8,400,022	3/19/2013	Joannopoulos et al.			
	A29	8,400,024	3/19/2013	Joannopoulos et al.			
	A30	2003/0160590	8/28/2003	Schaefer et al.			
	A31	2005/0125093	6/9/2005	Kikuchi et al.			
	A32	2005/0135122	6/23/2005	Cheng et al.			
	A33	2005/0151511	7/14/2005	Chary			
	A34	2006/0010902	1/19/2006	Trinh et al.			
	A35	2006/0090956	5/4/2006	Peshkovskiy et al.			
	A36	2007/0096875	5/3/2007	Waterhouse et al.			
	A37	2007/0105429	5/10/2007	Kohl et al.			
	A38	2007/0126650	6/7/2007	Guenther			
	A39	2007/0164839	7/19/2007	Naito			
	A40	2007/0257636	11/8/2007	Phillips et al.			
	A41	2008/0047727	2/28/2008	Sexton et al.			
	A42	2008/0176521	7/24/2008	Singh et al.			
	A43	2009/0033280	2/5/2009	Choi et al.			
	A44	2009/0038623	2/12/2009	Farbarik et al.			
	A45	2009/0322280	12/31/2009	Kamijo et al.			
	A46	2010/0188183	7/29/2010	Shpiro			
	A47	2012/0001593	1/5/2012	DiGuardo			
	A48	2012/0146575	6/14/2012	Armstrong et al.			
	A49	2012/0267960	10/25/2012	Low et al.			
	A50	2013/0154383	6/20/2013	Kasturi et al.			
	A51	2013/0200721	8/8/2013	Kurs et al.			
	A52	2014/0070764	3/13/2014	Keeling			

Examiner Signature	Date Considered
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

Substitute Disclosure Form (37 CFR §1.98(b))	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 25236-0134001	Application No. 13/752,169
Information Disclosure Statement by Applicant (Use several sheets if necessary)		First Named Inventor Andre B. Kurs	
		Filing Date January 28, 2013	Group Art Unit 2836

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No
	B1	CN 102239633	11/9/2011	China			Abstract	
	B2	CN 102439669	5/2/2012	China			Abstract	
	B3	CN 103329397	9/25/2013	China			Abstract	
	B4	EP 1 521 206	04/06/2005	Europe				
	B5	EP 1 524 010	4/20/2005	Europe				
	B6	JP 6-341410	12/13/1994	Japan			Abstract	
	B7	JP 2004-229144	8/12/2004	Japan			Abstract	
	B8	JP 2006-074848	3/16/2006	Japan			Abstract	
	B9	JP 2007-266892	10/11/2007	Japan			Abstract	
	B10	JP 2012-504387	2/16/2012	Japan			Abstract	
	B11	JP 2013-543718	12/5/2013	Japan			Not Available	
	B12	KR 10-2007-0017804	2/13/2007	Korea			Abstract	
	B13	SG 112842	7/28/2005	Singapore			Partial Translation	
	B14	WO 95/11545	04/27/1995	WIPO				
	B15	WO 2004/015885	2/19/2004	WIPO				

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	C1	"Next Little Thing 2010 Electricity without wires", CNN Money (See money.cnn.com/galleries/2009/smallbusiness/0911/gallery.next_little_thing_2010.smb/) (dated November 30, 2009)
	C2	Ahmadian, M. et al., "Miniature Transmitter for Implantable Micro Systems", Proceedings of the 25th Annual International Conference of the IEEE EMBS Cancun, Mexico, pp. 3028-3031 (September 17-21, 2003)
	C3	Borenstein, S., "Man tries wirelessly boosting batteries", (The Associated Press), USA Today, (November 16, 2006) 1 page
	C4	Eisenberg, Anne, "Automatic Recharging, From a Distance", The New York Times, (see www.nytimes.com/2012/03/11/business/built-in-wireless-chargeing-for-electronic-devices.html?_r=0) (published on March 10, 2012)

Examiner Signature	Date Considered
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 25236-0134001	Application No. 13/752,169
Information Disclosure Statement by Applicant (Use several sheets if necessary)		First Named Inventor Andre B. Kurs	
(37 CFR §1.98(b))		Filing Date January 28, 2013	Group Art Unit 2836

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	C5	Fan, Shanhui et al., "Rate-Equation Analysis of Output Efficiency and Modulation Rate of Photomic-Crystal Light-Emitting Diodes", IEEE Journal of Quantum Electronics, Vol. 36(10):1123-1130 (October 2000)
	C6	Ferris, David, "How Wireless Charging Will Make Life Simpler (And Greener)", Forbes (See forbes.com/sites/davidferris/2012/07/24/how-wireless-charging-will-make-life-simpler-and-greener/print/) (dated July 24, 2012)
	C7	Finkenzeller, Klaus, "RFID Handbook – Fundamentals and Applications in Contactless Smart Cards", Nikkan Kohgyo-sya, Kanno Taihei, first version, pp. 32-37, 253 (August 21, 2001)
	C8	Finkenzeller, Klaus, "RFID Handbook (2nd Edition)", The Nikkan Kogyo Shimbun, Ltd., pp. 19, 20, 38, 39, 43, 44, 62, 63, 67, 68, 87, 88, 291, 292 (Published on May 31, 2004)
	C9	Ho, S. L. et al., "A Comparative Study Between Novel Witricity and Traditional Inductive Magnetic Coupling in Wireless Charging", IEEE Transactions on Magnetics, Vol. 47(5):1522-1525 (May 2011)
	C10	Moskvitch, Katia, "Wireless charging – the future for electric cars?", BBC News Technology (See www.bbc.co.uk/news/technology-14183409) (dated July 21, 2011)
	C11	Schneider, D. "A Critical Look at Wireless Power", IEEE Spectrum, pp. 35-39 (May 2010)
	C12	Stewart, W., "The Power to Set you Free", Science, Vol. 317:55-56 (July 6, 2007)
	C13	Yates, David C. et al., "Optimal Transmission Frequency for Ultralow-Power Short-Range Radio Links", IEEE Transactions on Circuits and Systems - 1, Regular Papers, Vol. 51:1405-1413 (July 2004)
	C14	Ziaie, Babak et al., "A Low-Power Miniature Transmitter Using A Low-Loss Silicon Platform For Biotelemetry", Proceedings - 19th International Conference IEEE/EMBS, pp. 2221-2224, (October 30 - November 2, 1997) 4 pages
	C15	PCT/US2013/023478, International Application Serial No. PCT/US2013/023478, International Preliminary Report on Patentability and Written Opinion, mailed August 7, 2014, 8 pages

Examiner Signature	Date Considered
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Disclosure Form

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING
TRANSMITTAL OF COPY OF INTERNATIONAL
PRELIMINARY REPORT ON PATENTABILITY
(CHAPTER I OF THE PATENT COOPERATION
TREATY)
(PCT Rule 44bis.1(c))

To:

AMBROZIAK, Jeffrey
GTC Law Group LLP & Affiliates
c/o CPA Global
P.O. Box 52050
Minneapolis, MN 55402
ETATS-UNIS D'AMERIQUE

Date of mailing *(day/month/year)*	
07 August 2014 (07.08.2014)	
Applicant's or agent's file reference WTCY-0075-PWO	**IMPORTANT NOTICE**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2013/023478	28 January 2013 (28.01.2013)	26 January 2012 (26.01.2012)

Applicant
WITRICITY CORPORATION

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Philippe Bécamel
Facsimile No. +41 22 338 82 70	e-mail: pt03.pct@wipo.int

Form PCT/IB/326 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference WTCY-0075-PWO	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/US2013/023478	International filing date *(day/month/year)* 28 January 2013 (28.01.2013)	Priority date *(day/month/year)* 26 January 2012 (26.01.2012)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant WITRICITY CORPORATION		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 29 July 2014 (29.07.2014)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Philippe Bécamel e-mail: pt03.pct@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
AMBROZIAK JEFFREY

GTC LAW GROUP LLP & AFFILIATES C/O CPA
GLOBAL P.O. BOX 52050 MINNEAPOLIS MN 55402 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**25 June 2013 (25.06.2013)**
Applicant's or agent's file reference: WTCY-0075-PWO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2013/023478	**28 January 2013 (28.01.2013)**	26 January 2012 (26.01.2012)

International Patent Classification (IPC) or both national classification and IPC

H02J 17/00(2006.01)i

Applicant
WITRICITY CORPORATION

1. This opinion contains indications relating to the following items:

- [x] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [x] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	25 June 2013 (25.06.2013)	PARK, Hye Lyun Telephone No. 82-42-481-3463

Form PCT/ISA/237 (cover sheet) (July 2011)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2013/023478

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of :

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or furnishing
      ☐ contained in the international application as filed.
      ☐ filed together with the international application in electronic form.
      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2013/023478

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-20	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	NONE	YES
	Claims	1-20	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following document:

D1: US 2011-0025131 A1 (ARISTEIDIS KARALIS et al.) 03 February 2011

1. Novelty and Inventive step

1.1 Claims 1-11

1.1.1 Independent claim 1

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a wireless power system comprising: a conducting coil; and a capacitor in series with said conducting coil (See claim 15). The subject matter of claim 1 differs from a system of D1 in an inductor. However, such a slight change in a conducting coil comes within the scope of the customary practice followed by a person skilled in the art. Accordingly, this claim would have been obvious over D1. Therefore, claim 1 lacks an inventive step under PCT Article 33(3).

1.1.2 Dependent claims 2-11

The additional feature of claim 2 is identical to the feature of D1 in that a quality factor is greater than about 5000 (See paragraph [0053]).

Claims 3-4 further specify a size of loops and a magnitude of dipoles. However, the additional features of claims 3-4 are merely matters of design option when the general knowledge in relevant field of the art is used.

Continued on Supplemental Box

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of : Box No. V

The additional features of claims 5-7 are identical to the features of D1 in a wireless energy transfer system (See paragraph [0127]).

Claims 8-9 further specify a type of loops. However, the additional feature of claims 8-9 is merely a matter of design option when the general knowledge in relevant field of the art is used.

The additional feature of claim 10 is identical to the feature of D1 in a capacitor having a variable capacitance (See claim 1).

Claim 11 further specifies a second capacitor. However, the additional feature of claim 11 is merely a matter of design option when the general knowledge in relevant field of the art is used.

Accordingly, claims 2-11 would have been obvious over D1. Therefore, claims 2-11 lack an inventive step under PCT Article 33(3).

1.2 Claims 12-13

1.2.1 Independent claim 12

D1, which is considered to be the closest prior art to the subject matter of claim 12, discloses a wireless power system comprising: conducting loops; and an electronic circuit that controls a variable inductor (See paragraph [0117], claim 12). The subject matter of claim 12 differs from a system of D1 in a control system. However, such a slight change in an electronic circuit comes within the scope of the customary practice followed by a person skilled in the art. Accordingly, this claim would have been obvious over D1. Therefore, claim 12 lacks an inventive step under PCT Article 33(3).

1.2.2 Dependent claim 13

The additional feature of claim 13 is identical to the feature of D1 in a subwavelength current loop (magnetic dipole) with h=0 (See paragraph [0171]). Accordingly, this claim would have been obvious over D1. Therefore, claim 13 lacks an inventive step under PCT Article 33(3).

Continued on The Next Page

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of : Previous Page

1.3 Claims 14-16

1.3.1 Independent claim 14

Claim 14 relates to a method for manufacturing a magnetic resonator, but it shares the same technical features with claim 12. Accordingly, the same reasoning as in claim 12 applies to claim 14. Therefore, claim 14 lacks an inventive step under PCT Article 33(3).

1.3.2 Dependent claims 15-16

Claim 15 further specifies altering at least one dipole moment. However, the additional feature of claim 15 is considered to be a minor difference over the disclosure of D1 that falls under the general knowledge of a person skilled in the art.

The additional feature of claim 16 is identical to the feature of D1 in a subwavelength current loop (magnetic dipole) with h=0 (See paragraph [0171]).

Accordingly, claims 15-16 would have been obvious over D1. Therefore, claims 15-16 lack an inventive step under PCT Article 33(3).

1.4 Claims 17-18

1.4.1 Independent claim 17

D1, which is considered to be the closest prior art to the subject matter of claim 17, discloses a wireless power system comprising: a first high-Q magnetic resonator; and a pair of conducting parallel plates (See claim 1, paragraph [0118]). The subject matter of claim 17 differs from a system of D1 in a position of a conducting plate. However, such a slight change in a parallel conducting plate comes within the scope of the customary practice followed by a person skilled in the art. Accordingly, this claim would have been obvious over D1. Therefore, claim 17 lacks an inventive step under PCT Article 33(3).

Continued on The Next Page

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of : Previous Page

1.4.2 Dependent claim 18

Claim 18 further specifies a position of the conducting plates. However, the additional feature of claim 18 is considered to be a minor difference over the disclosure of D1 that falls under the general knowledge of a person skilled in the art. Accordingly, this claim would have been obvious over D1. Therefore, claim 18 lacks an inventive step under PCT Article 33(3).

1.5 Claims 19-20

Claims 19-20 relate to a wireless power device, but they share the same technical features with claims 17-18, respectively. Accordingly, the same reasonings as in claims 17-18 apply to claims 19-20. Therefore, claims 19-20 lack an inventive step under PCT Article 33(3).

2. Industrial Applicability

Claims 1-20 are industrially applicable under PCT Article 33(4).

Electronic Acknowledgement Receipt

EFS ID:	20709661
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	26161
Filer:	Marc M. Wefers/Lakeisha Bryant
Filer Authorized By:	Marc M. Wefers
Attorney Docket Number:	25236-0134001
Receipt Date:	17-NOV-2014
Filing Date:	28-JAN-2013
Time Stamp:	08:23:16
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS.pdf	189020 032b97a155827e48b8b3aef706df5f645f28fea5	yes	5

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Transmittal Letter		1	1	
	Information Disclosure Statement (IDS) Form (SB08)		2	5	
Warnings:					
Information:					
2	Foreign Reference	CN102239633_AB.pdf	20848129 9e117f810090f7128695f0048abcc034d82bfbe5	no	124
Warnings:					
Information:					
3	Foreign Reference	CN102439669_Part1_Abstract.pdf	21996169 29153f4c049ca975c46f37747d5845b00b0254ad	no	100
Warnings:					
Information:					
4	Foreign Reference	CN102439669_Part2_Abstract.pdf	4223931 a5aced290feaef37d6ecd114461e2a1ad8e06d01	no	66
Warnings:					
Information:					
5	Foreign Reference	CN103329397_Abstract.pdf	11772652 652d951d92bde8bcfeedc2f6e262969935a6b67f	no	70
Warnings:					
Information:					
6	Foreign Reference	EP1521206.pdf	3562916 9c5ca53b71625caa96d346d8cade4c5a3591eacd	no	26
Warnings:					
Information:					
7	Foreign Reference	EP1524010.pdf	1562796 451386640ce327e1602a02bee70b866eeaf4aab7	no	13
Warnings:					
Information:					
8	Foreign Reference	JPH06341410_Abstract.pdf	1455698 764e458c0dbba3bad22a46a30b02291fd49baebe	no	16
Warnings:					
Information:					

9	Foreign Reference	JP2004229144_Abstract.pdf	4389726 6924c882c84cd6f7d1dff2317942b2f44298f3fb	no	8
Warnings:					
Information:					
10	Foreign Reference	JP2006074848_Abstract.pdf	896375 73c74b630bef53403bc3cd283c4db4fe7fe13f5b	no	12
Warnings:					
Information:					
11	Foreign Reference	JP2007266892_Abstract.pdf	942969 9ea41fdcfb07c110acb08083f0a7c6b15467d5c5	no	11
Warnings:					
Information:					
12	Foreign Reference	JP2012504387_Ab.pdf	13976783 2b402ac1ea309f75558007ed833d6b161f9022cb	no	129
Warnings:					
Information:					
13	Foreign Reference	JP2013543718_Notavailable.pdf	6988756 76d7c21e16f4156816c667be20ba8355cf9fe4f4	no	64
Warnings:					
Information:					
14	Foreign Reference	KR10-2007-0017804_Abstract.pdf	1136334 74d782c117d36a228f8bd792c6359b32e24298e6	no	31
Warnings:					
Information:					
15	Foreign Reference	SG112842_PartialTrans.pdf	624668 23141064a4a81d333d74901af4750eeb9497d2c3	no	3
Warnings:					
Information:					
16	Foreign Reference	WO95011545.pdf	4701308 a28e588edcf1e9604e363c8007b77499a44666d6	no	37
Warnings:					
Information:					
17	Foreign Reference	WO2004015885.pdf	1773071 4d83719bcdb7880eb6c5b80ce4100ede1d4dd49e	no	19
Warnings:					
Information:					

18	Non Patent Literature	4_Next_Little_Thing.pdf	448753 56d83de8b4e4fcb084922911f9c2b4c9c27a2f7c	no	2
Warnings:					
Information:					
19	Non Patent Literature	Ahmadian_3028.pdf	551393 ea0b23d130dbafe3ee4e923df20605b51005c004	no	4
Warnings:					
Information:					
20	Non Patent Literature	Borenstein_USAToday.pdf	173426 cf6c4d0f8bebad5a99a4881dcd2c3347ac3662f8	no	2
Warnings:					
Information:					
21	Non Patent Literature	Eisenberg.pdf	334013 ba86cc6c4728a39efecbe0192d4c65c07a16948a	no	3
Warnings:					
Information:					
22	Non Patent Literature	Fan.pdf	269505 b39839ccd264e0422e37cbf3e268d74448023372	no	8
Warnings:					
Information:					
23	Non Patent Literature	Ferris.pdf	111319 d8a7d08cc388ec96aebd2b0b3c1f19028722f7c8	no	3
Warnings:					
Information:					
24	Non Patent Literature	Finkenzeller-RFIDHandbook_32-37and253.pdf	6356705 0c29ad287672fc4e890deb4b908ab835e29cba15	no	24
Warnings:					
Information:					
25	Non Patent Literature	Finkenzeller_38.pdf	8231216 e9d5fc507bfe0fe4502b53a84dcd3ed186283349	no	23
Warnings:					
Information:					
26	Non Patent Literature	Ho_1522.pdf	1626121 482cf05958eab877cc20dd953d5ce7af7eed6624	no	4
Warnings:					
Information:					

27	Non Patent Literature	Moskvitch.pdf	224748 4edc299a65fe8c23871e1e86d82c30400401829b	no	5
Warnings:					
Information:					
28	Non Patent Literature	Schneider-A-Critical-Look.pdf	367692 7878652440e992b8031da7d0910e9669f7b41926	no	6
Warnings:					
Information:					
29	Non Patent Literature	Stewart_55.pdf	353735 edbcff1182f8fd0514fe4cd290b8ea63d25ae1fb	no	3
Warnings:					
Information:					
30	Non Patent Literature	Yates_1405.pdf	733636 3e17d4dc267481694aa0130f934e0705e3e2a354	no	9
Warnings:					
Information:					
31	Non Patent Literature	Ziaie.pdf	845413 2912325e2646474219d2020ba02ff457c2b8cede	no	4
Warnings:					
Information:					
32	Non Patent Literature	IPRP-0134WO1.pdf	279338 2ca8b1f1ff5ffa33f80a8098cf9aad124518b4e9	no	8
Warnings:					
Information:					
		Total Files Size (in bytes):	121948314		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: WiTricity Corporation	Art Unit	: 2836
Serial No.	: 13/752,169	Examiner	: Rexford N. Barnie
Filed	: January 28, 2013	Conf. No.	: 6134
Title	: WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS		

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the references listed on the attached Disclosure Form. Foreign patent documents and non-patent literature are attached; cited U.S. patents and patent application publications will be provided on request. A copy of a communication from a foreign patent office in a counterpart application is also attached

This statement is being filed before the receipt of a first action on the merits.

Apply any necessary charges or credits to deposit account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: November 14, 2014

/Marc M. Wefers Reg. No. 56,842/
Marc M. Wefers
Reg. No. 56,842

Customer Number 26161
Fish & Richardson P.C.
Telephone: (617) 542-5070
Facsimile: (877) 769-7945

23304781.doc

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	01/28/2013	Andre B. Kurs	25236-0134001	6134

26161 7590 02/12/2015

FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
MOURAD, RASEM	

ART UNIT	PAPER NUMBER
2836	

NOTIFICATION DATE	DELIVERY MODE
02/12/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No. 13/752,169	Applicant(s) KURS ET AL.	
	Examiner RASEM MOURAD	Art Unit 2836	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/28/2013*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-20* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☐ Claim(s) _____ is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☒ Claim(s) *1-20* are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-11, drawn to an inductor with two loops and each loop has a dipole moment with a capacitor connected to one of the loops.

II. Claims 12-13, drawn to a plurality of loops with dipole moments and a control system to adjust the dipole moment.

III. Claims 14-16, drawn to a plurality of loops and a specific method of altering dipole moment of said loops (in claim 15).

IV. Claims 17-20, drawn to a conducting plate positioned perpendicular to the dipole moment of a resonator placed in a wireless power source or wireless power device.

Inventions I, II, III and IV are directed to related products. The related inventions are distinct if: (1) the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect; (2) the inventions do not overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants. See MPEP § 806.05(j). In the instant case, the inventions as claimed have a materially different design and are mutually exclusive in scope. For instance, Invention I is directed to a magnetic resonator (product) with two loops of an inductor and a capacitor in series with one of the loops. However, Invention IV is directed towards a conducting plate positioned perpendicular to a dipole moment of a resonator in a wireless power system to reduce the dipole radiation of the resonator. Both inventions recite mutually exclusive features and have a materially different design. Inventions I and II do not overlap in scope and recite mutually exclusive features. For instance, Invention II recites "a control system" for adjusting the dipole moment of one of the loops whereas there are no limitations in Invention I that suggest the magnetic resonator is "controllable". Invention I is a fixed system. Inventions II and III have a different mode of operation, function and recite mutually exclusive features. Invention III requires specific method steps that are not required in Invention

II. Furthermore, the inventions as claimed do not encompass overlapping subject matter and there is nothing of record to show them to be obvious variants.

Inventions II and III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case, Invention II (the product) is directed towards adjusting the dipole moment of the magnetic resonator whereas Invention III (the process) introduces specific method steps in adjusting the dipole moment that is not required of the product.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because one or more of the following reasons apply:

Inventions I-IV are directed towards mutually exclusive features of a magnetic resonator and of a wireless power system. Thus, there is a search burden. Additionally, the prior art applicable to one invention would not likely be applicable to another invention.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of an invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention**.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RASEM MOURAD whose telephone number is (571)270-7770. The examiner can normally be reached on Monday-Friday (10:30am-5:00pm) alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rexford Barnie can be reached on 5722727492. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rasem Mourad/
Examiner, AU 2836

/REXFORD BARNIE/

Supervisory Patent Examiner, Art Unit 2836

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Andre B. Kurs	Art Unit	:	2836
Serial No.	:	13/752,169	Examiner	:	Rasem Mourad
Filed	:	January 28, 2013	Conf. No.	:	6134
Title	:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS			

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO RESTRICTION REQUIREMENT

In response to the restriction requirement made in the action dated February 12, 2015, identified Group I (claims 1-11) is elected for examination. The election is made without traverse.

Please apply any necessary charges or credits to Deposit Account No. 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: April 10, 2015

/Marc M. Wefers Reg. No. 56,842/
Marc M. Wefers
Reg. No. 56,842

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23380691.doc

Electronic Acknowledgement Receipt

EFS ID:	22025617
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	26161
Filer:	Marc M. Wefers/Cheryl Forrest
Filer Authorized By:	Marc M. Wefers
Attorney Docket Number:	25236-0134001
Receipt Date:	10-APR-2015
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Time Stamp:	12:06:05
Application Type:	Utility under 35 USC 111(a)

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Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response to Election / Restriction Filed	ReplytoRR.pdf	51480 6b208c0d2215594ae83ef1d79a9c5bf77890be46	no	1

Warnings:	
Information:	

Total Files Size (in bytes):	51480

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	01/28/2013	Andre B. Kurs	25236-0134001	6134

26161 7590 05/06/2015

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P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
MOURAD, RASEM	

ART UNIT	PAPER NUMBER
2836	

NOTIFICATION DATE	DELIVERY MODE
05/06/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary	Application No. 13/752,169	Applicant(s) KURS ET AL.	
	Examiner RASEM MOURAD	Art Unit 2836	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/10/2015*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-11* is/are pending in the application.

