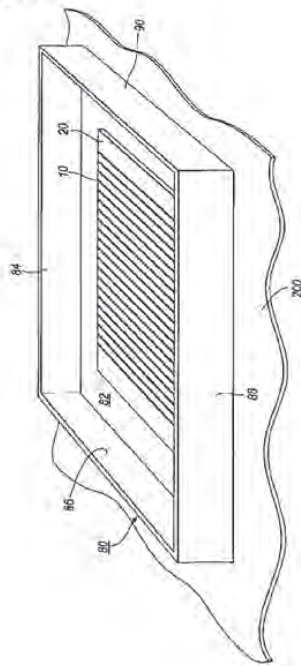
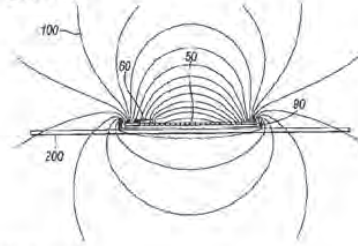


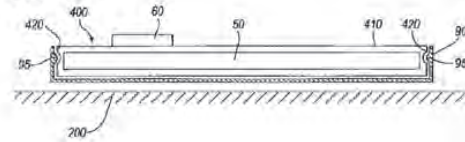
【図 7】



【図 8】



【図 9】



【国際調査報告】

INTERNATIONAL SEARCH REPORT		Inter. Application No. PCT/682004/003844
A. CLASSIFICATION OF SUBJECT MATTER IPC 7 H01F38/14 H01F27/36		
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 7 H01F H02J H05K		
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 practical, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 959 433 A (ROHDE ET AL) 28 September 1999 (1999-09-28) column 3, lines 3-12; figures 1,2 column 3, lines 22-27	1-9, 13, 14, 17-21
Y	DE 197 43 860 C1 (BRAUN AKTIENGESELLSCHAFT, 60326 FRANKFURT, DE) 8 April 1999 (1999-04-08) column 2, line 38 - column 3, line 9 column 3, line 33 - column 4, line 48; figures 1,2	1-9, 13, 14, 17-21
-/-		
☒ Further documents are listed in the continuation of box C. ☒ Patent family members are listed in 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 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 (see specification) *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 31 March 2005		Date of mailing of the international search report 11/04/2005
Name and mailing address of the ISA European Patent Office, P.O. Box 5015 Patentstr. 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax. (+31-70) 340-3015		Authorized officer Reder, M

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/GB2004/003844

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	HATANAKA K ET AL: "POWER TRANSMISSION OF A DESK WITH A CORD-FREE POWER SUPPLY" IEEE TRANSACTIONS ON MAGNETICS, IEEE INC. NEW YORK, US, vol. 38, no. 5, September 2002 (2002-09), pages 3329-3331, XP001132144 ISSN: 0018-9464 abstract right-hand column; figures 1-3	1-3,7,9,13,14,17-19,21
P,X	GB 2 389 720 A (* CITY UNIVERSITY OF HONG KONG) 17 December 2003 (2003-12-17) cited in the application abstract page 7, line 20 - page 9, line 6; figures 4,5	1
A	US 5 528 113 A (BOYS ET AL) 18 June 1996 (1996-06-18) column 6, line 44 - column 7, line 52; figures 10-12	1-21
A	US 6 389 318 B1 (ZARINETCHI FARHAD ET AL) 14 May 2002 (2002-05-14) abstract	1-21

Form PCT/ISA/E10 (continuation of second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.
PCT/GB2004/003844

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5959433	A	28-09-1999	NONE
DE 19743860	C1	08-04-1999	NONE
GB 2389720	A	17-12-2003	WO 03105308 A1 18-12-2003 AU 2003229145 A1 22-12-2003
US 5528113	A	18-06-1996	AU 8006494 A 08-05-1995 AU 8006594 A 08-05-1995 DE 4498007 T0 21-11-1996 DE 69432262 D1 17-04-2003 EP 0727105 A1 21-08-1996 JP 7170681 A 04-07-1995 WO 9511544 A1 27-04-1995 WO 9511545 A1 27-04-1995 NZ 274938 A 27-05-1998 NZ 274939 A 24-06-1997 US 5821638 A 13-10-1998
US 6389318	B1	14-05-2002	US 6324430 B1 27-11-2001 AU 4861399 A 24-01-2000 CA 2336725 A1 13-01-2000 EP 1095384 A1 02-05-2001 US 2002058971 A1 16-05-2002 US 2002055763 A1 09-05-2002 WO 0002212 A1 13-01-2000

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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, IT, LU, 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, GR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW



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ANTENNA ARRANGEMENT FOR INDUCTIVE ENERGY TRANSMISSION AND USE OF THE ANTENNA ARRANGEMENT

No documents available for this priority number.

Inventor(s):

Applicant(s):

Classification: - international: H01F1/26; H01F3/08; H01F38/14; H01P5/02;
H01Q7/06; H01Q7/08; H02J7/02
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Application number: JP20070512117 20050513

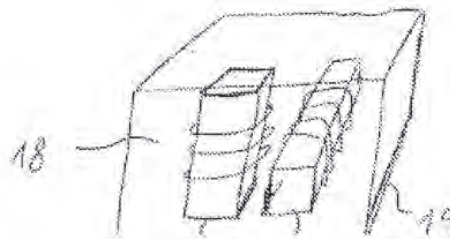
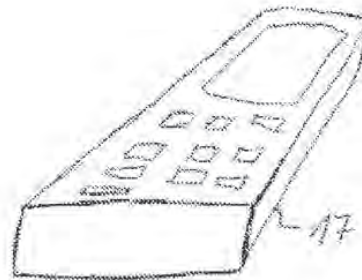
Priority number (s): WO2005EP05271 20050513 ; DE20041023815 20040513

Also published as: WO2005112192 (A1) WO2005112192 (A9) US2007126650 (A1)
US7545337 (B2) EP1745527 (A1) EP1745527 (B1)
DE102004023815 (A1) less

Abstract not available for JP2007537637 (A)

Abstract of corresponding document: WO2005112192 (A1)

An antenna arrangement is disclosed for the inductive transmission of energy by means of magnetic cores made of a composite material with amorphous or nanocrystalline flakes and a moulded plastic material, so that the magnetic properties suitable for effective energy transmission can be adjusted at the same time as high security against fracture and a small overall height are achieved.



Last updated: 11.12.2013 Worldwide
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(19) 日本国特許庁(JP)

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HO1P	5/02	(2006.01)	HO1P	5/02	Z	
HO1F	1/26	(2006.01)	HO1F	1/26		
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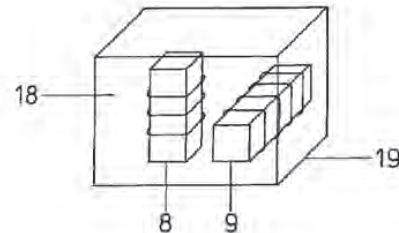
審査請求 未請求 予備審査請求 未請求 (全 15 頁)

(21) 出願番号	特願2007-512117 (P2007-512117)	(71) 出願人	500460379
(86) (22) 出願日	平成17年5月13日 (2005.5.13)		バクームシュメルツェ ゲゼルシャフト
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(31) 優先権主張番号	102004023815.4		ナウ グリュナー ヴェーク 37
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(33) 優先権主張国	ドイツ(DE)		弁理士 山口 巖
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			ドイツ連邦共和国 63477 マインタ
			ール フロックスグラベンシュトラッセ
			12
		Fターム(参考)	5E041 AA02 AA03 AA04 AA07 BB03
			BC05 BD03 CA01 NN06
			最終頁に続く

(54) 【発明の名称】 誘導エネルギー伝送用アンテナ装置およびこのアンテナ装置の使用方法

(57) 【要約】

アモルファスフレークまたはナノ結晶フレークとプラスチック鋳造材とを含んだ複合材から成る磁気コアを用いてエネルギーを誘導伝送するためのアンテナ装置であって、効率的なエネルギー伝送に適した磁気特性を、高い破壊靱性と小サイズとを実現したうえで生じさせることができる。



【特許請求の範囲】

【請求項 1】

磁気コア（１，５，１４）と巻線（２，３，４，７，１０，１６）とを備えた、エネルギーを誘導伝送する際に使用するためのアンテナ装置であって、磁気コア（１，５，１４）が、複合材として、微細分散粒子から成る軟磁性成分とプラスチック成分とを含み、且つ磁気コア（１，５，１４）が、２０～２００の有効初透磁率と、０．６Ｔよりも大きな飽和磁気誘導とを有しているアンテナ装置。

【請求項 2】

軟磁性成分がアモルファス材またはナノ結晶材を含んでいる、請求項 1 に記載のアンテナ装置。

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【請求項 3】

軟磁性成分が表面層により個々に電氣的に絶縁されている粒子から成っている、請求項 1 または 2 に記載のアンテナ装置。

【請求項 4】

粒径が 2 mm よりも小さい、請求項 3 に記載のアンテナ装置。

【請求項 5】

粒子厚が 0.5 mm よりも小さい、請求項 3 または 4 に記載のアンテナ装置。

【請求項 6】

粒子が表面酸化またはプラスチックコーティングされている、請求項 3 から 5 までのいずれか一つに記載のアンテナ装置。

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【請求項 7】

プラスチック成分が注型樹脂技術で加工可能な熱可塑性樹脂または熱硬化性樹脂を含んでいる、請求項 1 から 6 までのいずれか一つに記載のアンテナ装置。

【請求項 8】

磁気コア（１，５，１４）と巻線（２，３，４，７，１０，１６）とにより形成されるアンテナが、２０kHz～１５０kHz の周波数範囲で 50 よりも大きなゲインを有している、請求項 1 から 7 までのいずれか一つに記載のアンテナ装置。

【請求項 9】

磁気コア（１，５，１４）が少なくとも 20 μ Wb の磁束まで負荷可能である、請求項 1 から 8 までのいずれか一つに記載のアンテナ装置。

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【請求項 10】

同じ磁気コア（１，５，１４）に複数の巻線（２，３，４，７，１０，１６）を備え、これら巻線の縦軸線（２０，２１）が互いに 0° よりも大きな角度で配置されている、請求項 1 から 9 までのいずれか一つに記載のアンテナ装置。

【請求項 11】

複数個の磁気コア（１，５，１４）が複数の巻線（２，３，４，７，１０，１６）を担持し、個々の磁気コア（１，５，１４）の放射パターンが異なる形状および／または指向性を持っている、請求項 1 から 10 までのいずれか一つに記載のアンテナ装置。

【請求項 12】

複数個の磁気コア（１，５，１４）のうちの少なくとも一つに、電子部品を受容するための凹部（１５）が設けられている、請求項 1 から 11 までのいずれか一つに記載のアンテナ装置。

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【請求項 13】

請求項 1 から 12 までのいずれか一つに記載のアンテナ装置を誘導エネルギー伝送に使用する使用方法。

【請求項 14】

固定機と誘導受信装置を備えた移動機との間で誘導エネルギー伝送するために使用する、請求項 13 に記載の使用方法。

【請求項 15】

移動機（１７）内に配置されるエネルギー蓄積装置を充電するために使用する、請求項

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14に記載のアンテナ装置の使用方法。

【請求項16】

エネルギーを移動機から固定機へ誘導伝送するために使用する、請求項13に記載のアンテナ装置の使用方法。

【請求項17】

異なる巻線(2, 3, 4, 7, 10, 16)を位相をずらして同時に、または、時間的に交互に制御する、請求項10または11に記載のアンテナ装置の作動方法。

【発明の詳細な説明】

【技術分野】

【0001】

本発明は、開放型磁気コアと巻線とを備えたアンテナ装置に関する。

【背景技術】

【0002】

本発明は、誘導エネルギー伝送に利用される磁場アンテナの分野に属する。エネルギーおよび情報を電気双極子または磁気双極子を用いて伝送することは基本的に可能である。この場合、制御回路に応じて、電磁波が発生する場合も主として電場または磁場だけが発生する場合もある。たとえばアンテナ周辺の有機組織への影響を避けるには、電磁波を放射するのではなく、磁場の発生に限定するのが望ましい場合がある。特に、磁場の放射或いは磁気アンテナに対する誘導結合により、比較的高いエネルギーを電気結合なしに伝送させることができる。この種の結合の作用はほぼ1m以下の狭い空間範囲に限られている。それにもかかわらず、この種の伝送には種々の適用可能性がある。

【0003】

その際、原理的には、圧縮磁気コアとして通常の軟質フェライト以外に周知の軟磁性粉末複合材を使用することができる。軟磁性粉末複合材はたとえば鉄粉から成ることができる。この種の磁気コアにより、およそ10~30の有効透磁率を達成できる。これに対応して達成可能な飽和磁気誘導はおよそ1.0Tないし1.4T程度である。さらに、軟磁性結晶質の鉄・アルミニウム・珪素合金と鉄・ニッケル合金とから成る粉末複合材が知られており、この粉末複合材により100kHzを超える程度の適用周波数を達成できる。

【0004】

この種の複合材およびフェライトの欠点は、圧縮技術が簡単な幾何学的形状しか可能にしないこと、生じる磁気コアは比較的もろく、破損の危険があることである。さらに、対応する磁気特性は温度に強く依存しており、共振回路の使用を困難にしている。

【0005】

独国特許出願公開第19846781A1号明細書からは、射出成形可能なプラスチックとナノ結晶合金から射出成形方法で製造される磁気コアが知られている。

【0006】

対応するナノ結晶合金は、たとえば欧州特許出願公開第0271657A2号明細書および欧州特許出願公開第0455113A2号明細書から知られている。この種の合金はたとえば高速固化技術を用いて薄い合金帯の形状で製造され、合金帯は当初非晶質であるが、ナノ結晶構造を生成させるために熱処理される。この種の合金は2mmよりも小さな粉径を持つ合金粉に粉碎することができる。特に、1個の粒子につき0.01mm~0.04mmの厚さと0.04mm~1mmの幅または長さを持ついわゆるフレークが発生する。このフレークは合成樹脂を用いて複合材へ加工することができ、加工した複合材においては、0.5テスラよりも大きな飽和磁化と、10~200の透磁率とを実現できる。この種の磁気コアの製造方法はたとえば国際公開第0191141A1号パンフレットに示されている。

【0007】

欧州特許出願公開第0762535A1号明細書からは、トランスポンダ用のアンテナが知られている。このアンテナも同様に軟磁性の粉末複合材から成り、たとえばアモルファス合金から成っている。そこでは、この種のアンテナは情報交換用に使用されている。

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この場合重要なことは、数メートルの空間範囲内で情報交換がフェールセーフ動作すること、およびアンテナ周辺の金属対象物に対する故障発生度が少ないことである。

【発明の開示】

【発明が解決しようとする課題】

【0008】

そこで、本発明の課題は、エネルギーを誘導伝送する際に使用するアンテナ装置を提供することである。

【課題を解決するための手段】

【0009】

本発明は、近接場範囲内での効率的なエネルギー伝送と、エネルギーを誘導的に伝達させる対象である受信機に対するアンテナ装置の正確な位置決めに関係のない信頼性のある動作とを目的としている。このためには特定の磁気特性を設定する必要がある、特に適切な放射パターンを備えた十分な磁束を設定することがアンテナ装置においては必要である。

【0010】

この種のアンテナ装置を用いることにより、送信機から受信機へほぼ0.5cm～50cmの距離にわたっておよそ1W～100Wのパワーを伝送させる必要がある。その適用例は、ワイヤレスで一時的にまたは継続的にエネルギーを供給しなければならないすべての機器である。この場合、もっぱら誘導結合であるために、10kHz～150kHzの周波数範囲がこの周波数帯の可用性と二次的境界条件との故に特に適している。さらに、少なくとも20μWbの磁束が磁気コア内に実現されるべきである。

【0011】

本アンテナ装置において使用されるようなアンテナは、ほとんどの場合共振回路の誘導部分であるので、エネルギー放射を最適化するには、動作周波数の範囲で少なくとも50の高いアンテナフィールドゲイン、有利には100のアンテナフィールドゲインが望ましい。さらに、温度に依存しない透磁率が必要である。このような透磁率は、最適な磁束案内のために30と200の間にある。透磁率がこれよりも高ければ、コア内での磁束の集束性が優れて、非常にわずかな磁束成分しかコアから側方へ流出せず、コアに沿った場の強さ、すなわち受信機範囲内での場の強さがかなり不均一になる。

【0012】

本発明の基礎となっている課題は、公知の磁気装置、磁気コア、材料では満足に解決することはできない。

【0013】

前記課題は、本発明によれば、請求項1に記載の装置と、この種の装置を請求項13にしたがって使用する使用方法とにより解決される。本発明の思想の構成および更なる改良形は従属項の対象である。

【0014】

本発明によれば、磁気コアは、複合材として、微細分散粒子から成る軟磁性成分とプラスチック成分とを含み、この場合磁気コアは、20～200の有効初透磁率と、0.6Tを超える飽和磁気誘導とを有している。

【0015】

軟磁性成分は、ナノ結晶材から成るすでに述べたフレークから構成されているのが有利である。ナノ結晶材はおよそ1T～1.6Tの飽和磁化と、30,000を超える透磁率とを有している。プラスチック成分と混合させることにより、磁気回路はフレーク間の顕微鏡的隙間によって中断され、高いゲインと温度一定のもとで30ないし100のより低い有効透磁率が生じる。それにもかかわらず、0.6Tよりも大きな達成可能な高い磁束密度、典型的には0.9Tよりも大きな磁束密度も得られる。さらに、磁気コアの軟磁性成分は、粒子がそれぞれ個別に表面層により電気的に絶縁されているという性質を持っているのが有利である。これはたとえば表面酸化またはプラスチックコーティングにより実現されていることができる。粒径は2mm以下であるのが有利であり、この場合粒子厚は

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0.5 mmよりも小さくてよい。粒子をこのように構成することにより、特に少ないヒステリシス損が達成され、よってアンテナの特に高いゲインが達成される。機械的特性は、使用するプラスチックの種類および成分量に応じて、破壊靱性および可撓性並びにその温度依存性に関し調整可能である。

【0016】

プラスチック成分としては、一般的に、注型樹脂技術の枠内で加工可能なポリアミド、ポリアクリレート、ポリアセテート、ポリイミドのようなすべての熱可塑性樹脂または熱硬化性樹脂、或いはエポキシ樹脂を、所望の機械的特性および熱的特性に応じて選択することができる。