5a) Of the above claim(s) *12-20* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-11* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *1/28/2013* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date *11/17/2014,2/25/2014,6/20/2013,2/28/2013*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, claims 1-11 in the reply filed on 4/10/2015 is acknowledged. Therefore, claims 12-20 are canceled.

Claim Rejections - 35 USC § 103

The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 1 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over **Buhrer (4,240,010)** in view of **Cook et al. (2009/0051224 A1).**

Regarding Claim 1,

Buhrer (Fig.6) teaches a magnetic resonator comprising:

Buhrer teaches an inductor (item 90) comprising a conductive first loop (item 96) having a first dipole moment (see dipole moment 98 in downward direction) and a conductive second loop (item 94) having a second dipole moment (see dipole moment 98 in upward direction) wherein a direction of the first dipole moment is substantially opposite to a direction of the second dipole moment (see Fig.6. Downward dipole moment 98 is opposite to upward dipole moment 98).

Buhrer does not explicitly disclose at least one capacitor in series with at least one of the first loop and the second loop.

Cook (Fig.1), however, teaches at least one capacitor (item 114) in series with at least one of the first loop and the second loop (par [21]; Cook teaches the resonant antenna includes a number N of coil loops 113 each loop having a radius rA. A capacitor 114, here shown as a variable capacitor, is in series with the coil 113, forming a resonant loop).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Buhrer to include a capacitor in series with one of the first and second loops. The motivation would have been to build a more efficient wireless power system since it is well known in wireless power systems to use capacitors for tuning. By adding a capacitor to an inductor (L+C), a band pass filter is formed which gives more control than just L.
It is noted that the loops form “inductance” and this combines with the capacitor to be "resonant".

Claims 1-6, 9-10 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over **Steinberg et al. (2011/0125007 A1)** in view of **Cook et al. (2009/0051224 A1).**

Regarding Claim 1,

Steinberg (Figs.1 and 2B) teaches a magnetic resonator comprising:
Steinberg teaches an inductor comprising a conductive first loop having a first dipole moment (see Fig.1, item 111, Fig.2B, dipole moment m_q, pars [72, 75-76]; Steinberg teaches properly arranged coils in electromagnetic radiator source coils 111, for example, can be synthesized by positioning two magnetic dipoles (loops or coils) in parallel, excited with opposite polarity. Therefore, Steinberg teaches a first loop with a first dipole moment m_q) and a conductive second loop having a second dipole moment (Figs.1 and Fig.2B, item 111, pars [72, 75-76]; item 111 comprises a plurality of loops (i.e. at least a second loop) and Steinberg teaches oppositely polarized magnetic dipole poles (coils). The second dipole moment is $-m_q$) wherein a direction of the first dipole moment is substantially opposite to a direction of the second dipole moment (see Fig.2B, par [76]; m_q and $-m_q$ are in opposite directions).
Steinberg does not explicitly disclose at least one capacitor in series with at least one of the first loop and the second loop.
Cook (Fig.1), however, teaches at least one capacitor (item 114) in series with at least one of the first loop and the second loop (par [21]; Cook teaches the resonant antenna includes a number N

of coil loops 113 each loop having a radius rA. A capacitor 114, here shown as a variable capacitor, is in series with the coil 113, forming a resonant loop).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Steingberg to include a capacitor in series with one of the first and second loops. The motivation would have been to build a more efficient wireless power system since it is well known in wireless power systems to use capacitors for tuning. By adding a capacitor to an inductor (L+C), a band pass filter is formed which gives more control than just L. It is noted that the loops form “inductance” and this combines with the capacitor to be "resonant".

Regarding Claim 2,

The combination of Steinberg in view of Cook teaches the claimed subject matter in claim 1 and the combination further teaches wherein a quality factor of the resonator is greater than 100 (Cook, see claim 2, said antenna part has a quality factor greater than 500.Therefore, the resonator has a quality factor greater than 100).

Regarding Claim 3,

The combination of Steinberg in view of Cook teaches the claimed subject matter in claim 1 and the combination further teaches wherein the first loop and second loop are substantially the same size and have the same number of turns (Steinberg, par [76]; magnetic quadrupoles may be synthesized using identical and oppositely polarized coils. This suggests to one of ordinary skill in the art that the coils would be similar to each other in their construction, including size and the number of turns. Cook, Fig.6, Cook illustrates a two turn antenna 600 comprising two loops (one turn for each loop). Also, see Cook, Fig.1, pars [21 and 28] a number N of coil loops 113 with each loop having a radius rA. Each loop is substantially the same size as illustrated in Fig.1 and each loop is one turn of a coil; therefore they have the same number of turns).

Regarding Claim 4,

The combination of Steinberg in view of Cook teaches the claimed subject matter in claim 1 and the combination further teaches wherein a magnitude of the first dipole moment and a magnitude of the second dipole moment are substantially equal (Steingberg, Fig.2B, pars [72 and 76];

Steinberg teaches dipoles have a magnitude m in par [72]. In par [76] and Fig.2B, Steinberg teaches the magnetic dipoles (coils/loops) are identical and oppositely polarized. This means it is obvious the magnitudes of the magnetic dipoles illustrated in Fig.2B are substantially equal. Moreover, the dipole moments cancel each other out, which means the magnitudes are the same).

Regarding Claim 5,

The combination of Steinberg in view of Cook teaches the claimed subject matter in claim 1 and the combination further teaches wherein the resonator is one component of a wireless power source (Steinberg, Fig.1, item 111 is part of power source 117 and Cook, left side of Fig.1 labeled as energy source).

Regarding Claim 6,

The combination of Steinberg in view of Cook teaches the claimed subject matter in claim 1 and the combination further teaches wherein the resonator is one component of a wireless power device (Steinberg teaches the resonator on the source side. Cook teaches a resonator structure with loops and a capacitor on both the source and device side. It would have been obvious to one of ordinary skill in the art to rearrange the structure disclosed by Steinberg on the source side and apply it on the receiver side, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70). The resonator structure itself is taught by the combination of Steinberg in view of Cook. Placing said resonator structure in known resonators (i.e. source, repeater, or device) is obvious.

Regarding Claim 9,

The combination of Steinberg in view of Cook teaches the claimed subject matter in claim 1 and the combination further teaches wherein the first loop and the second loop of the resonator are oriented such that an axis of the first loop is substantially parallel to an axis of the second loop (Steinberg, par [75]; A magnetic quadrupole, such as properly arranged coils in electromagnetic radiator source coils 111, for example, can be synthesized by positioning two magnetic dipoles (loops or coils) in **parallel**, excited with opposite polarity).

Regarding Claim 10,

The combination of Steinberg in view of Cook teaches the claimed subject matter in claim 1 and the combination further teaches wherein the capacitor is a variable capacitor (Cook, Fig.1, item 114, par [21]; Item 114 is a variable capacitor).

Claim 7 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over **Steinberg et al. (2011/0125007 A1)** in view of **Cook et al. (2009/0051224 A1)** as applied to claim 1 above and further in view of **Chen et al. (2009/0153273 A1).**

Regarding Claim 7,

The combination of Steinberg in view of Cook teaches the claimed subject matter in claim 1.

The combination does not explicitly disclose a wireless power repeater.

Chen (Fig.1), however, teaches it is known in wireless power systems to include wireless power repeater (see Fig.1, item 120 or Fig.2, item 122). Wireless power repeaters are known to be used for efficiency in wireless power by extending the range of wireless power supply from the source to the device.

By modifying the repeater taught by Chen to include the resonator structure taught by the combination of Steinberg in view of Cook, it would have been obvious to one of ordinary skill in the art to do so, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70). The resonator structure itself is taught by the combination of Steinberg in view of Cook. Placing said resonator structure in known resonators (i.e. source, repeater, or device) is obvious.

Claim 8 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over **Steinberg et al. (2011/0125007 A1)** in view of **Cook et al. (2009/0051224 A1)** as applied to claim 1 above and further in view of **Buhrer (4,240,010).**

Regarding Claim 8,

The combination of Steinberg in view of Cook teaches the claimed subject matter in claim 1.

The combination does not explicitly the first and second loops are substantially co-planar. Buhrer (Fig.6), however, teaches a coil 90 with two loops 94 and 96 with opposite dipole moments (see items 98). Both loops 95 and 96 are connected at midpoint 92 and are substantially co-planar (see Fig.6).

It would have been an obvious matter of design choice to have the first and second loops substantially co-planar since applicant has not disclosed that the loops being substantially co-planar is for any particular purpose and it appears the invention would perform equally well with the structure of loops taught by Steinberg in combination with Cook. Steinberg teaches two loops with opposite dipole moments in parallel and one of ordinary skill in the art would seek to find the appropriate/desired design of the two loops without changing the structure or functionality taught by Steinberg.

Claim 11 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over **Steinberg et al. (2011/0125007 A1)** in view of **Cook et al. (2009/0051224 A1)** as applied to claim 1 above and further in view of **Kurs (2010/0308939 A1).**

Regarding Claim 11,

The combination of Steinberg in view of Cook teaches the claimed subject matter in claim 1.

The combination does not explicitly disclose a second capacitor in parallel with the inductor.

Kurs (Figs. 33a-f), however, illustrates six topologies that show at least a second capacitor (par [63], see capacitor C2) in parallel with an inductor L.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Steinberg in view of Cook to those of Kurs of a second capacitor. The motivation would have been to produce an overall variable capacitance with finer tuning resolution.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RASEM MOURAD whose telephone number is (571)270-7770. The examiner can normally be reached on Monday-Friday (10:30am-5:00pm) alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rexford Barnie can be reached on 5722727492. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rasem Mourad/
Examiner, AU 2836

/REXFORD BARNIE/
Supervisory Patent Examiner, Art Unit 2836

Notice of References Cited	Application/Control No. 13/752,169	Applicant(s)/Patent Under Reexamination KURS ET AL.	
	Examiner RASEM MOURAD	Art Unit 2836	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-4,240,010	12-1980	Buhrer, Carl F.	315/248
*	B	US-2009/0051224	02-2009	Cook et al.	307/104
*	C	US-2011/0125007	05-2011	Steinberg et al.	600/424
*	D	US-2010/0308939	12-2010	Kurs, Andre B.	333/219.2
*	E	US-2009/0153273	06-2009	Chen et al.	333/219
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Modified PTO/SB/08a (01-10)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Application Number	13/752,169
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First Named Inventor	Morris P. Kesler
Art Unit	Not Yet Assigned
Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/R.M./	1	645576		1900-03-20	Tesla, N.	
/R.M./	2	649621		1900-05-15	Tesla, N.	
/R.M./	3	787412		1905-04-18	Tesla, N.	
/R.M./	4	1119732		1914-12-01	Tesla, N.	
/R.M./	5	2133494		1938-10-18	Waters, H. F.	
/R.M./	6	3517350		1970-06-23	Beaver, William D.	
/R.M./	7	3535543		1970-10-20	Dailey, C. C.	
/R.M./	8	3780425		1973-12-25	Alan, William	
/R.M./	9	3871176		1975-03-18	Schukei, Glen Elwin	
/R.M./	10	4088999		1978-05-09	Fletcher, James C., et al.	
/R.M./	11	4095998		1978-06-20	Hanson, Charles M.	
/R.M./	12	4280129		1981-07-21	Wells, Donald H.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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/R.M./	13	5027709	A	1991-07-02	Slagle, Glenn B.	
/R.M./	14	5053774	A	1991-10-01	Schuermann et al.	
/R.M./	15	5070293	A	1991-12-03	Ishii, Naoki et al.	
/R.M./	16	5118997	A	1992-06-02	El-Hamamsy, Sayed-amr A.	
/R.M./	17	5216402	A	1993-06-01	Carosa, Paul F.	
/R.M./	18	5287112	A	1994-02-15	Schuermann, Josef H.	
/R.M./	19	5341083	A	1994-08-23	Klontz, Keith W., et al.	
/R.M./	20	5367242	A	1994-11-22	Hulman, Fredericus W.	
/R.M./	21	5408209	A	1995-04-18	Tanzer, Herbert J., et al.	
/R.M./	22	5437057	A	1995-07-25	Richley, Edward A., et al.	
/R.M./	23	5455467	A	1995-10-03	Young, Steven J., et al.	
/R.M./	24	5493691	A	1996-02-20	Barrett, Terence W.	
/R.M./	25	5522856	A	1996-06-04	Reineman, Henk	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
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/R.M./	26	5528113	A	1996-06-18	Boys, John T., et al.	
/R.M./	27	5550452	A	1996-08-27	Shirai, Ichiro et al.	
/R.M./	28	5565763	A	1996-10-15	Arrendale, Hubert G., et al.	
/R.M./	29	5630835	A	1997-05-20	Brownlee, Robert R.	
/R.M./	30	5697956	A	1997-12-16	Bornzin, Gene A.	
/R.M./	31	5703461	A	1997-12-30	Minoshima, Norimoto et al.	
/R.M./	32	5742471	A	1998-04-21	Barbee Jr., Troy W., et al.	
/R.M./	33	5821731	A	1998-10-13	Kuki, Heiji et al.	
/R.M./	34	5898579	A	1999-04-27	Boys, John T., et al.	
/R.M./	35	5923544	A	1999-07-13	Urano, Takashi	
/R.M./	36	5940509	A	1999-08-17	Jovanovich, Alan et al.	
/R.M./	37	5957956	A	1999-09-28	Kroll, Mark W., et al.	
/R.M./	38	5986895	A	1999-11-16	Stewart, Neal G., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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/R.M./	39	5993996	A	1999-11-30	Firsich, David W.	
/R.M./	40	5999308	A	1999-12-07	Nelson, Keith A., et al.	
/R.M./	41	6012659	A	2000-01-11	Nakazawa, Yuji et al.	
/R.M./	42	6066163	A	2000-05-23	John, Michael Sasha	
/R.M./	43	6067473	A	2000-05-23	Greeninger, Daniel R., et al.	
/R.M./	44	6108579	A	2000-08-22	Snell, Jeffrey D., et al.	
/R.M./	45	6127799	A	2000-10-03	Krishnan, Rajesh	
/R.M./	46	6184651	B1	2001-02-06	Fernandez, Jose M., et al.	
/R.M./	47	6207887	B1	2001-03-27	Bass, John C., et al.	
/R.M./	48	6252762	B1	2001-06-26	Amatucci, Glenn G.	
/R.M./	49	6436299	B1	2002-08-20	Baarman, David W., et al.	
/R.M./	50	6450946	B1	2002-09-17	Forsell, Peter	
/R.M./	51	6452465	B1	2002-09-17	Brown, Andrew et al.	

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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	52	6483202	B1	2002-11-19	Boys, John Talbot	
/R.M./	53	6515878	B1	2003-02-04	Meins, Jürgen G., et al.	
/R.M./	54	6535133	B2	2003-03-18	Gohara, Takashi	
/R.M./	55	6597076	B2	2003-07-22	Scheible, Guntram et al.	
/R.M./	56	6609023	B1	2003-08-19	Fischell, David R., et al.	
/R.M./	57	6631072	B1	2003-10-07	Paul, George L., et al.	
/R.M./	58	6664770	B1	2003-12-16	Bartels, Oliver	
/R.M./	59	6673250	B2	2004-01-06	Kuennen, Roy W., et al.	
/R.M./	60	6731071	B2	2004-05-04	Baarman, David W.	
/R.M./	61	6749119	B2	2004-06-15	Scheible, Guntram et al.	
/R.M./	62	6772011	B2	2004-08-03	Dolgin, Alexander	
/R.M./	63	6798716	B2	2004-09-28	Charych, Arthur	
/R.M./	64	6806649	B2	2004-10-19	Mollema, Scott A., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	65	6812645	B2	2004-11-02	Baarman, David W.	
/R.M./	66	6825620	B2	2004-11-30	Kuennen, Roy W., et al.	
/R.M./	67	6831417	B2	2004-12-14	Baarman, David W.	
/R.M./	68	6844702	B2	2005-01-18	Giannopoulos, Demetri et al.	
/R.M./	69	6856291	B2	2005-02-15	Mickle, Marlin H., et al.	
/R.M./	70	6858970	B2	2005-02-22	Malkin, Matthew C., et al.	
/R.M./	71	6906495	B2	2005-06-14	Cheng, Lily Ka Lai et al.	
/R.M./	72	6917163	B2	2005-07-12	Baarman, David W.	
/R.M./	73	6917431	B2	2005-07-12	Soljacic, Marin et al.	
/R.M./	74	6937130	B2	2005-08-30	Scheible, Guntram et al.	
/R.M./	75	6960968	B2	2005-11-01	Odendaal, Willem G., et al.	
/R.M./	76	6961619	B2	2005-11-01	Casey, Don E.	
/R.M./	77	6967462	B1	2005-11-22	Landis, Geoffrey A.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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/R.M./	78	6975198	B2	2005-12-13	Baarman, David W., et al.	
/R.M./	79	7027311	B2	2006-04-11	Vanderelli, Timm A., et al.	
/R.M./	80	7035076	B1	2006-04-25	Stevenson, Robert A.	
/R.M./	81	7042196	B2	2006-05-09	Ka-Lai, Lily et al.	
/R.M./	82	7069064	B2	2006-06-27	Gevorgian, Spartak et al.	
/R.M./	83	7084605	B2	2006-08-01	Mickle et al.	
/R.M./	84	7116200	B2	2006-10-03	Baarman, David W., et al.	
/R.M./	85	7118240	B2	2006-10-10	Baarman, David W., et al.	
/R.M./	86	7126450	B2	2006-10-24	Baarman, David W., et al.	
/R.M./	87	7127293	B2	2006-10-24	MacDonald, Stuart G.	
/R.M./	88	7132918	B2	2006-11-07	Baarman, David W., et al.	
/R.M./	89	7147604	B1	2006-12-12	Allen, Mark et al.	
/R.M./	90	7180248	B2	2007-02-20	Kuennen, Roy W., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	91	7191007	B2	2007-03-13	Desai, Resha H., et al.	
/R.M./	92	7212414	B2	2007-05-01	Baarman, David W.	
/R.M./	93	7233137	B2	2007-06-19	Nakamura, Junichi et al.	
/R.M./	94	7239110	B2	2007-07-03	Cheng, Lily K., et al.	
/R.M./	95	7248017	B2	2007-07-24	Cheng, Lily K., et al.	
/R.M./	96	7251527	B2	2007-07-31	Lyden, Michael J.	
/R.M./	97	7288918	B2	2007-10-30	DiStefano, Michael Vincent	
/R.M./	98	7340304	B2	2008-03-04	MacDonald, Stuart G.	
/R.M./	99	7375492	B2	2008-05-20	Calhoon, John C., et al.	
/R.M./	100	7375493	B2	2008-05-20	Calhoon, John C., et al.	
/R.M./	101	7378817	B2	2008-05-27	Calhoon, John C., et al.	
/R.M./	102	7382636	B2	2008-06-03	Baarman, David W., et al.	
/R.M./	103	7385357	B2	2008-06-10	Kuennen, Roy W., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Attorney Docket Number	WTCY-0075-P01

/R.M./	104	7462951	B1	2008-12-09	Baarman, David W.	
/R.M./	105	7466213	B2	2008-12-16	Löbl, Hans-Peter et al.	
/R.M./	106	7474058	B2	2009-01-06	Baarman, David W.	
/R.M./	107	7492247	B2	2009-02-17	Schmidt, Josef et al.	
/R.M./	108	7514818	B2	2009-04-07	Abe, Hideaki et al.	
/R.M./	109	7518267	B2	2009-04-14	Baarman, David W.	
/R.M./	110	7525283	B2	2009-04-28	Cheng, Lily K., et al.	
/R.M./	111	7599743	B2	2009-10-06	Hassler Jr., William L., et al.	
/R.M./	112	7615936	B2	2009-11-10	Baarman, David W., et al.	
/R.M./	113	7639514	B2	2009-12-29	Baarman, David W.	
/R.M./	114	7741734	B2	2010-06-22	Joannopoulos, John D., et al.	
/R.M./	115	7795708	B2	2010-09-14	Katti, Romney R.	
/R.M./	116	7825543	B2	2010-11-02	Karalis, Aristeidis et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Attorney Docket Number	WTCY-0075-P01

/R.M./	117	7843288	B2	2010-11-30	Lee, Dong-Hyun et al.	
/R.M./	118	7863859	B2	2011-01-04	Soar, Roger J.	
/R.M./	119	7885050	B2	2011-02-08	Lee, Hyung-Joo	
/R.M./	120	7919886	B2	2011-04-05	Tanaka, Katsuyuki	
/R.M./	121	7999506	B1	2011-08-16	Hollar, Seth E., et al.	
/R.M./	122	8022576	B2	2011-09-20	Joannopoulos, John D., et al.	
/R.M./	123	8035255	B2	2011-10-11	Kurs, Andre B., et al.	
/R.M./	124	8076800	B2	2011-12-13	Joannopoulos et al.	
/R.M./	125	8076801	B2	2011-12-13	Karalis, Aristeidis et al.	
/R.M./	126	8084889	B2	2011-12-27	Joannopoulos et al.	
/R.M./	127	8097983	B2	2012-01-17	Karalis, Aristeidis et al.	
/R.M./	128	8106539	B2	2012-01-31	Schatz, David A., et al.	
/R.M./	129	8115448	B2	2012-02-14	John, Michael Sasha	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	130	8304935	B2	2012-11-06	Karalis, Aristeidis et al.	
/R.M./	131	8324759	B2	2012-12-04	Karalis, Aristeidis et al.	