【0017】

最も簡単なケースでは、アンテナ装置は、磁気コアとして、巻線部を備えた棒または板を有している。装置をエネルギーの効率的な伝送のために使用できるようにするには、特定のコア横断面が必要である。コア内に少なくとも $20 \mu\text{Wb}$ の平均磁束を達成させる場合には、 0.5 cm^2 の横断面で 400 mT の誘導が生じる。これは、軟質フェライトを使用する際に必要な横断面のほぼ半分に相当する。

【0018】

この場合、磁束を高めるために磁気コアを効率的に利用できるようにするには、巻線のコイル長は巻線の径以上、好ましくは径よりも大きくするべきである。本発明にしたがって使用される材料の主要な性質は、衝撃または振動に対して機械的に不感性であり、且つ製造にあたっての自由な成形性或いは爾後の可撓性である。本発明にしたがって使用される材料は、その磁氣的性質の故に、コスト上の理由、スペース上の理由、デザイン上の理由から多くの適用分野において望ましいような小型のサイズを可能にする。

【0019】

アンテナ装置の所望の放射パターンまたは磁束案内を実現するには、同じ磁気コアに複数の巻線が配置され、これら巻線の縦軸線が互いに 0° を超える角度、たとえば 90° の角度にあるのが有利である。同時に、誘導エネルギー伝送が種々の位置で受信機に及ぶようにするには、前記巻線は位相をずらして、或いは交互に制御されてよい。これによりエネルギー伝送はより確実になり、送信機と受信機との相対位置に関しいっそう影響を受けなくなる。なお本発明は、異なる巻線を間欠的に作動するようにした、或いは、前述のように異なる巻線を位相をずらして同時に制御するようにした、本発明によるアンテナ装置の種々の作動態様にも関わる。

【0020】

このように送信機と受信機との位置決めの際に許容度を大きくするため、前述のような種類の異なる磁気コアの上に複数の巻線を設けることも考えられる。この場合、個々の磁気コアの放射パターンは形状または指向性に関し異なっている。この処置によっても、送信されたエネルギーの受信機の最適な位置決め範囲が拡大される。

【0021】

加えて、本発明によるアンテナ装置は、省スペースも志向しているため、たとえばアンテナ装置の制御回路のような電子部品を収納することができる凹部を磁気コア内部に設けることは意義深い。このような凹部により、もし凹部が大きすぎなければ、磁気コア内部での磁束案内が阻害されることはほとんどない。さらに、前記制御回路を備えたアンテナ装置を予め製作して一体の構成ユニットとして機器内に簡単に取り付けることができるので有利である。

【発明を実施するための最良の形態】

【0022】

次に、本発明を図面に図示した実施形態を用いてより詳細に説明する。

【0023】

図1は巻線部2を備えた扁平な磁気コア1を示しており、この場合磁気コアのサイズはたとえば $20 \times 10 \times 0.2 \text{ cm}$ である。コアの基面は、受信機の目標とする受信可能域ほどの大きさであるのが好ましい。巻線の構成により、たとえば巻き方を巻線端部へ向か

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うにしたがって密にすることにより、コア面にわたって可能な限り均一な強さの磁束密度が生じる。磁束指向性および放射パターンを特殊に構成するために、図2は、ほぼ正方形の板として構成した磁気コア5の上に直交軸20、21に対して互いに垂直に配置した2つの巻線3、4の組み合わせを示している。両巻線は交互に順次制御することができ、或いは、互いに位相をずらして同時に制御することができる。

【0024】

プラスチック成分を適宜選定することにより、図1または図2の装置全体を可撓性とすることができる。しかし、いずれの場合も、たとえばフェライトコアを備えたアンテナまたは他の通常材料から成るコアを備えたアンテナよりも破損に強いであろう。

【0025】

エネルギーを移動受信機へ伝送するために特に適しているのは、図3に示した、棒状の磁気コアを備えた装置であり、この場合移動方向は（受信機のアンテナも）巻線7の縦軸線6に対し平行である。

【0026】

図6には2つの異なる磁気コア8、9が図示されており、これらの磁気コアは、異なる磁束密度および放射パターンを可能にするため、それぞれ別個の巻線を有し、且つその縦軸線は互いに垂直である。これは、ただ1つの磁気コアの上に複数の巻線部を備える図2に図示した実施形態に対する択一的な実施形態である。

【0027】

図4に示した装置では、巻線10が磁気コア11を貫通しているという点で巻線10が当該磁性体11に一体に組み込まれており、その結果図4においては磁気コア11の下部部分は磁束を下面で短絡させるヨークを形成している。これにより且つ磁極片12、13により、一方向（下方）への遮蔽作用が達成され、それにもかかわらず優れた上方放射が達成される。

【0028】

この種の装置を製造するには、磁気コアの製作の際に巻線を一緒に鋳込むことができるようにした、前記国際公開第0191141A1号パンフレットに記載の鋳造方法が特に適している。

【0029】

図5は磁気コア14内の凹部15を示している。凹部15はそこに電子回路、たとえば巻線16を制御するための電子回路の構成要素を収納することを可能にさせる。

【0030】

図6は、たとえば移動電話またはコードレス電話17のような移動通信端末機を備えた本発明によるアンテナ装置の適用例を示している。移動通信端末機はアンテナ装置18との誘導結合のための詳細には図示していない受信装置を備えている。アンテナ装置18はケーシング19内に2つの磁気コア8、9を有しており、これらの磁気コア8、9はそれぞれ巻線部を備えており、誘導的にエネルギーを端末機17内の受信機に伝送させることができる。端末機17内には、受信機以外に、伝送されたエネルギーを蓄積するためのコンデンサまたはアキュムレータが設けられている。

【0031】

以上説明したアンテナ装置はエネルギー伝送用に特殊化されているが、同じアンテナ装置をたとえば信号のような情報の返送にも用いることができる。この信号は、送受信を切換えて同様に誘導的に伝達されるか、或いは、受信機のエネルギー受信量を価値判断することによって伝達される。

【0032】

移動機から固定機へエネルギーを伝送させる際に本発明を使用することも考えられる。たとえば鉄道技術において、信号および／またはエネルギーを車両に固定の機器から交通監視用の制御室／信号扱い所の定置センサへ伝送させるために使用できる。

【図面の簡単な説明】

【0033】

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- 【図 1】 1つの巻線部を備えた磁気コアの板状角形構成の実施例の斜視図である。
 【図 2】 2つの巻線部を備えた対応する磁気コアの実施例の斜視図である。
 【図 3】 1つの巻線部を備えた棒状磁気コアの実施例の斜視図である。
 【図 4】 巻線部と磁極片とを一体に組み込んだ棒状磁気コアの実施例の斜視図である。
 【図 5】 1つの凹部を備えた磁気コアの実施例の斜視図である。
 【図 6】 2つの磁気コアを備えたアンテナ装置の適用例の斜視図である。

【符号の説明】

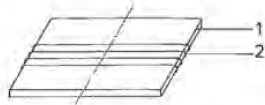
【0034】

- 1 磁気コア
 2 巻線部
 3, 4, 7, 10, 16 巻線
 5, 8, 11, 14 磁気コア
 6 巻線の縦軸線
 12, 13 磁極片
 15 凹部
 17 携帯電話またはコードレス電話のような移動通信端末機
 18 アンテナ装置
 19 ケーシング

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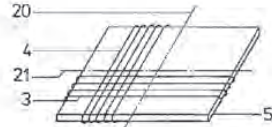
【図 1】

FIG 1



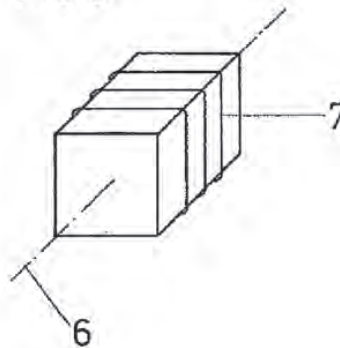
【図 2】

FIG 2

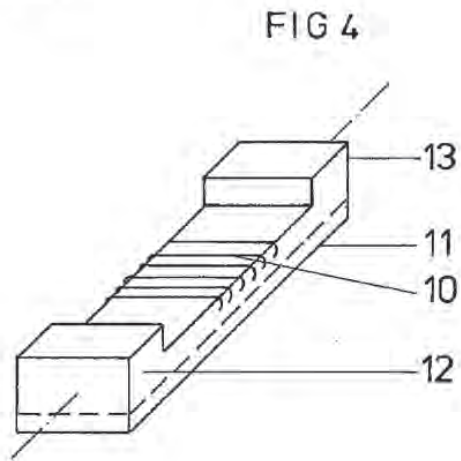


【図 3】

FIG 3

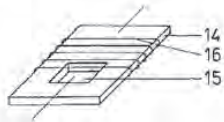


【図4】

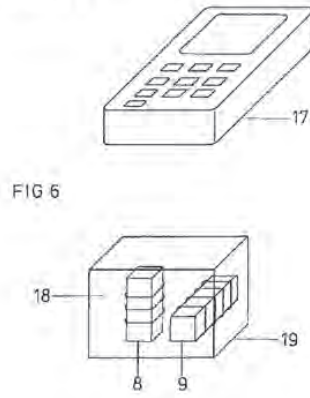


【図5】

FIG 5



【図6】



【国際調査報告】

INTERNATIONAL SEARCH REPORT

PCT/EP2005/005271

A. CLASSIFICATION OF SUBJECT MATTER		
IPC 7 H01Q7/06 H02J7/02 H01F38/14		
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)		
IPC 7 H01Q H02J H01F G06K G01S		
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 practical, search terms used)		
EPO-Internal, PAJ, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2003/210106 A1 (CHENG LILY KA LAI ET AL) 13 November 2003 (2003-11-13) abstract; figures 4a-4c, 6a-9c, 12a, 12b paragraphs '0005!', '0021!', '0025!', '0036!' - '0039!', '0045!' - '0049!', '0051!', '0052!', '0054!', '0057!', '0065!', '0074!', '0115!', '0117!', '0119!', paragraphs '0206!', '0209!', '222212!', '0213! -/-	1-16
☒ Further documents are listed in the continuation of box C. ☒ Patent family members are listed in 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 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 (see specification) "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
1 August 2005		08/08/2005
Name and mailing address of the ISA: European Patent Office, P.O. Box 5819 Patentish 2 NL - 2280 HV Rijswijk Tel (+31-70) 340-2040, Tx 31 651 epo nl, Fax (+31-70) 340-3018		Authorized officer Jäschke, H

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INTERNATIONAL SEARCH REPORT

PCT/EP2005/005271

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 01/91141 A (VACUUMSCHMELZE GMBH & CO. KG; BRUNNER, MARKUS) 29 November 2001 (2001-11-29) cited in the application abstract; figures 1-3 page 1, line 14 - line 20 page 1, line 32 - line 35 page 4, line 1 - line 4 page 4, line 27 - line 29 page 10, line 4 - line 25 page 11, line 5 - line 30	1-16
A	WO 02/101763 A (VACUUMSCHMELZE GMBH; BRUNNER, MARKUS) 19 December 2002 (2002-12-19) the whole document	1-9

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INTERNATIONAL SEARCH REPORT

PCT/EP2005/005271

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 2003210106	A1	13-11-2003	AU 2003233895 A1	11-11-2003
			AU 2003240999 A1	11-11-2003
			EP 1506605 A2	16-02-2005
			EP 1506554 A1	16-02-2005
			GB 2398176 A	11-08-2004
			WO 03096512 A2	20-11-2003
			WO 03096361 A1	20-11-2003
			GB 2388715 A ,B	19-11-2003
			GB 2388716 A ,B	19-11-2003
			GB 2399225 A ,B	08-09-2004
			GB 2399226 A ,B	08-09-2004
			GB 2399227 A	08-09-2004
			GB 2399228 A	08-09-2004
			GB 2399229 A	08-09-2004
			GB 2399230 A ,B	08-09-2004
			US 2005135122 A1	23-06-2005
			US 2005140482 A1	30-06-2005
			US 2005116683 A1	02-06-2005
WO 0191141	A	29-11-2001	DE 10024824 A1	29-11-2001
			DE 50103010 D1	02-09-2004
			WO 0191141 A1	29-11-2001
			EP 1282903 A1	12-02-2003
			JP 2003534656 T	18-11-2003
			US 2003156000 A1	21-08-2003
WO 02101763	A	19-12-2002	DE 10128004 A1	19-12-2002
			WO 02101763 A1	19-12-2002
			EP 1393330 A1	03-03-2004
			JP 2004529508 T	24-09-2004
			US 2004183643 A1	23-09-2004

INTERNATIONALER RECHERCHENBERICHT

PCT/EP2005/005271

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES IPK 7 H01Q7/06 H02J7/02 H01F38/14		
Nach der internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK		
B. RECHERCHIERTE GEBIETE Forschelter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole) IPK 7 H01Q H02J H01F G06K G01S		
Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen		
Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe) EPO-Internal, PAJ, WPI Data		
C. ALS WESENTLICH ANGESEHENE UNTERLAGEN		
Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
Y	US 2003/210106 A1 (CHENG LILY KA LAI ET AL) 13. November 2003 (2003-11-13) Zusammenfassung; Abbildungen 4a-4c, 6a-9c, 12a, 12b Absätze '0005!, '0021!, '0025!, '0036! - '0039!, '0045! - '0049!, '0051!, '0052!, '0054!, '0057!, '0065!, '0074!, '0115!, '0117!, '0119!, Absätze '0206!, '0209!, '222212!, '0213! -/-	1-16
☒ Weitere Veröffentlichungen sind der Fortsetzung von Field C zu entnehmen. ☒ Siehe Anhang Patentfamilie		
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Datum des Abschlusses der internationalen Recherche 1. August 2005		Absendedatum des internationalen Recherchenberichts 08/08/2005
Name und Postanschrift der internationalen Recherchenbehörde Europäisches Patentamt, P.B. 5616 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 840-2040, Tx. 31 651 apo nl, Fax (+31-70) 840-9016		Bevollmächtigter Dedienstleister Jäschke, H

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INTERNATIONALER RECHERCHENBERICHT

PCT/EP2005/005271

C.(Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN		
Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
Y	WO 01/91141 A (VACUUMSCHMELZE GMBH & CO. KG; BRUNNER, MARKUS) 29. November 2001 (2001-11-29) in der Anmeldung erwähnt Zusammenfassung; Abbildungen 1-3 Seite 1, Zeile 14 - Zeile 20 Seite 1, Zeile 32 - Zeile 35 Seite 4, Zeile 1 - Zeile 4 Seite 4, Zeile 27 - Zeile 29 Seite 10, Zeile 4 - Zeile 25 Seite 11, Zeile 5 - Zeile 30 -----	1-16
A	WO 02/101763 A (VACUUMSCHMELZE GMBH; BRUNNER, MARKUS) 19. Dezember 2002 (2002-12-19) das ganze Dokument -----	1-9

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INTERNATIONALER RECHERCHENBERICHT

PCT/EP2005/005271

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
US 2003210106 A1	13-11-2003	AU 2003233895 A1	11-11-2003
		AU 2003240999 A1	11-11-2003
		EP 1506605 A2	16-02-2005
		EP 1506554 A1	16-02-2005
		GB 2398176 A	11-08-2004
		WO 03096512 A2	20-11-2003
		WO 03096361 A1	20-11-2003
		GB 2388715 A ,B	19-11-2003
		GB 2388716 A ,B	19-11-2003
		GB 2399225 A ,B	08-09-2004
		GB 2399226 A ,B	08-09-2004
		GB 2399227 A	08-09-2004
		GB 2399228 A	08-09-2004
		GB 2399229 A	08-09-2004
		GB 2399230 A ,B	08-09-2004
		US 2005135122 A1	23-06-2005
		US 2005140482 A1	30-06-2005
		US 2005116683 A1	02-06-2005
WO 0191141 A	29-11-2001	DE 10024824 A1	29-11-2001
		DE 50103010 D1	02-09-2004
		WO 0191141 A1	29-11-2001
		EP 1282903 A1	12-02-2003
		JP 2003534656 T	18-11-2003
		US 2003156000 A1	21-08-2003
WO 02101763 A	19-12-2002	DE 10128004 A1	19-12-2002
		WO 02101763 A1	19-12-2002
		EP 1393330 A1	03-03-2004
		JP 2004529508 T	24-09-2004
		US 2004183643 A1	23-09-2004

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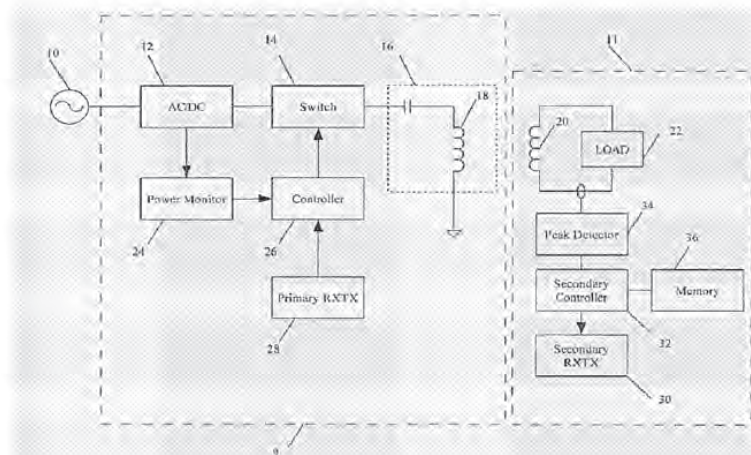
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(54) Title: **INDUCTIVE POWER SUPPLY, REMOTE DEVICE POWERED BY INDUCTIVE POWER SUPPLY AND METHOD FOR OPERATING SAME**

(57) Abstract: An inductive power supply includes a transceiver for sending information between the remote device and the inductive power supply. The remote device determines the actual voltage and then sends a command to the inductive power supply to change the operating frequency if the actual voltage is different from the desired voltage. In order to determine the actual voltage, the remote device determines a peak voltage and then applies a correction factor.

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INDUCTIVE POWER SUPPLY, REMOTE DEVICE POWERED BY INDUCTIVE
POWER SUPPLY AND METHOD FOR OPERATING SAME

BACKGROUND OF THE INVENTION

The invention relates to inductive power supplies, and more specifically to a
5 configuration for inductively powering a load based on the power requirement of that load.

Inductively powered remote devices are very convenient. An inductive power
supply provides power to a device without direct physical connection. In those devices using
inductive power, the device and the inductive power supply are typically designed so that the
device works only with one particular type of inductive power supply. This requires that each
10 device have a uniquely designed inductive power supply.

It would be preferable to have an inductive power supply capable of supplying
power to a number of different devices.

SUMMARY OF THE INVENTION

The foregoing deficiencies and other problems presented by conventional inductive
15 charging are resolved by the inductive charging system and method of the present invention.

According to one embodiment, an inductive power supply is comprised of a switch
operating at a frequency, a primary energized by the switch, a primary transceiver for receiving
frequency change information from a remote device; and a controller for changing the frequency
in response to the frequency change information.

20 According to a second embodiment, a remote device capable of energization by an
inductive power supply is comprised of a secondary, a load, a secondary controller for determining
the actual voltage across the load; and a secondary transceiver for sending frequency adjustment
instructions to the inductive power supply.

According to yet another embodiment, a method of operating an inductive power
25 supply is comprised of energizing a primary at an initial frequency, polling a remote device; and if
there is no response from the remote device, turning off the primary.

According to yet another embodiment, a method of operating a remote device, the
remote device having a secondary for receiving power at an operating frequency from an inductive

power supply and powering a load, is comprised of comparing a desired voltage with an actual voltage; and sending an instruction to the inductive power supply to correct the actual voltage.

BRIEF DESCRIPTION OF THE DRAWINGS

5 FIG. 1 shows a system for inductively powering a remote device.

FIG. 2 is a look-up table for use by the system.

FIG. 3 is a flow chart for the operation of secondary controller.

FIG. 4 is a flow chart for the operation of a primary controller.

DETAILED DESCRIPTION OF THE DRAWINGS

10 FIG. 1 shows a system for inductively powering a remote device. AC (alternating current) power supply 10 provides power to inductive power supply 9. DC (direct current) power supply 12 converts AC power to DC power. Switch 14 in turn operates to convert the DC power to AC power. The AC power provided by switch 14 then powers tank circuit 16.

Switch 14 could be any one of many types of switch circuits, such as a half-bridge
15 inverter, a full-bridge inverter, or any other single transistor, two transistor or four transistor switching circuits. Tank circuit 16 is shown as a series resonant tank circuit, but a parallel resonant tank circuit could also be used. Tank circuit 16 includes primary 18. Primary 18 energizes secondary 20, thereby supplying power to load 22. Primary 18 is preferably air-core or coreless.

20 Power monitor 24 senses the voltage and current provided by DC power supply 12 to switch 14. The output of power monitor 24 is provided to primary controller 26. Primary controller 26 controls the operation of switch 14 as well as other devices. Primary controller 26 can adjust the operating frequency of switch 14 so that switch 14 can operate over a range of frequencies. Primary transceiver 28 is a communication device for receiving data communication
25 from secondary transceiver 30. Secondary controller 32 senses the voltage and current provided to load 22.

Primary transceiver 28 could be any of a myriad of wireless communication devices. It could also have more than one mode of operation so as accommodate different

secondary transceivers. For example, primary transceiver 28 could allow RFID, IR, 802.11(b), 802.11(g), cellular, or Bluetooth communication.

Primary controller 26 performs several different tasks. It periodically polls power monitor 24 to obtain power information. Primary controller 26 also monitors transceiver 28 for communication from secondary transceiver 30. If controller 26 is not receiving communication from secondary transceiver 30, controller 26 periodically enables the operation of switch 14 for a brief period of time in order to provide sufficient power to any secondary to allow secondary transceiver 30 to be energized. If a secondary is drawing power, then controller 26 controls the operation of switch 14 in order to insure efficient power transfer to load 22, as described in more detail below. Controller 26 is also responsible for routing data packets through primary transceiver 28, as discussed in more detail below. According to one embodiment, controller 26 directs switch 14 to provide power at 30-100 kilohertz (kHz). According to this embodiment, Controller 26 is clocked at 36.864 megahertz (MHz) to provide acceptable frequency resolution while also performing the tasks described above.

Power monitor 24 monitors the AC input current and voltage. Power monitor 24 calculates the mean power consumed by the device. It does so by multiplying instantaneous voltage and current samples to approximate the power consumed. Power monitor 24 also calculates RMS (Root Mean Square) voltage and current, current cresting factor and other diagnostic values. Because the current is non-sinusoidal, the effective power consumed generally differs from the apparent power ($V^{rms} * I^{rms}$).

To increase the accuracy of the power consumption calculation, current samples can be multiplied with values interpolated from the voltage samples. Each voltage/current product is integrated and held for one full AC cycle. It is then divided by the sample rate to obtain the average power over one cycle. After one cycle, the process is repeated.

Power monitor 24 could be a specially designed chip or the power monitor 24 could be a controller with attendant supporting circuitry.

According to the illustrated embodiment, power monitor 24 references its ground with respect to the neutral side of the AC power line, while primary controller 26 and switch 14 reference a ground based on their own power supply circuitry. As a consequence, the serial link between power monitor 24 and primary controller 26 is bidirectionally optoisolated.

5 Secondary controller 32 is powered by secondary 20. Secondary 20 is preferably air-core or coreless. Secondary controller 32 may have less computational ability than power monitor 24. Secondary controller 32 monitors the voltage and current with reference to secondary 20, and compares the monitored voltage or current with the target voltage or current required by load 22. The target voltage or current is stored in memory 36. Memory 36 is preferably non-
10 volatile so that the information is not lost at power off. Secondary 32 also requests appropriate changes in the operating frequency of switch 14 by primary controller 26 by way of secondary transceiver 30.

 Secondary controller 32 monitors waveforms with a frequency of around 40 KHz (kilohertz). Secondary controller 32 could perform the task of monitoring the waveforms in a
15 manner similar to that of power monitor 24. If so, then peak detector 34 would be optional.

 Peak detector 34 determines the peak voltage across secondary 24, load 22 or across any other component within remote device 11.

 If secondary controller 32 has insufficient computing power to perform instantaneous current and voltage calculations, then a lookup table could be provided in memory
20 36. The lookup table includes correction factors indexed by the drive frequency and applied to the voltage observed by peak detector 34 to obtain the actual voltage across secondary 20. Memory 36 could be a 128-byte array in an EEPROM memory of 8-bit correction factors. The correction factors are indexed by the frequency of the current. Secondary controller 32 receives the frequency from controller 26 by way of primary RXTX 28. Alternatively, if secondary controller
25 32 had more computational ability, it could calculate the frequency. Memory 36 also contains the minimum power consumption information for remote device 11.

The correction factors are unique for each load. For example, an MP3 player acting as a remote device would have different correction factors than an inductively powered light or an inductive heater. In order to obtain the correction factors, the remote device would be characterized. Characterization consists of applying an AC voltage and then varying the frequency. The true RMS voltage is then obtained by using a voltmeter or oscilloscope. The true RMS voltage is then compared with the peak voltage in order to obtain the correction factor. The correction factors for each frequency is then stored in memory 36. One type of correction factor found to be suitable is a multiplier. The multiplier is found by dividing the true RMS voltage with the peak voltage.

FIG. 2 is a table showing the correction factors for a specific load. When using a PIC18F microcontroller, the PR2 register is used to control the period of the output voltage, and thereby the frequency of the output voltage. The correction factors can range from 0 to 255. The correction factor within the table are 8-bit fixed-point fractions. In order to access the correction factor, the PR2 register for the PIC18F microcontroller is read. The least significant bit is discarded, and that value is then used to retrieve the appropriate correction factor.

It has been found to be effective to match the correction factor with the period. As is well known, the period is the inverse of frequency. Since many microcontrollers such as the PIC18F have a PWM (pulse width modulated) output where the period of the output is dictated by a register, then the lookup table is indexed by the period of the PWM output.

Secondary transceiver 30 could be any of many different types of wireless transceivers, such as an RFID (Radio Frequency Identification), IR (Infra-red), Bluetooth, 802.11(b), 802.11(g), or cellular. If secondary transceiver 30 were an RFID tag, secondary transceiver 30 could be either active or passive in nature.

FIG. 3 shows a flow chart for the operation of secondary controller 32. The peak voltage is read by peak detector 34. Step 100. The frequency of the circuit is then obtained by secondary controller 32 either from controller 26 or by computing the frequency itself. Step 102. The frequency is then used to retrieve the correction factor from memory 36. Step 104. The

correction factor is then applied to the peak voltage output from peak detector 34 to determine the actual voltage. Step 106.

The actual voltage is compared with the desired voltage stored in memory 36. If the actual voltage is less than a desired voltage, then an instruction is sent to the primary controller to decrease the frequency. Steps 110, 112. If the actual voltage is greater than the desired voltage, then an instruction is sent to the primary controller to increase the frequency. Steps 114, 116.

This change in frequency causes the power output of the circuit to change. If the frequency is decreased so as to move the resonant circuit closer to resonance, then the power output of the circuit is increased. If the frequency is increased, the resonant circuit moves farther from resonance, and thus the output of the circuit is decreased.

Secondary controller 32 then obtains the actual power consumption from primary controller 26. Step 117. If the actual power consumption is less than the minimum power consumption for the load, then controller disables the load and the components enter a quiescent mode. Steps 118, 120.

FIG. 4 is a flow chart for operation of primary controller 26. Primary 18 is energized at a probe frequency. Step 200. The probe frequency could be preset or it could be determined based upon any prior communication with a remote device. According to this embodiment, load 32 periodically writes the operating frequency to memory 36. If secondary 20 is de-energized, and subsequently re-energized, secondary controller retrieves the last recorded operating frequency from memory 36 and transmits that operating frequency to primary controller 26 by way of secondary RXTX 30 and primary RXTX 28. The probe frequency should be such that secondary transceiver 30 would be energized.

The secondary transceiver 30 is then polled. Step 202. The system then waits for a reply. Step 204. If no reply is received, then primary 18 is turned off. Step 206. After a predetermined time, the process of polling the remote device occurs again.

If a reply is received from secondary transceiver 30, then the operating parameters are received from secondary controller 32. Step 208. Operating parameters include, but are not

limited to initial operating frequency, operating voltage, maximum voltage, and operating current, operating power. Primary controller 26 then enables switch 14 to energize primary 18 at the initial operating frequency. Step 210. Primary controller 26 sends power information to secondary controller 32. Step 212. Primary 18 energizes secondary 20. Primary controller 26 then polls
5 secondary controller 32. Step 214.

If primary controller 26 gets no reply or receives an "enter quiescent mode" command from secondary controller 32, the switch 14 is turned off (step 206), and the process continues from that point.

If primary controller 26 receives a reply, then primary controller 26 extracts any
10 frequency change information from secondary controller 32. Step 218. Primary controller 26 then changes the frequency in accordance with the instruction from secondary controller 32. Step 220. After a delay (step 222), the process repeats by primary controller 26 sending information to secondary controller 32. Step 212.

The above description is of the preferred embodiment. Various alterations and
15 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 references 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 inductive power supply comprising:
 - 5 a switch operating at a frequency;
 - a primary energized by the switch;
 - a primary transceiver for receiving frequency change information from a remote device; and
 - a controller for changing the frequency in response to the frequency change
 - 10 information.
2. The inductive power supply of claim 1 further comprising:
 - a power monitor for determining power consumption information by the inductive power supply.
3. The inductive power supply of claim 2 where the primary transceiver sends the
- 15 power consumption information to the remote device.
4. The inductive power supply of claim 3 further comprising a tank circuit where the primary is part of the tank circuit.
5. The inductive power supply of claim 4 where the tank circuit is a series resonant tank circuit.
- 20 6. The inductive power supply of claim 4 where the tank circuit is a parallel resonant tank circuit.
7. A remote device capable of energization by an inductive power supply comprising:
 - a secondary;
 - a load;
 - 25 a secondary controller for determining the actual voltage across the load; and
 - a secondary transceiver for sending frequency adjustment instructions to the inductive power supply.

8. The remote device of claim 7 further comprising:
a peak detector.
9. The remote device of claim 8 where the secondary controller determines the actual voltage across the load from a peak detector output.
- 5 10. The remote device of claim 9 further comprising:
a memory containing a database, the database having a plurality of values indicative of the actual voltage, the database indexed by the peak detector output.
11. The remote device of claim 10 where the database is also indexed by an operating frequency.
- 10 12. The remote device of claim 11 where the memory contains a minimum power consumption.
13. The remote device of claim 12 further comprising a secondary transceiver.
14. The remote device of claim 13 where the secondary transceiver is capable of receiving power consumption information from the inductive power supply and the secondary controller compares the power consumption information with the minimum power consumption.
- 15 15. A method of operating an inductive power supply comprising:
energizing a primary at an initial frequency;
polling a remote device; and
if there is no response from the remote device, turning off the primary.
- 20 16. The method of operating an inductive supply of claim 15 further comprising:
if there is a response from the remote device, then obtaining an operating frequency from the remote device; and
energizing the primary at the operating frequency.
- 25 17. The method of operating an inductive supply of claim 16 further comprising:
receiving frequency change information from the remote device; and
changing the operating frequency based upon the frequency change information.

18. The method of operating an inductive supply of claim 17 further comprising:
receiving from the remote device a quiescent mode instruction; and
turning off the primary in response to the quiescent mode instruction.
19. The method of operating an inductive supply of claim 18 further comprising:
5 determining a consumed power by the primary; and
transmitting the consumed power to the remote device.
20. A method of operating a remote device, the remote device having a secondary for
receiving power at an operating frequency from an inductive power supply and powering a load,
comprising:
10 comparing a desired voltage with an actual voltage; and
sending an instruction to the inductive power supply to correct the actual voltage.
21. The method of operating a remote device of claim 20 where the actual voltage and
desired voltage are with reference to a voltage across the secondary.
22. The method of operating a remote device of claim 21 where the instruction is a
15 command to the inductive power supply to change the operating frequency.
23. The method of operating a remote device of claim 22 where the step of comparing a
desired voltage with an actual voltage further comprises:
reading a peak voltage.
24. The method of operating a remote device of claim 22 where the step of comparing a
20 desired voltage with an actual voltage further comprises:
retrieving from memory a correction factor; and
applying the correction factor to the peak voltage to obtain the actual voltage.
25. The method of operating a remote device of claim 22 where the step of comparing
applying the correction factor comprising multiplying the peak voltage by the correction factor.
26. The method of operating a remote device of claim 23 further comprising:
25 if the actual voltage is greater than desired voltage, then the command to the
inductive power supply includes an instruction to increase the operating frequency.

27. The method of operating a remote device of claim 23 further comprising:
- if the actual voltage is less than desired voltage, then the command to the inductive power supply includes an instruction to decrease the operating frequency.

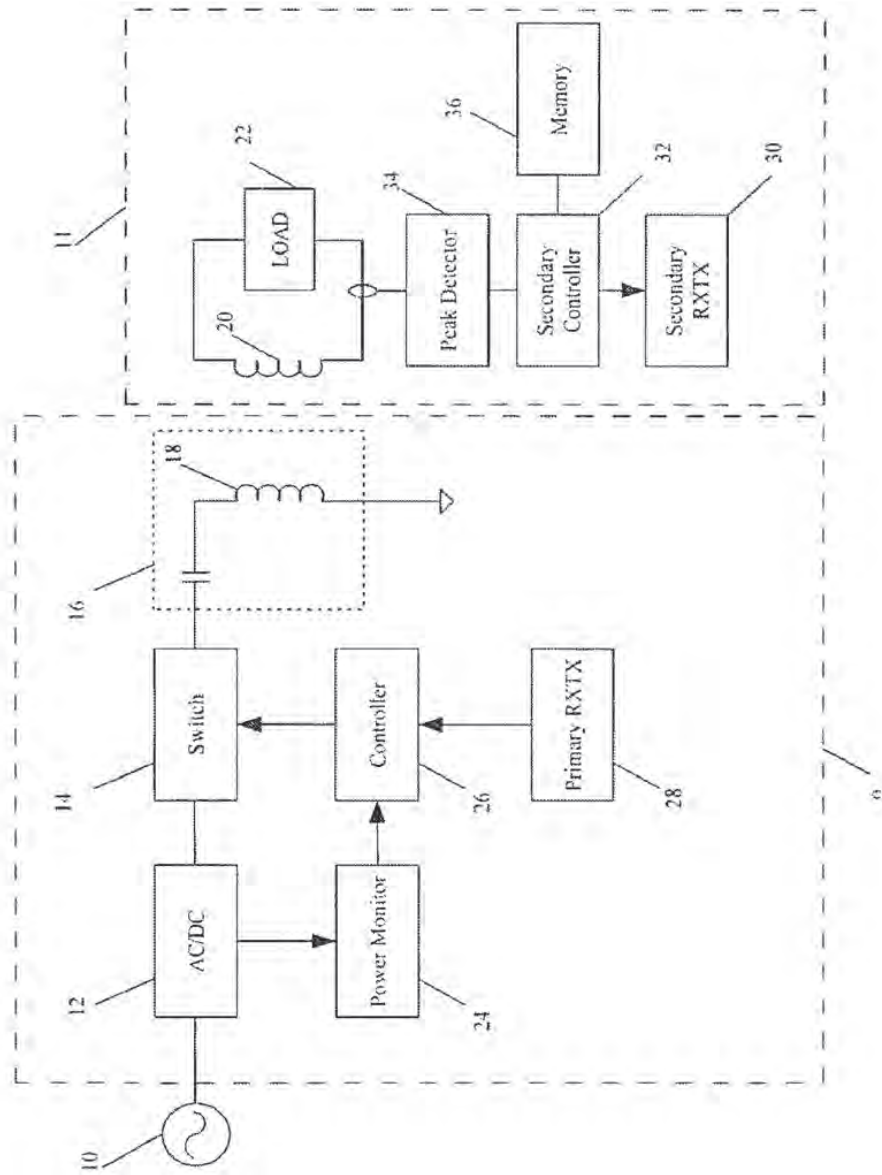


FIG. 1

CORRECTION FACTOR INDEXED BY PR2

(Light Bulb)