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/R.M./	132	20020032471	A1	2002-03-14	Loftin, Scott M., et al.	
/R.M./	133	20020105343	A1	2002-08-08	Scheible, Guntram et al.	
/R.M./	134	20020118004	A1	2002-08-29	Scheible, Guntram et al.	
/R.M./	135	20020130642	A1	2002-09-19	Ettes, Wilhelmus G., et al.	
/R.M./	136	20020167294	A1	2002-11-14	Odaohhara, Shigefumi	
/R.M./	137	20030038641	A1	2003-02-27	Scheible, Guntram	
/R.M./	138	20030062794	A1	2003-04-03	Scheible, Guntram et al.	
/R.M./	139	20030062980	A1	2003-04-03	Scheible, Guntram et al.	
/R.M./	140	20030124050	A1	2003-07-03	Yadav, Tapesh et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	141	20030126948	A1	2003-07-10	Yadav, Tapesh et al.	
/R.M./	142	20030199778	A1	2003-10-23	Mickle, Marlin et al.	
/R.M./	143	20030214255	A1	2003-11-20	Baarman, David W., et al.	
/R.M./	144	20040000974	A1	2004-01-01	Odenaal, Willem G., et al.	
/R.M./	145	20040100338	A1	2004-05-27	Clark, Roger L.	
/R.M./	146	20040113847	A1	2004-06-17	Qi, Yihong et al.	
/R.M./	147	20040130915	A1	2004-07-08	Baarman, David W.	
/R.M./	148	20040130916	A1	2004-07-08	Baarman, David W.	
/R.M./	149	20040142733	A1	2004-07-22	Parise, Ronald J.	
/R.M./	150	20040150934	A1	2004-08-05	Baarman, David W.	
/R.M./	151	20040189246	A1	2004-09-30	Bulai, Claudiu et al.	
/R.M./	152	20040201361	A1	2004-10-14	Koh, Won-jun et al.	
/R.M./	153	20040222751	A1	2004-11-11	Mollema, Scott A., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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First Named Inventor	Morris P. Kesler
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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	154	20040227057	A1	2004-11-18	Tuominen, Juha et al.	
/R.M./	155	20040232845	A1	2004-11-25	Baarman, David W., et al.	
/R.M./	156	20040233043	A1	2004-11-25	Yazawa, Yoshiaki et al.	
/R.M./	157	20040267501	A1	2004-12-30	Freed, Mason L., et al.	
/R.M./	158	20050007067	A1	2005-01-13	Baarman, David W., et al.	
/R.M./	159	20050021134	A1	2005-01-27	Opie, John C.	
/R.M./	160	20050033382	A1	2005-02-10	Single, Peter	
/R.M./	161	20050085873	A1	2005-04-21	Gord, John C., et al.	
/R.M./	162	20050093475	A1	2005-05-05	Kuennen, Roy W., et al.	
/R.M./	163	20050104064	A1	2005-05-19	Hegarty, John et al.	
/R.M./	164	20050104453	A1	2005-05-19	Vanderelli, Timm A., et al.	
/R.M./	165	20050116650	A1	2005-06-02	Baarman, David W.	
/R.M./	166	20050122058	A1	2005-06-09	Baarman, David W., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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/R.M./	167	20050122059	A1	2005-06-09	Baarman, David W., et al.	
/R.M./	168	20050127849	A1	2005-06-16	Baarman, David W., et al.	
/R.M./	169	20050127850	A1	2005-06-16	Baarman, David W., et al.	
/R.M./	170	20050127866	A1	2005-06-16	Hamilton, Alistair et al.	
/R.M./	171	20050140482	A1	2005-06-30	Cheng, Lily K., et al.	
/R.M./	172	20050156560	A1	2005-07-21	Shimaoka, Motohiro et al.	
/R.M./	173	20050194926	A1	2005-09-08	Di Stefano, Michael Vincent	
/R.M./	174	20050253152	A1	2005-11-17	Klimov, Victor I., et al.	
/R.M./	175	20050288739	A1	2005-12-29	Hassler Jr., William L., et al.	
/R.M./	176	20050288740	A1	2005-12-29	Hassler Jr., William L., et al.	
/R.M./	177	20050288741	A1	2005-12-29	HasslerJr, William L., et al.	
/R.M./	178	20050288742	A1	2005-12-29	Giordano, James R., et al.	
/R.M./	179	20060022636	A1	2006-02-02	Xian, Bo-xun et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	180	20060061323	A1	2006-03-23	Cheng, Lily Ka-lai et al.	
/R.M./	181	20060066443	A1	2006-03-30	Hall, David M.	
/R.M./	182	20060132045	A1	2006-06-22	Baarman, David W.	
/R.M./	183	20060164866	A1	2006-07-27	Vanderelli, Timm A., et al.	
/R.M./	184	20060181242	A1	2006-08-17	Freed, Mason L., et al.	
/R.M./	185	20060184209	A1	2006-08-17	John, Constance M., et al.	
/R.M./	186	20060184210	A1	2006-08-17	Singhal, Ruchika et al.	
/R.M./	187	20060185809	A1	2006-08-24	Elfrink, Rudolph B., et al.	
/R.M./	188	20060199620	A1	2006-09-07	Greene, Charles E., et al.	
/R.M./	189	20060202665	A1	2006-09-14	Hsu, Feng-Hsiung	
/R.M./	190	20060205381	A1	2006-09-14	Beart, Pilgrim G., et al.	
/R.M./	191	20060214626	A1	2006-09-28	Nilson, Lee A., et al.	
/R.M./	192	20060238365	A1	2006-10-26	Vecchione, Elio et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	193	20060270440	A1	2006-11-30	Shearer, John G., et al.	
/R.M./	194	20060281435	A1	2006-12-14	Shearer, John G., et al.	
/R.M./	195	20070010295	A1	2007-01-11	Greene, Charles E., et al.	
/R.M./	196	20070013483	A1	2007-01-18	Stewart, Robert	
/R.M./	197	20070016089	A1	2007-01-18	Fischell, David R., et al.	
/R.M./	198	20070021140	A1	2007-01-25	Keyes IV, Marion A., et al.	
/R.M./	199	20070024246	A1	2007-02-01	Flaugher, David J.	
/R.M./	200	20070064406	A1	2007-03-22	Beart, Pilgrim G.	
/R.M./	201	20070069687	A1	2007-03-29	Suzuki, Katsuya	
/R.M./	202	20070096875	A1	2007-05-03	Waterhouse, Paul et al.	
/R.M./	203	20070117596	A1	2007-05-24	Greene, Charles E., et al.	
/R.M./	204	20070145830	A1	2007-06-28	Lee, Yeechun et al.	
/R.M./	205	20070171681	A1	2007-07-26	Baarman, David W.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	206	20070176840	A1	2007-08-02	Pristas, James et al.	
/R.M./	207	20070178945	A1	2007-08-02	Cook, Nigel P., et al.	
/R.M./	208	20070182367	A1	2007-08-09	Partovi, Afshin	
/R.M./	209	20070208263	A1	2007-09-06	John, Michael S., et al.	
/R.M./	210	20070222542	A1	2007-09-27	Joannopoulos, John D., et al.	
/R.M./	211	20070267918	A1	2007-11-22	Gyland, Geir O.	
/R.M./	212	20070276538	A1	2007-11-29	Kjellsson, Jimmy et al.	
/R.M./	213	20080014897	A1	2008-01-07	Cook, Nigel P., et al.	
/R.M./	214	20080012569	A1	2008-01-17	Hall, David R., et al.	
/R.M./	215	20080030415	A1	2008-02-07	Homan, Dean M., et al.	
/R.M./	216	20080036588	A1	2008-02-14	Iverson, Rod et al.	
/R.M./	217	20080067874	A1	2008-03-20	Tseng, Ryan	
/R.M./	218	20080154331	A1	2008-06-26	John, Varghese et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	219	20080191638	A1	2008-08-14	Kuennen, Roy W., et al.	
/R.M./	220	20080197710	A1	2008-08-21	Kreitz, Andreas et al.	
/R.M./	221	20080211320	A1	2008-09-04	Cook, Nigel P., et al.	
/R.M./	222	20080265684	A1	2008-10-30	Farkas, Laszlo	
/R.M./	223	20080266748	A1	2008-10-30	Lee, Hyung-joo	
/R.M./	224	20080273242	A1	2008-11-06	Woodgate, Graham J., et al.	
/R.M./	225	20080278264	A1	2008-11-13	Karalis, Aristeidis et al.	
/R.M./	226	20080300657	A1	2008-12-04	Stultz, Mark Raymond	
/R.M./	227	20080300660	A1	2008-12-04	John, Michael S.	
/R.M./	228	20090010028	A1	2009-01-08	Baarman, David W., et al.	
/R.M./	229	20090015075	A1	2009-01-15	Cook, Nigel P., et al.	
/R.M./	230	20090033564	A1	2009-02-05	Cook, Nigel P., et al.	
/R.M./	231	20090045772	A1	2009-02-19	Cook, Nigel P., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Attorney Docket Number	WTCY-0075-P01

/R.M./	232	20090051224	A1	2009-02-26	Cook, Nigel P., et al.	
/R.M./	233	20090058189	A1	2009-03-05	Cook, Nigel P.	
/R.M./	234	20090058361	A1	2009-03-05	John, Michael S.	
/R.M./	235	20090067198	A1	2009-03-12	Graham, D. J., et al.	
/R.M./	236	20090072627	A1	2009-03-19	Cook, N. P., et al.	
/R.M./	237	20090072628	A1	2009-03-19	Cook, N. P., et al.	
/R.M./	238	20090072629	A1	2009-03-19	Cook, Nigel P.	
/R.M./	239	20090072782	A1	2009-03-19	Randall, Mitch	
/R.M./	240	20090079268	A1	2009-03-26	Cook, N. P., et al.	
/R.M./	241	20090085408	A1	2009-04-02	Bruhn, Alfred	
/R.M./	242	20090085706	A1	2009-04-02	Baarman, David W., et al.	
/R.M./	243	20090096413	A1	2009-04-16	Partovi, Afshin et al.	
/R.M./	244	20090102292	A1	2009-04-23	Cook, Nigel P., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
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/R.M./	245	20090108679	A1	2009-04-30	Porwal, Gunjan	
/R.M./	246	20090108997	A1	2009-04-30	Petterson, Mike et al.	
/R.M./	247	20090127937	A1	2009-05-21	Widmer, Hanspeter et al.	
/R.M./	248	20090134712	A1	2009-05-28	Cook, Nigel P., et al.	
/R.M./	249	20090146892	A1	2009-06-11	Shimizu, Kanjiro et al.	
/R.M./	250	20090153273	A1	2009-06-18	Chen, Chih-jung et al.	
/R.M./	251	20090160261	A1	2009-06-25	Elo, HarriHeikki T.	
/R.M./	252	20090167449	A1	2009-07-02	Cook, Nigel P., et al.	
/R.M./	253	20090174263	A1	2009-07-09	Baarman, David W., et al.	
/R.M./	254	20090179502	A1	2009-07-16	Cook, Nigel P., et al.	
/R.M./	255	20090189458	A1	2009-07-30	Kawasaki, Koji	
/R.M./	256	20090195332	A1	2009-08-06	Joannopoulos, John D., et al.	
/R.M./	257	20090195333	A1	2009-08-06	Joannopoulos, John D., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
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/R.M./	258	20090212636	A1	2009-08-27	Cook, Nigel P., et al.	
/R.M./	259	20090213028	A1	2009-08-27	Cook, Nigel P., et al.	
/R.M./	260	20090224608	A1	2009-09-10	Cook, Nigel P., et al.	
/R.M./	261	20090224609	A1	2009-09-10	Cook, Nigel P., et al.	
/R.M./	262	20090224856	A1	2009-09-10	Karalis, Aristeidis et al.	
/R.M./	263	20090230777	A1	2009-09-17	Baarman, David W., et al.	
/R.M./	264	20090237194	A1	2009-09-24	Waffenschmidt, Eberhard et al.	
/R.M./	265	20090243394	A1	2009-10-01	Levine, Richard C.	
/R.M./	266	20090243397	A1	2009-10-01	Cook, Nigel P., et al.	
/R.M./	267	20090251008	A1	2009-10-08	Sugaya, Shigeru	
/R.M./	268	20090261778	A1	2009-10-22	Kook, Yoon-Sang	
/R.M./	269	20090267558	A1	2009-10-29	Jung, Chun-Kil	
/R.M./	270	20090267709	A1	2009-10-29	Joannopoulos, John D., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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/R.M./	271	20090267710	A1	2009-10-29	Joannopoulos, John D., et al.	
/R.M./	272	20090271047	A1	2009-10-29	Wakamatsu, Masataka	
/R.M./	273	20090271048	A1	2009-10-29	Wakamatsu, Masataka	
/R.M./	274	20090273242	A1	2009-11-05	Cook, Nigel P.	
/R.M./	275	20090281678	A1	2009-11-12	Wakamatsu, Masataka	
/R.M./	276	20090284082	A1	2009-11-19	Mohammadian, Alireza H.	
/R.M./	277	20090284083	A1	2009-11-19	Karalis, Aristeidis et al.	
/R.M./	278	20090284218	A1	2009-11-19	Mohammadian, Alireza H., et al.	
/R.M./	279	20090284220	A1	2009-11-19	Toncich, Stanley S., et al.	
/R.M./	280	20090284227	A1	2009-11-19	Mohammadian, Alireza H., et al.	
/R.M./	281	20090284245	A1	2009-11-19	Kirby, Miles A., et al.	
/R.M./	282	20090284369	A1	2009-11-19	Toncich, Stanley S., et al.	
/R.M./	283	20090286470	A1	2009-11-19	Mohammadian, Alireza H., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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/R.M./	284	20090286475	A1	2009-11-19	Toncich, Stanley S.	
/R.M./	285	20090286476	A1	2009-11-19	Toncich, Stanley S., et al.	
/R.M./	286	20090289595	A1	2009-11-26	Chen, Chih-jung et al.	
/R.M./	287	20090299918	A1	2009-12-03	Cook, Nigel P., et al.	
/R.M./	288	20100017249	A1	2010-01-21	Fincham, Carson et al.	
/R.M./	289	20100033021	A1	2010-02-11	Bennett, James D.	
/R.M./	290	20100034238	A1	2010-02-11	Bennett, James D.	
/R.M./	291	20100036773	A1	2010-02-11	Bennett, James D.	
/R.M./	292	20100038970	A1	2010-02-18	Cook, Nigel P., et al.	
/R.M./	293	20100045114	A1	2010-02-25	Sample, Alanson et al.	
/R.M./	294	20100052431	A1	2010-03-04	Mita, Hiroyuki	
/R.M./	295	20100052811	A1	2010-03-04	Smith, Joshua et al.	
/R.M./	296	20100060077	A1	2010-03-11	Paulus, Peter et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Attorney Docket Number	WTCY-0075-P01

/R.M./	297	20100065352	A1	2010-03-18	Ichikawa, Shinji	
/R.M./	298	20100066349	A1	2010-03-18	Lin, Jenshan et al.	
/R.M./	299	20100081379	A1	2010-04-01	Cooper, Emily R., et al.	
/R.M./	300	20100094381	A1	2010-04-15	Kim, Yong et al.	
/R.M./	301	20100096934	A1	2010-04-22	Joannopoulos, John D., et al.	
/R.M./	302	20100102639	A1	2010-04-29	Joannopoulos, John D., et al.	
/R.M./	303	20100102640	A1	2010-04-29	Joannopoulos, John D., et al.	
/R.M./	304	20100102641	A1	2010-04-29	Joannopoulos, John D., et al.	
/R.M./	305	20100109443	A1	2010-05-06	Cook, Nigel et al.	
/R.M./	306	20100109445	A1	2010-05-06	Kurs, Andre B., et al.	
/R.M./	307	20100109604	A1	2010-05-06	Boys, John T., et al.	
/R.M./	308	20100115474	A1	2010-05-06	Takada, Kazuyoshi et al.	
/R.M./	309	20100117454	A1	2010-05-13	Cook, Nigel et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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/R.M./	310	20100117455	A1	2010-05-13	Joannopoulos, John D., et al.	
/R.M./	311	20100117456	A1	2010-05-13	Karalis, Aristeidis et al.	
/R.M./	312	20100117596	A1	2010-05-13	Cook, Nigel p., et al.	
/R.M./	313	20100123353	A1	2010-05-20	Joannopoulos, John D., et al.	
/R.M./	314	20100123354	A1	2010-05-20	Joannopoulos, John D., et al.	
/R.M./	315	20100123355	A1	2010-05-20	Joannopoulos, John D., et al.	
/R.M./	316	20100123452	A1	2010-05-20	Amano, Yasushi et al.	
/R.M./	317	20100123530	A1	2010-05-20	Park, Eun-seok et al.	
/R.M./	318	20100127573	A1	2010-05-27	Joannopoulos, John D., et al.	
/R.M./	319	20100127574	A1	2010-05-27	Joannopoulos, John D., et al.	
/R.M./	320	20100127575	A1	2010-05-27	Joannopoulos, John D., et al.	
/R.M./	321	20100127660	A1	2010-05-27	Nigel, Cook P., et al.	
/R.M./	322	20100133918	A1	2010-06-03	Joannopoulos, John D., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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/R.M./	323	20100133919	A1	2010-06-03	Joannopoulos, John D., et al.	
/R.M./	324	20100133920	A1	2010-06-03	Joannopoulos, John D., et al.	
/R.M./	325	20100141042	A1	2010-06-10	Kesler, Morris et al.	
/R.M./	326	20100148589	A1	2010-06-17	Hamam, Rafif E., et al.	
/R.M./	327	20100148723	A1	2010-06-17	Nigel, Cook P., et al.	
/R.M./	328	20100151808	A1	2010-06-17	Stanley, Toncich S., et al.	
/R.M./	329	20100156346	A1	2010-06-24	Takada, Kazuyoshi et al.	
/R.M./	330	20100156355	A1	2010-06-24	Bauerle, Paul A., et al.	
/R.M./	331	20100156570	A1	2010-06-24	Hong, Young-tack et al.	
/R.M./	332	20100164295	A1	2010-07-01	Ichikawa, Katsuei et al.	
/R.M./	333	20100164296	A1	2010-07-01	Kurs, Andre B.	
/R.M./	334	20100164297	A1	2010-07-01	Kurs, Andre B., et al.	
/R.M./	335	20100164298	A1	2010-07-01	Karalis, Aristeidis et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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/R.M./	336	20100171368	A1	2010-07-08	Schatz, David A., et al.	
/R.M./	337	20100171370	A1	2010-07-08	Karalis, Aristeidis et al.	
/R.M./	338	20100181843	A1	2010-07-22	Schatz, D A., et al.	
/R.M./	339	20100181844	A1	2010-07-22	Karalis, Aristeidis et al.	
/R.M./	340	20100181845	A1	2010-07-22	Fiorello, Ron et al.	
/R.M./	341	20100181961	A1	2010-07-22	Novak, William V., et al.	
/R.M./	342	20100184371	A1	2010-07-22	Nigel, Cook P., et al.	
/R.M./	343	20100187911	A1	2010-07-29	Joannopoulos, John D., et al.	
/R.M./	344	20100187913	A1	2010-07-29	Smith, Joshua R., et al.	
/R.M./	345	20100190435	A1	2010-07-29	Nigel, Cook P., et al.	
/R.M./	346	20100190436	A1	2010-07-29	Nigel, Cook P., et al.	
/R.M./	347	20100194206	A1	2010-08-05	Burdo, Rinat et al.	
/R.M./	348	20100194207	A1	2010-08-05	Graham, David S.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Attorney Docket Number	WTCY-0075-P01

/R.M./	349	20100194334	A1	2010-08-05	Kirby, Miles A., et al.	
/R.M./	350	20100194335	A1	2010-08-05	Kirby, Miles A., et al.	
/R.M./	351	20100201189	A1	2010-08-12	Kirby, Miles A., et al.	
/R.M./	352	20100201201	A1	2010-08-12	Mobarhan, Ramin et al.	
/R.M./	353	20100201202	A1	2010-08-12	Kirby, Miles A., et al.	
/R.M./	354	20100201203	A1	2010-08-12	Schatz, D A., et al.	
/R.M./	355	20100201204	A1	2010-08-12	Sakoda, Shimpei et al.	
/R.M./	356	20100201205	A1	2010-08-12	Karalis, Aristeidis et al.	
/R.M./	357	20100201310	A1	2010-08-12	Vorenkamp, Pieter et al.	
/R.M./	358	20100201313	A1	2010-08-12	Vorenkamp, Pieter et al.	
/R.M./	359	20100201316	A1	2010-08-12	Takada, Kazuyoshi et al.	
/R.M./	360	20100201513	A1	2010-08-12	Vorenkamp, Pieter et al.	
/R.M./	361	20100207458	A1	2010-08-19	Joannopoulos, John D., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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Attorney Docket Number	WTCY-0075-P01

/R.M./	362	20100210233	A1	2010-08-19	Nigel, Cook P., et al.	
/R.M./	363	20100213770	A1	2010-08-26	Kikuchi, Hideo	
/R.M./	364	20100213895	A1	2010-08-26	Keating, Virginia Walker et al.	
/R.M./	365	20100217553	A1	2010-08-26	Von Novak, William et al.	
/R.M./	366	20100219694	A1	2010-09-02	Kurs, Andre B., et al.	
/R.M./	367	20100219695	A1	2010-09-02	Komiyama, Shinji et al.	
/R.M./	368	20100219696	A1	2010-09-02	Kojima, Hideki	
/R.M./	369	20100222010	A1	2010-09-02	Ozaki, Ernest T., et al.	
/R.M./	370	20100225175	A1	2010-09-09	Karalis, Aristeidis et al.	
/R.M./	371	20100225270	A1	2010-09-09	Jacobs, Paul E., et al.	
/R.M./	372	20100225271	A1	2010-09-09	Oyobe, Hichirosai et al.	
/R.M./	373	20100225272	A1	2010-09-09	Kirby, Miles A., et al.	
/R.M./	374	20100231053	A1	2010-09-16	Karalis, Aristeidis et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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Attorney Docket Number	WTCY-0075-P01