PR2	CF	PR2	CF	PR2	CF	PR2	CF	PR2	CF
1	174	27	174	53	174	79	180	105	199
2	174	28	174	54	174	80	180	106	199
3	174	29	174	55	174	81	181	107	199
4	174	30	174	56	174	82	182	108	199
5	174	31	174	57	174	83	183	109	199
6	174	32	174	58	174	84	184	110	199
7	174	33	174	59	174	85	185	111	199
8	174	34	174	60	174	86	186	112	199
9	174	35	174	61	174	87	186	113	199
10	174	36	174	62	174	88	189	114	199
11	174	37	174	63	174	89	189	115	199
12	174	38	174	64	174	90	190	116	199
13	174	39	174	65	174	91	192	117	199
14	174	40	174	66	174	92	194	118	199
15	174	41	174	67	174	93	196	119	199
16	174	42	174	68	174	94	197	120	199
17	174	43	174	69	174	95	198	121	199
18	174	44	174	70	174	96	199	122	199
19	174	45	174	71	174	97	200	123	199
20	174	46	174	72	174	98	200	124	199
21	174	47	174	73	175	99	199	125	199
22	174	48	174	74	175	100	199	126	199
23	174	49	174	75	176	101	199	127	199
24	174	50	174	76	176	102	199	128	199
25	174	51	174	77	177	103	199		
26	174	52	174	78	179	104	199		

FIG. 2

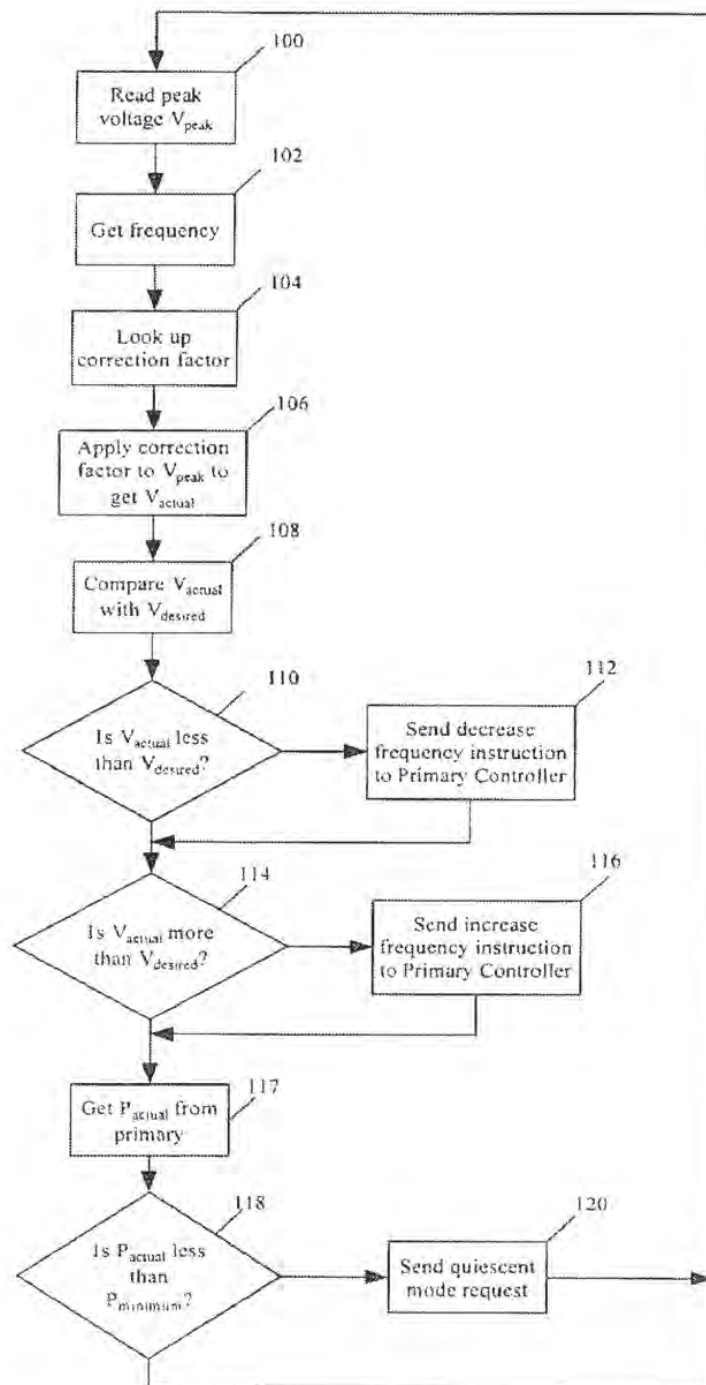


FIG. 3

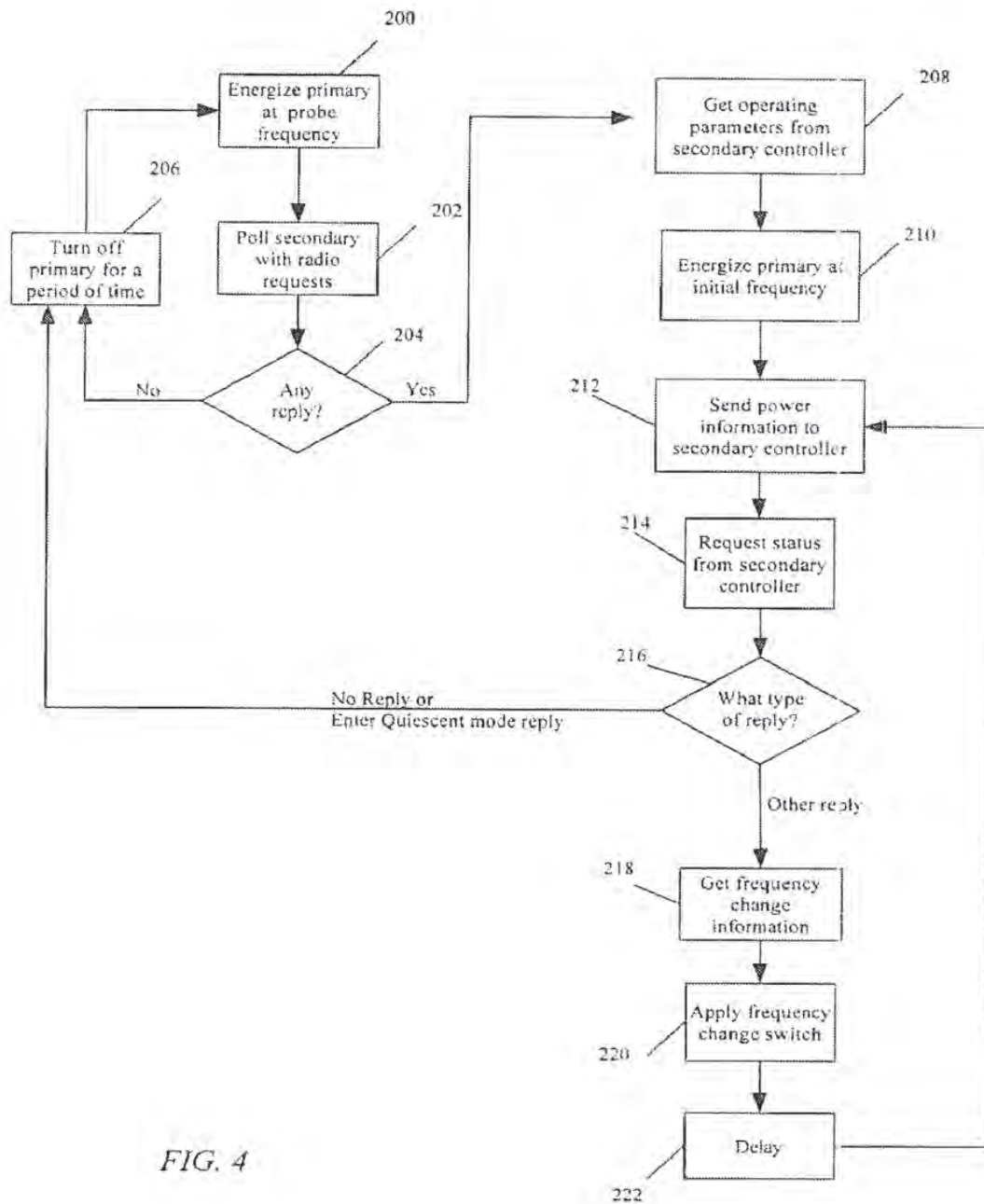


FIG. 4

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- (75) Inventors/Applicants (for US only): **BAARMAN, David, W** [US/US]; 6414 - 127th Avenue, Fennville, MI 49408 (US). **STIEN, Nathan, P.** [US/US]; 127 East Hines Place, Apt. B4, Peoria, IL 61614 (US). **BACHMAN, Wesley, J.** [US/US]; 48 Sugar Creek Hills, Auburn, IL 62615 (US). **LORD, John, James** [US/US]; 3106 Hazlett Road, Springfield, IL 62707 (US).
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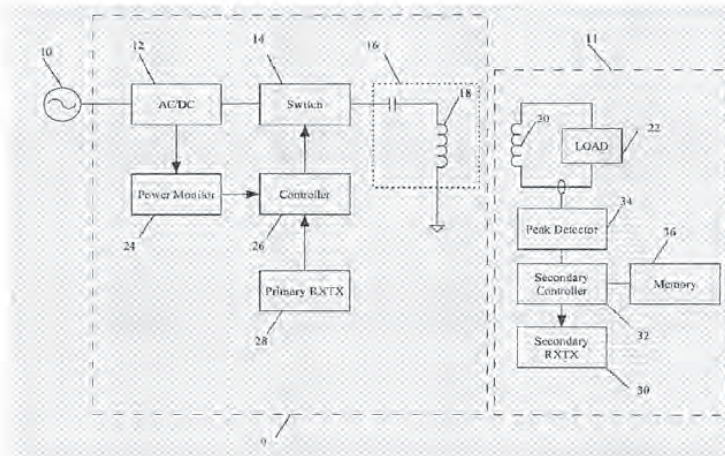
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(57) Abstract: An inductive power supply (9) includes a transceiver (28) for sending information between the remote device (11) and the inductive power supply. The remote device determines the actual voltage and then sends a command to the inductive power supply to change the operating frequency if the actual voltage is different from the desired voltage. In order to determine the actual voltage, the remote device determines a peak voltage (34) and then applies a correction factor.

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

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2005/007067 A1 (BAARMAN DAVID W [US] ET AL) 13 January 2005 (2005-01-13) figures 7-9 paragraphs [0023], [0027] paragraphs [0029] - [0037] paragraphs [0040], [0041] paragraphs [0044], [0045] paragraphs [0047] - [0049] paragraphs [0053], [0054], [0056] paragraphs [0059] - [0061]	1-19
X	US 2003/214821 A1 (GIANNOPOULOS DEMETRI [US] ET AL) 20 November 2003 (2003-11-20) figure 1 paragraphs [0016], [0020], [0021], [0026] ----- -/-	1,7-9, 20-27

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/089305 A1 (PARK SANG-KYU [KR] ET AL) 11 July 2002 (2002-07-11) figure 2 -----	1,7-9
X	US 6 184 651 B1 (FERNANDEZ JOSE M [US] ET AL) 6 February 2001 (2001-02-06) figures 2,3 column 4, line 10 - line 20 column 4, line 47 - line 54 column 5, line 62 - line 66 column 6, line 3 - line 17 column 6, line 50 - line 65 column 7, line 3 - line 6 -----	1,7-9
A	-----	18,19
A	US 4 924 171 A (BABA FUJIO [JP] ET AL) 8 May 1990 (1990-05-08) figure 3 -----	8,9,23
A	"PS402-01XX Single Chip Battery Manager - Nickel Chemistries" 2003, MICROCHIP TECHNOLOGY INC. , XP002455122 pages 2,3,5-6 page 16 -----	10-12

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005007067	A1	13-01-2005	US 2005122058 A1 09-06-2005
			US 2005122059 A1 09-06-2005
			US 2005127849 A1 16-06-2005
			US 2005127850 A1 16-06-2005
US 2003214821	A1	20-11-2003	AU 2003230103 A1 02-12-2003
			CN 1653670 A 10-08-2005
			EP 1506606 A1 16-02-2005
			WO 03098773 A1 27-11-2003
			JP 2005526474 T 02-09-2005
US 2002089305	A1	11-07-2002	KR 20020057468 A 11-07-2002
US 6184651	B1	06-02-2001	NONE
US 4924171	A	08-05-1990	JP 1206853 A 21-08-1989
			JP 2597623 B2 09-04-1997

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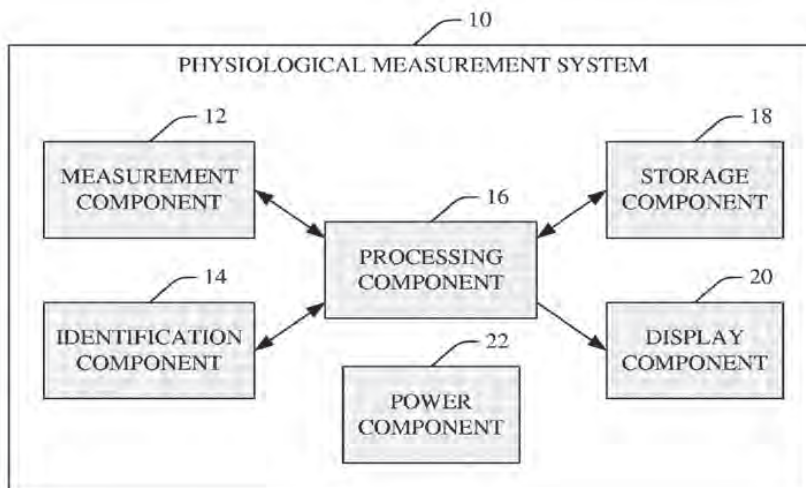
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[Continued on next page]

(54) Title: EAR-THERMOMETER WITH EAR IDENTIFICATION



(57) Abstract: A physiological measurement device (10) that concurrently measures a physiological state of an individual and determines an identity of the individual includes at least a measurement component (12), an identification component (14), and processing component (16). The measurement component (12) measures the physiological state of the individual, and the identification component (14) concurrently determines the identity of the individual. The processing component (16) associates the physiological state of the individual with the identity of the individual.

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EAR-THERMOMETER WITH EAR IDENTIFICATION

DESCRIPTION

The following relates to sensing physiological information emitted by an individual and concurrently biometrically identifying the individual through a single device. It finds particular application to concurrently sensing a temperature of the individual and
5 identifying the individual via an ear-thermometer with ear biometric identification componentry. Other applications are also contemplated.

Conventionally, a temperature of an individual is obtained through fluid-filled or electronic thermometers. Both types of thermometers are used to obtain oral, axillary, and rectal temperatures. Some electronic thermometers also measure temperature from the
10 eardrum of the individual. For example, tympanic ("in-the-ear") thermometers measure the temperature of the tympanum, or tympanic membrane, which is a thin membrane that separates the outer ear from the middle ear, via an infrared measurement. Typically, tympanic thermometers are simple hand-held devices with a probe that is inserted into the ear canal to measure the patient's temperature.

15 Electronic thermometers are commonly used at health care facilities (e.g., hospitals, clinics, doctor offices, etc.), infirmaries in businesses, educational institutions and day cares, home, etc. In these settings, a single electronic thermometer typically is used to measure the temperature of more than one individual, sometimes within a relatively short period of time. In order to prevent forgetting a temperature and/or associating a
20 temperature with the wrong individual, the user of the electronic thermometer typically records the temperature shortly after it is obtained. By way of example, a nurse in a hospital caring for a plurality of patients typically uses the same thermometer, stethoscope, sphygmomanometer, etc. when collecting vital signs for the patients. Upon measuring the temperature of a particular patient, the nurse records the temperature, and associates the
25 recorded temperature with the patient. For instance, the nurse may record the temperature in a patient chart or write the temperature next to a unique identification (e.g., the individual's name, social security number, patient number, room number, etc.). After obtaining and recording the patient's vital signs, the nurse replaces a disposable cover, disinfects the instrument, or the like, and moves on to the next patient. Similarly, a parent
30 at home may have more than one ill child. Likewise, the parent typically measures, records and associates each child's temperature on a child by child basis.

Manually recording and associating temperatures of individuals is susceptible to human error. For instance, the user may inadvertently record an incorrect temperature. In another instance, the temperature of a first individual may be mistakenly associated with a different individual. In yet another instance, an identification wrist band or other
5 identifying indicia may include erroneous information or be affixed to the wrong individual. In still another instance, the identification wrist band or other identifying indicia may have been tampered with such that the correct identity of the individual cannot be readily obtained from it. In another instance, an individual lends his/her identification
10 wrist band to someone else, which can lead to erroneous operations, blood transfusions, etc. in the worst case leading to death. One or more of these examples as well as other situations may lead to the administration of an incorrect medication, unnecessary surgery, accidental baby swapping, etc.

A more robust approach for identifying the individual is through biometric identification such as a fingerprint, an iris map, acoustical properties of the ear, etc. By
15 way of example, an ear probe may send a tone into the ear and listens for either reflected sound or otoacoustic emissions. Both of these approaches can be used to uniquely identify the individual through a biometric that typically cannot be lost or stolen. Even when using an ear thermometer device and a biometric ear probe or other biometric device, the user still has to manually record the temperature of the individual and associate the temperature
20 with the correct biometrically identified individual. Thus, even when using more robust identification techniques, recorded measurements are still susceptible to human error.

In one embodiment, a physiological measurement device is illustrated. The device
25 concurrently measures a physiological state of an individual and determines an identity the individual. The device includes a measurement component that measures the physiological state of the individual, and an identification component that concurrently determines the identity of the individual. A processing component of the device associates the physiological state of the individual with the identity of the individual.

30 One advantage includes concurrently measuring a physiological state of an individual and identifying the individual.

Another advantage resides in using a single device to concurrently identify an individual and measure at least one physiological state of the individual.

Another advantage lies in mitigating human error associated with manually associating physiological and identity information.

5 Another advantage resides in storing physiological state and identify information for a plurality of individuals.

Another advantage includes conveying correlated physiological state and identify information for one or more individuals to other components.

10 Still further advantages will become apparent to those of ordinary skill in the art upon reading and understanding the detailed description of the preferred embodiments.

FIGURE 1 illustrates a physiological measurement system that concurrently measures physiological state information and identification of an individual.

15 FIGURE 2 illustrates another embodiment of the physiological measurement system.

FIGURE 3 illustrates an embodiment in which the physiological measurement system includes an electronic ear thermometer.

20 FIGURE 4 illustrates a reflected sound technique for facilitating identifying an individual via ear characteristics unique to the individual.

FIGURE 5 illustrates a particular embodiment of the physiological measurement system having an electronic ear thermometer.

FIGURE 6 illustrates the physiological measurement system within a body area network.

25 FIGURE 7 illustrates a method for using the physiological measurement system to concurrently measure a temperature and identify an individual via an ear of the individual.

30 FIGURE 1 illustrates a physiological measurement system ("system") 10 that concurrently measures various physiological information representative of at least a physiological state and an identification of an individual. Suitable information indicative of physiological state includes, but is not limited to, temperature, pulse, blood pressure,

blood-oxygen percent, heart rate, ECG/EKG or other heart electrical signals, etc., and suitable information indicative of identification includes, but is not limited to, a fingerprint, an iris map, acoustical properties of the ear, etc.

5 The system 10 includes a measurement component 12 for collecting physiological state information for one more physiological systems (e.g., circulatory, respiratory, cardiovascular, etc.) of the individual. For example, the measurement component 12 can include sensors for sensing temperature, blood pressure, blood-oxygen percent, heart rate, heart electrical activity, eye pressure, etc. An identification component 14 works in conjunction with the measurement component 12 in order to identify the individual while
10 collecting the physiological state information. For example, while using a temperature sensor (not shown) of the measurement component 12 to measure a temperature from within an ear of the individual, an identification sensor (not shown) of the identification component 12 is used to identify the individual through biometrics such as unique characteristics of the ear (e.g., via reflected sound, otoacoustic (spontaneous and evoked)
15 emissions, etc.).

In another example, while using an inner-ear blood pressure sensor (not shown) or a pulseoximeter of the measurement component 12 to measure a blood pressure or a blood oxygen level of the individual from the ear, an identification sensor (not shown) of the identification component 12 is used to identify the individual through unique
20 characteristics of the ear. In another example, while using an eye pressure sensor (not shown) of the measurement component 12 to measure a pressure within an eye of the individual, an identification sensor (not shown) of the identification component 12 is used to identify the individual through an iris map or retinal scan. In another example, while using a finger blood pressure sensor (not shown) or a finger pulseoximeter of the
25 measurement component 12 to measure a blood pressure or blood oxygen level of the individual, an identification sensor (not shown) of the identification component 12 is used to identify the individual through a fingerprint. It is to be appreciated that the sensor used for measuring the physiological state and for identification may be two independent sensors or substantially the same sensor. For instance, the QRS of a heart beat may be
30 derived from information obtained from the same infrared sensor (e.g., in an ear-thermometer) used to measure temperature.

It is to be understood that the above examples are provided for explanatory purposes and are not limiting. In other embodiments, various other physiological state information is concurrently obtained along with the identity of the individual. In addition, the physiological state information and the identification may or may not be determined
5 from substantially similar data. Furthermore, the identity information can be used to verify the identity of the individual. For instance, the identity of the individual as determined by the identification component 12 can be cross-checked with a wrist band or other mechanism or indicia used to identify the individual.

The system 10 further includes a processing component 16 that receives and
10 associates the physiological information collected by the measurement component 12 and the identification component 14. Thus, the measured physiological information indicative of a state of one or more physiological systems of the individual is associated with the measured physiological information indicative of an identity of the individual. This association enables the system 10 to measure and store physiological state information
15 from a plurality of different individuals. Subsequently, the physiological state information of any one of the individuals can be extracted from the stored data based on the identity of the individual.

The processing component 16 associates raw data with each individual and/or includes componentry (not shown) to process (e.g., filter, condition, amplify, threshold,
20 etc.) the physiological state information into data more meaningful to the person acquiring the physiological information. For instance, the processing component 16 can associate resistance, current, voltage, capacitance, etc. readings with an individual and/or convert such readings to a temperature, heart rate, blood pressure, etc. and associate the processed data with the individual.

The processing component 16 stores the raw and/or processed data along with the
25 identity of the individual in a storage component 18, which allows the user of the system 10 to measure and retain physiological information from a plurality of individuals. The storage component 18 includes volatile and/or non-volatile memory for storage of such data. The storage capacity of the storage component 18 is based on the application and
30 cost considerations.

A display component 20 is used to present the collected physiological information to a user of the system 10. The processing component 16 presents newly acquired and/or

stored physiological information on the display for the user to observe. The user determines the display information, for example, by using the system 10 to acquire physiological information and/or selecting stored physiological information. The display 20 can include at least one of one or more light emitting diodes (LEDs), seven-segment displays, liquid crystals displays, etc. Various actuators and sensors (not shown) are used to initiate measurements and/or retrieve stored data. For instance, the display 20 may include touch-screen technology to navigate through menus of options. In another instance, the system 10 may include physical buttons, dials, switches, triggers, etc. that invoke one or more actions.

10 A power supply 22 powers the components of the system 10. The power supply 22 can include one or more internal batteries (e.g., re-chargeable and non-rechargeable) and/or an adapter that converts AC power to suitable power.

The system 10 can be a portable device such as a hand held device or a device (removeably) affixed to a mobile structure that moves on a wheel(s), or a static device mounted to a supporting structure such as a wall or other relatively stationary instrumentation.

With reference to FIGURE 2, the system 10 optionally includes portable storage 24 and/or network componentry 26. The portable storage 24 includes storage such as various types of flash memory. This enables the user of the system 10 to store and transfer physiological information by storing such information within the portable storage 24, removing the portable storage component 24 from the system 10, and connecting it to a suitable interface of another device such as a computer, a database, a monitoring station, etc. The portable storage 24 is also used to load applications, firmware, utilities, etc. onto the system 10, for example, by first storing applications, firmware, utilities, etc. on the portable storage 24, connecting the portable storage 24 to the system 10, and manually and/or automatically loading the applications, firmware, utilities, etc.

The network component 26 is also used to convey measured and/or stored physiological information to other systems. The network component 26 is associated with various wired and/or wireless communication protocols for communicating with networks such as a cellular network, a Personal Communication Service (PCS), a Wide Area Network (WAN) (e.g., the Internet), a Local Area Networks (LAN), a Metropolitan Area Network (MAN), a Campus Area Network (CAN), a Home Area Network (HAN), a

Personal Area Networks (PAN), a Body Area Network (BAN), and the like. Suitable communication ports include Ethernet, Universal Serial Bus (USB), parallel, serial, optical, infrared, FireWire, etc.

5 Stored physiological information obtained from the system 10 via the portable storage 24 and/or the network component 26 can be analyzed and displayed according to each individual since each measurement is associated with an identity of an individual. Other information such as date, an identity of the person taking the measurement, an identity of a doctor, etc. can also be associated with the temperatures. This enables temperatures to be delineated by individual and analyzed over time, separated across the
10 people using the system 10 to take measurements, grouped by physician, etc.

FIGURE 3 illustrates a preferred embodiment in which the measurement component 12 includes an electronic ear thermometer 28. In one instance, the electronic ear thermometer 28 is a thermoelectric thermometer that uses thermoelectric current to measure temperature. This type of thermometer reads the infrared heat waves released by
15 the eardrum. A temperature is obtained by pulling the ear backward to straighten the ear canal and aiming the ear probe between the opposite eye and earlobe. The electronic ear thermometer 28 measures the infrared heat of the eardrum and converts it to an electric signal representative of the temperature. This temperature correlates to the temperature of the hypothalamus, which is the temperature controlling system of the brain. Typically, this
20 type of thermometer measures temperature relatively quickly (e.g., less than 2 seconds) with respect to non-ear thermometers. It also does not require cooperation by the individual (like holding a thermometer under an arm, in a mouth, etc.) and does not usually cause any discomfort.

As the electronic ear thermometer 28 measures temperature, the identification
25 component 14 concurrently identifies the person via any suitable ear identification technique. For instance, in one embodiment a reflected sound technique is used. This embodiment is illustrated in FIGURE 4 in which the identification component 14 includes a first transducer 30 (e.g., a speaker) that is used to emit a sound wave, or an excitation signal, into the eardrum and a second transducer 32 (e.g., a microphone) that captures a
30 reflected sound wave, or echo signal. The echo signal is characteristic of the eardrum/ear canal combination and is unique to the individual.

In another embodiment, an otoacoustic approach is used. Otoacoustic emissions are weak emissions from the inner ear which can be recorded in the occluded ear canal using a relatively sensitive microphone. The otoacoustic emissions can arise spontaneously or be evoked by presenting acoustic stimuli. Applying two pure tones simultaneously in an inharmonic ratio leads to additional tones (e.g., distortion products) caused by the nonlinear behavior of the human auditory system. It is to be appreciated that the foregoing examples are provided for illustrative purpose and do not limit the invention. Other techniques such as ultrasound and the like are also contemplated.

FIGURE 5 illustrates a particular example of the system 10 in which the measurement component 12 includes the electronic ear thermometer 28. Depicted is a hand-held unit having a housing 34 that protects various componentry (e.g., electronics) of the system 10 from contamination, destruction, etc. The housing 34 may be hermetically sealed to prevent ingress of fluids and/or particulate matter.

A shaft (or probe) 36 houses the ear thermometer 28. The shaft 36 is suitably designed for penetrating an opening into the ear canal. The shaft 36 is placed in the ear canal of the individual such that the ear thermometer 28 is suitably positioned for obtaining measurements. The ear thermometer 28 includes a sensor (not shown) such as an infrared sensor which collects signals emitted from within the ear canal. A transducer (not shown) of the ear thermometer 28 converts the collected signals to suitable representations such as electric currents, voltages, resistance, etc.

The shaft 36 also includes a plurality of transceivers 40 that emit acoustic signals into the ear canal and that receive signals reflected from the physical structure within the ear. The received signals are correlated with the emitted signals to obtain the physical structure in the ear and are unique to each individual such that they can be used to identify each individual. An optional sheath (not shown) can be placed over the end of the shaft 36 to protect the shaft and subsequent individuals from contamination. The sheath and/or shaft 36 can be cleanable and/or sterilizable or disposable. The temperature and the ear-identification information are concurrently obtained and associated.

FIGURE 6 illustrates the system 10 residing within a wireless body area network (BAN). The system 10 is depicted at various locations proximate an individual for concurrently measuring physiological state information and identity. At a first position 42, the system 10 is positioned proximate to an ear of the individual for concurrently

measuring a temperature of the individual and uniquely identifying the individual from ear characteristics. In other embodiments, blood pressure, blood oxygen level, etc. can also be acquired at 42 along with the unique identity. At a second position 44, the system 10 is positioned proximate to an eye of the individual for concurrently measuring an eye pressure, etc. of the individual and uniquely identifying the individual via an iris map. At an Nth position 46, the system 10 is positioned proximate to a finger of the individual for concurrently measuring a pulse, blood pressure, blood oxygen level, etc. of the individual and uniquely identifying the individual via a fingerprint. It is to be appreciated that these examples are provided for explanatory purposes and are not limiting. The system 10 can be used to measure various other physiological state information and identify the individual through other biometrics.

The physiological state information and identity of the individual can be displayed by the system 10 via the display component 20 and/or conveyed to other components via the portable memory 24 and/or the network component 26 as described in detail above. In addition, the system 10 can leverage a body area network (BAN) 48 to convey the physiological state and identity information to other components and/or networks.

One or more sensors and/or emitters 50 are also suitably placed on the individual to acquire physiological information. The one or more sensors and/or emitters 50 capture Electrocardiograms (ECGs), Electroencephalograms (EEGs), Electromyograms (EMGs), non-invasive blood pressure (NiBP), pulse, respirations, blood oxygen (SpO₂), etc. In addition, the one or more sensors and/or emitters 50 can transmit information such as current medications, scheduled procedures, etc. The network component 26 can convey the associated physiological measurement and the associated patient identification of the present patient, or potentially other patients, to a corresponding receiving element of the body area network. These measurements and associated identifications are transmitted or otherwise communicated with the other data from the body area network.

FIGURE 7 illustrates a method for using the physiological measurement system to concurrently measure temperature and identify an individual via an ear of the individual. At 52, a shaft that houses an ear thermometer measuring device and ear identification device is suitably positioned in the ear canal of the individual. Prior to insertion, an optional sheath can be placed over the end of the shaft to protect the shaft and individuals from contamination.

At 54, the ear thermometer measures a temperature of the individual. In one embodiment, the ear thermometer includes thermoelectric componentry that uses thermoelectric current to measure temperature by reading infrared heat waves released by the eardrum. A converter converts the measured heat waves into electric signals representative of temperature. In other embodiments, other techniques can be used to measure the temperature.

Concurrently, at 56, the ear identification device identifies the individual through unique characteristics of the ear. In one embodiment, a reflected sound technique is used in which a sound wave is emitted into the ear and a reflected sound wave is captured. The reflected sound wave is characteristic of the eardrum and is unique to the individual. In another embodiment, an otoacoustic approach is used in which a spontaneous or evoked otoacoustic emission generated via a number of different cellular mechanisms within the inner ear is captured. Similarly, this emission is characteristic of the eardrum and is unique to the individual.

At 58, the temperature and identification of the individual is associated. The temperature and identification of the individual can be displayed by the person taking the measurements. Optionally, the temperature and identification of the individual can be locally stored and/or conveyed to other components through network componentry, portable storage, and/or a body area network.

The invention has been described with reference to the preferred embodiments. Modifications and alterations may occur to others upon reading and understanding the preceding detailed description. It is intended that the invention be constructed as including all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof.

CLAIMS

1. A physiological measurement device (10) that concurrently measures a physiological state of an individual and determines an identity of the individual, comprising:

a measurement component (12) that measures the physiological state of the individual;

an identification component (14) that concurrently determines the identity of the individual; and

a processing component (16) that associates the physiological state of the individual with the identity of the individual.

2. The physiological measurement device (10) as set forth in claim 1, wherein the measurement component (12) includes an electronic ear thermometer (28) that measures a temperature of the individual from an ear of the individual.

3. The physiological measurement device (10) as set forth in claim 1, wherein the identification component (14) determines the identity of the individual from the same information used by the measurement component (12) to determine the physiological state of the individual.

4. The physiological measurement device (10) as set forth in claim 1, wherein the identification component (14) uses one of a reflected sound and an otoacoustic technique to determine the identity of the individual.

5. The physiological measurement device (10) as set forth in claim 1, wherein the measurement component (12) measures at least one of temperature, blood pressure, eye pressure, heart rate, heart electrical activity, pulse, and blood oxygen level of the individual.

6. The physiological measurement device (10) as set forth in claim 1, wherein the identification component (14) determines the identity of the individual through biometric identification including at least one of a unique physical characteristic of an ear, a fingerprint, and an iris map.

7. The physiological measurement device (10) as set forth in claim 1, further including:

a storage component (18) for storing multiple temperatures for a plurality of individuals, wherein each temperature is associated with a corresponding individual based on the identity of the individual as determined by the identification component (14).

8. The physiological measurement device (10) as set forth in claim 1, further including:

a display component (20) for displaying the temperature and the identity of the individual.

9. The physiological measurement device (10) as set forth in claim 1, further including:

portable storage (24) for transferring stored temperatures and identity information from the system (10) to devices that reads the portable storage (24).

10. The physiological measurement device (10) as set forth in claim 1, further including:

a network component (26) for conveying the temperature and the identity of the individual to other devices over a network.

11. The physiological measurement device (10) as set forth in claim 1, further including:

a shaft (36) that houses the measurement component (12) and the identification component (14), the shaft (36) is designed to be inserted within an ear of the individual.

12. The physiological measurement device (10) as set forth in claim 1, the physiological measurement system (10) uses a local body area network to convey the physiological state information and the identity of the individual to other components.

13. An ear thermometer with ear identification device (10), comprising:
a probe (36) including:

an ear thermometer (28) that measures a temperature of an individual, and

an identification component (14) that determines an identity of the individual, the identification component (14);

a processing component (16) that associates the temperature with the identity; and

a display component (20) for presenting the temperature and an indication of the identity of the individual.

14. The ear thermometer with ear identification device (10) as set forth in claim 13, wherein the ear thermometer (28) includes:

a sensor that captures signals emitted from within an ear canal; and

a signal processing system that converts the collected signal to a temperature.

15. The ear thermometer with ear identification device (10) as set forth in claim 13, wherein the sensor is an infrared sensor that captures heat waves emitted from within an ear of the individual.

16. The ear thermometer with ear identification device (10) as set forth in claim 13, wherein the identification component (14) includes a plurality of transceivers (40) that emit acoustic signals into an ear canal of the individual and that receive signals reflected from the physical structured within the ear, wherein the received signals uniquely identify the individual.

17. The ear thermometer with ear identification device (10) as set forth in claim 13, wherein the identification component (14) uses one of a reflected sound and an otoacoustic approach to determine the identity of the individual.

18. The ear thermometer with ear identification device (10) as set forth in claim 13, further including at least one of:

portable storage (24); and

a network component (26) for transferring the temperature and the identity of the individual to other devices.

19. A method for measuring a physiological state of an individual and determining an identity the individual, comprising:

concurrently determining:

a physiological state of the individual, and

an identity of the individual; and

associating the physiological state with the identity of the individual.

20. The method as set forth in claim 19, wherein the physiological state is one of a temperature, a blood pressure, an eye pressure, a heart rate, a heart electrical signal, a pulse, and a blood oxygen level.

21. The method as set forth in claim 19, further including:

storing a plurality of temperatures, each of which is associated with an identity of a corresponding individual;

displaying the plurality of temperatures with the identity information; and

transferring the stored temperatures and identity information to at least one other device.