/R.M./	375	20100231163	A1	2010-09-16	Mashinsky, Alex	
/R.M./	376	20100231340	A1	2010-09-16	Fiorello, Ron et al.	
/R.M./	377	20100235006	A1	2010-09-16	Brown, Wendell	
/R.M./	378	20100237706	A1	2010-09-23	Karalis, Aristeidis et al.	
/R.M./	379	20100237707	A1	2010-09-23	Karalis, Aristeidis et al.	
/R.M./	380	20100237708	A1	2010-09-23	Karalis, Aristeidis et al.	
/R.M./	381	20100237709	A1	2010-09-23	Hall, L. K., et al.	
/R.M./	382	20100244576	A1	2010-09-30	Hillan, John et al.	
/R.M./	383	20100244577	A1	2010-09-30	Shimokawa, Satoshi	
/R.M./	384	20100244578	A1	2010-09-30	Yoshikawa, Hiroyasu	
/R.M./	385	20100244579	A1	2010-09-30	Sogabe, Haruhiko et al.	
/R.M./	386	20100244580	A1	2010-09-30	Uchida, Akiyoshi et al.	
/R.M./	387	20100244581	A1	2010-09-30	Uchida, Akiyoshi	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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/R.M./	388	20100244582	A1	2010-09-30	Yoshikawa, Hiroyasu	
/R.M./	389	20100244583	A1	2010-09-30	Shimokawa, Satoshi	
/R.M./	390	20100244839	A1	2010-09-30	Yoshikawa, Hiroyasu	
/R.M./	391	20100248622	A1	2010-09-30	Lyell Kirby, Miles A. et al.	
/R.M./	392	20100253152	A1	2010-10-07	Karalis, Aristeidis et al.	
/R.M./	393	20100253281	A1	2010-10-07	Li, Peng	
/R.M./	394	20100256831	A1	2010-10-07	Abramo, Keith et al.	
/R.M./	395	20100259108	A1	2010-10-14	Giler, E R., et al.	
/R.M./	396	20100259109	A1	2010-10-14	Sato, Kazuhiro	
/R.M./	397	20100259110	A1	2010-10-14	Kurs, Andre B., et al.	
/R.M./	398	20100264745	A1	2010-10-21	Karalis, Aristeidis et al.	
/R.M./	399	20100264746	A1	2010-10-21	Kazama, Satoshi et al.	
/R.M./	400	20100264747	A1	2010-10-21	Hall, Katherine L., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	401	20100276995	A1	2010-11-04	Marzetta, Thomas Louis et al.	
/R.M./	402	20100277003	A1	2010-11-04	Von Novak, William H. et al.	
/R.M./	403	20100277004	A1	2010-11-04	Suzuki, Masayuki et al.	
/R.M./	404	20100277005	A1	2010-11-04	Karalis, Aristeidis et al.	
/R.M./	405	20100277120	A1	2010-11-04	Cook, Nigel P. et al.	
/R.M./	406	20100277121	A1	2010-11-04	Hall, Katherine L. et al.	
/R.M./	407	20100289341	A1	2010-11-18	Ozaki, Ernest T. et al.	
/R.M./	408	20100289449	A1	2010-11-18	Elo, Harri H.	
/R.M./	409	20100295505	A1	2010-11-25	Jung, Chun-kil et al.	
/R.M./	410	20100295506	A1	2010-11-25	Ichikawa, Shinji	
/R.M./	411	20100308939	A1	2010-12-09	Kurs, Andre B.	
/R.M./	412	20100327660	A1	2010-12-30	Karalis, Aristeidis et al.	
/R.M./	413	20100327661	A1	2010-12-30	Karalis, Aristeidis et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	414	20110004269	A1	2011-01-06	Strother, Robert B., et al.	
/R.M./	415	20110012431	A1	2011-01-20	Karalis, Aristeidis et al.	
/R.M./	416	20110018361	A1	2011-01-27	Karalis, Aristeidis et al.	
/R.M./	417	20110025131	A1	2011-02-03	Karalis, Aristeidis et al.	
/R.M./	418	20110043046	A1	2011-02-24	Joannopoulos, John D., et al.	
/R.M./	419	20110043047	A1	2011-02-24	Karalis, Aristeidis et al.	
/R.M./	420	20110043048	A1	2011-02-24	Karalis, Aristeidis et al.	
/R.M./	421	20110043049	A1	2011-02-24	Karalis, Aristeidis et al.	
/R.M./	422	20110049996	A1	2011-03-03	Karalis, Aristeidis et al.	
/R.M./	423	20110049998	A1	2011-03-03	Karalis, Aristeidis et al.	
/R.M./	424	20110074218	A1	2011-03-31	Karalis, Aristedis et al.	
/R.M./	425	20110074346	A1	2011-03-31	Hall, Katherine L., et al.	
/R.M./	426	20110074347	A1	2011-03-31	Karalis, Aristeidis et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	427	20110089895	A1	2011-04-21	Karalis, Aristeidis et al.	
/R.M./	428	20110095618	A1	2011-04-28	Schatz, A. D., et al.	
/R.M./	429	20110115303	A1	2011-05-19	Baarman, David W., et al.	
/R.M./	430	20110121920	A1	2011-05-26	Kurs, B. A., et al.	
/R.M./	431	20110140544	A1	2011-06-16	Karalis, A. et al.	
/R.M./	432	20110148219	A1	2011-06-23	Karalis, A. et al.	
/R.M./	433	20110162895	A1	2011-07-07	Karalis, A. et al.	
/R.M./	434	20110169339	A1	2011-07-14	Karalis, A. et al.	
/R.M./	435	20110181122	A1	2011-07-28	Karalis, A. et al.	
/R.M./	436	20110193416	A1	2011-08-11	Campanella, A J., et al.	
/R.M./	437	20110193419	A1	2011-08-11	Karalis, Aristeidis et al.	
/R.M./	438	20110198939	A1	2011-08-18	Karalis, A. et al.	
/R.M./	439	20110221278	A1	2011-09-15	Karalis, A. et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	440	20110227528	A1	2011-09-22	Karalis, A. et al.	
/R.M./	441	20110227530	A1	2011-09-22	Karalis, A. et al.	
/R.M./	442	20110241618	A1	2011-10-06	Karalis, A et al.	
/R.M./	443	20110254377	A1	2011-10-20	Wildmer, Hanspeter et al.	
/R.M./	444	20110254503	A1	2011-10-20	Widmer, Hanspeter et al.	
/R.M./	445	20120001492	A1	2012-01-05	Cook, Nigel P., et al.	
/R.M./	446	20120007441	A1	2012-01-12	John, Michael S., et al.	
/R.M./	447	20120032522	A1	2012-02-09	Schatz, David et al.	
/R.M./	448	20120062345	A1	2012-03-15	Kurs, Andre B., et al.	
/R.M./	449	20120068549	A1	2012-03-22	Karalis, Aristeidis et al.	
/R.M./	450	20120086284	A1	2012-04-12	Capanella, Andrew J., et al.	
/R.M./	451	20120086867	A1	2012-04-12	Kesler, Morris et al.	
/R.M./	452	20120091794	A1	2012-04-19	Campanella, Andrew J., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	453	20120091795	A1	2012-04-19	Fiorello, Ron et al.	
/R.M./	454	20120091796	A1	2012-04-19	Kesler, Morris P., et al.	
/R.M./	455	20120091797	A1	2012-04-19	Kesler, Morris P., et al.	
/R.M./	456	20120091819	A1	2012-04-19	Kulikowski, Konrad et al.	
/R.M./	457	20120091820	A1	2012-04-19	Campanella, Andrew J., et al.	
/R.M./	458	20120091949	A1	2012-04-19	Campanella, Andrew J., et al.	
/R.M./	459	20120091950	A1	2012-04-19	Campanella, Andrew J., et al.	
/R.M./	460	20120098350	A1	2012-04-26	Campanella, Andrew J., et al.	
/R.M./	461	20120112531	A1	2012-05-10	Kesler, Morris P., et al.	
/R.M./	462	20120112532	A1	2012-05-10	Kesler, Morris P., et al.	
/R.M./	463	20120112534	A1	2012-05-10	Kesler, Morris P., et al.	
/R.M./	464	20120112535	A1	2012-05-10	Karalis, Aristeidis et al.	
/R.M./	465	20120112536	A1	2012-05-10	Karalis, Aristeidis et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	466	20120112538	A1	2012-05-10	Kesler, Morris P., et al.	
/R.M./	467	20120112691	A1	2012-05-10	Kurs, Andre B., et al.	
/R.M./	468	20120119569	A1	2012-05-17	Karalis, Aristeidis et al.	
/R.M./	469	20120119575	A1	2012-05-17	Kurs, Andre B., et al.	
/R.M./	470	20120119576	A1	2012-05-17	Kesler, Morris P., et al.	
/R.M./	471	20120119698	A1	2012-05-17	Karalis, Aristeidis et al.	
/R.M./	472	20120139355	A1	2012-06-07	Ganem, Steven J., et al.	
/R.M./	473	20120153732	A1	2012-06-21	Kurs, Andre B., et al.	
/R.M./	474	20120153733	A1	2012-06-21	Schatz, David A., et al.	
/R.M./	475	20120153734	A1	2012-06-21	Kurs, Andre B., et al.	
/R.M./	476	20120153735	A1	2012-06-21	Karalis, Aristeidis et al.	
/R.M./	477	20120153736	A1	2012-06-21	Karalis, Aristeidis et al.	
/R.M./	478	20120153737	A1	2012-06-21	Karalis, Aristeidis et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Filing Date	Jan 28, 2013
First Named Inventor	Morris P. Kesler
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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	479	20120153738	A1	2012-06-21	Karalis, Aristeidis et al.	
/R.M./	480	20120153893	A1	2012-06-21	Schatz, David A., et al.	
/R.M./	481	20120184338	A1	2012-07-19	Kesler, Morris P., et al.	
/R.M./	482	20120206096	A1	2012-08-16	John, Michael S.	
/R.M./	483	20120223573	A1	2012-09-06	Schatz, David A., et al.	
/R.M./	484	20120228952	A1	2012-09-13	Hall, Katherine L., et al.	
/R.M./	485	20120228953	A1	2012-09-13	Kesler, Morris P., et al.	
/R.M./	486	20120228954	A1	2012-09-13	Kesler, Morris P., et al.	
/R.M./	487	20120235500	A1	2012-09-20	Ganem, Steven J., et al.	
/R.M./	488	20120235501	A1	2012-09-20	Kesler, Morris P., et al.	
/R.M./	489	20120235502	A1	2012-09-20	Kesler, Morris P., et al.	
/R.M./	490	20120235503	A1	2012-09-20	Kesler, Morris P., et al.	
/R.M./	491	20120235504	A1	2012-09-20	Kesler, Morris P., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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/R.M./	492	20120235505	A1	2012-09-20	Schatz, David A., et al.	
/R.M./	493	20120235566	A1	2012-09-20	Karalis, Aristeidis et al.	
/R.M./	494	20120235567	A1	2012-09-20	Karalis, Aristeidis et al.	
/R.M./	495	20120235633	A1	2012-09-20	Kesler, Morris P., et al.	
/R.M./	496	20120235634	A1	2012-09-20	Hall, Katherine L., et al.	
/R.M./	497	20120239117	A1	2012-09-20	Kesler, Morris P., et al.	
/R.M./	498	20120242159	A1	2012-09-27	Lou, Herbert T., et al.	
/R.M./	499	20120242225	A1	2012-09-27	Karalis, Aristeidis et al.	
/R.M./	500	20120248884	A1	2012-10-04	Karalis, Aristeidis et al.	
/R.M./	501	20120248886	A1	2012-10-04	Kesler, Morris P., et al.	
/R.M./	502	20120248887	A1	2012-10-04	Kesler, Morris P., et al.	
/R.M./	503	20120248888	A1	2012-10-04	Kesler, Morris P., et al.	
/R.M./	504	20120248981	A1	2012-10-04	Karalis, Aristeidis et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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Modified PTO/SB/08a (01-10)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Attorney Docket Number	WTCY-0075-P01

/R.M./	505	20120256494	A1	2012-10-11	Kesler, Morris P., et al.	
/R.M./	506	20120280765	A1	2012-11-08	Kurs, Andre B., et al.	
/R.M./	507	20120313449	A1	2012-12-13	Kurs, Andre B., et al.	
/R.M./	508	20120313742	A1	2012-12-13	Kurs, Andre B., et al.	
/R.M./	509	20130007949	A1	2013-01-10	Kurs, Andre B., et al.	
/R.M./	510	20130020878	A1	2013-01-24	Karalis, Aristeidis et al.	
/R.M./	511	20130033118	A1	2013-02-07	Karalis, Aristeidis et al.	
/R.M./	512	20130038402	A1	2013-02-14	Karalis, Aristeidis et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
/R.M./	513	142352	CA		1912-08-13	Nikola, Tesla		☐
/R.M./	514	3824972	DE	A1	1989-01-12	Roland, Hiering et al.	English Abstract Only	☐
/R.M./	515	02097005	JP	A	1990-04-09	Tokyo Cosmos Electric Co., Ltd.	English Abstract Only	☐
/R.M./	516	1992017929	WO	A1	1992-10-15	Boys, John T., et al.		☐
/R.M./	517	1993023908	WO	A1	1993-11-25	Nishino, Shuzo et al.		☐
/R.M./	518	1994028560	WO	A1	1994-12-08	Pedder, Donald A.,		☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Attorney Docket Number	WTCY-0075-P01

						et al.		
/R.M./	519	1996002970	WO	A1	1996-02-01	Boys, John T., et al.		☐
/R.M./	520	09298847	JP	A	1997-11-18	Chiba, Yoji	English Abstract Included	☐
/R.M./	521	10164837	JP	A	1998-06-19	Kikuchi, Akihiko et al.	English Abstract Included	☐
/R.M./	522	199850993	WO	A1	1998-11-12	Boys, John T.		☐
/R.M./	523	11188113	JP	A	1999-07-13	Seiichi, Ishikawa	English Abstract Only	☐
/R.M./	524	2000077910	WO	A1	2000-12-21	Scheible, Guntram et al.		☐
/R.M./	525	2001309580	JP	A	2001-11-02	Muto, Motoharu et al.	English Abstract Included	☐
/R.M./	526	10029147	DE	A1	2001-12-20	Ulf, Tiemens	English Abstract Only	☐
/R.M./	527	2002010535	JP	A	2002-01-11	Hideaki, Abe et al.	English Abstract Included	☐
/R.M./	528	20016655	DE	U1	2002-02-14	IC HAUS GMBH	English Translation and Abstract Included	☒
/R.M./	529	1335477	EP	A2	2003-08-13	Talbot, Boys J., et al.		☐
/R.M./	530	2003092329	WO	A1	2003-11-06	Baarman, David W.		☐
/R.M./	531	2003096361	WO	A1	2003-11-20	Cheng, Lily et al.		☐
/R.M./	532	2003096512	WO	A2	2003-11-20	Cheng, Lily et al.		☐
/R.M./	533	10221484	DE	A1	2003-11-27	Laue, Hans-Joachim et al.	Abstract Only	☐
/R.M./	534	2004038888	WO	A2	2004-05-06	Cheng, Lily et al.		☐
/R.M./	535	2004055654	WO	A2	2004-07-01	Beart, Pilgrim G., et al.		☐
/R.M./	536	10304584	DE	A1	2004-08-19	Guntram, Scheible et al.	English Abstract Only	☐
/R.M./	537	2004073150	WO	A1	2004-08-26	Baarman, David W.		☐
/R.M./	538	2004073166	WO	A2	2004-08-26	Baarman, David W.		☐
/R.M./	539	2004073176	WO	A2	2004-08-26	Baarman, David W.		☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	540	2004073177	WO	A2	2004-08-26	Baarman, David W.		☐
/R.M./	541	2004112216	WO	A1	2004-12-23	Scheible, Guntram et al.		☐
/R.M./	542	2005024865	WO	A2	2005-03-17	Beart, Pilgrim G.		☐
/R.M./	543	2005060068	WO	A1	2005-06-30	Kjellsson, Jimmy et al.		☐
/R.M./	544	2005109597	WO	A1	2005-11-17	Stevens, Michael C., et al.		☐
/R.M./	545	2005109598	WO	A1	2005-11-17	Stevens, Michael C., et al.		☐
/R.M./	546	2006011769	WO	A1	2006-02-02	Lee, Hyung-Joo		☐
/R.M./	547	2007008646	WO	A2	2007-01-18	Joannopoulos, John D., et al.		☐
/R.M./	548	102005036290	DE	A1	2007-02-15	Achim, Schwarz et al.	English Abstract Only	☐
/R.M./	549	2007020583	WO	A2	2007-02-22	Baarman, David W., et al.		☐
/R.M./	550	2007042952	WO	A1	2007-04-19	Akkermans, Ton H., et al.		☐
/R.M./	551	2007084716	WO	A2	2007-07-26	Cook, Nigel P., et al.		☐
/R.M./	552	2007084717	WO	A2	2007-07-26	Cook, Nigel P., et al.		☐
/R.M./	553	102006044057	DE	A1	2008-04-10	Berthold, Dilger et al.	English Abstract Only	☐
/R.M./	554	2008109489	WO	A2	2008-09-12	Cook, Nigel P., et al.		☐
/R.M./	555	2008118178	WO	A1	2008-10-02	Karalis, Aristeidis et al.		☐
/R.M./	556	2009009559	WO	A1	2009-01-05	Cook, Nigel P., et al.		☐
/R.M./	557	2009018568	WO	A2	2009-02-05	Cook, Nigel P., et al.		☐
/R.M./	558	2009023155	WO	A2	2009-02-19	Cook, Nigel P., et al.		☐
/R.M./	559	2009023646	WO	A2	2009-02-19	Cook, Nigel P., et al.		☐
/R.M./	560	2009033043	WO	A2	2009-03-12	Low, Zhen N., et al.		☐
/R.M./	561	2009062438	WO	A1	2009-05-22	Ho, Wing C., et al.		☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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/R.M./	562	2009070730	WO	A2	2009-06-04	Low, Zhen N., et al.		☐
/R.M./	563	2009126963	WO	A2	2009-10-15	Low, Zhen N., et al.		☐
/R.M./	564	2009140506	WO	A1	2009-11-19	Karalis, Aristeidis et al.		☐
/R.M./	565	2009149464	WO	A2	2009-12-10	Low, Zhen N., et al.		☐
/R.M./	566	2009155000	WO	A2	2009-12-23	Lin, Jenshan		☐
/R.M./	567	2010030977	WO	A2	2010-03-18	Lin, Jenshan et al.		☐
/R.M./	568	2010036980	WO	A1	2010-04-01	Kesler, Morris P., et al.		☐
/R.M./	569	2010039967	WO	A1	2010-04-08	Hamam, Rafif E., et al.		☐
/R.M./	570	2010090538	WO	A1	2010-08-12	Boys, John T., et al.		☐
/R.M./	571	2010090539	WO	A1	2010-08-12	Boys, John T., et al.		☐
/R.M./	572	2010093997	WO	A1	2010-08-19	Kurs, Andre B., et al.		☐
/R.M./	573	2010104569	WO	A1	2010-09-16	Derbas, Justin R., et al.		☐
/R.M./	574	2011061388	WO	A1	2011-05-26	Saunamaki, Esa		☐
/R.M./	575	2011062827	WO	A2	2011-05-26	Culbert, Michael F., et al.		☐
/R.M./	576	2011112795	WO	A1	2011-09-15	Kesler, M et al.		☐
/R.M./	577	2012037279	WO	A1	2012-03-22	Ganem, Steven et al.		☐
/R.M./	578	2012170278	WO	A2	2012-12-13	Schatz, David et al.		☐
/R.M./	579	2013013235	WO	A2	2013-01-24	Karalis, Aristeidis et al.		☐
/R.M./	580	2012170278	WO	A3	2013-01-31	Schatz, David A., et al.		☐
/R.M./	581	2013020138	WO	A2	2013-02-07	Karalis, Aristeidis et al.		

NON-PATENT LITERATURE DOCUMENTS

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
/R.M./	582	ABE et al., "A Noncontact Charger Using a Resonant Converter with Parallel Capacitor of the Secondary Coil", IEEE 36(2), March/April 2000, 444-51	☐
/R.M./	583	ALTCHEV et al., "Efficient Resonant Inductive Coupling Energy Transfer Using New Magnetic and Design Criteria", IEEE, June 16, 2005, pp. 1293-1298	☐
/R.M./	584	AOKI et al., "Observation of strong coupling between one atom and a monolithic microresonator," Nature, Vol. 443, October 12, 2006, pp. 671-674	☐
/R.M./	585	APNESETH et al., "Introducing wireless proximity switches", ABB Review, April 2002, pp. 42-49	☐
/R.M./	586	Application Serial No. 12/613,686, Notice of Allowance mailed 1-6-2011, 10 pages	☐
/R.M./	587	Application Serial No. 12/613,686, Notice of Allowance mailed 3-7-2011, 8 pages	☐
/R.M./	588	Australian Application Serial No. 2006269374, Examination Report mailed September 18, 2008	☐
/R.M./	589	BAKER et al., "Feedback Analysis and Design of RF Power Links for Low-Power Bionic Systems", IEEE Transactions on Biomedical Circuits and Systems, Vol. 1,No. 1, March 2007, pp. 28-38	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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/R.M./	590	BALANIS, CONSTANTINE A., Antenna Theory: Analysis and Design, 3rd Edition, Sections 4.2, 4.3, 5.2, 5.3, John Wiley & Sons Inc., 2005, 40 pages	☐
/R.M./	591	BBC News, In pictures: A year in technology", http://news.bbc.co.uk/2/hi/in_pictures/7129507.stm, December 28, 2007, 2 pages	☐
/R.M./	592	BERARDELLI, PHIL, "Outlets Are Out", ScienceNOW Daily News, Science Now, http://sciencenow.sciencemag.org/cgi/content/full/2006/1114/2, November 14, 2006, 2 pages	☐
/R.M./	593	BIEVER, CELESTE, "Evanescent coupling could power gadgets wirelessly", NewScientistsTech.com, http://www.newscientisttech.com/article.ns?id=dn10575&print=true, November 15, 2006, 2 pages	☐
/R.M./	594	BORENSTEIN, SETH, (AP Science writer) "Man tries wirelessly boosting batteries", Boston.com, http://www.boston.com/business/technology/articles/2006/11/15/man_tries_wirelessly_b … November 15, 2006, 1 page	☐
/R.M./	595	BOYLE, ALAN, "Electro-nirvana? Not so fast", MSNBC, http://cosmiclog.msnbc.msn.com/_news/2007/06/08/4350760-electro-nirvana-not-so-fast, June 8, 2007, 1 page	☐
/R.M./	596	BULKELEY, WILLIAM M., "MIT Scientists Pave the Way For Wireless Battery Charging", The Wall Street Journal, http://online.wsj.com/article/SB118123955549228045.html?mod=googlenews_wsj, June 8, 2007, 2 pages	☐
/R.M./	597	BURRI et al., Invention Description, February 5, 2008, 16 pages	☐
/R.M./	598	CASS, STEPHEN, "Air Power – Wireless data connections are common -- now scientists are working on wireless power", Sponsored by IEEE Spectrum, http://spectrum.ieee.org/computing/hardware/air-power, November 2006, 2 pages	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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/R.M./	599	CASTELVECCHI, DAVIDE, "The Power of Induction – Cutting the last cord could resonate with our increasingly gadget-dependent lives", Science News Online, Vol. 172, No. 3, July 21, 2007, 6 pages	☐
/R.M./	600	CHANG, ANGELA, "Recharging, The Wireless Way – Even physicists forget to recharge their cell phones sometimes", PC Magazine, ABC News Internet Ventures, December 12, 2006, 1 page	☐
/R.M./	601	CHINAVIEW, "Scientists light bulb with 'wireless electricity' ", www.Chinaview.cn, http://news.xinhuanet.com/english/2007-06/08/content_6215681.htm, June 2007, 1 page	☐
/R.M./	602	COOKS, GARETH (Globe staff), "The vision of an MIT physicist: Getting rid of pesky rechargers" Boston.com, December 11, 2006, 1 page	☐
/R.M./	603	DERBYSHIRE, DAVID, "The end of the plug? Scientists invent wireless device that beams electricity through your home", Daily Mail, http://www.dailymail.co.uk/pages/live/articles/technology/technology.html?in_article_id=4.. ., June 7, 2007, 3 pages	☐
/R.M./	604	ESSER et al., "A New Approach to Power Supplies for Robots", IEEE, Vol. 27, No. 5, September/October 1991, pp. 872-875	☐
/R.M./	605	European Application No. 06 786 588.1 - 1242, Examination Report mailed January 15, 2009, 5 pages	☐
/R.M./	606	FENSKE et al., "Dielectric Materials at Microwave Frequencies", Applied Microwave & Wireless, 2000, pp. 92-100	☐
/R.M./	607	FERNANDEZ et al., "A simple DC-DC converter for the power supply of a cochlear implant", Power Electronics Specialist Conference, IEEE 34th Annual, June 2003, pp. 1965-1970	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	608	FILDES, JONATHAN, "Physics Promises Wireless Power" BBC News, (Science and Technology Reporter), November 15, 2006, 3 pages	☐
/R.M./	609	FILDES, JONATHAN, "The technology with impact 2007", BBC News, December 27, 2007, 3 pages	☐
/R.M./	610	FILDES, JONATHAN, "Wireless energy promise powers up" Science and Technology Report, BBC News, http://news.bbc.co.uk/2/hi/technology/6725955.stm, June 7, 2007, 3 pages	☐
/R.M./	611	FREEDMAN, DAVID H., "Power on a Chip", MIT Technology Review, November 2004, 3 pages	☐
/R.M./	612	HADLEY, FRANKLIN, "Goodbye Wires - MIT Team Experimentally Demonstrates Wireless Power Transfer, Potentially Useful for Power Laptops, Cell-Phones Without Cords", Massachusetts Institute of Technology, Institute for Soldier Nanotechnologies, http://web.mit.edu/newsoffice/2007/wireless-0607.html, June 7, 2007, 3 pages	☐
/R.M./	613	HAUS, H.A., "Waves and Fields in Optoelectronics", Chapter 7 Coupling of Modes --- Reasonators and Couplers, 1984, pp. 197-234	☐
/R.M./	614	HEIKKINEN et al., "Performance and Efficiency of Planar Rectennas for Short-Range Wireless Power Transfer at 2.45 GHz", Microwave and Optical Technology Letters, Vol. 31, No. 2, October 20, 2001, pp. 86-91	☐
/R.M./	615	HIGHFIELD, ROGER, (Science Editor), "Wireless revolution could spell end of plugs", Telegraph.co.uk, http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2007/06/07/nwireless107.xml, June 7, 2007, 3 pages	☐
/R.M./	616	HIRAI et al., "Integral Motor with Driver and Wireless Transmission of Power and Information for Autonomous Subspindle Drive", IEEE, Vol. 15, No. 1, January 2000, pp. 13-20	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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/R.M./	617	HIRAI et al., "Practical Study on Wireless Transmission of Power and Information for Autonomous Decentralized Manufacturing System", IEEE, Vol. 46, No. 2, April 1999, pp. 349-359	☐
/R.M./	618	HIRAI et al., "Study on Intelligent Battery Charging Using Inductive Transmission of Power and Information", IEEE, Vol.15, No. 2, March 2000, pp. 335-345	☐
/R.M./	619	HIRAI et al., "Wireless Transmission of Power and Information and Information for Cableless Linear Motor Drive", IEEE, Vol. 15, No. 1, January 2000, pp. 21-27	☐
/R.M./	620	HIRAYAMA, MAKOTO, "Splashpower - World Leaders in Wireless Power", PowerPoint presentation, Splashpower Japan, September 3, 2007, 30 pages	☐
/R.M./	621	INFOTECH ONLINE, "Recharging gadgets without cables", infotech.indiatimes.com, November 17, 2006, 1 page	☐
/R.M./	622	INTEL NEWS RELEASE, "Intel CTO Says Gap between Humans, Machines Will Close by 2050", (intel.com/…/20080821comp.htm?iid=S…), Printed November 6, 2009, 2 pages	☐
/R.M./	623	International Application Serial No. PCT/US2006/026480, International Preliminary Report on Patentability mailed January 29, 2008, 8 pages	☐
/R.M./	624	International Application Serial No. PCT/US2006/026480, International Search Report and Written Opinion mailed December 21, 2007, 14 pages	☐
/R.M./	625	International Application Serial No. PCT/US2007/070892, International Preliminary Report on Patentability mailed September 29, 2009, 14 pages	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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/R.M./	626	International Application Serial No. PCT/US2007/070892, International Search Report and Written Opinion mailed March 3, 2008, 21 pages	☐
/R.M./	627	International Application Serial No. PCT/US2009/043970, International Search Report and Written Opinion mailed July 14, 2009, 9 pages	☐
/R.M./	628	International Application Serial No. PCT/US2009/058499, International Preliminary Report on Patentability mailed March 29, 2011, 5 pages	☐
/R.M./	629	International Application Serial No. PCT/US2009/058499, International Search Report and Written Opinion mailed December 10, 2009, 6 pages	☐
/R.M./	630	International Application Serial No. PCT/US2009/059244, International Search Report and Written Opinion mailed December 7, 2009, 12 pages	☐
/R.M./	631	International Application Serial No. PCT/US2010/024199, International Preliminary Report on Patentability mailed August 25, 2011, 8 pages	☐
/R.M./	632	International Application Serial No. PCT/US2010/024199, International Search Report and Written Opinion mailed May 14, 2010, 12 pages	☐
/R.M./	633	International Application Serial No. PCT/US2011/027868, International Preliminary Report on Patentability mailed September 20, 2012, 8 pages	☐
/R.M./	634	International Application Serial No. PCT/US2011/027868, International Search Report and Written Opinion mailed July 5, 2011, 9 pages	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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/R.M./	635	International Application Serial No. PCT/US2011/051634, International Search Report and Written Opinion mailed January 6, 2012, 11 pages	☐
/R.M./	636	International Application Serial No. PCT/US2011/054544, International Search Report and Written Opinion mailed January 30, 2012, 17 pages	☐
/R.M./	637	International Application Serial No. PCT/US2012/040184, International Search Report and Written Opinion mailed November 28, 2012, 8 pages	☐
/R.M./	638	International Application Serial No. PCT/US2012/049777, International Search Report and Written Opinion mailed January 23, 2013, 10 pages	☐
/R.M./	639	JACKSON, J D., "Classical Electrodynamics", 3rd Edition, Sections 1.11 5.5 5.17 6.9 8.1 8.8 9.2 9.3, 1999, 33 pages	☐
/R.M./	640	JACKSON, J. D., "Classical Electrodynamics", 3rd Edition, Wiley, New York, 1999, pp. 201-203	☐
/R.M./	641	JACOB et al., "Lithium Tantalate – A High Permittivity Dielectric Material for Microwave Communication Systems", Proceedings of IEEE TENCON – Poster Papers, 2003, pp. 1362-1366	☐
/R.M./	642	KARALIS et al., Efficient Wireless non-radiative mid-range energy transfer, Annals of Physics, Vol. 323, 2008, pp. 34-48	☐
/R.M./	643	KARALIS, ARISTEIDIS, "Electricity Unplugged", Feature: Wireless Energy, Physics World, physicsworld.com, February 2009, pp. 23-25	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	644	KAWAMURA et al., "Wireless Transmission of Power and Information Through One High-Frequency Resonant AC Link Inverter for Robot Manipulator Applications", IEEE, Vol. 32, No. 3, May/June 1996, pp. 503-508	☐
/R.M./	645	KONISHI, YOSHIHIRO, Microwave Electronic Circuit Technology, (Marcel Dekker, Inc., New York, NY 1998), Chapter 4, pp. 145-197	☐
/R.M./	646	KURS et al., "Optimized design of a low-resistance electrical conductor for the multi megahertz range," Applied Physics Letters, Vol. 98, April 2011, pp. 172504 - 172504-3	☐
/R.M./	647	KURS et al., "Simultaneous mid-range power transfer to multiple devices", Applied Physics Letters, Vol. 96, January 26, 2010, pp. 044102 - 044102-3	☐
/R.M./	648	KURS et al., "Wireless Power Transfer via Strongly Coupled Magnetic Resonances", Science Vol. 317, No. 5834, July 6, 2007, pp. 83-86	☐
/R.M./	649	LAMB, GREGORY M., "Look, Ma – no wires! - Electricity broadcast through the air may someday run your home", The Christian Science Monitor, http://www.csmonitor.com/2006/1116/p14s01-stct.html, November 15, 2006, 2 pages	☐
/R.M./	650	LEE, "Antenna Circuit Design for RFID Applications", Microchip Technology Inc., AN710, January 21, 2003, 50 pages	☐
/R.M./	651	LEE, "RFID Coil Design", Microchip Technology Inc., AN678, 1998, 21 pages	☐
/R.M./	652	LIANG et al., Silicon waveguide two-photon absorption detector at 1.5 μm wavelength for autocorrelation measurements, Applied Physics Letters, Vol. 81, No. 7, August 12, 2002, pp. 1323-1325	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	653	MARKOFF, JOHN, "Intel Moves to Free Gadgets of Their Recharging Cords", The New York Times - nytimes.com, August 21, 2008, 2 pages	☐
/R.M./	654	MEDIANO et al. "Design of class E amplifier with nonlinear and linear shunt capacitances for any duty cycle", IEEE Trans. Microwave Theor. Tech., Volume 55, No. 3, March 2007, pp. 484-492	☐
/R.M./	655	Microchip Technology Inc., "MCRF355/360 Reader Reference Design", microID 13.56 MHz Design Guide, 2001, 24 pages	☐
/R.M./	656	MINKEL, J.R., "Wireless Energy Lights Bulb from Seven Feet Away - Physicists vow to cut the cord between your laptop battery and the wall socket with just a simple loop of wire", Scientific American, http://www.scientificamerican.com/article.cfm?id=wireless-energy-lights-bulb-from-seven-feet-away , June 7, 2007, 1 page	☐
/R.M./	657	MINKEL, J.R., "Wireless Energy Transfer May Power Devices at a Distance", Scientific American, November 14, 2006, 1 page	☐
/R.M./	658	MORGAN, JAMES, "Lab report: Pull the plug for a positive charge", The Herald, Web Issue 2680, November 16, 2006, 3 pages	☐
/R.M./	659	O'BRIEN et al., "Analysis of Wireless Power Supplies for Industrial Automation Systems", IEEE, November 2-6, 2003, pp. 367-372	☐
/R.M./	660	O'BRIEN et al., "Design of Large Air-Gap Transformers for Wireless Power Supplies", IEEE, June 15-19, 2003, pp. 1557-1562	☐
/R.M./	661	PENDRY, J.B., "A Chiral Route to Negative Refraction", Science, Vol. 306, November 19, 2004, pp. 1353-1355	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	662	PETERSON, GARY, "MIT WiTricity Not So Original After All, Feed Line No. 9:, http://www.tfcbooks.com/articles/witricity.htm, accessed on November 12, 2009, pp. 1-3	☐
/R.M./	663	PHYSICS TODAY, "Unwired energy questions asked, answered", September 2007, pp. 16-17	☐
/R.M./	664	PHYSICS TODAY, "Unwired Energy" section in Physics Update, www.physicstoday.org, http://arxiv.org/abs/physics/0611063, January 2007, p. 26	☐
/R.M./	665	POWERCAST L.L.C., "White Paper", Powercast simply wire free, 2003, 2 pages	☐
/R.M./	666	PR NEWS Wire, "The Big Story for CES 2007: The public debut of eCoupled Intelligent Wireless Power", Press Release, Fulton Innovation LLC, Las Vegas, NV, December 27, 2006, 3 pages	☐
/R.M./	667	PRESS RELEASE, "The world's first sheet-type wireless power transmission system: Will a socket be replaced by e-wall?", Public Relations Office, School of Engineering, University of Tokyo, Japan, December 12, 2006, 4 pages	☐
/R.M./	668	PRESSTV, "Wireless power transfer possible", http://edition.presstv.ir/detail/12754.html, June 11, 2007, 1 page	☐
/R.M./	669	REIDY, CHRIS (Globe staff), "MIT discovery could unplug your iPod forever", Boston.com, http://www.boston.com/business/ticker/2007/06/mit_discovery_c.html, June 7, 2007, 3 pages	☐
/R.M./	670	RISEN, CLAY, "Wireless Energy", The New York Times, December 9, 2007, 1 page	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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Attorney Docket Number	WTCY-0075-P01

/R.M./	671	SAKAMOTO et al., "A Novel Circuit for Non-Contact Charging Through Electro-Magnetic Coupling, IEEE, 29 June - 3 July, 1992, pp. 168-174	☐
/R.M./	672	SCHEIBLE et al., "Novel Wireless Power Supply System for Wireless Communication Devices in Industrial Automation Systems", IEEE, November 5-8, 2002, pp. 1358-1363	☐
/R.M./	673	SCHNEIDER, DAVID, "Electrons Unplugged. Wireless power at a distance is still far away," IEEE SPECTRUM, May 2010, pp. 35-39	☐
/R.M./	674	SCHUDER et al., "An Inductively Coupled RF System for the Transmission of 1 kW of Power Through the Skin", IEEE Transactions on Bio-Medical Engineering, Vol. BME-18, No. 4, July 1971, pp. 265-273	☐
/R.M./	675	SCHUDER et al., "Energy Transport Into the Closed Chest From a Set of Very-Large Mutually Orthogonal Coils", Communication Electronics, Vol. 64, January 1963, pp. 527-534	☐
/R.M./	676	SCHUDER, JOHN C., "Powering an Artificial Heart: Birth of the Inductively Coupled-Radio Frequency System in 1960", Artificial Organs, Vol. 26, No. 11, November 2002, pp. 909-915	☐
/R.M./	677	SCHUTZ et al., "Load Adaptive Medium Frequency Resonant Power Supply", IEEE, November 2002, pp. 282-287	☐
/R.M./	678	SEKITANI et al., "A large-area flexible wireless power transmission sheet using printed plastic MEMS switches and organic field-effect transistors", IEDM '06. International Electron Devices Meeting, December 11-13, 2006, 4 pages	☐
/R.M./	679	SEKITANI et al., "A large-area wireless power-transmission sheet using printed organic transistors and plastic MEMS switches", Nature Materials 6: 413–417 (June 1, 2007) Published online April 29, 2007, 5 pages	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13/752,169
Filing Date	Jan 28, 2013
First Named Inventor	Morris P. Kesler
Art Unit	Not Yet Assigned
Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

/R.M./	680	SEKIYA et al. "FM/PWM control scheme in class DE inverter", IEEE Trans. Circuits Syst. I, vol. 51, no. 7, July 2004, pp. 1250-1260	☐
/R.M./	681	SENGE, MIEBI, "MIT's wireless electricity for mobile phones", Vanguard, http://www.vanguardngr.com/articles/2002/features/gsm/gsm211062007.htm, June 11, 2007, 1 page	☐
/R.M./	682	SENSIPER, S., "Electromagnetic wave propogation on helical conductors", Technical Report No. 194 (based on PhD thesis), Massachusetts Institute of Technology, May 16, 1951, 126 pages	☐
/R.M./	683	SOLJACIC et al., "Photonic-crystal slow-light enhancement of nonlinear phase sensitivity", J. Opt. Soc. Am B, Vol. 19, No. 9, September 2002, pp. 2052-2059	☐
/R.M./	684	SOLJACIC et al., "Wireless Energy Transfer Can Potentially Recharge Laptops, Cell Phones Without Cords", November 14, 2006, 3 pages	☐
/R.M./	685	SOLJACIC, "Wireless Non-Radiative Energy Transfer", PowerPoint presentation, Massachusetts Institute of Technology, October 6, 2005, 14 pages	☐
/R.M./	686	SOLJACIC, MARIN, "Wireless nonradiative energy transfer", Visions of Discovery New Light on Physics, Cosmology, and Consciousness, Cambridge University Press, New York, 2011, pp. 530-542	☐
/R.M./	687	SOMEYA, TAKAO, "The world's first sheet-type wireless power transmission system", Press Interview Handout, University of Tokyo, December 12, 2006, 18 pages	☐
/R.M./	688	STAELIN et al., Electromagnetic Waves, (Prentice Hall Upper Saddle River, New Jersey, 1998), Chapters 2, 3, 4, and 8, pp. 46-176 and 336-405	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
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/R.M./	689	STARK III, JOSEPH C., "Wireless Power Transmission Utilizing a Phased Array of Tesla Coils", Master Thesis, Massachusetts Institute of Technology, 2004, 247 pages	☐
/R.M./	690	TESLA, NIKOLA, "High Frequency Oscillators for Electro-Therapeutic and Other Purposes", Proceedings of the IEEE, Vol. 87, No. 7, July 1999, pp. 1282-1292	☐
/R.M./	691	TESLA, NIKOLA, "High Frequency Oscillators for Electro-Therapeutic and Other Purposes", The Electrical Engineer, Vol. XXVI, No. 50, November 17, 1898, 11 pages	☐
/R.M./	692	TEXAS INSTRUMENTS, "HF Antenna Design Notes", Technical Application Report, Literature Number 11-08-26-003, September 2003, 47 pages	☐
/R.M./	693	THOMSEN et al., "Ultrahigh speed all-optical demultiplexing based on two-photon absorption in a laser diode", Electronics Letters, Vol. 34, No. 19, September 17, 1998, pp. 1871-1872	☐
/R.M./	694	U.S. Provisional Application No. 60/698,442, "Wireless Non-Radiative Energy Transfer", filed on July 12, 2005, 14 pages	☐
/R.M./	695	U.S. Provisional Application No. 60/908,666, "Wireless Energy Transfer", filed on March 28, 2007, 108 pages	☐
/R.M./	696	U.S. Provisional Application Serial No. 60/908,383, "Wireless Energy Transfer", filed on March 27, 2007, 80 pages	☐
/R.M./	697	UPM Rafsec, "Tutorial overview of inductively coupled RFID Systems", http://www.rafsec.com/rfidsystems.pdf, May 2003, 7 pages	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
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/R.M./	698	VANDEVOORDE et al., "Wireless energy transfer for stand-alone systems: a comparison between low and high power applicability", Sensors and Actuators A 92, July 17, 2001, pp. 305-311	☐
/R.M./	699	VILKOMERSON et al., "Implantable Doppler System for Self-Monitoring Vascular Grafts", IEEE Ultrasonics Symposium, August 23-27, 2004, pp. 461-465	☐
/R.M./	700	WEN, GEYI, "A Method for the Evaluation of Small Antenna Q.", IEEE Transactions on Antennas and Propagation Vol. 51, No.8, August 2003, pp. 2124-2129	☐
/R.M./	701	YARIV et al., "Coupled-resonator optical waveguide: a proposal and analysis", Optics Letters, Vol. 24, No. 11, June 1, 1999, pp. 711-713	☐
/R.M./	702	ZIERHOFER et al., "High-Efficiency Coupling-Insensitive Transcutaneous Power and Data Transmission Via an Inductive Link", IEEE Transactions on Biomedical Engineering, Vol. 37, No. 7, July 1990, pp. 716-722	☐

EXAMINER SIGNATURE

Examiner Signature	/Rasem Mourad/	Date Considered	04/23/2015

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.
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First Named Inventor	Morris P. Kesler
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Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/John A. Monocello/	Date (YYYY-MM-DD)	2013-02-28
Name/Print	John A. Monocello	Registration Number	51022

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA22313-1450.**

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Substitute Disclosure Form / U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 25236-0134001	Application No. 13/752,169
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	First Named Inventor Andre B. Kurs	
	Filing Date January 28, 2013	Group Art Unit 2836

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
/R.M./	A1	4,180,795	12/25/1979	Matsuda et al.			
/R.M./	A2	4,450,431	5/22/1984	Hochstein			
/R.M./	A3	4,588,978	5/13/1986	Allen			
/R.M./	A4	5,033,295	7/23/1991	Schmid et al.			
/R.M./	A5	5,034,658	7/23/1991	Hiering et al.			
/R.M./	A6	5,374,930	12/20/1994	Schuermann			
/R.M./	A7	5,703,573	12/30/1997	Fujimoto et al.			
/R.M./	A8	5,864,323	1/26/1999	Berthon			
/R.M./	A9	5,959,245	9/28/1999	Moe et al.			
/R.M./	A10	6,176,433	1/23/2001	Uesaka et al.			
/R.M./	A11	6,459,218	10/1/2002	Boys et al.			
/R.M./	A12	6,563,425	5/13/2003	Nicholson et al.			
/R.M./	A13	6,650,227	11/18/2003	Bradin			
/R.M./	A14	6,683,256	1/27/2004	Kao			
/R.M./	A15	6,696,647	2/24/2004	Ono et al.			
/R.M./	A16	6,839,035	1/4/2005	Addonisio et al.			
/R.M./	A17	7,835,417	11/16/2010	Heideman et al.			
/R.M./	A18	7,884,697	2/8/2011	Wei et al.			
/R.M./	A19	8,178,995	5/15/2012	Amano et al.			
/R.M./	A20	8,334,620	12/18/2012	Park et al.			
/R.M./	A21	8,362,651	1/29/2013	Hamam et al.			
/R.M./	A22	8,395,282	3/12/2013	Joannopoulos et al.			
/R.M./	A23	8,395,283	3/12/2013	Joannopoulos et al.			
/R.M./	A24	8,400,018	3/19/2013	Joannopoulos et al.			
/R.M./	A25	8,400,019	3/19/2013	Joannopoulos et al.			
/R.M./	A26	8,400,020	3/19/2013	Joannopoulos et al.			
/R.M./	A27	8,400,021	3/19/2013	Joannopoulos et al.			

Examiner Signature	Date Considered
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Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	First Named Inventor Andre B. Kurs	
	Filing Date January 28, 2013	Group Art Unit 2836

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
/R.M./	A28	8,400,022	3/19/2013	Joannopoulos et al.			
/R.M./	A29	8,400,024	3/19/2013	Joannopoulos et al.			
/R.M./	A30	2003/0160590	8/28/2003	Schaefer et al.			
/R.M./	A31	2005/0125093	6/9/2005	Kikuchi et al.			
/R.M./	A32	2005/0135122	6/23/2005	Cheng et al.			
/R.M./	A33	2005/0151511	7/14/2005	Chary			
/R.M./	A34	2006/0010902	1/19/2006	Trinh et al.			
/R.M./	A35	2006/0090956	5/4/2006	Peshkovskiy et al.			
/R.M./	A36	2007/0096875	5/3/2007	Waterhouse et al.			
/R.M./	A37	2007/0105429	5/10/2007	Kohl et al.			
/R.M./	A38	2007/0126650	6/7/2007	Guenther			
/R.M./	A39	2007/0164839	7/19/2007	Naito			
/R.M./	A40	2007/0257636	11/8/2007	Phillips et al.			
/R.M./	A41	2008/0047727	2/28/2008	Sexton et al.			
/R.M./	A42	2008/0176521	7/24/2008	Singh et al.			
/R.M./	A43	2009/0033280	2/5/2009	Choi et al.			
/R.M./	A44	2009/0038623	2/12/2009	Farbarik et al.			
/R.M./	A45	2009/0322280	12/31/2009	Kamijo et al.			
/R.M./	A46	2010/0188183	7/29/2010	Shpiro			
/R.M./	A47	2012/0001593	1/5/2012	DiGuardo			
/R.M./	A48	2012/0146575	6/14/2012	Armstrong et al.			
/R.M./	A49	2012/0267960	10/25/2012	Low et al.			
/R.M./	A50	2013/0154383	6/20/2013	Kasturi et al.			
/R.M./	A51	2013/0200721	8/8/2013	Kurs et al.			
/R.M./	A52	2014/0070764	3/13/2014	Keeling			

Examiner Signature	Date Considered
/Rasem Mourad/	04/23/2015

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Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	25236-0134001	13/752,169
	First Named Inventor: Andre B. Kurs	
	Filing Date: January 28, 2013	Group Art Unit: 2836

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No
/R.M./	B1	CN 102239633	11/9/2011	China			Abstract	
/R.M./	B2	CN 102439669	5/2/2012	China			Abstract	
/R.M./	B3	CN 103329397	9/25/2013	China			Abstract	
/R.M./	B4	EP 1 521 206	04/06/2005	Europe				
/R.M./	B5	EP 1 524 010	4/20/2005	Europe				
/R.M./	B6	JP 6-341410	12/13/1994	Japan			Abstract	
/R.M./	B7	JP 2004-229144	8/12/2004	Japan			Abstract	
/R.M./	B8	JP 2006-074848	3/16/2006	Japan			Abstract	
/R.M./	B9	JP 2007-266892	10/11/2007	Japan			Abstract	
/R.M./	B10	JP 2012-504387	2/16/2012	Japan			Abstract	
/R.M./	B11	JP 2013-543718	12/5/2013	Japan			Not Available	
/R.M./	B12	KR 10-2007-0017804	2/13/2007	Korea			Abstract	
/R.M./	B13	SG 112842	7/28/2005	Singapore			Partial Translation	
/R.M./	B14	WO 95/11545	04/27/1995	WIPO				
/R.M./	B15	WO 2004/015885	2/19/2004	WIPO				

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
/R.M./	C1	"Next Little Thing 2010 Electricity without wires", CNN Money (See money.cnn.com/galleries/2009/smallbusiness/0911/gallery.next_little_thing_2010.smb/) (dated November 30, 2009)
/R.M./	C2	Ahmadian, M. et al., "Miniature Transmitter for Implantable Micro Systems", Proceedings of the 25th Annual International Conference of the IEEE EMBS Cancun, Mexico, pp. 3028-3031 (September 17-21, 2003)
/R.M./	C3	Borenstein, S., "Man tries wirelessly boosting batteries", (The Associated Press), USA Today, (November 16, 2006) 1 page
/R.M./	C4	Eisenberg, Anne, "Automatic Recharging, From a Distance", The New York Times, (see www.nytimes.com/2012/03/11/business/built-in-wireless-chargeing-for-electronic-devices.html?_r=0) (published on March 10, 2012)

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Other Documents (include Author, Title, Date, and Place of Publication)

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/R.M./	C5	Fan, Shanhui et al., "Rate-Equation Analysis of Output Efficiency and Modulation Rate of Photomic-Crystal Light-Emitting Diodes", IEEE Journal of Quantum Electronics, Vol. 36(10):1123-1130 (October 2000)
/R.M./	C6	Ferris, David, "How Wireless Charging Will Make Life Simpler (And Greener)", Forbes (See forbes.com/sites/davidferris/2012/07/24/how-wireless-charging-will-make-life-simpler-and-greener/print/) (dated July 24, 2012)
/R.M./	C7	Finkenzeller, Klaus, "RFID Handbook – Fundamentals and Applications in Contactless Smart Cards", Nikkan Kohgyo-sya, Kanno Taihei, first version, pp. 32-37, 253 (August 21, 2001)
/R.M./	C8	Finkenzeller, Klaus, "RFID Handbook (2nd Edition)", The Nikkan Kogyo Shimbun, Ltd., pp. 19, 20, 38, 39, 43, 44, 62, 63, 67, 68, 87, 88, 291, 292 (Published on May 31, 2004)
/R.M./	C9	Ho, S. L. et al., "A Comparative Study Between Novel Witricity and Traditional Inductive Magnetic Coupling in Wireless Charging", IEEE Transactions on Magnetics, Vol. 47(5):1522-1525 (May 2011)
/R.M./	C10	Moskvitch, Katia, "Wireless charging – the future for electric cars?", BBC News Technology (See www.bbc.co.uk/news/technology-14183409) (dated July 21, 2011)
/R.M./	C11	Schneider, D. "A Critical Look at Wireless Power", IEEE Spectrum, pp. 35-39 (May 2010)
/R.M./	C12	Stewart, W., "The Power to Set you Free", Science, Vol. 317:55-56 (July 6, 2007)
/R.M./	C13	Yates, David C. et al., "Optimal Transmission Frequency for Ultralow-Power Short-Range Radio Links", IEEE Transactions on Circuits and Systems - 1, Regular Papers, Vol. 51:1405-1413 (July 2004)
/R.M./	C14	Ziaie, Babak et al., "A Low-Power Miniature Transmitter Using A Low-Loss Silicon Platform For Biotelemetry", Proceedings - 19th International Conference IEEE/EMBS, pp. 2221-2224, (October 30 - November 2, 1997) 4 pages
/R.M./	C15	PCT/US2013/023478, International Application Serial No. PCT/US2013/023478, International Preliminary Report on Patentability and Written Opinion, mailed August 7, 2014, 8 pages