1/4

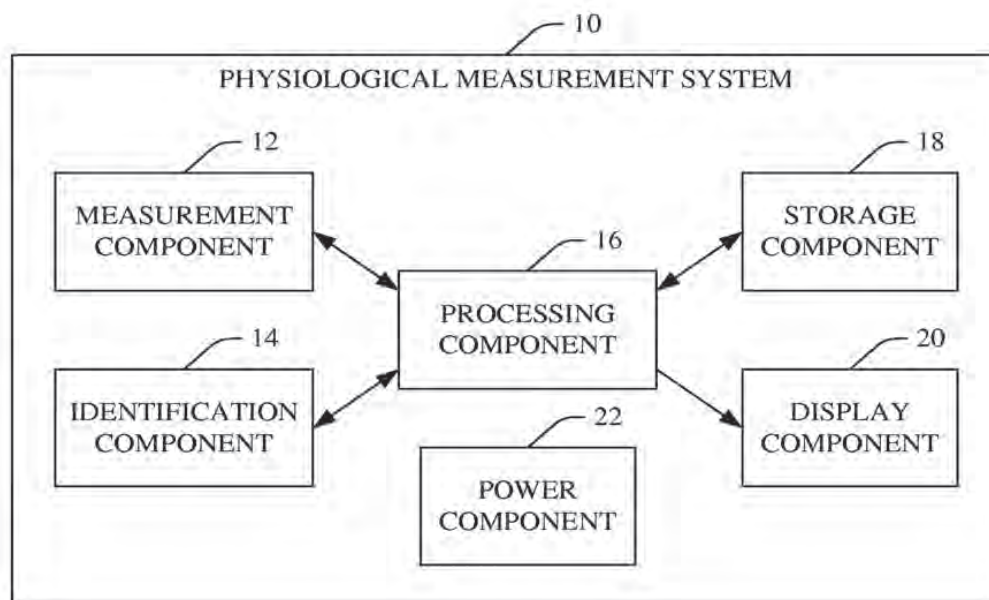


FIGURE 1

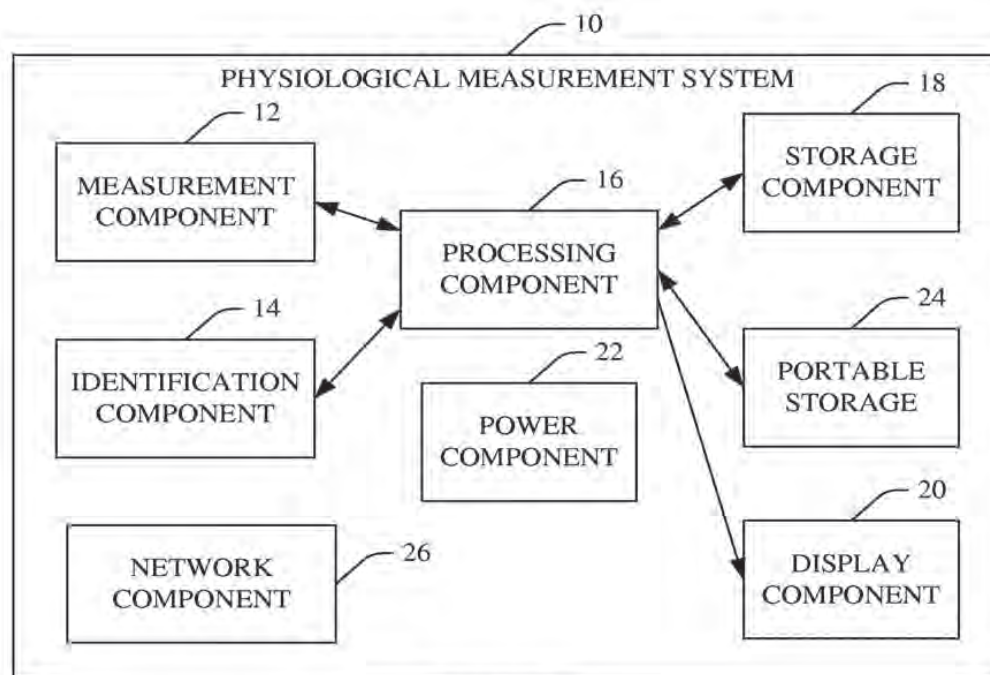


FIGURE 2

2/4

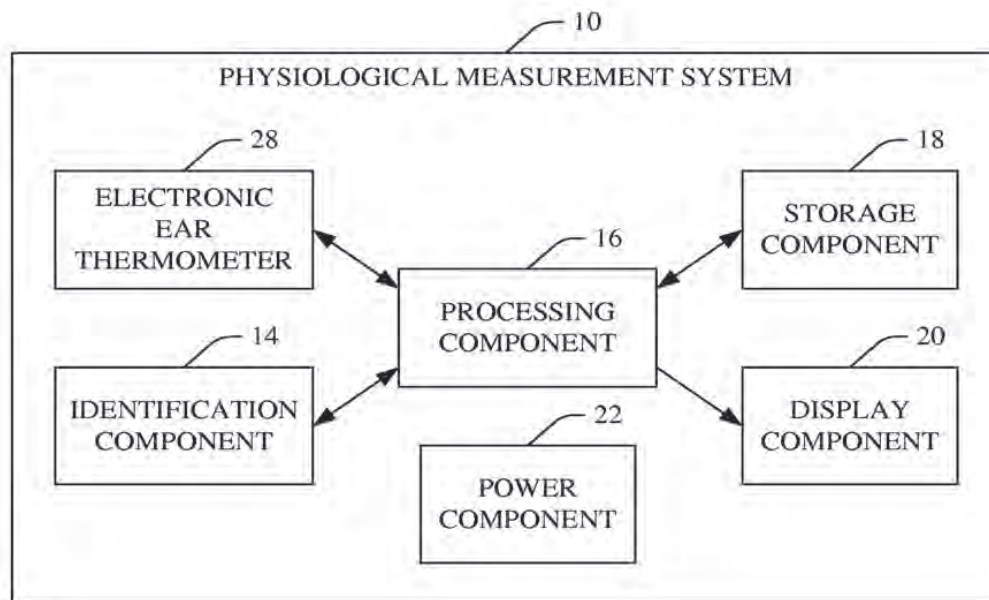


FIGURE 3

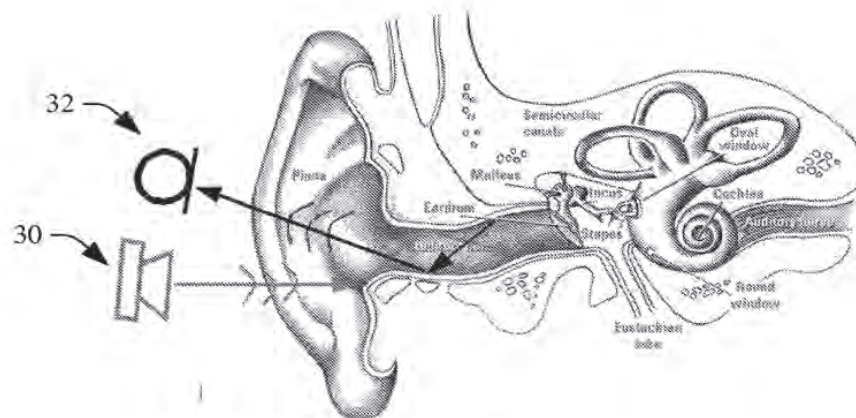


FIGURE 4

3/4

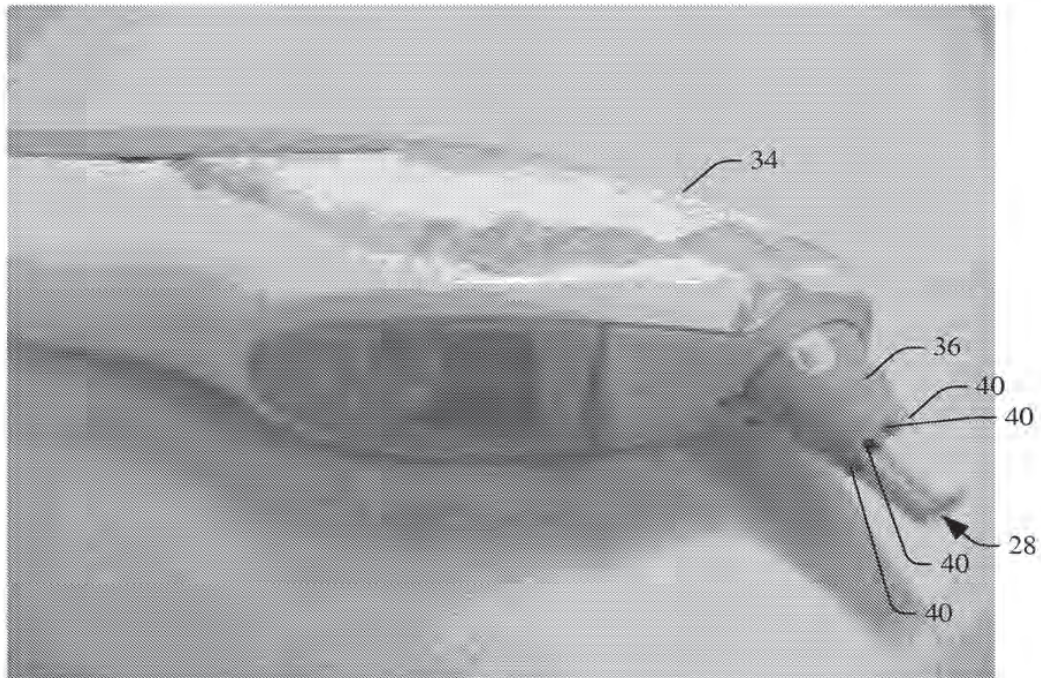


FIGURE 5

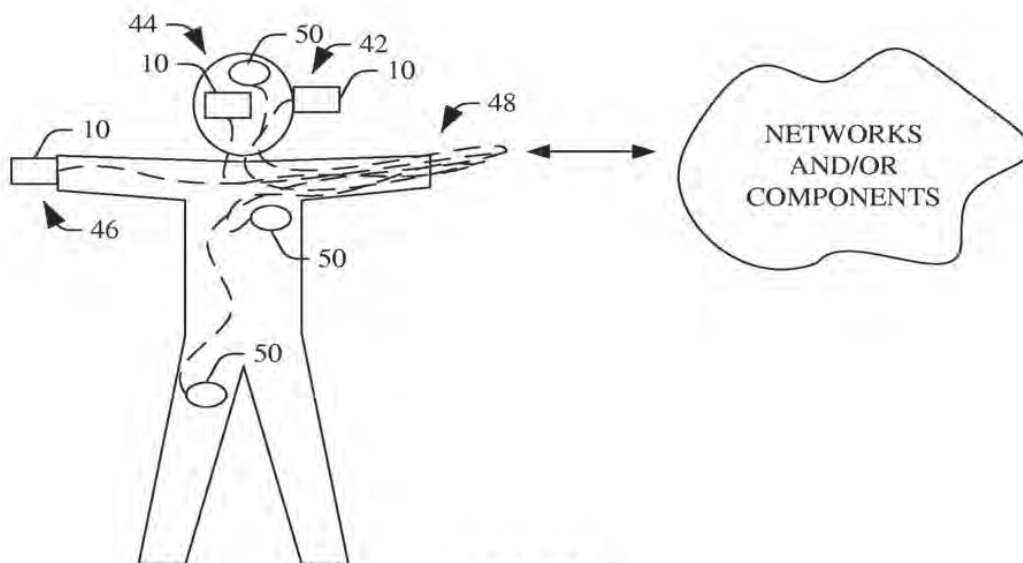


FIGURE 6

4/4

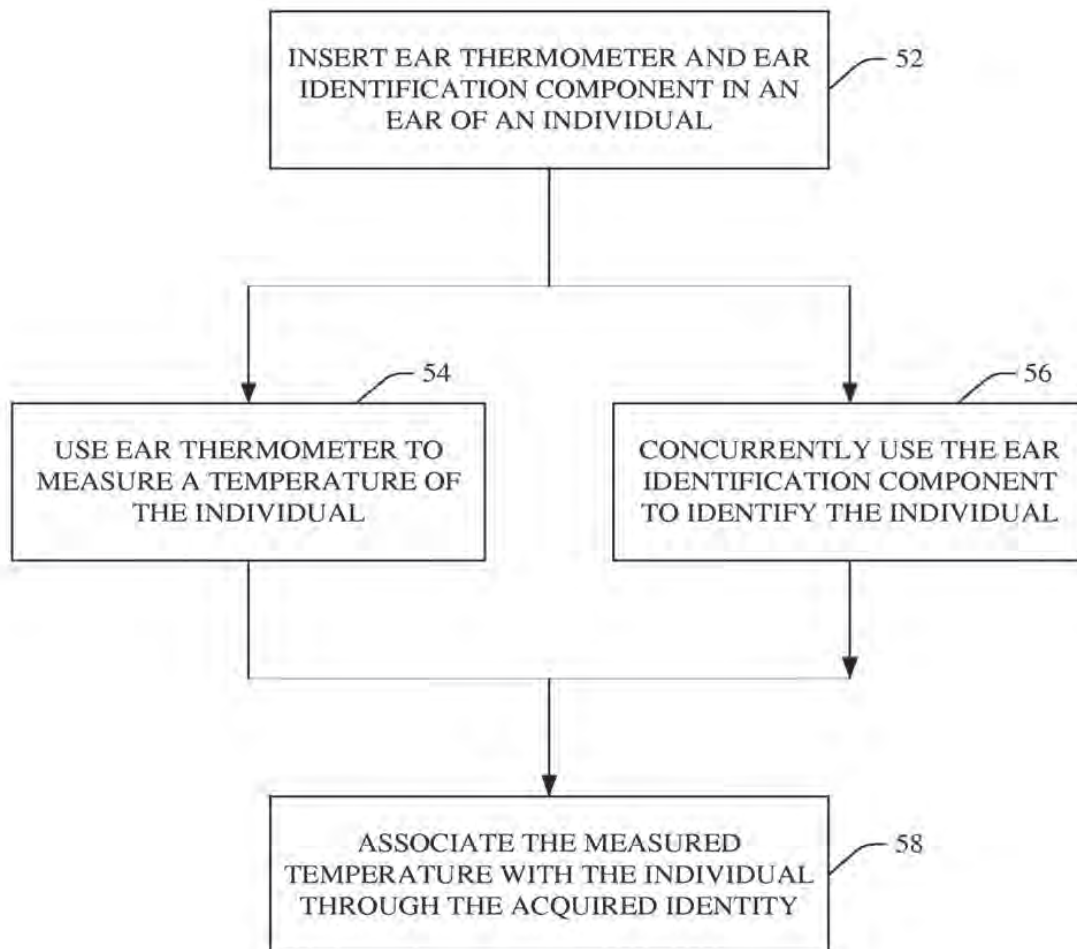


FIGURE 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2006/053299

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61B5/117

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)
A61B G01K

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 practical, search terms used)

EPO-Internal, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 6 643 531 B1 (KATAROW FRANK [US]) 4 November 2003 (2003-11-04) column 1, line 25 - column 2, line 32 column 3, line 1 - column 5, line 15	1,5,6, 12,19,20 7-10
X Y	US 2005/083993 A1 (HSIEH CHIN-CHIH [TW]) 21 April 2005 (2005-04-21) the whole document	1,2,5-8, 11,13-15 16
X Y	EP 1 465 117 A (HOTZ MICHEL ANDRE [CH]; HAUSER ROLF [DE]) 6 October 2004 (2004-10-06) paragraphs [0004] - [0010], [0015], [0016]	1,3,4,6, 19 16
X	US 2002/125991 A1 (LEVIN PAUL D [US]) 12 September 2002 (2002-09-12) paragraphs [0009] - [0011]	1,3,5,19
-/--		

☒ 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 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 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

13 February 2007

Date of mailing of the international search report

26/02/2007

Name and mailing address of the ISA/
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Manschot, Jan

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2006/053299

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/240712 A1 (ROWE ROBERT K [US] ET AL ROWE ROBERT K [US] ET AL) 2 December 2004 (2004-12-02) paragraphs [0015] - [0020], [0074]; claims 1,22-25	1,3
P,X	EP 1 634 530 A (IBM [US]) 15 March 2006 (2006-03-15) paragraphs [0003] - [0008], [0033] - [0038]	1,2,5, 7-15, 18-21
A	US 5 919 143 A (JENKINS GEOFFREY [US] ET AL) 6 July 1999 (1999-07-06) the whole document	1-16

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2006/053299

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6643531	B1	04-11-2003	AU 2003259837 A1 11-03-2004
		CA 2496359 A1 04-03-2004	
		CN 1688246 A 26-10-2005	
		EP 1545300 A1 29-06-2005	
		JP 2005536282 T 02-12-2005	
		KR 20050067385 A 01-07-2005	
		WO 2004017828 A1 04-03-2004	
US 2005083993	A1	21-04-2005	DE 202004000813 U1 01-04-2004
		FR 2861173 A3 22-04-2005	
		TW 244878 Y 01-10-2004	
EP 1465117	A	06-10-2004	NONE
US 2002125991	A1	12-09-2002	NONE
US 2004240712	A1	02-12-2004	US 2005205667 A1 22-09-2005
		US 2006002597 A1 05-01-2006	
		US 2006002598 A1 05-01-2006	
		US 2006210120 A1 21-09-2006	
		US 2006202028 A1 14-09-2006	
EP 1634530	A	15-03-2006	NONE
US 5919143	A	06-07-1999	NONE

Form PCT/ISA/210 (patent family annex) (April 2005)

Electronic Patent Application Fee Transmittal				
Application Number:		12649635		
Filing Date:		30-Dec-2009		
Title of Invention:		WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS		
First Named Inventor/Applicant Name:		John D. Joannopoulos		
Filer:		Marc M. Wefers/Cheryl Forrest		
Attorney Docket Number:		01997-0359015 / MIT 11757		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Claims in Excess of 20	1202	2	80	160
Independent claims in excess of 3	1201	4	420	1680
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1840

Electronic Acknowledgement Receipt	
EFS ID:	18777846
Application Number:	12649635
International Application Number:	
Confirmation Number:	5891
Title of Invention:	WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS
First Named Inventor/Applicant Name:	John D. Joannopoulos
Customer Number:	26161
Filer:	Marc M. Wefers/Cheryl Forrest
Filer Authorized By:	Marc M. Wefers
Attorney Docket Number:	01997-0359015 / MIT 11757
Receipt Date:	16-APR-2014
Filing Date:	30-DEC-2009
Time Stamp:	13:24:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1840
RAM confirmation Number	10342
Deposit Account	061050
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1		Reply.pdf	106617 d5c125e9411c17208019b0792d030c88741.pdf	yes	13
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	Document Description	Start	End		
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1		
	Claims	2	11		
	Applicant Arguments/Remarks Made in an Amendment	12	13		
Warnings:					
Information:					
2		IDS.pdf	169681 2c8bde70d9780113e013518c9df17d61c2c48d1	yes	6
	Multipart Description/PDF files in .zip description				
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	Transmittal Letter	1	1		
	Information Disclosure Statement (IDS) Form (SB08)	2	6		
Warnings:					
Information:					
3	Foreign Reference	FA95.pdf	209481 d6e0d6003fa65497ad248d17d613e00d832077f1	no	9
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4	Foreign Reference	FA96.pdf	476658 d1abd793a2c9e042d259e51cb2db887c0b572bd17	no	11
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5	Foreign Reference	FA97.pdf	751370 f1fdpa8014cdd51a6fca3c68f6a35e7aee7991beb1	no	17
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Information:					
6	Foreign Reference	FA98.pdf	1962228 57575891366d59d0d5d87d9892d772b31f7f0db	no	45
Warnings:					

Information:					
7	Foreign Reference	FA99.pdf	2527609	no	52
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8	Foreign Reference	FA100.pdf	405382	no	23
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19	Non Patent Literature	NPL111.pdf	942724	no	17
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Warnings:					
Information:					
Total Files Size (in bytes):			17925720		

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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.