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"20090312885"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/01/15 12:37
S2	2	"13700353"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/01/15 12:41
S3	2	"13752169"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/01/15 13:34
S4	9	"20110025131"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/01/15 13:37
S5	39008	(wireless$4 contactless inductiv$4) near power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/01/15 14:02
S7	32	S5 and (resonator inductor) with (multiple plurality) near2 (loop$1 coil$1) same dipole adj moment	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 14:11
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		"20030160590" | "20030199778" |					
		"20030214255" | "20040000974" |					
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		"20040189246" | "20040201361" |					
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		"20060184209" | "20060184210" |					
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		"20060238365" | "20060270440" |					
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S9	183	S8 and dipole adj moment	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 14:25
S11	128	S8 and (resonator inductor) with (loop$1 coil$1) same dipole adj moment	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 14:26

S12	2	"13752169"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 14:30
S13	1	S8 and (resonator inductor) with (loop$1 coil$1) same dipole adj moment and (conduct$3 adj plane)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 15:45
S14	1	S8 and (resonator inductor) with (loop$1 coil$1) same dipole adj moment with (control$4 measur$4 alter$4 adjust$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 15:49
S15	1	S5 and (resonator inductor) with (loop$1 coil$1) same dipole adj moment with (control$4 measur$4 alter$4 adjust$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 15:49
S16	1	S8 and (resonator inductor) with (loop$1 coil$1) near5 dipole adj moment with (control$4 measur$4 alter$4 adjust$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 15:50
S17	3	S8 and (resonator inductor) with (loop$1 coil$1) and dipole adj moment with (control$4 measur$4 alter$4 adjust$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 15:50
S18	9	"20110025131"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 16:21
S19	2132	@rlad <"20120126" and ((H02J17/00.cpc. H02J17/005.cpc. H02J7/025.cpc. H01F38/14.cpc. 307/104.ccls))	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	2015/04/14 11:51

			JPO; IBM_TDB			
S21	111	S19 and (resonat$3) with (loops! coils!) same (dipole adj moment)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 11:53
S22	57	S19 and (resonat$3) with (loops! coils!) same (dipole adj moment) same (capacit$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 11:54
S23	9	"20110025131"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 12:03
S24	2132	@rlad <"20120126" and ((H02J17/00.cpc. H02J17/005.cpc. H02J7/025.cpc. H01F38/14.cpc. 307/104.ccls))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/14 13:22
S25	0	S24 and (inductor) with (loops! coils!) same (dipole adj moment)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S26	40	S24 and (inductor) same (loops! coils!) same (dipole adj moment)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S27	111	S24 and (resonat$3) with (loops! coils!) same (dipole adj moment)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S28	0	S26 not S27	US-PGPUB; USPAT;	OR	ON	2015/04/14 13:22

			USOCR; FPRS; EPO; JPO; IBM_TDB			
S29	57	S24 and (resonat$3) with (loops! coils!) same (dipole adj moment) same (capacit$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S30	6	S26 not S29	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S31	72	(resonat$3) with (loops! coils!) same (dipole adj moment) same (opposite different)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:34
S32	40907	(wireless$4 contactless inductiv$4) near power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/20 14:40
S33	100	S32 and dipole adj moments!	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/20 14:41
S34	22	S33 not kurs	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/20 14:41
S35	20	("4240010").URPN.	USPAT	OR	OFF	2015/04/20 17:50
S36	328	S32 and dipole adj moment$1	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2015/04/20 17:55

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S37	126	S36 not kurs	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/20 17:55
S39	104	S37 not S34	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/20 17:55
S40	43865	307/104.ccls ((wireless$4 contactless non? contact inductiv$4) near power)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/22 17:23
S41	205	S40 and (reverse opposite) near2 direction near4 (coil loop wound)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/22 17:23
S43	59	"7197113"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/22 17:24
S45	43	"6499701"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/22 17:34
S46	9	"20110025131"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/23 09:04
S47	4	"12189433"	US-PGPUB; USPAT;	OR	OFF	2015/04/23 09:14

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S48	8	"20090051224"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/23 11:38
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BIB DATA SHEET

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SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
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**** CONTINUING DATA ***************************

This appln claims benefit of 61/590,856 01/26/2012

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

02/16/2013

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /RASEM MOURAD/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		MA	51	20	5

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UNITED STATES

TITLE

WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

FILING FEE RECEIVED		
2580	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13752169	KURS ET AL.
	Examiner	Art Unit
	RASEM MOURAD	2836

CPC- SEARCHED		
Symbol	Date	Examiner
H2J17/00,H02J17/005,H02J7/025,H01F38/140	4/23/2015	RM

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
307	104	4/23/2015	RM

SEARCH NOTES		
Search Notes	Date	Examiner
searched in H2J17/00,H02J17/005,H02J7/025,H01F38/140 and 307/104	4/23/2015	RM
consulted with Adi Amrany	4/23/2015	RM
checked for double patenting	4/23/2015	RM

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/RASEM MOURAD/ Examiner.Art Unit 2836	

Doc code: IDS
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Application Number	13/752,169
Filing Date	Jan 28, 2013
First Named Inventor	Andre B. Kurs
Art Unit	2836
Examiner Name	Not Yet Assigned
Attorney Docket Number	WTCY-0075-P01

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/R.M./	1	6232841	B1	2001-05-15	Bartlett, James L., et al.	
/R.M./	2	6238387	B1	2001-05-29	Miller, III	
/R.M./	3	7193418	B2	2007-03-20	Freytag, Nicolas	
/R.M./	4	7554316	B2	2009-06-30	Stevens, Michael C., et al.	
/R.M./	5	7923870	B2	2011-04-12	Jin, Mikimoto	
/R.M./	6	7952322	B2	2011-05-31	Partovi, Afshin et al.	
/R.M./	7	8400017	B2	2013-03-19	Kurs, Andre B., et al.	
/R.M./	8	8410636	B2	2013-04-02	Kurs, Andre B., et al.	
/R.M./	9	8441154	B2	2013-05-14	Karalis, Aristeidis et al.	
/R.M./	10	8461719	B2	2013-06-11	Kesler, Morris P., et al.	
/R.M./	11	8461720	B2	2013-06-11	Kurs, Andre B., et al.	
/R.M./	12	8461721	B2	2013-06-11	Karalis, Aristeidis et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Attorney Docket Number	WTCY-0075-P01

/R.M./	13	8461722	B2	2013-06-11	Kurs, Andre B., et al.	
/R.M./	14	8466583	B2	2013-06-18	Karalis, Aristeidis et al.	
/R.M./	15	8471410	B2	2013-06-25	Karalis, Aristeidis et al.	

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/R.M./	16	20030071034	A1	2003-04-17	Thompson, Leslie L., et al.	
/R.M./	17	20080272860	A1	2008-11-06	Pance, Kristi D.	
/R.M./	18	20090188396	A1	2009-07-30	Hofmann, Matthias C., et al.	
/R.M./	19	20090322158	A1	2009-12-31	Stevens, Michael C., et al.	
/R.M./	20	20110115431	A1	2011-05-19	Dunworth, Jeremy D., et al.	
/R.M./	21	20110128015	A1	2011-06-02	Dorairaj, Hariharakumaran et al.	
/R.M./	22	20110248573	A1	2011-10-13	Kanno, Hiroshi et al.	
/R.M./	23	20130057364	A1	2013-03-07	Kesler, Morris P., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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/R.M./	24	20130062966	A1	2013-03-14	Verghese, Simon et al.	
/R.M./	25	20130069441	A1	2013-03-21	Verghese, Simon et al.	
/R.M./	26	20130069753	A1	2013-03-21	Kurs, Andre B., et al.	
/R.M./	27	20130099587	A1	2013-04-25	Herbert, Lou T.	

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
/R.M./	28	04265875	JP	A	1992-09-22	Chiba, Tokuo et al.	English Abstract Submitted	☐
/R.M./	29	11075329	JP	A	1999-03-16	Makuuchi, Masami et al.	English Abstract Submitted	☐
/R.M./	30	2003179526	JP	A	2003-06-27	Kobayashi, Miyuki et al.	English Abstract Submitted	☐
/R.M./	31	2004166459	JP	A	2004-06-10	Yamamoto, Kitao et al.	English Abstract Submitted	☐
/R.M./	32	2004201458	JP	A	2004-07-15	Kojima, Hideki	English Abstract Submitted	☐
/R.M./	33	2005057444	JP	A	2005-03-03	Yoshida, mitsunobu et al.	English Abstract Submitted	☐
/R.M./	34	1020080007635	KR	A	2008-01-22	Womac, Michael D., et al.	English Abstract Submitted	☐
/R.M./	35	2008206231	JP	A	2008-09-04	Onishi, Kota et al.	English Abstract Submitted	☐
/R.M./	36	1020090122072	KR	A	2009-11-26	Kim, Moon et al.	English Abstract Submitted	☐
/R.M./	37	2011072074	JP	A	2011-04-07	Kitamura, Hiroyasu et al.	English Abstract Submitted	☐
/R.M./	38	1020110050920	KR	A	2011-05-17	Park, Eun S., et al.	English Abstract Submitted	☐
/R.M./	39	2011061821	WO	A1	2011-05-26	Ueno, Takeshi et al.		☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
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/R.M./	40	2357716	EP	A2	2011-08-17	Jung, Chun-Kil et al.		☐
/R.M./	41	2013036947	WO	A2	2013-03-14	Verghese, Simon et al.		☐
/R.M./	42	2013020138	WO	A3	2013-04-04	Karalis, Aristeidis et al.		☐
/R.M./	43	2013059441	WO	A1	2013-04-25	Lou, Herbert et al.		☐
/R.M./	44	2013036947	WO	A3	2013-05-02	Verghese, Simon et al.		☐
/R.M./	45	2013067484	WO	A1	2013-05-10	Verghese, Simon et al.		☐
/R.M./	46	2013013235	WO	A3	2013-05-30	Karalis, Aristeidis et al.		☐

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
/R.M./	47	Extended European Search Report for 11184066.6 mailed 3-28-2013", Massachusetts Institute of Technology, 7 pages	☐
/R.M./	48	International Application Serial No. PCT/US2011/051634, International Preliminary Report on Patentability mailed 03-28-13, 8 pages	☐
/R.M./	49	International Application Serial No. PCT/US2012/047844, International Search Report and Written Opinion mailed 03-25-13, 9 pages	☐
/R.M./	50	International Application Serial No. PCT/US2012/054490, International Search Report and Written Opinion mailed 02-28-13, 8 pages	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
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	Attorney Docket Number	WTCY-0075-P01

/R.M./	51	International Application Serial No. PCT/US2012/060793, International Search Report and Written Opinion mailed 03-08-13, 13 pages	☐
/R.M./	52	International Application Serial No. PCT/US2012/063530, International Search Report and Written Opinion mailed 03-13-13, 16 pages	☐

EXAMINER SIGNATURE

Examiner Signature	/Rasem Mourad/	Date Considered	04/23/2015

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.
[4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e) (1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e) (2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jeffrey R. Ambroziak/	**Date (YYYY-MM-DD)**	2013-06-20
Name/Print	Jeffrey R. Ambroziak	**Registration Number**	47387

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Art Unit	2836
Examiner Name	Rexford N. Barnie
Attorney Docket Number	WTCY-0075-P01

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/R.M./	1	5229652	A	1993-07-20	Hough, Wayne	
/R.M./	2	5541604	A	1996-07-30	Meier, Herbert	
/R.M./	3	5710413	A	1998-01-20	King, James et al.	
/R.M./	4	5821728	A	1998-10-13	Schwind, John	
/R.M./	5	5903134	A	1999-05-11	Takeuchi, Yasuo	
/R.M./	6	6047214	A	2000-04-04	Mueller, Jeffrey S., et al.	
/R.M./	7	6057668	A	2000-05-02	Chao, Wen-Chung	
/R.M./	8	6356773	B1	2002-03-12	Rinot, Eyal	
/R.M./	9	6406168	B1	2002-06-18	Whiting, William S.	
/R.M./	10	6473028	B1	2002-10-29	Luc, Wuidart	
/R.M./	11	6561975	B1	2003-05-13	Pool, Nancy P., et al.	
/R.M./	12	6703921	B1	2004-03-09	Wuidart, Luc et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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/R.M./	13	6803744	B1	2004-10-12	Sabo, Anthony	
/R.M./	14	6988026	B2	2006-01-17	Breed, David S., et al.	
/R.M./	15	7076206	B2	2006-07-11	Elferich, Reinhold et al.	
/R.M./	16	D541322	S	2007-04-24	Garrett, David A., et al.	
/R.M./	17	7221966	B2	2007-05-22	Birli, Joseph et al.	
/R.M./	18	D545855	S	2007-07-03	Garrett, David A., et al.	
/R.M./	19	7443135	B2	2008-10-28	Cho, Ki-Young	
/R.M./	20	7471062	B2	2008-12-30	Bruning, Gert W.	
/R.M./	21	7521890	B2	2009-04-21	Lee, Yeechun et al.	
/R.M./	22	7545337	B2	2009-06-09	Guenther, Wulf	
/R.M./	23	7825544	B2	2010-11-02	Jansen, Gerardus L., et al.	
/R.M./	24	7844306	B2	2010-11-30	Shearer, John G., et al.	
/R.M./	25	7880337	B2	2011-02-01	Farkas, Laszlo	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
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/R.M./	26	7932798	B2	2011-04-26	Tolle, Tobias G., et al.	
/R.M./	27	7948209	B2	2011-05-24	Jung, Chun-Kil	
/R.M./	28	7963941	B2	2011-06-21	Wilk, Peter J.	
/R.M./	29	7969045	B2	2011-06-28	Schmidt, Josef et al.	
/R.M./	30	7994880	B2	2011-08-09	Chen, Chih-Jung et al.	
/R.M./	31	8131378	B2	2012-03-06	Greenberg, Robert J., et al.	
/R.M./	32	8193769	B2	2012-06-05	Azancot, Yossi et al.	
/R.M./	33	8212414	B2	2012-07-03	Howard, Robert J., et al.	
/R.M./	34	8260200	B2	2012-09-04	Shimizu, Kanjiro et al.	
/R.M./	35	8400023	B2	2013-03-19	Joannopoulos, John D., et al.	
/R.M./	36	8457547	B2	2013-06-04	Meskens, Werner	
/R.M./	37	8461817	B2	2013-06-11	Martin, Donald C., et al.	
/R.M./	38	8476788	B2	2013-07-02	Karalis, Aristeidis et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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/R.M./	39	8482157	B2	2013-07-09	Cook, Nigel et al.	
/R.M./	40	8482158	B2	2013-07-09	Kurs, Andre B., et al.	
/R.M./	41	8487480	B2	2013-07-16	Kesler, Morris P., et al.	
/R.M./	42	8497601	B2	2013-07-30	Hall, Katherine L., et al.	
/R.M./	43	8552592	B2	2013-10-08	Schatz, David A., et al.	
/R.M./	44	8569914	B2	2013-10-29	Karalis, Aristeidis et al.	
/R.M./	45	8587153	B2	2013-11-19	Schatz, David A., et al.	
/R.M./	46	8587155	B2	2013-11-19	Giler, Eric R., et al.	
/R.M./	47	8598743	B2	2013-12-03	Katherine, Hall L., et al.	
/R.M./	48	8618696	B2	2013-12-31	Karalis, Aristeidis et al.	
/R.M./	49	8629578	B2	2014-01-14	Kurs, Andre B.	
/R.M./	50	8643326	B2	2014-02-04	Campanella, Andrew J., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/R.M./	51	20040026998	A1	2004-02-12	Henriott, Jay M., et al.	
/R.M./	52	20040130425	A1	2004-07-08	Dayan, Tal et al.	
/R.M./	53	20050027192	A1	2005-02-03	Govari, Assaf et al.	
/R.M./	54	20050116683	A1	2005-06-02	Cheng, Lily K., et al.	
/R.M./	55	20050189945	A1	2005-09-01	Reiderman, Arcady	
/R.M./	56	20060001509	A1	2006-01-05	Gibbs, Phillip R.	
/R.M./	57	20060053296	A1	2006-03-09	Busboom, Axel et al.	
/R.M./	58	20060219448	A1	2006-10-05	Grieve, Malcolm J., et al.	
/R.M./	59	20060277666	A1	2006-12-14	Gertsch, Jeffrey H., et al.	
/R.M./	60	20080051854	A1	2008-02-28	Bulkes, Cherik et al.	
/R.M./	61	20080132909	A1	2008-06-05	Jascob, Bradley A., et al.	
/R.M./	62	20080197802	A1	2008-08-21	Onishi, Kota et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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/R.M./	63	20080238364	A1	2008-10-02	Weber, Charles F., et al.	
/R.M./	64	20080255901	A1	2008-10-16	Carroll, John S., et al.	
/R.M./	65	20080291277	A1	2008-11-27	Jacobsen, Jeffrey J., et al.	
/R.M./	66	20090079387	A1	2009-03-26	Jin, Mikimoto et al.	
/R.M./	67	20090115628	A1	2009-05-07	Dicks, Kent et al.	
/R.M./	68	20090161078	A1	2009-06-25	Wu, Spencer et al.	
/R.M./	69	20090218884	A1	2009-09-03	Soar, Roger J.	
/R.M./	70	20090224723	A1	2009-09-10	Tanabe, Akihiro	
/R.M./	71	20090273318	A1	2009-11-05	Rondoni, John C., et al.	
/R.M./	72	20100015918	A1	2010-01-21	Liu, Yiming et al.	
/R.M./	73	20100076524	A1	2010-03-25	Forsberg, John W., et al.	
/R.M./	74	20100100997	A1	2010-04-29	Lee, Kang S., et al.	
/R.M./	75	20100104031	A1	2010-04-29	Lacour, Gilles	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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/R.M./	76	20100179384	A1	2010-07-15	Hoeg, Hans D., et al.	
/R.M./	77	20100181964	A1	2010-07-22	Huggins, Mark et al.	
/R.M./	78	20100201312	A1	2010-08-12	Kirby, Miles A., et al.	
/R.M./	79	20100234922	A1	2010-09-16	Forsell, Peter	
/R.M./	80	20100244767	A1	2010-09-30	Turner, Jim et al.	
/R.M./	81	20100256481	A1	2010-10-07	Mareci, Thomas H., et al.	
/R.M./	82	20100314946	A1	2010-12-16	Budde, Wolfgang O., et al.	
/R.M./	83	20100328044	A1	2010-12-30	Waffenschmidt, Eberhard et al.	
/R.M./	84	20110031928	A1	2011-02-10	Soar, Roger J.	
/R.M./	85	20110049995	A1	2011-03-03	Hashiguchi, Takaaki	
/R.M./	86	20110215086	A1	2011-09-08	Yeh, Ming-Hsiang	
/R.M./	87	20110266878	A9	2011-11-03	Cook, Nigel P., et al.	
/R.M./	88	20110278943	A1	2011-11-17	Eckhoff, Philip A., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13/752,169
Filing Date	Jan 28, 2013
First Named Inventor	Andre B. Kurs
Art Unit	2836
Examiner Name	Rexford N. Barnie
Attorney Docket Number	WTCY-0075-P01

/R.M./	89	20110282415	A1	2011-11-17	Eckhoff, Philip A., et al.	
/R.M./	90	20120007435	A1	2012-01-12	Sada, Tomokazu et al.	
/R.M./	91	20120025602	A1	2012-02-02	Boys, John T., et al.	
/R.M./	92	20120038525	A1	2012-02-16	Monsalve Carcelen, Beatriz et al.	
/R.M./	93	20130154389	A1	2013-06-20	Kurs, Andre B., et al.	
/R.M./	94	20130159956	A1	2013-06-20	Verghese, Simon et al.	
/R.M./	95	20130175874	A1	2013-07-11	Lou, Herbert T., et al.	
/R.M./	96	20130175875	A1	2013-07-11	Kurs, Andre B., et al.	
/R.M./	97	20130200716	A1	2013-08-08	Kesler, Morris P., et al.	
/R.M./	98	20130221744	A1	2013-08-29	Hall, Katherine L., et al.	
/R.M./	99	20130278073	A1	2013-10-24	Kurs, Andre B., et al.	
/R.M./	100	20130278074	A1	2013-10-24	Kurs, Andre B., et al.	
/R.M./	101	20130278075	A1	2013-10-24	Kurs, Andre B., et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

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Attorney Docket Number	WTCY-0075-P01

/R.M./	102	20130300353	A1	2013-11-14	Kurs, Andre B., et al.	
/R.M./	103	20130307349	A1	2013-11-21	Hall, Katherine L., et al.	
/R.M./	104	20130320773	A1	2013-12-05	Schatz, David A., et al.	
/R.M./	105	20130334892	A1	2013-12-19	Hall, Katherine L., et al.	
/R.M./	106	20140002012	A1	2014-01-02	McCauley, Alexander P., et al.	
/R.M./	107	20140021798	A1	2014-01-23	Kesler, Morris P., et al.	
/R.M./	108	20140035378	A1	2014-02-06	Kesler, Morris P., et al.	
/R.M./	109	20140035704	A1	2014-02-06	Efe, Volkan et al.	
/R.M./	110	20140044281	A1	2014-02-13	Ganem, Steven J., et al.	
/R.M./	111	20140044293	A1	2014-02-13	Ganem, Steven J., et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
/R.M./	112	09182323	JP	A	1997-07-11	Hayashi, Hiroshi	English Abstract Submitted	■
/R.M./	113	2005-149238	JP	A	2005-06-09	Takahashi, Tetsuya	English Abstract Submitted	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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First Named Inventor	Andre B. Kurs
Art Unit	2836
Examiner Name	Rexford N. Barnie
Attorney Docket Number	WTCY-0075-P01

/R.M./	114	2007-505480	JP	T	2007-03-08	Splashpower Limited	Abstract of corresponding document: WO 2005/024865 (A2) Submitted	☐
/R.M./	115	2007-537637	JP	A	2007-12-20	Vacuumschmelze GmbH & Co. KG	Abstract of corresponding document: WO 2005/112192 (A1) Submitted	☐
/R.M./	116	2008-508842	JP	A	2008-03-21	JC Protek Co., LTD.	Abstract of corresponding document: WO 2006/011769 (A1) Submitted	☐
/R.M./	117	2008-206327	JP	A	2008-09-04	Onishi, Kota et al.	English Abstract Submitted	☐
/R.M./	118	2013/113017	WO	A1	2013-08-01	Kurs, Andre et al.		☐
/R.M./	119	2013/142840	WO	A1	2013-09-26	Kesler, Morris et al.		☐
/R.M./	120	2014/004843	WO	A1	2014-01-03	McCauley, Alexander P., et al.		☐

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
/R.M./	121	Machine Translation for Japanese Patent Application No. JPH09182323 which published on July 11, 1997, 8 pages	☐
/R.M./	122	BUDHIA, MICKEL et al., "A New IPT Magnetic Coupler for Electric Vehicle Charging Systems", IECON 2010 - 36th Annual Conference on IEEE Industrial Electronics Society, Glendale, AZ, November 7-10, 2010, pp. 2487-2492	☐
/R.M./	123	BUDHIA, MICKEL et al., "Development and Evaluation of Single Sided Flux Couplers for Contactless Electric Vehicle Charging", IEEE Energy Conversion Congress and Exposition (ECCE), Phoenix, AZ, September 17-22, 2011, pp. 614-621	☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
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Art Unit	2836
Examiner Name	Rexford N. Barnie
Attorney Docket Number	WTCY-0075-P01

/R.M./	124	BUDHIA, MICKEL et al., "Development of a Single-Sided Flux Magnetic Coupler for Electric Vehicle IPT Charging Systems", IEEE Transactions on Industrial Electronics, Vol. 60, No. 1, January 2013, pp. 318-328	☐
/R.M./	125	International Application Serial No. PCT/US2012/040184, International Preliminary Report On Patentability and Written Opinion mailed 12-27-2013, Witricity Corporation, 7 pages	☐
/R.M./	126	International Application Serial No. PCT/US2012/047844, International Preliminary Report on Patentability with Written Opinion mailed 01-30-2014", Witricity Corporation et al., 6 pages	☐
/R.M./	127	International Application Serial No. PCT/US2013/023478, International Search Report and Written Opinion mailed 06-25-2013, Witricity Corporation, 15 pages	☐
/R.M./	128	International Application Serial No. PCT/US2013/033599, International Search Report and Written Opinion mailed 07-25-2013, Witricity Corporation, 13 pages	☐
/R.M./	129	International Application Serial No. PCT/US2013/048210, International Search Report mailed on 10-15-2013, Witricity Corporation, 12 pages	☐
/R.M./	130	TANG, S.C et al., "Evaluation of the Shielding Effects on Printed-Circuit-Board Transformers Using Ferrite Plates and Copper Sheets", IEEE Transactions on Power Electronics, Vol. 17, No. 6, Nov 2002, pp. 1080-1088	☐
/R.M./	131	VILLENEUVE, PIERRE R. et al., "Microcavities in Photonic Crystals: Mode Symmetry, Tunability, and Coupling Efficiency", Physical Review B, Vol. 54, No. 11, September 15, 1996, pp. 7837-7842	☐

EXAMINER SIGNATURE

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Filing Date	Jan 28, 2013
First Named Inventor	Andre B. Kurs
Art Unit	2836
Examiner Name	Rexford N. Barnie
Attorney Docket Number	WTCY-0075-P01

Examiner Signature	/Rasem Mourad/	Date Considered	04/23/2015

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.
[4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M

Modified PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Application Number	13/752,169
Filing Date	Jan 28, 2013
First Named Inventor	Andre B. Kurs
Art Unit	2836
Examiner Name	Rexford N. Barnie
Attorney Docket Number	WTCY-0075-P01

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e) (1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e) (2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Jeffrey R. Ambroziak/	Date (YYYY-MM-DD)	2014-02-25
Name/Print	Jeffrey R. Ambroziak	Registration Number	47387

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

Courtesy Reminder for
Application Serial No: 13/752,169

Attorney Docket No: 25236-0134001
Customer Number: 26161
Date of Electronic Notification: 05/06/2015

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
PATDOCTC@fr.com

To view your correspondence online or update your email addresses, please visit us anytime at **https://sportal.uspto.gov/secure/myportal/privatepair.** If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Andre B. Kurs	Art Unit	:	2836
Serial No.	:	13/752,169	Examiner	:	Rasem Mourad
Filed	:	January 28, 2013	Conf. No.	:	6134
Title	:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS			

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF MAY 6, 2015

Please consider the following reply.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
13/752,169	01/28/2013	

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **11/05/2015**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 5	Minus	***5	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/Frederick Briscoe/

Electronic Patent Application Fee Transmittal

Application Number:	13752169
Filing Date:	28-Jan-2013
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Filer:	Marc M. Wefers/Cheryl Forrest
Attorney Docket Number:	25236-0134001

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	1253	1	1400	1400
Miscellaneous:				
			Total in USD ($)	**1400**

Electronic Acknowledgement Receipt

EFS ID:	23997882
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	26161
Filer:	Marc M. Wefers/Cheryl Forrest
Filer Authorized By:	Marc M. Wefers
Attorney Docket Number:	25236-0134001
Receipt Date:	05-NOV-2015
Filing Date:	28-JAN-2013
Time Stamp:	14:13:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1400
RAM confirmation Number	480
Deposit Account	061050
Authorized User	FISH & RICHARDSON P C

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Extension of Time	PetforExt.pdf	40206 f291c2640ecdffdb953eced41fd69e5044843616	no	1
Warnings:					
Information:					
2		Reply.pdf	163308 488538d77f6d726fb67a89b292dbb697cb5cd090	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	11

Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	31030 13eb0980c079f793160a982dc2438ce0a80520e5	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	234544	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Andre B. Kurs	Art Unit	:	2836
Serial No.	:	13/752,169	Examiner	:	Rasem Mourad
Filed	:	January 28, 2013	Conf. No.	:	6134
Title	:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS			

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PETITION FOR THREE-MONTH EXTENSION OF TIME UNDER 37 C.F.R. §1.136

Please extend the period for response to the action dated May 6, 2015, for three months to and including November 6, 2015. Fees of $1400 are being paid with this petition. In addition, please apply any other necessary charges or credits to Deposit Account 06-1050, referencing the above Attorney Docket Number 25236-0134001.

Respectfully submitted,

Date: November 5, 2015

/Marc M. Wefers Reg. No. 56,842/
Marc M. Wefers
Reg. No. 56,842

Customer Number 26161
Fish & Richardson P.C.
Telephone: (617) 542-5070
Facsimile: (877) 769-7945

23456848.doc

List of Claims (replacing prior versions):

1. (Currently Amended) A ~~magnetic resonator~~ system for wireless power transfer, comprising:

a first source magnetic resonator comprising ~~an inductor comprising~~ a conductive first ~~loop having a first dipole moment and~~ coil having one or more loops coupled to at least one capacitor;

a second source magnetic resonator comprising a conductive second coil having one or more loops, the second source magnetic resonator positioned at a non-zero distance from the first source magnetic resonator; and

a device magnetic resonator positioned closer to the first source magnetic resonator than to the second source magnetic resonator,

wherein during operation of the system:

a first current flowing in the first source magnetic resonator generates a first magnetic field that couples to the device magnetic resonator to transfer operating power to the device magnetic resonator, and the magnetic field has a first dipole moment;

a second current flowing in the second source magnetic resonator generates a second magnetic field having ~~a conductive second loop having~~ a second dipole moment, wherein a direction of the first dipole moment is substantially opposite to a direction of the second dipole moment; and

wherein the first and second source magnetic resonators are positioned so that the second magnetic field at least partially cancels the first magnetic field outside a spatial region through which power is transferred from the first source magnetic resonator to the device magnetic resonator.

~~at least one capacitor in series with at least one of the first loop and the second loop.~~

2. (Currently Amended) The ~~magnetic resonator~~ system of claim 1, wherein a quality factor of the first source magnetic resonator is greater than 100.

3. (Currently Amended) The ~~magnetic resonator~~ system of claim 1, wherein the first ~~loop~~ coil and the second ~~loop~~ coil are substantially the same size and have the same number of turns.

4. (Currently Amended) The ~~magnetic resonator~~ system of claim 1, wherein a magnitude of the first dipole moment and a magnitude of the second dipole moment are substantially equal.

5. (Currently Amended) The ~~magnetic resonator~~ system of claim 1, wherein the first source magnetic resonator is ~~one~~ a component of a wireless power source.

6. (Currently Amended) The ~~magnetic resonator~~ system of claim 1, wherein the device magnetic resonator is ~~one~~ a component of a wireless power device.

7. (Canceled)

8. (Currently Amended) The ~~magnetic resonator~~ system of claim 1, wherein the first ~~loop~~ coil and the second ~~loop~~ coil are substantially co-planar.

9. (Currently Amended) The ~~magnetic resonator~~ system of claim 1, wherein the first ~~loop~~ coil and the second ~~loop~~ coil ~~of the resonator~~ are oriented such that an axis of the first ~~loop~~ coil is substantially parallel to an axis of the second ~~loop~~ coil.

10. (Currently Amended) The ~~magnetic resonator~~ system of claim 1, wherein the at least one capacitor is a variable capacitor.

11. (Currently Amended) The ~~magnetic resonator~~ system of claim 1, ~~further comprising a second~~ wherein the at least one capacitor is in parallel with the ~~inductor~~ first coil.

12. (Withdrawn) A magnetic resonator comprising:

a plurality of conductive loops each having a dipole moment comprising a magnitude and a direction; and

a control system for adjusting the dipole moment of at least one of the plurality of loops to produce a predetermined far field radiation level.

13. (Withdrawn) The magnetic resonator of claim 12 wherein a sum of the dipole moments of each of the plurality of conductive loops is approximately zero.

14. (Withdrawn) A method comprising:

providing a plurality of conductive loops each having a dipole moment comprising a magnitude and a direction; and

selectively altering at least one dipole moment of at least one of the plurality of loops to produce a predetermined far field radiation level.

15. (Withdrawn) The method of claim 14 wherein selectively altering at least one dipole moment comprises:

measuring an existing far field radiation level;

determining a difference between the existing far field radiation level and the predetermined far field radiation level; and

selectively altering at least one dipole moment of at least one of the plurality of loops to effectively counteract the difference.

16. (Withdrawn) The method of claim 14 wherein the predetermined far field radiation level is approximately zero.

17. (Withdrawn) A wireless power source comprising:

at least one high-Q magnetic resonator for generating an oscillating magnetic field, and

at least one conducting plate positioned substantially perpendicular to the dipole moment of the resonator.

18. (Withdrawn) The wireless power source of claim 17 wherein the conductor plate is positioned to reduce the dipole radiation of the resonator in the far field of the resonator.

19. (Withdrawn) A wireless power device comprising:

at least one high-Q magnetic resonator for generating a current in the presence of an oscillating magnetic field, and

at least one conducting plate positioned substantially perpendicular to the dipole moment of the resonator.

20. (Withdrawn) The wireless power device of claim 19 wherein the conductor plate is positioned to reduce the dipole radiation of the resonator in the far field of the resonator.

REMARKS

In reply to the office action of May 6, 2015, Applicants have amended claims 1-6 and 8-11, and canceled claim 7. Accordingly, claims 1-6 and 8-20 are pending, with claims 1, 12, 14, 17, and 19 in independent form, and claims 12-20 presently withdrawn.

Claim Amendments

Independent claim 1 has been amended to cover systems that include first and second source magnetic resonators and a device magnetic resonator positioned closer to the first source magnetic resonator than to the second source magnetic resonator, where during operation of the system, "a first current flowing in the first source magnetic resonator generates a first magnetic field that couples to the device magnetic resonator to transfer operating power to the device magnetic resonator," and "the first and second source magnetic resonators are positioned so that the second magnetic field at least partially cancels the first magnetic field outside a spatial region through which power is transferred from the first source magnetic resonator to the device magnetic resonator." Support for the amendments to claim 1 is found in the published version of Applicants' specification (U.S. Patent Application Publication No. 2013/0200721) at, for example, paragraphs [0284]-[0299], and in Fig. 40.

Claims 2-6 and 8-11 have been amended for consistency with claim 1.

Claim Rejections – 35 U.S.C. § 103(a)

Claim 1 stands rejected as allegedly being unpatentable over Buhrer (U.S. Patent No. 4,240,010) in view of Cook (U.S. Patent Application Publication No. 2009/0051224). Without conceding that the foregoing rejection is correct, but merely to expedite prosecution, Applicants have amended independent claim 1 as discussed above. Neither Buhrer nor Cook discloses the systems covered by amended claim 1 for at least the following reasons.

Buhrer discloses electrode-less fluorescent light sources in which an oscillating magnetic field generated by an induction coil penetrates a wall of a gas-containing fluorescent lamp and induces a circulating plasma current within the lamp. The plasmas emit ultraviolet radiation,

which is then converted to white light by a phosphor coating on the lamp surface. *See, e.g., Buhrer*, col. 6, lines 58-66. Buhrer does not relate to wireless power transfer. Accordingly, Buhrer does not disclose first and second source magnetic resonators, as recited in amended claim 1.

Even if the two halves of Buhrer's induction coil 90 in Fig. 6 – which is cited by the Office (*see, e.g., Office Action*, p. 2) – were assumed to correspond to the recited magnetic resonators (which Applicants do not concede is correct), Buhrer fails to disclose a device magnetic resonator, and the generation of a magnetic field that "couples to the device magnetic resonator to transfer operating power to the device magnetic resonator," as required by claim 1. This is not surprising, as Buhrer does not use his induction coil 90 to transfer power to resonators at all, but to excite a plasma discharge in a gas tube. Notwithstanding any of the disclosure in Cook, a person of ordinary skill in the art would not have modified Buhrer to include the foregoing features of amended claim 1, as doing so would have been inconsistent with the functioning of Buhrer's fluorescent light source.

For at least these reasons, amended claim 1 is patentable over Buhrer, and Applicants respectfully request that the rejection of claim 1 over Buhrer and Cook under 35 U.S.C. § 103(a) be withdrawn.

Claims 1-6 and 9-10 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Steinberg (U.S. Patent Application Publication No. 2011/0125007) in view of Cook. Further, claims 7, 8, and 11 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Steinberg in view of Cook and further in view of one of: Chen (U.S. Patent Application Publication No. 2009/0153273); Buhrer; or Kurs (U.S. Patent Application Publication No. 2010/0308939).

Applicants do not concede that any of the foregoing rejections are correct. Further, regarding amended independent claim 1, Applicants submit that claim 1 is patentable over the foregoing references for at least the following reasons.

Steinberg discloses systems for localization of a device 140 which is "typically … an autonomous swallowable capsule." *Steinberg*, par. [0045]. Fig. 1 of Steinberg is reproduced below.

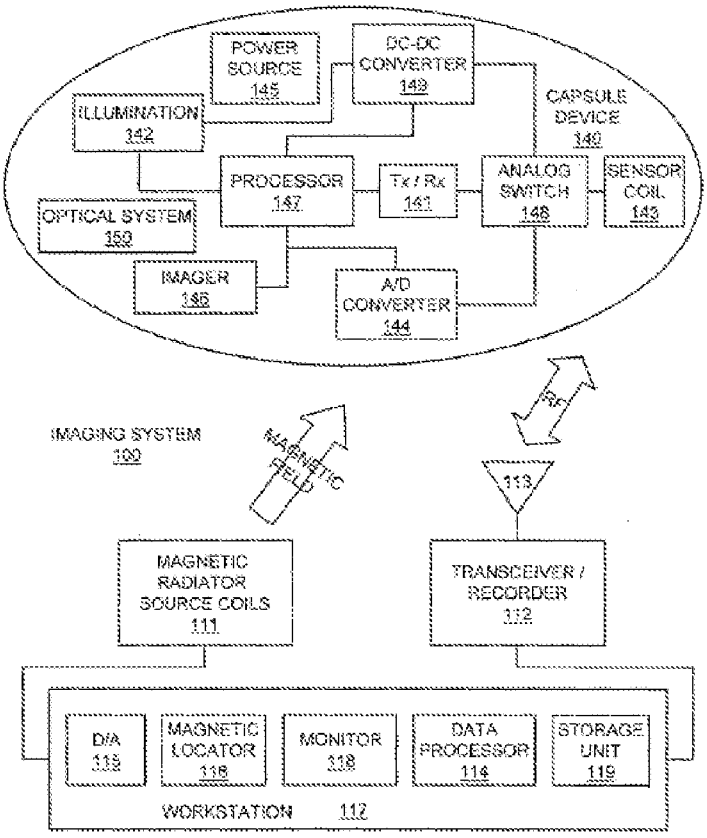

Figure 1

Steinberg's antenna 113 receives images from transceiver 141 in device 140. In particular, Steinberg states that "[t]ransceiver 141 may transmit images to, for example, external transceiver or transceiver/recorder 112 (e.g., through one or more antennas 143 and 113 respectively)." *Id.*, par. [0048]. In other words, antenna 113 does not transfer operating power to device 140.

Steinberg's "electromagnetic positioning source coils 111 may be connected to electromagnetic positioning locator 116 … [and] to one or more digital-to-analog (D/A) converters 115, which may be used to deliver the appropriate amounts of current to the source coils for positioning purposes." *Id.*, par. [0064]. In Steinberg's system, source coils 11 generate a magnetic quadrupole field. *Id.*, par. [0075]. The quadrupole field is shown in Figs. 2A-2C, and Steinberg notes that "[t]he observation point of FIG. 2 may represent sensor coil 143." *Id.*

To perform localization of device 140 in Steinberg, the quadrupole magnetic fields generated by source coils 111 are measured by sensor coil 143. The measurement of the quadrupole fields is then used to determine the trajectory of device 140. Steinberg states that "[a] set of three quadrupoles … each comprising a pair of simple coils, may be mounted on the source coordinate system." *Id.*, par. [0081]. The "coil pairs may be excited as quadrupoles … [and] [s]ensor coil 143 measurement g related to the quadrupole excitation may be expressed" as shown in Equation (8). *Id.* These measurements, along with measurements by sensor 143 of dipole fields generated by source coils 111, are used to compute the trajectory of device 140. *Id.*, pars. [0082], [0105]-[0115].

As is evident, Steinberg's source coils 111 and sensor coil 143 are not magnetic resonators, as required by amended claim 1. Further, source coils 111 do not transfer operating power to sensor coil 143. To the contrary, sensor coil 143 merely detects the dipole and quadrupole fields generated by source coils 111. Sensor coil 143, like the other components of device 140, receives operating power from power source 145. *Id.*, par. [0050]-[0051]. Indeed, it is conceivable that if operating power *was* transferred wirelessly to sensor coil 143, the magnitude of the field used for power transfer would be significantly larger than the fields used for position sensing of device 140, thereby making the objective of Steinberg's system (i.e., the determination of the trajectory of device 140) difficult or impossible to achieve.

In addition, because Steinberg does not disclose the transfer of operating power from a source magnetic resonator to a device magnetic resonator, none of Steinberg's source coils 11 are positioned so that a field generated by one of the coils at least partially cancels a field generated by another of the coils "outside a spatial region through which power is transferred".

A person of ordinary skill in the art would not have modified Steinberg to include the missing features of amended claim 1 discussed above. Steinberg does not relate to wireless power transfer, Steinberg's source coils 111 are not designed for use in magnetic resonators, and Steinberg's device 140 includes an independent power source 145. Instead, Steinberg's source coils 111 are designed to produce very specific, controlled dipole and quadrupole fields for accurate position measurements. Steinberg's trajectory reconstruction, as evidenced by Equations (1)-(13b), depends on these specific field geometries. Modifying Steinberg's source coils 111 for wireless power transfer would conceivably render his system inoperable for its

intended purpose. A person of ordinary skill in the art, realizing this, would therefore not have modified Steinberg's system to include the missing features of claim 1, notwithstanding the disclosures of Cook, Chen, Buhrer, and Kurs.

For all of the foregoing reasons, Applicants submit that amended claim 1 is patentable over Steinberg, Cook, Chen, Buhrer, and Kurs. Claim 7 has been canceled, making its rejection moot. Claims 2-6 and 8-11 each depend from claim 1, and are therefore patentable over the above references for at least the same reasons as claim 1. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections of claims 1-6 and 8-11 over Steinberg, Cook, Chen, Buhrer, and Kurs under 35 U.S.C. § 103(a).

Conclusion

In view of the foregoing, Applicants ask that the application be allowed.

Canceled claims, if any, have been canceled without prejudice or disclaimer. Any circumstance in which Applicants have: (a) addressed certain comments of the Office does not mean that Applicants concede other comments of the Office; (b) made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims; or (c) amended or canceled a claim does not mean that Applicants concede any of the Office's positions with respect to that claim or other claims.

Applicants respectfully request consideration of all filed IDSs not previously considered, by initialing and returning each Form PTO-1449.

Fees for the extension of time are being paid with this reply on the Electronic Filing System. Please apply those fees and any other necessary charges or credits to Deposit Account 06-1050, referencing the above Attorney Docket Number 25236-0134001.

Respectfully submitted,

Date: November 5, 2015

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23390388.doc

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 25236-0134001	Application No. 13/752,169
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant WiTricity Corporation	
(37 CFR §1.98(b))		Filing Date January 28, 2013	Group Art Unit 2836

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1.						

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No
	2.	EP 2 306 611	4/6/2011	EPO	H02J	5/00		
	3.	WO 2011/135424	11/3/2011	WIPO				

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	4.	Copy of Supplementary European Search Report for European Application No. EP 13740878 by Examiner Matthias Holz dated November 2, 2015 (5 pages)

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Electronic Acknowledgement Receipt

EFS ID:	24104679
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	26161
Filer:	Marc M. Wefers/Cheryl Forrest
Filer Authorized By:	Marc M. Wefers
Attorney Docket Number:	25236-0134001
Receipt Date:	17-NOV-2015
Filing Date:	28-JAN-2013
Time Stamp:	12:34:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS.pdf	137892 2eda8bd32487065250c76e1eb7e3250c0208c47f	yes	2

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Information Disclosure Statement (IDS) Form (SB08)	2	2

Warnings:					
Information:					
2	Foreign Reference	FA1.pdf	309780 adce66dcd53c1507e08bebe04b78609073fad01f	no	12
Warnings:					
Information:					
3	Foreign Reference	FA2.pdf	2325140 0a79a064578ca2da3ddbb6e794548aeed9c35f14	no	49
Warnings:					
Information:					
4	Non Patent Literature	NPL.pdf	197155 0d1a01285ee5ad8f1a4589ea5852e0b3bc3f4446	no	5
Warnings:					
Information:					
		Total Files Size (in bytes):	2969967		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Andre B. Kurs	Art Unit	:	2836
Serial No.	:	13/752,169	Examiner	:	Rasem Mourad
Filed	:	January 28, 2013	Conf. No.	:	6134
Title	:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS			

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the references listed on the enclosed PTO-SB-08 or Disclosure Form. Foreign patent documents and non-patent literature are enclosed; cited U.S. patents and patent application publications will be provided on request. A copy of a communication from a foreign patent office in a counterpart application is also enclosed.

This statement is being filed after a first action on the merits, but before receipt of a final action or a notice of allowance. Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement. See 37 CFR 1.97(e)(1).

Apply any necessary charges or credits to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this Statement.

Respectfully submitted,

Date: November 17, 2015

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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NOTICE OF ALLOWANCE AND FEE(S) DUE

26161 7590 11/20/2015
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
MOURAD, RASEM	
ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 11/20/2015

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	01/28/2013	Andre B. Kurs	25236-0134001	6134

TITLE OF INVENTION: WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	02/22/2016

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
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Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

26161 7590 11/20/2015
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P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	01/28/2013	Andre B. Kurs	25236-0134001	6134

TITLE OF INVENTION: WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	02/22/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
MOURAD, RASEM	2836	307-104000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
❑ Issue Fee
❑ Publication Fee (No small entity discount permitted)
❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
❑ A check is enclosed.
❑ Payment by credit card. Form PTO-2038 is attached.
❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
❑ Applicant certifying micro entity status. See 37 CFR 1.29
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
❑ Applicant asserting small entity status. See 37 CFR 1.27
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
❑ Applicant changing to regular undiscounted fee status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	01/28/2013	Andre B. Kurs	25236-0134001	6134

26161 7590 11/20/2015
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
MOURAD, RASEM	
ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 11/20/2015

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 13/752,169	Applicant(s) KURS ET AL.	
	Examiner RASEM MOURAD	Art Unit 2836	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *11/5/2015*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-6 and 8-11*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/RASEM MOURAD/
Examiner, Art Unit 2836

The present application is being examined under the pre-AIA first to invent provisions.

DETAILED ACTION

Response to Arguments

Applicant's response of 11/5/2015 has been entered and considered. Upon entering amendment, claims 1-6, 8-11 have been amended, and claim 7 has been canceled.

Applicant's arguments, filed 11/5/2015, with respect to claim 1 have been fully considered and are persuasive. As a result, the previous rejection of has been withdrawn.

Election/Restrictions

This application is in condition for allowance except for the presence of claims 12-20 directed to inventions non-elected without traverse. Accordingly, **claims 12-20 have been cancelled**.

Allowable Subject Matter

Claims1-6, 8-11 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The claims are deemed to be directed to a nonobvious improvement over the prior art of record, particularly over Steinberg (2011/0125007), Ballantyne (2011/0133726), and Yamamoto (2012/0153741).