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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

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 12/649,635		Filing Date 12/30/2009		☐ To be Mailed		
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO										
APPLICATION AS FILED – PART I										
(Column 1)		(Column 2)								
FOR	NUMBER FILED	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), (l), 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										
(Column 1)		(Column 2)		(Column 3)						
AMENDMENT	04/16/2014	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	= 48	Minus	= 46	= 2	X \$80 =		160		
	Independent (37 CFR 1.16(h))	= 8	Minus	= 4	= 4	X \$420 =		1680		
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE		1840		
(Column 1)		(Column 2)		(Column 3)						
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	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.										

This collection of information is required by 37 CFR 1.16. 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, 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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NOTICE OF ALLOWANCE AND FEE(S) DUE

26161 7590 06/06/2014
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P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER	
FLEMING, FRITZ M	
ART UNIT	PAPER NUMBER

2836

DATE MAILED: 06/06/2014

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/649,635	12/30/2009	John D. Joannopoulos	01997-0359015 / MIT 11757	5891

TITLE OF INVENTION: WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS

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	09/08/2014

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.

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Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

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26161 7590 06/06/2014
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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.
12/649,635	12/30/2009	John D. Joannopoulos	01997-0359015 / MIT 11757	5891

TITLE OF INVENTION: WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS

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	09/08/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
FLEMING, FRITZ M	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, 1 _____
(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. 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

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☐ 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
☐ Applicant asserting small entity status. See 37 CFR 1.27
☐ Applicant changing to regular undiscounted fee status.

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.

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.

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. _____



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/649,635	12/30/2009	John D. Joannopoulos	01997-0359015 / MIT 11757	5891
26161 7590 06/06/2014 FISH & RICHARDSON P.C. (BO) P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER FLEMING, FRITZ M	
			ART UNIT 2836	PAPER NUMBER
DATE MAILED: 06/06/2014				

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.

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. 12/649,635	Applicant(s) JOANNOPOULOS ET AL.	
	Examiner FRITZ M. FLEMING	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 the amendment filed 4/16/14.
☐ 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 1-3,5-7,9-36,38-40 and 42-52. 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)	5. ☐ Examiner's Amendment/Comment
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>4/16/14</u>	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	7. ☐ Other _____
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____	

/FRITZ M FLEMING/ Primary Examiner, Art Unit 2836	6/2/14
--	--------

1. The present application is being examined under the pre-AIA first to invent provisions.

Terminal Disclaimer

2. The terminal disclaimer filed on 4/16/14 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of 12/639,963 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Allowable Subject Matter

3. Claims 1-3,5-7,9-36,38-40,42-52 are allowed.
4. The following is an examiner's statement of reasons for allowance: the reasons set forth previously still apply.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRITZ M. FLEMING whose telephone number is (571)272-4145. The examiner can normally be reached on M-F, 0900-1730.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jared Fureman can be reached on 571-272-2391. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2836

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.

FRITZ M FLEMING
Primary Examiner
Art Unit 2836

/FRITZ M FLEMING/

Primary Examiner, Art Unit 2836



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BIB DATA SHEET

CONFIRMATION NO. 5891

SERIAL NUMBER 12/649,635	FILING or 371(c) DATE 12/30/2009 RULE	CLASS 307	GROUP ART UNIT 2836	ATTORNEY DOCKET NO. 01997-0359015 / MIT 11757		
APPLICANTS INVENTORS John D. Joannopoulos, Belmont, MA; Aristeidis Karalis, Boston, MA; Marin Soljacic, Belmont, MA; ** CONTINUING DATA ***** This application is a CON of 12/553,957 09/03/2009 ABN which is a CON of 11/481,077 07/05/2006 PAT 7741734 which claims benefit of 60/698,442 07/12/2005 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 01/14/2010						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/FRITZ M FLEMING/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY MA	SHEETS DRAWINGS 6	TOTAL CLAIMS 8	INDEPENDENT CLAIMS 2
ADDRESS FISH & RICHARDSON P.C. (BO) P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022 UNITED STATES						
TITLE WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS						
FILING FEE RECEIVED 4832	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			

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	94	("20020130642" "20020167294" "20030071034" "20030160590" "20040026998" "20040130425" "20040142733" "20040189246" "20040227057" "20050021134" "20050033382" "20050104453" "20050116683" "20050140482" "20050189945" "20050194926" "20050253152" "20050288742" "20060001509" "20060053296" "20060066443" "20060164866" "20060184209" "20060184210" "20060199620" "20060214626" "20060219448" "20060238365" "20060281435" "20070010295" "20070013483" "20070016089" "20070024246" "20070069687" "20070096875" "20070105429" "20070117596" "20070126650" "20070176840" "20070208563" "3780425" "3871176" "4095998" "4280129" "5229652" "5408209" "5522856" "5541604" "5565763" "5630835" "5697956" "5703461" "5710413" "5742471" "5821728" "5821731" "5903134" "5923544" "5940509" "5959245" "5959956" "5993996" "6012659" "6047214" "6066163" "6067473" "6108579" "6127799" "6207887" "6232841" "6238387" "6252762" "6473028" "6483202" "6535133" "6561975" "6609023" "6631072" "6683256" "6696647" "6703921" "6803744" "6858970" "6961619" "6967462" "6988026" "7027311" "7035076" "7084605" "7127293" "7193418" "7233137" "7251527" "7288918").PN.	US-PGPUB, USPAT	OR	OFF	2014/06/02 07:53
S1	12528	high adj q	USPAT	OR	OFF	2012/03/20 16:45
S2	296	S1 same wireless	USPAT	OR	OFF	2012/03/20 16:45
S3	88674	("5876425" "20040130916" "6345203" "20050151511" "5455467" "6597076" "6307468" "6047214" "5517194" "20030014091" "7355150" "20030114769" "6442434" "20040130915" "6364735" "20030069051").PN"	US-PGPUB, USPAT	OR	OFF	2012/03/20 16:48
S4	16	("5876425" "20040130916"	US-PGPUB,	OR	OFF	2012/03/20

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S5	5	S4 and q	US-PGPUB; USPAT	OR	OFF	2012/03/20 16:57
S6	2141	(307/104).OCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/20 16:59
S7	39	S6 and q	USPAT	OR	OFF	2012/03/20 16:59
S8	306	S6 and q	US-PGPUB; USPAT	OR	OFF	2012/03/20 16:59
S9	362	(320/108).OCLS.	USPAT; USOCR	OR	OFF	2012/03/20 17:35
S10	893	(320/108).OCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/20 17:36
S11	129	S10 and q	US-PGPUB; USPAT	OR	OFF	2012/03/20 17:36
S12	5432	(high adj q) same resonator	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 17:51
S13	480	(high adj q) same resonator same (contactless or (contact adj less) or inductive or inductively or wireless or wirelessly)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 17:52
S14	402	("2133494" "20030062794" "20030199778" "20040130916" "20050127849" "20060185809" "20080197710" "20090033564" "20090072627" "20090224608" "6450946" "6960968" "7069064" "7116200" "7180248" "7385357" "20080067874" "20090085408" "20090085706" "20090251008" "0649621" "7514818" "8022576" "1119732" "20030214255" "20040201361" "20060022636" "20080211320" "20090127937" "20090153273" "4088999" "5027709" "5070293" "5999308" "6436299" "7239110" "7248017" "7474058" "7518267" "20050288740" "20090189458" "20090284082" "7191007" "20070145830" "20090267709" "20100123355" "20100207458" "20110074218" "20110193419" "20030038641" "20040000974"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 21:29

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S15	10488	tet same q	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 22:31
S16	4	tet same q same implant	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 22:32
S17	2	transcutaneous adj energy adj transfer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 22:34
S18	550	transcutaneous adj energy adj transfer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 22:34
S19	60	S18 and q	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 22:34
S20	1060	("near" adj field) same wireless same power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 22:49
S21	76	("near" adj field) same wireless same power same q	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 22:49
S22	233	("near" adj field) same (wireless adj power)	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2012/03/20 22:52

			EPO; JPO; DERWENT; IBM_TDB			
S23	156	("near" adj field) adj inductive	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 23:01
S24	178	("near" adj field) same implant\$ same power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 23:19
S25	192	("near" adj field) same power same q	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/20 23:40
S26	2141	(307/104).CCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/20 23:54
S27	893	(320/108).CCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/20 23:54
S28	2316	S26 or S27	US-PGPUB; USPAT	OR	OFF	2012/03/20 23:54
S29	319	S28 and "near" adj field	US-PGPUB; USPAT	OR	ON	2012/03/20 23:54
S30	31	("3167168" "4023753" "4331225" "4459438" "4603640" "4689530" "4800328" "4833337" "4836344" "4879522").PN. OR ("5519262").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/21 00:10
S31	4	("near" adj field) same implant\$ same q	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/21 00:16
S32	186	("near" adj field) same high adj q	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/21 00:20
S33	34	("2401572" "2426226" "2805414" "3546699" "3713162" "3771075" "3786376" "3810183" "3914715" "4150345" "4157516" "4163961" "4233580" "4253101" "4258365" "4288759" "4358746" "Re29296").PN. OR	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/21 00:30

		("4516097").URPN.				
S34	1	("20100102639").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/21 11:50
S35	1	((("2010012355") or ("7741734"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/21 12:29
S36	2	((("20100012355") or ("7741734"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/21 12:29
S37	2	((("20100123355") or ("7741734"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/21 12:30
S38	2	((("20100096934") or ("7741734"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/21 12:52
S39	2	((("20100123355") or ("7741734"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/21 20:45
S40	0	S39 and (tunable)	US-PGPUB; USPAT	OR	OFF	2012/03/21 20:45
S41	0	S39 and (tuning)	US-PGPUB; USPAT	OR	OFF	2012/03/21 20:46
S42	0	S39 and (tune)	US-PGPUB; USPAT	OR	OFF	2012/03/21 20:46
S43	1	("20100127574").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/26 06:11
S44	1	S43 and rate	US-PGPUB; USPAT	OR	OFF	2012/03/26 06:13
S45	1	S43 and "0.2"	US-PGPUB; USPAT	OR	OFF	2012/03/26 06:18
S46	1	S43 and (tunable or tuning or tuned or feedback)	US-PGPUB; USPAT	OR	ON	2012/03/26 06:20
S47	1	S43 and (tunable or tuning or tuned or feedback or detune or detuning)	US-PGPUB; USPAT	OR	ON	2012/03/26 06:21
S48	1	("20090085408").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/03/26 06:57
S49	1	("20110140544").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/04/09 13:11
S50	1	S49 and common	US-PGPUB; USPAT	OR	OFF	2012/04/09 13:11
S51	3	((("20110140544") or ("7825543") or ("7741734"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/04/09 13:14
S52	3	S51 and common	US-PGPUB; USPAT	OR	OFF	2012/04/09 13:14
S53	1	S51 and (common adj inductance)	US-PGPUB; USPAT	OR	ON	2012/04/09 13:15
S54	4	((("20110140544") or ("20100117456") or ("7825543") or ("7741734"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/04/09 13:19
S55	1	S52 and (common adj inductance)	US-PGPUB; USPAT	OR	ON	2012/04/09 13:19

S56	3	S52 and common	US-PGPUB; USPAT	OR	OFF	2012/04/09 13:20
S57	4	S54 and common	US-PGPUB; USPAT	OR	OFF	2012/04/09 13:20
S58	368	(high adj q) same resonant same (tune or tuning)	USPAT	OR	OFF	2012/04/09 13:54
S59	587	(high adj q) same resonant same (tune or tuning)	US-PGPUB; USPAT	OR	ON	2012/04/09 13:54
S60	1485	(307/104).OCLS.	USPAT; USOCR	OR	OFF	2012/05/07 04:48
S61	3	S60 and young and fleming	USPAT	OR	OFF	2012/05/07 04:48
S62	2	((("7825543") or ("7741734"))).PN.	USPAT; USOCR	OR	OFF	2012/05/07 08:04
S63	5	"2006011769"	EPO; DERWENT	OR	OFF	2012/05/07 08:16
S64	4	"2004072581"	EPO; DERWENT	OR	OFF	2012/05/07 08:17
S65	2179	(307/104).OCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/05/07 12:02
S66	921	(320/108).OCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/05/07 12:02
S67	1199	S65 or S66	USPAT	OR	OFF	2012/05/07 12:02
S68	2381	S65 or S66	US-PGPUB; USPAT	OR	OFF	2012/05/07 12:02
S69	100	S68 and (nano or nanoscale)	US-PGPUB; USPAT	OR	ON	2012/05/07 12:02
S70	409	capacitor same inductor same(nano or nanoscale)	US-PGPUB; USPAT	OR	ON	2012/05/07 12:07
S71	5	capacitor same inductor same(nano or nanoscale) same transponder	US-PGPUB; USPAT	OR	ON	2012/05/07 12:13
S72	365	capacitor same inductor same powder	US-PGPUB; USPAT	OR	ON	2012/05/07 12:19
S73	87	q same (inductor or inductance) same (air adj core) same frequency	US-PGPUB; USPAT	OR	ON	2012/05/07 13:09
S74	5	q same (inductor or inductance) same (air adj core) same adjustable	US-PGPUB; USPAT	OR	ON	2012/05/07 13:13
S75	24	(inductor or inductance) same (air adj core) same adjustable	US-PGPUB; USPAT	OR	ON	2012/05/07 13:14
S76	79	(inductor or inductance) same (air adj core) same variable	US-PGPUB; USPAT	OR	ON	2012/05/07 13:15
S77	166	S68 and (air adj core)	US-PGPUB; USPAT	OR	ON	2012/05/07 13:24
S78	21	(inductor or inductance) same (air adj core) same variable	EPO; JPO; DERWENT	OR	ON	2012/05/07 13:38
S79	98	S68 and (variable or adjustable) near2 (inductor or inductance)	US-PGPUB; USPAT	OR	ON	2012/05/07 13:43
S80	53	("20020082059" "20030006880" "20030090239" "3689885" "3938018" "3949268" "4800328" "4818855" "5229652" "5341280"	US-PGPUB; USPAT; USOCR	OR	OFF	2012/05/07 13:51

		"5428659" "5455466" "5455467" "5550452" "5600225" "5701657" "5734254" "5814900" "5831348" "5982764" "6057668" "6127799" "6252380" "6265791" "6301128" "6323775" "6424124" "6429622" "6462432" "6597076" "6683438" "6703920" "6821670" "6844702" "6977479").PN. OR ("7518267").URPN.				
S81	1	("6436299").PN.	USPAT; USOCR	OR	OFF	2012/05/07 13:59
S82	2222	(307/104).CCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/06/18 05:48
S83	962	(320/108).CCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/06/18 05:48
S84	2222	(307/104).CCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/06/18 05:49
S85	962	(320/108).CCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/06/18 05:49
S86	2458	S84 or S85	US-PGPUB; USPAT	OR	OFF	2012/06/18 05:49
S87	511	(high adj q) same resonator same (contactless or (contact adj less) or inductive or inductively or wireless or wirelessly)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/06/18 05:50
S88	264	("near" adj field) same (wireless adj power)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/06/18 05:50
S89	163	("near" adj field) adj inductive	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/06/18 05:50
S90	2458	S84 or S85	US-PGPUB; USPAT	OR	OFF	2012/06/18 05:51
S91	350	S90 and "near" adj field	US-PGPUB; USPAT	OR	ON	2012/06/18 05:51
S92	11	("20040100338" "20040233043" "20060202665" "20120068549" "5053774" "5287112" "6772011" "8076800" "8076801" "8084889" "8097983").PN.	US-PGPUB; USPAT	OR	ON	2012/06/18 07:40
S93	4	("20030124050" "20030126948" "5455467" "6772011").PN.	US-PGPUB; USPAT	OR	ON	2012/06/18 07:40
S94	2	((("7825543") or ("7741734"))).PN.	USPAT;	OR	OFF	2012/06/18

			USOCR			08:05
S95	2	S94 and characteristic	USPAT	OR	OFF	2012/06/18 08:05
S96	1	("20030210106").PN.	US-PGPUB; USPAT	OR	OFF	2012/07/03 10:37
S97	1	("5959433").PN.	US-PGPUB; USPAT	OR	OFF	2012/07/03 10:39
S98	447	evanescent adj tail	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/03 10:40
S99	50	S98 and inductive	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/03 10:41
S100	97	S98 same power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/03 10:42
S101	50	S98 same wireless\$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/03 10:43
S102	60	S98 and wireless\$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/07/03 10:44
S103	37316	computer same (wireless\$ or inductive\$) same power	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/07/03 11:05
S104	4230	computer same (wireless\$ or inductive\$) same power same (coupling or transfer)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/07/03 11:05
S105	56	("2967267" "3549990" "4038625" "4654573" "4697183" "4755783" "4914561" "4924171" "4996638" "5122729" "5157319"	US-PGPUB; USPAT; USOCR	OR	OFF	2012/07/03 11:06