The prior art of record does not teach a system for wireless power transfer, comprising: a first source magnetic resonator comprising a conductive coil having one or more loops coupled to at least one capacitor; a second source magnetic resonator comprising a conductive second coil having one or more loops, the second source magnetic resonator positioned at a non-zero distance from the first source magnetic resonator; and a device magnetic resonator positioned closer to the first source magnetic resonator than to the second source magnetic resonator, wherein during operation of the system: a first current flowing in the first source magnetic resonator generates a first magnetic field that couples to the device magnetic resonator to transfer operating power to the device magnetic resonator, and the magnetic field has a first dipole moment; a second current flowing in the second source magnetic resonator generates a second magnetic field having a second dipole moment, wherein a direction of the first dipole

moment is substantially opposite to a direction of the second dipole moment; and wherein the first and second source magnetic resonators are positioned so that the second magnetic field at least partially cancels the first magnetic field outside a spatial region through which power is transferred from the first source magnetic resonator to the device magnetic resonator.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RASEM MOURAD whose telephone number is (571)270-7770. The examiner can normally be reached on Monday-Friday (10:30am-5:00pm) alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rexford Barnie can be reached on 5722727492. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rasem Mourad/
Examiner, AU 2836

/REXFORD BARNIE/
Supervisory Patent Examiner, Art Unit 2836

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13752169	KURS ET AL.
	Examiner	**Art Unit**
	RASEM MOURAD	2836

CPC- SEARCHED		
Symbol	**Date**	**Examiner**
H2J17/00,H02J17/005,H02J7/025,H01F38/140	4/23/2015	RM
H04B5/0037	11/12/2015	RM
H03H7/0115	11/12/2015	RM

CPC COMBINATION SETS - SEARCHED		
Symbol	**Date**	**Examiner**

US CLASSIFICATION SEARCHED			
Class	**Subclass**	**Date**	**Examiner**
307	104	4/23/2015	RM

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
searched in H2J17/00,H02J17/005,H02J7/025,H01F38/140 and 307/104	4/23/2015	RM
consulted with Adi Amrany	4/23/2015	RM
checked for double patenting	4/23/2015	RM
updated search	11/12/2015	RM
interference search	11/12/2015	RM

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**
307	104	11/12/2015	RM

/RASEM MOURAD/ Examiner.Art Unit 2836	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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L16	45	"6499701"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/11/12 16:42
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L22	421	20 and (reverse opposite) near2 direction near4 (coil loop wound)	US-PGPUB; USPAT;	OR	ON	2015/11/12 16:48

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L23	96	20 and (reverse opposite) near2 direction near4 (coil loop wound) and (flux field) same (cancel)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/11/12 16:49
L24	10	23 and dipole	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/11/12 17:18
L25	28	21 and 23	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/11/12 17:27
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S9	183	S8 and dipole adj moment	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 14:25
S11	128	S8 and (resonator inductor) with (loop$1 coil$1) same dipole adj moment	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 14:26
S12	2	"13752169"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 14:30
S13	1	S8 and (resonator inductor) with (loop$1 coil$1) same dipole adj moment and (conduct$3 adj plane)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 15:45
S14	1	S8 and (resonator inductor) with (loop$1 coil$1) same dipole adj moment with (control$4 measur$4 alter$4 adjust$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 15:49
S15	1	S5 and (resonator inductor) with (loop$1 coil$1) same dipole adj moment with (control$4 measur$4 alter$4 adjust$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 15:49
S16	1	S8 and (resonator inductor) with (loop$1 coil$1) near5 dipole adj moment with (control$4 measur$4 alter$4 adjust$4)	US-PGPUB; USPAT;	OR	ON	2015/01/15 15:50

			USOCR; FPRS; EPO; JPO; IBM_TDB			
S17	3	S8 and (resonator inductor) with (loop$1 coil$1) and dipole adj moment with (control$4 measur$4 alter$4 adjust$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 15:50
S18	9	"20110025131"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/01/15 16:21
S19	2132	@rlad < "20120126" and ((H02J17/00.cpc. H02J17/005.cpc. H02J7/025.cpc. H01F38/14.cpc. 307/104.ccls))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/14 11:51
S21	111	S19 and (resonat$3) with (loops! coils!) same (dipole adj moment)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 11:53
S22	57	S19 and (resonat$3) with (loops! coils!) same (dipole adj moment) same (capacit$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 11:54
S23	9	"20110025131"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 12:03
S24	2132	@rlad < "20120126" and ((H02J17/00.cpc. H02J17/005.cpc. H02J7/025.cpc. H01F38/14.cpc. 307/104.ccls))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/14 13:22

S25	0	S24 and (inductor) with (loops! coils!) same (dipole adj moment)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S26	40	S24 and (inductor) same (loops! coils!) same (dipole adj moment)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S27	111	S24 and (resonat$3) with (loops! coils!) same (dipole adj moment)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S28	0	S26 not S27	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S29	57	S24 and (resonat$3) with (loops! coils!) same (dipole adj moment) same (capacit$5)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S30	6	S26 not S29	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:22
S31	72	(resonat$3) with (loops! coils!) same (dipole adj moment) same (opposite different)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/14 13:34
S32	40907	(wireless$4 contactless inductiv$4) near power	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	2015/04/20 14:40

			JPO; IBM_TDB			
S33	100	S32 and dipole adj moments!	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/20 14:41
S34	22	S33 not kurs	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/20 14:41
S35	20	("4240010").URPN.	USPAT	OR	OFF	2015/04/20 17:50
S36	328	S32 and dipole adj moment$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/20 17:55
S37	126	S36 not kurs	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/20 17:55
S39	104	S37 not S34	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	ON	2015/04/20 17:55
S40	43865	307/104.ccls ((wireless$4 contactless non? contact inductiv$4) near power)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/22 17:23
S41	205	S40 and (reverse opposite) near2 direction near4 (coil loop wound)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/22 17:23
S43	59	"7197113"	US-	OR	OFF	2015/04/22

			PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB			17:24
S45	43	"6499701"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/22 17:34
S46	9	"20110025131"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/23 09:04
S47	4	"12189433"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/23 09:14
S48	8	"20090051224"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/23 11:38
S49	2	"20090153273"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; IBM_TDB	OR	OFF	2015/04/23 11:38

11/12/2015 6:13:43 PM
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EAST Search History

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L27	26	wireless and power and transfer and first and source and magnetic and resonator and conductive and capacitor and second and positioned and non and zero and current and magnetic and field and flowing and dipole and spatial and region and opposite and direction.clm.	US-PGPUB; USPAT	OR	ON	2015/11/12 18:11
L28	20	wireless and power and transfer and first and source and magnetic and resonator and conductive and capacitor and second and positioned and non and zero and current and magnetic and field and flowing and dipole and spatial and region and opposite and direction and cancels and partially.clm.	US-PGPUB; USPAT	OR	ON	2015/11/12 18:12
L30	31	wireless and power and transfer and first and source and magnetic and resonator and conductive and capacitor and second and positioned and non and zero and current and magnetic and field and flowing and dipole and spatial and region and opposite and direction and cancels and partially and moment and device and distance.clm.	US-PGPUB; USPAT	OR	ON	2015/11/12 18:12
L31	11	30 and 307/104.ccls.	US-PGPUB; USPAT	OR	ON	2015/11/12 18:13

11/ 12/ 2015 6:13:55 PM
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Notice of References Cited	Application/Control No. 13/752,169	Applicant(s)/Patent Under Reexamination KURS ET AL.	
	Examiner RASEM MOURAD	Art Unit 2836	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2011/0125007 A1	05-2011	Steinberg; Ben Zion	A61B1/00158	600/424
*	B	US-4,240,010 A	12-1980	Buhrer; Carl F.	H01J65/048	313/493
*	C	US-2009/0185658 A1	07-2009	Katcha; Jason Stuart	G08C17/04	378/15
*	D	US-6,499,701 B1	12-2002	Thornton; Richard D.	B60L5/005	246/1C
*	E	US-2012/0153741 A1	06-2012	Yamamoto; Kitao	H02J5/005	307/104
*	F	US-2011/0133726 A1	06-2011	Ballantyne; Alexander	G01B7/31	324/207.11
*	G	US-2012/0326499 A1	12-2012	Ichikawa; Shinji	B60L11/182	307/9.1
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13752169	KURS ET AL.
	Examiner	**Art Unit**
	RASEM MOURAD	2836

CPC						
Symbol					**Type**	**Version**
H04B		5	/	0037	F	2013-01-01
H03H		7	/	0115	I	2013-01-01
H02J		5	/	005	I	2013-01-01
H04B		5	/	0075	A	2013-01-01
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CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
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/RASEM MOURAD/ Examiner.Art Unit 2836	11/12/2015	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	10	
/REXFORD BARNIE/ Supervisory Patent Examiner.Art Unit 2836	11/13/2015	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	40

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13752169	KURS ET AL.
	Examiner	**Art Unit**
	RASEM MOURAD	2836

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION														
CLASS	SUBCLASS	CLAIMED									NON-CLAIMED					
307	104	H	0	1	F	27 / 42 (2006.01.01)										
CROSS REFERENCE(S)		H	0	1	F	37 / 00 (2006.01.01)										
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CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)															

/RASEM MOURAD/ Examiner.Art Unit 2836	11/12/2015	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	10	
/REXFORD BARNIE/ Supervisory Patent Examiner.Art Unit 2836	11/13/2015	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	40

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13752169	KURS ET AL.
	Examiner	**Art Unit**
	RASEM MOURAD	2836

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
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2	2	-	18												
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-	12														
-	13														
-	14														
-	15														
-	16														

/RASEM MOURAD/ Examiner.Art Unit 2836 (Assistant Examiner)	11/12/2015 (Date)	**Total Claims Allowed:** 10	
/REXFORD BARNIE/ Supervisory Patent Examiner.Art Unit 2836 (Primary Examiner)	11/13/2015 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 40

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 25236-0134001	Application No. 13/752,169
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant WiTricity Corporation	
(37 CFR §1.98(b))		Filing Date January 28, 2013	Group Art Unit 2836

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1.						

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No
	2.							

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	3.	Copy of European Office Action for European Patent Application No. 13 740 878.7 by Examiner Matthias Holz dated November 23, 2015 (6 pages)

Examiner Signature	Date Considered

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

Electronic Acknowledgement Receipt

EFS ID:	24376458
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	26161
Filer:	Marc M. Wefers/Cheryl Forrest
Filer Authorized By:	Marc M. Wefers
Attorney Docket Number:	25236-0134001
Receipt Date:	16-DEC-2015
Filing Date:	28-JAN-2013
Time Stamp:	11:16:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	9825
Deposit Account	061050
Authorized User	FISH & RICHARDSON P C
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS.pdf	138471 22141c8104da71b7999806cddd32d91e5f13b992	yes	2
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	1	
	Information Disclosure Statement (IDS) Form (SB08)		2	2	
Warnings:					
Information:					
2	Non Patent Literature	NPL.pdf	276956 c01cb7fb3af004ed68c25ff1992f0e4508754337	no	6
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30738 e3829e772f9d9aa0e549c60351e93c23aab5514f	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	446165		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Andre B. Kurs	Art Unit	:	2836
Serial No.	:	13/752,169	Examiner	:	Rasem Mourad
Filed	:	January 28, 2013	Conf. No.	:	6134
Title	:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS			

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Please consider the references listed on the enclosed PTO-SB-08 or Disclosure Form. Foreign patent documents and non-patent literature are enclosed; cited U.S. patents and patent application publications will be provided on request. A copy of a communication from a foreign patent office in a counterpart application is also enclosed.

This statement is being filed after a final action or a notice of allowance, but before payment of the issue fee. Each item of information in this information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement. See 37 CFR 1.97(e)(1). A late submission fee in the amount of $180, specified by 37 CFR §1.17(p) is being paid with this statement.

Apply any necessary charges or credits to deposit account 06-1050, referencing the above attorney docket number.

Please contact the undersigned if there are any questions regarding this Statement.

Respectfully submitted,

Date: December 16, 2015

/Marc M. Wefers Reg. No. 56,842/
Marc M. Wefers
Reg. No. 56,842

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Electronic Patent Application Fee Transmittal

Application Number:	13752169
Filing Date:	28-Jan-2013
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Filer:	Marc M. Wefers/Cheryl Forrest
Attorney Docket Number:	25236-0134001

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	01/28/2013	Andre B. Kurs	25236-0134001	6134

26161 7590 01/07/2016

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EXAMINER	
MOURAD, RASEM	

ART UNIT	PAPER NUMBER
2836	

NOTIFICATION DATE	DELIVERY MODE
01/07/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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PATDOCTC@fr.com

Corrected Notice of Allowability	Application No. 13/752,169	Applicant(s) KURS ET AL.	
	Examiner RASEM MOURAD	Art Unit 2836	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *12/10/2015*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-6 and 8-11*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 11/17/2015
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/RASEM MOURAD/ Examiner, Art Unit 2836	/THIENVU TRAN/ Supervisory Patent Examiner, Art Unit 2836

Substitute Disclosure Form (37 CFR §1.98(b))	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No.	Application No.
Information Disclosure Statement by Applicant (Use several sheets if necessary)		25236-0134001	13/752,169
		Applicant: WiTricity Corporation	
		Filing Date: January 28, 2013	Group Art Unit: 2836

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1.						

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No
	2.	EP 2 306 611	4/6/2011	EPO	H02J	5/00		
	3.	WO 2011/135424	11/3/2011	WIPO				

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	4.	Copy of Supplementary European Search Report for European Application No. EP 13740878 by Examiner Matthias Holz dated November 2, 2015 (5 pages)

Examiner Signature	Date Considered
/Rasem Mourad/	12/16/2015

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M./

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	01/28/2013	Andre B. Kurs	25236-0134001	6134

26161 7590 01/21/2016

FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
MOURAD, RASEM	

ART UNIT	PAPER NUMBER
2836	

NOTIFICATION DATE	DELIVERY MODE
01/21/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 13752169
Applicant : Kurs
Filing Date : 01/28/2013
Date Mailed : 01/21/2016

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Stephanie Smart/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 13752169

IDENTIFICATION OF SPECIFICATION/DRAWING INCONSISTENCIES

☐ On Page of the specification there is a brief description of FIG. , but the drawings filed do not include a drawing with that designation. Applicant must respond either by supplying the omitted drawing or by amending the specification to remove all references to that drawing.

☐ The drawings filed include FIG. , but the specification's brief description of the drawings does not describe a drawing with that designation. Applicant must respond either by amending the specification to add a brief description of that drawing or by correcting the drawings to remove the drawing in question.

☐ Drawings are present in the application and are referred to in the detailed description of the invention, but the specification does not contain a brief description of the drawings as required by 37 CFR 1.74 and 37 CFR 1.77(b)(8).

☒ Page page 75 of the specification refers to FIG. 134, but no drawing with that designation is described in the brief description of the drawings and no drawing with that designation is present in the application. Applicant must respond either by amending the specification to remove all references to that drawing, or by supplying that drawing and amending the specification to add a brief description of it.

☐ In the reissue application, FIG. , is labeled as "New" but is not described in the reissue specification's brief description of the drawings. Applicant must respond by amending the reissue specification's brief description of the drawings to add a brief description of the new drawing.

☐ OTHER:

☐ COMMENTS:

Sheet 1 of 1

Substitute Disclosure Form / U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No.	Application No.
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))	25236-0134001	13/752,169
	Applicant: WiTricity Corporation	
	Filing Date: January 28, 2013	Group Art Unit: 2836

U.S. Patent Documents

Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1.						

Foreign Patent Documents or Published Foreign Patent Applications

Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation Yes	Translation No
	2.							

Other Documents (include Author, Title, Date, and Place of Publication)

Examiner Initial	Desig. ID	Document
	3.	Copy of European Office Action for European Patent Application No. 13 740 878.7 by Examiner Matthias Holz dated November 23, 2015 (6 pages)

Examiner Signature	Date Considered
/Rasem Mourad/	02/04/2016

EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute Disclosure Form

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.M./

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	01/28/2013	Andre B. Kurs	25236-0134001	6134

26161 7590 02/11/2016

FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
MOURAD, RASEM	

ART UNIT	PAPER NUMBER
2836	

NOTIFICATION DATE	DELIVERY MODE
02/11/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Corrected Notice of Allowability	Application No. 13/752,169	Applicant(s) KURS ET AL.	
	Examiner RASEM MOURAD	Art Unit 2836	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *12/31/2015*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-6 and 8-11*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 12/16/2015
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/RASEM MOURAD/ Examiner, Art Unit 2836	/REXFORD BARNIE/ Supervisory Patent Examiner, Art Unit 2836

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Andre B. Kurs	Art Unit	:	2836
Serial No.	:	13/752,169	Examiner	:	Rasem Mourad
Filed	:	January 28, 2013	Conf. No.	:	6134
Title	:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS			

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO NOTICE TO FILE CORRECTED APPLICATION PAPERS DATED JANUARY 21, 2016

The applicant as a large entity submits:

☒ An Amendment After Allowance. No new matter has been added.

The applicant understands that this perfects the application and no additional papers or filing fees are required.

Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above Attorney Docket Number 25236-0134001.

Respectfully submitted,

Date: February 19, 2016

/William E. Hunter/
William E. Hunter
Reg. No. 47,671

Customer Number 26161
Fish & Richardson P.C.
Telephone: (858) 678-5070
Facsimile: (877) 769-7945

23482953.doc

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Andre B. Kurs	Art Unit	:	2836
Serial No.	:	13/752,169	Examiner	:	Rasem Mourad
Filed	:	January 28, 2013	Confirmation No.	:	6134
			Notice of Allowance Date: November 20, 2015		
Title	:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS			

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO NOTICE OF ALLOWANCE

In response to the Notice of Allowance dated November 20, 2016, enclosed is a completed Part B - Fee(s) Transmittal.

The issue fee in the amount of $960 is being paid with this reply on the Electronic Filing System. Please apply those fees and any other necessary charges or credits to Deposit Account 06-1050, referencing the above Attorney Docket Number 25236-0134001.

COMMENTS ON EXAMINER'S REASONS FOR ALLOWANCE

It is recognized that in accordance with M.P.E.P. § 1302.14, the Examiner's reasons for allowance need not set forth all of the details as to why the claims are allowed. In the above-referenced application, it is not conceded that the Examiner's stated reasons for allowance are the only reasons for which the claims are allowable. The Examiner's reasons for allowance indicate that particular claim elements are not disclosed or suggested by the prior art of record, yet the claims may be patentable for other reasons as well, including the inventive combination of all of the recited claim elements. It is not conceded that the specific limitations identified by the Examiner are necessary to distinguish the art of record or to satisfy the requirements of 35 U.S.C. § 112. Moreover, the Examiner does not assert, and it would not be conceded, that the Examiner's reasons have any bearing on the patentability of claims in any other applications directed to the disclosed subject matter.

In addition, each dependent claim stands on its own and may be allowable on its own merits. In particular, each dependent claim may be allowable on the basis of a combination of

some of the features recited in the dependent claim and its base claim(s), which combination of features may not include all of the limitations identified in the Examiner's reasons for allowance.

Respectfully submitted,

Date: February 19, 2016

/William E. Hunter/
William E. Hunter
Reg. No. 47,671

Customer Number 26161
Fish & Richardson P.C.
Telephone: (858) 678-5070
Facsimile: (877) 769-7945

23491158.doc

Amendments to the Specification:

Please replace paragraph [00287] beginning at page 75, line 15, with the following amended paragraph:

[00287] In embodiments each of the loops of the conductor shown in Figs. 38 and ~~134~~ 39 may comprise of more than one loops of conductor. A single conductor may be first shaped to form multiple loops or turns such that the current flows in the same direction in each of the loops or turns and then formed to make an additional set of loops or turns with the current flowing in the same direction in each of the second set of loops or turns but opposite direction with respect to the first set of loops or turns.

REMARKS

This Amendment After Allowance is being filed in response to the Notice to File Corrected Application Papers dated January 21, 2016. The amendment is needed to correct clerical errors in the specification. The amendment requires no additional search or examination because the scope of the claims is not being changed. Finally, this amendment was not presented earlier because the need for this amendment was discovered only after the Notice of Allowance was received.

No fee is believed to be due at this time. Please apply any necessary charges or credits to Deposit Account 06-1050, referencing the above Attorney Docket Number 25236-0134001.

Respectfully submitted,

Date: February 19, 2016

/William E. Hunter/
William E. Hunter
Reg. No. 47,671

Customer Number 26161
Fish & Richardson P.C.
Telephone: (858) 678-5070
Facsimile: (877) 769-7945

23482949.doc

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

26161 7590 11/20/2015

FISH & RICHARDSON P.C.
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	01/28/2013	Andre B. Kurs	25236-0134001	6134

TITLE OF INVENTION: WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	LARGE	$960	$0	$0	$960	02/22/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
MOURAD, RASEM	2836	307-104000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

[ ] Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

[ ] "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Fish & Richardson P.C.
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: WiTricity Corporation

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Watertown, MA

Please check the appropriate assignee category or categories (will not be printed on the patent): **[**] Individual [X] Corporation or other private group entity [ ] Government

4a. The following fee(s) are submitted:

[X] Issue Fee

[ ] Publication Fee (No small entity discount permitted)

[ ] Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

[ ] A check in the amount of the fee(s) is enclosed.

[ ] Payment by credit card. Form PTO-2038 is attached.

[X] The Director is hereby authorized to charge the required fee(s), or credit any overpayment, to Deposit Account Number 06-1050

5. **Change in Entity Status** (from status indicated above)

[ ] Applicant certifying micro entity status. See 37 CFR 1.29 — **NOTE**: Absent a valid certification of Micro Entity Status (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

[ ] Applicant asserting small entity status. See 37 CFR 1.27. — **NOTE**: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

[ ] Applicant changing to regular undiscounted fee status. — **NOTE**: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /William E. Hunter, Reg. No. 47671/ Date February 19, 2016

Typed or printed name William E. Hunter Registration No. 47,671

23491159.doc

Electronic Patent Application Fee Transmittal

Application Number:	13752169
Filing Date:	28-Jan-2013
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Filer:	William E. Hunter/Cheryl Forrest
Attorney Docket Number:	25236-0134001

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**960**

Electronic Acknowledgement Receipt

EFS ID:	24966600
Application Number:	13752169
International Application Number:	
Confirmation Number:	6134
Title of Invention:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS
First Named Inventor/Applicant Name:	Andre B. Kurs
Customer Number:	26161
Filer:	William E. Hunter/Bryan Huett
Filer Authorized By:	William E. Hunter
Attorney Docket Number:	25236-0134001
Receipt Date:	19-FEB-2016
Filing Date:	28-JAN-2013
Time Stamp:	15:38:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$960
RAM confirmation Number	2315
Deposit Account	061050
Authorized User	FISH & RICHARDSON P C
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		AmendAfterAllow.pdf	55427 f35fa2d74b1a8343399be396a636e3f6a16efd55	yes	3
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment after Notice of Allowance (Rule 312)		1	1	
	Specification		2	2	
	Applicant Arguments/Remarks Made in an Amendment		3	3	
Warnings:					
Information:					
2	Applicant Response to Pre-Exam Formalities Notice	ReplytoNTFCAP.pdf	42544 c0ed745860db0faed864d87ed16b637f3902ed81	no	1
Warnings:					
Information:					
3	Issue Fee Payment (PTO-85B)	ReplytoNOA.pdf	149322 c0295c237e1d3f6ae4c2c305358f5e91284b609d	no	3
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30590 c2e46c806491fda5b63c98618cbcb631348a8a49	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	277883		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Andre B. Kurs	Art Unit	:	2836
Serial No.	:	13/752,169	Examiner	:	Rasem Mourad
Filed	:	January 28, 2013	Confirmation No.	:	6134
			Notice of Allowance Date: 11/20/2015		
Title	:	WIRELESS ENERGY TRANSFER WITH REDUCED FIELDS			

MAIL STOP ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AFTER ALLOWANCE
PURSUANT TO 37 C.F.R. §1.312

Please amend the application as indicated on the following pages. This amendment is being filed concurrently with the payment of the issue fee.

UNITED STATES PATENT AND TRADEMARK OFFICE

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P.O. Box 1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	01/28/2013	Andre B. Kurs	25236-0134001	6134

26161 7590 02/29/2016
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
MOURAD, RASEM	

ART UNIT	PAPER NUMBER
2836	

NOTIFICATION DATE	DELIVERY MODE
02/29/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Response to Rule 312 Communication	Application No. 13/752169	Applicant(s)
	Examiner	Art Unit

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

1. ☒ The amendment filed on *19 February 2016* under 37 CFR 1.312 has been considered, and has been:

a) ☒ entered.

b) ☐ entered as directed to matters of form not affecting the scope of the invention.

c) ☐ disapproved because the amendment was filed after the payment of the issue fee.
Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

d) ☐ disapproved. See explanation below.

e) ☐ entered in part. See explanation below.

DF

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/752,169	04/05/2016	9306635	25236-0134001	6134

26161 7590 03/16/2016

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ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 252 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

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