		"5166965").PN. OR ("5455467").URPN.				
S106	1358	computer same (wireless\$ or inductive\$) same power same (charging)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/07/03 11:09
S107	2	("2005/0151511").URPN.	USPAT	OR	OFF	2012/07/03 11:19
S108	971	(320/108).CCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/07/03 11:20
S109	130	S108 and computer	USPAT	OR	OFF	2012/07/03 11:20
S110	364	S108 and computer	US-PGPUB; USPAT	OR	OFF	2012/07/03 11:21
S111	1	("20100277005").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/07/03 11:28
S112	2	((("20100277005") or ("20110049996"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/07/03 11:29
S113	0	S112 and base	USPAT	OR	OFF	2012/07/03 11:30
S114	0	S112 and hold	USPAT	OR	OFF	2012/07/03 11:30
S115	0	S112 and portable	USPAT	OR	OFF	2012/07/03 11:31
S116	2	S112 and portable	US-PGPUB; USPAT	OR	OFF	2012/07/03 11:31
S117	2	S112 and base	US-PGPUB; USPAT	OR	OFF	2012/07/03 11:31
S118	135	S108 and contacts	USPAT	OR	OFF	2012/07/03 11:44
S119	1	("5367242").PN.	USPAT; USOCR	OR	OFF	2012/07/03 12:01
S120	0	S119 and phone	USPAT	OR	OFF	2012/07/03 12:01
S121	244	S108 and ferrite	US-PGPUB; USPAT	OR	OFF	2012/07/03 12:19
S122	1	S112 and desktop	US-PGPUB; USPAT	OR	OFF	2012/07/03 13:38
S123	2	S112 and "near"	US-PGPUB; USPAT	OR	OFF	2012/07/03 13:48
S124	2	S112 and evanescent	US-PGPUB; USPAT	OR	OFF	2012/07/03 14:44
S125	2	S112 and radiative	US-PGPUB; USPAT	OR	OFF	2012/07/03 14:46
S126	2	((("7825543") or ("7741734"))).PN.	USPAT; USOCR	OR	OFF	2012/07/03 14:50
S127	1	("20100207458").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/08/13 02:46

S128	1	S127 and characteristic	US-PGPUB; USPAT	OR	OFF	2012/08/13 02:46
S129	1	("20100127575").PN.	US-PGPUB; USPAT	OR	OFF	2012/08/27 06:11
S130	1	S129 and second and third	US-PGPUB; USPAT	OR	OFF	2012/08/27 06:14
S131	0	("7687939").PN.	USPAT; USOCR	OR	OFF	2012/08/27 06:15
S132	0	("7687939").PN.	US-PGPUB; USPAT	OR	OFF	2012/08/27 06:16
S133	0	("7687939").PN.	US-PGPUB; USPAT	OR	OFF	2012/08/27 06:16
S134	1	("7741734").PN.	US-PGPUB; USPAT	OR	OFF	2012/08/27 06:21
S135	0	S134 and second and third	USPAT	OR	OFF	2012/08/27 06:22
S136	1	("20110074347").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/08/27 12:22
S137	3	((("20110074347") or ("7825543") or ("7741734"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/08/27 12:23
S138	1	("20100237708").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/08/29 08:48
S139	1	S138 and housing	US-PGPUB; USPAT	OR	OFF	2012/08/29 08:49
S140	1	S138 and housing	US-PGPUB; USPAT	OR	ON	2012/08/29 09:17
S141	2	((("20101117456") or ("20080278264") or ("7825543"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/04 11:41
S142	3	((("20100117456") or ("20080278264") or ("7825543"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/04 11:42
S143	3	S142 and impedance	US-PGPUB; USPAT	OR	ON	2012/09/04 11:44
S144	0	S142 and (impedance same (match or matching))	US-PGPUB; USPAT	OR	ON	2012/09/04 11:45
S145	3	((("20100127573") or ("7741734") or ("7825543"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/10 10:27
S146	3	S145 and characteristic	US-PGPUB; USPAT	OR	OFF	2012/09/10 10:28
S147	1706	(307/104).OCLS.	US-PGPUB; USPAT	OR	OFF	2012/09/10 12:09
S148	1095	(333/195).OCLS.	US-PGPUB; USPAT	OR	OFF	2012/09/10 12:09
S149	1017	(320/108).OCLS.	US-PGPUB; USPAT	OR	OFF	2012/09/10 12:09
S155	1	("20100096934").PN.	US-PGPUB; USPAT	OR	OFF	2012/09/10 13:29
S157	1	("20100102641").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/10 14:44

S159	1	("20110169339").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/11 07:05
S160	0	S159 and (voltage same capacitor)	USPAT	OR	OFF	2012/09/11 07:08
S161	1	S159 and (voltage same capacitor)	US-PGPUB; USPAT	OR	ON	2012/09/11 07:08
S162	1	S159 and (information same exchange)	US-PGPUB; USPAT	OR	ON	2012/09/11 07:09
S163	1	S159 and planar	US-PGPUB; USPAT	OR	ON	2012/09/11 07:18
S164	25	(high adj q) same feedback same (wireless\$ or (non adj contact) or contactless)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/11 08:16
S165	1110	q same feedback same (wireless\$ or (non adj contact) or contactless or inductive\$)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/11 08:18
S166	78	q same feedback same (wireless\$ or (non adj contact) or contactless or inductive\$) same power same transfer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/11 08:18
S167	1019	(320/108).OCLS.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2012/09/11 08:21
S168	1794	(307/104).OCLS.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2012/09/11 08:21
S169	0	("032or33").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2012/09/11 08:22
S170	2717	S167 or S168	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/11 08:22
S171	485	S170 and feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/11 08:22
S172	507	S170 and (secondary same current	US-PGPUB;	OR	OFF	2012/09/11

		same voltage)	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			09:33
S173	128	S170 and (secondary same current same voltage same resonant)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/11 09:33
S174	145	(implant\$) and (secondary same current same voltage same resonant)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/11 10:29
S175	9	tet same (secondary same current same voltage same resonant)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/11 10:39
S176	45	tet and (secondary same current same voltage same resonant)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/11 10:40
S177	54	tet and (secondary same power same resonant)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/11 10:40
S178	316	tet and (power same feedback)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2012/09/11 10:45
S179	126	high same q same wireless same power same transfer	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/11 11:12
S180	1790	(307/104).OCLS.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2012/09/21 20:55
S181	1013	(320/108).OCLS.	US-PGPUB; USPAT;	OR	OFF	2012/09/21 20:56

			EPO; JPO; DERWENT			
S183	0	20016655u1	EPO; DERWENT	OR	OFF	2012/09/30 18:52
S184	9	"20016655"	EPO; DERWENT	OR	OFF	2012/09/30 18:52
S185	3	"10221484"	EPO; DERWENT	OR	OFF	2012/09/30 18:53
S186	0	("200902677710").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/30 19:05
S187	1	("200902677710").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/09/30 19:05
S188	0	S187 and radiative	USPAT	OR	OFF	2012/09/30 19:05
S189	0	S187 and nonradiative	USPAT	OR	OFF	2012/09/30 19:05
S190	0	S187 and nonradiative	US-PGPUB	OR	OFF	2012/09/30 19:05
S191	1	S187 and radiative	US-PGPUB; USPAT	OR	OFF	2012/09/30 19:06
S192	2	((("7825543") or ("7741734"))).PN.	USPAT; USOCR	OR	OFF	2012/10/01 07:01
S193	1020	(320/108).OCLS.	US-PGPUB; USPAT	OR	OFF	2012/10/01 07:16
S194	746	(320/109).OCLS.	US-PGPUB; USPAT	OR	OFF	2012/10/01 07:16
S195	67	S193 and S194	US-PGPUB; USPAT	OR	OFF	2012/10/01 07:16
S196	1	("20110018361").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 08:01
S197	1	S196 and motorized	US-PGPUB; USPAT	OR	OFF	2012/10/01 08:01
S198	1	S196 and movement	US-PGPUB; USPAT	OR	OFF	2012/10/01 08:02
S199	1	S196 and position	US-PGPUB; USPAT	OR	OFF	2012/10/01 08:04
S200	1	("20100327660").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 09:41
S201	1	S200 and optimize	US-PGPUB; USPAT	OR	OFF	2012/10/01 09:41
S202	1	S200 and optimizing	US-PGPUB; USPAT	OR	OFF	2012/10/01 09:43
S203	1	S200 and optimiz\$	US-PGPUB; USPAT	OR	OFF	2012/10/01 09:44
S204	1	("20110074218").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/10/01 17:14
S205	3	((("20100123354") or ("20100123353") or ("200902677710"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/11/23 11:14
S206	3	S205 and resonator	US-PGPUB	OR	OFF	2012/11/23

			USPAT			11:19
S207	60	"7741734"	US-PGPUB; USPAT	OR	OFF	2012/11/23 12:01
S208	1	("7741734").PN.	USPAT; USOCR	OR	OFF	2012/11/23 12:01
S209	1	("7741734").PN.	USPAT; USOCR	OR	OFF	2012/11/26 19:58
S210	0	S209 and storing	USPAT	OR	OFF	2012/11/26 19:58
S211	0	S209 and store	USPAT	OR	OFF	2012/11/26 19:58
S212	0	S209 and store	USPAT	OR	ON	2012/11/26 20:05
S213	1	S209 and energy	USPAT	OR	ON	2012/11/26 20:05
S214	1	S209 and stored	USPAT	OR	ON	2012/11/26 20:07
S215	1	S209 and intrinsic	USPAT	OR	ON	2012/11/26 20:12
S216	2	((("6960968") or ("7069064")).PN.	USPAT; USOCR	OR	OFF	2012/12/10 15:46
S217	1802	(307/104).OCLS.	US-PGPUB; USPAT	OR	OFF	2012/12/10 22:53
S219	4	((("20110140544") or ("20100117456") or ("7825543") or ("7741734")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2012/12/17 08:16
S220	4	S219 and acoustic	US-PGPUB; USPAT	OR	OFF	2012/12/17 08:16
S221	233	acoustic near3 power near3 transmission	US-PGPUB; USPAT	OR	ON	2012/12/17 08:17
S222	34	S221 and resonant	US-PGPUB; USPAT	OR	ON	2012/12/17 08:17
S223	774	(self adj (resonant or resonating)) near5 (coil or loop)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/01/24 09:19
S224	593	(self adj (resonant or resonating)) near2 (coil or loop)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/01/24 09:20
S225	303	(self adj (resonant or resonating)) adj (coil or loop)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/01/24 09:20
S226	123	("3859624" "4450431" "4630044" "4658263" "4868915").PN. OR ("5084699").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/01/24 09:29

S227	23	S223 same ("near" adj field)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/01/24 09:38
S228	1	("5012236").PN.	USPAT; USOCR	OR	OFF	2013/01/24 09:40
S229	900	self near2 (resonant or resonate or resonance or resonating) near2 (coil or loop)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/01/24 12:09
S230	2524	(307/104).OCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/01/24 12:19
S231	209	S230 and (self near2 (resonant or resonate or resonance or resonating))	US-PGPUB; USPAT; USOCR	OR	ON	2013/01/24 12:19
S232	782	S229 or S231	US-PGPUB; USPAT; USOCR	OR	ON	2013/01/24 12:20
S233	209	S230 and (self near2 (resonant or resonate or resonance or resonating))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/01/24 12:20
S234	957	S233 or S229	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/01/24 12:20
S235	17	self same resonant same coil same transponder	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/02/07 10:50
S236	1	("20100231053").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/02/21 08:45
S237	2993	contactless same (energy or power)	EPO; JPO; DERWENT	OR	OFF	2013/02/28 01:50
S238	137	contactless same (energy or power) same (resonant or resonance or resonating)	EPO; JPO; DERWENT	OR	ON	2013/02/28 01:50
S239	934	wireless same (energy or power) same (resonant or resonance or resonating)	EPO; JPO; DERWENT	OR	ON	2013/02/28 02:15
S240	233	wireless same (energy or power) same (resonant or resonance or	EPO; JPO; DERWENT	OR	ON	2013/02/28 02:15

		resonating) same coil				
S241	118	wireless same (energy or power) same q	EPO; JPO; DERWENT	OR	ON	2013/02/28 02:23
S242	29	wireless same (energy or power) same (resonant or resonance or resonating) same q	EPO; JPO; DERWENT	OR	ON	2013/02/28 02:29
S243	0	(h02j5/0005).IPCR.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2013/02/28 08:48
S244	975	h02j5/005.cpc.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2013/02/28 08:52
S245	0	h02j5/005.cpc.	EPO; JPO; DERWENT	OR	OFF	2013/02/28 08:55
S246	0	h02j5/005	EPO; JPO; DERWENT	OR	OFF	2013/02/28 08:55
S247	0	h02j5/005.cpc.	EPO; JPO; DERWENT	OR	OFF	2013/02/28 09:03
S248	0	h02j5.cpcl.	EPO; JPO; DERWENT	OR	OFF	2013/02/28 09:06
S249	0	h02j.cpcl.	EPO; JPO; DERWENT	OR	OFF	2013/02/28 09:07
S250	9041	h02j17/00	EPO; JPO; DERWENT	OR	OFF	2013/02/28 09:18
S251	0	h02j17/00	EPO	OR	OFF	2013/02/28 09:21
S252	7452	h02j17/00	DERWENT	OR	OFF	2013/02/28 09:21
S253	9041	h02j17/00	JPO; DERWENT	OR	OFF	2013/02/28 09:21
S254	1589	h02j17/00	JPO	OR	OFF	2013/02/28 09:21
S255	0	h02j17/00.ipc.	EPO	OR	OFF	2013/02/28 09:26
S256	0	h02j17/00.ipc.	DERWENT	OR	OFF	2013/02/28 09:26
S257	0	h02j17/00.epc.	EPO	OR	OFF	2013/02/28 09:27
S258	0	H02J17/00.epc.	EPO	OR	OFF	2013/02/28 09:27
S259	0	H02J17/00.ipc.	EPO	OR	OFF	2013/02/28 09:27
S260	1589	H02J17/00.ipc.	JPO	OR	OFF	2013/02/28 09:28
S261	1095	S252 and q	DERWENT	OR	OFF	2013/02/28 09:28
S262	25	S252 and (high adj q)	DERWENT	OR	OFF	2013/02/28 09:30
S263	1	schuerman and (high adj q)	USPAT	OR	OFF	2013/02/28 09:32
S264	1	("5053774").PN.	USPAT	OR	OFF	2013/02/28 09:32

S265	8	schuerman and q	USPAT	OR	OFF	2013/02/28 09:36
S266	1	("5374930").PN.	USPAT; USOCR	OR	OFF	2013/02/28 09:39
S267	97	("5287112").PN. OR ("5374930").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/02/28 09:39
S268	230	S252 and (resonator)	DERWENT	OR	OFF	2013/02/28 09:45
S269	242	S252 and (resonator)	DERWENT	OR	ON	2013/02/28 09:46
S270	554	S252 and (resonant)	DERWENT	OR	ON	2013/02/28 09:51
S271	61	transponder and (resonance or resonant or resonating) and q	JPO; DERWENT; IBM_TDB	OR	ON	2013/02/28 10:34
S272	1	("5095224").PN.	USPAT; USOCR	OR	OFF	2013/02/28 10:44
S273	43	("3166718" "3360732" "3391345" "4345604" "4489370" "4584499" "4654574" "4675796" "4694387" "4743789" "4829415").PN. OR ("5095224").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/02/28 10:44
S274	1069	S252 and resonance	DERWENT	OR	OFF	2013/02/28 10:47
S275	44	S274 and quality	DERWENT	OR	OFF	2013/02/28 10:47
S276	541	S252 and resonance and coil	DERWENT	OR	OFF	2013/02/28 10:48
S277	557	S252 and resonance and coil	DERWENT	OR	ON	2013/02/28 10:48
S278	71	(high adj q) and coil and resonance	DERWENT	OR	ON	2013/02/28 10:59
S279	453	(high adj q) same coil same resonance	US-PGPUB; USPAT	OR	ON	2013/02/28 11:03
S280	33	(high adj q) same transponder same power	US-PGPUB; USPAT	OR	ON	2013/02/28 11:22
S281	34	(high adj q) same wireless\$ same power	EPO; JPO; DERWENT	OR	ON	2013/02/28 11:45
S282	786	(resonance or resonator or resonating) same wireless\$ same power	EPO; JPO; DERWENT	OR	ON	2013/02/28 11:46
S283	521	(resonance or resonator or resonating) same inductive\$ same power	EPO; JPO; DERWENT	OR	ON	2013/02/28 11:53
S284	41	S252 and meter	EPO; JPO; DERWENT	OR	ON	2013/02/28 12:04
S285	108	"10" and power and distance and resonant	EPO; JPO; DERWENT	OR	ON	2013/02/28 14:47
S286	7452	h02j17/00	DERWENT	OR	OFF	2013/02/28 14:51
S287	77	S286 and power and distance and resonant	EPO; JPO; DERWENT	OR	ON	2013/02/28 14:51
S288	477	magnetic and resonant and power and (transfer or transmission or	EPO; JPO; DERWENT	OR	ON	2013/02/28 14:52

		coupling)				
S289	39	S286 and repeater	EPO; JPO; DERWENT	OR	ON	2013/02/28 15:02
S290	2569	(307/104).OCLS.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/02/28 15:04
S291	145	S290 and repeater	US-PGPUB; USPAT	OR	ON	2013/02/28 15:04
S292	67	implant same repeater	US-PGPUB; USPAT	OR	ON	2013/02/28 15:07
S293	9	"near field" and q and loop	EPO; JPO; DERWENT	OR	ON	2013/03/01 10:26
S294	193	"near field" and loop	EPO; JPO; DERWENT	OR	ON	2013/03/01 10:27
S295	201	"near field" and power and transmission	EPO; JPO; DERWENT	OR	ON	2013/03/01 10:31
S296	1374	"near field" same power same transmission	US-PGPUB; USPAT	OR	ON	2013/03/01 10:33
S297	130	"near field" same power same transmission same q	US-PGPUB; USPAT	OR	ON	2013/03/01 10:33
S298	160	"near field" same power same transmission same resonance	US-PGPUB; USPAT	OR	ON	2013/03/01 10:35
S299	256	"near field" same (wireless or contactless or inductive) same resonance	US-PGPUB; USPAT	OR	ON	2013/03/01 10:36
S300	101	("3036295" "3137847" "3182314" "3182315" "3218638" "3299424" "3363246" "3467962" "3518546" "3522602" "3737911" "3739279").PN. OR ("4160971").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/03/01 10:39
S301	228	"wireless power transfer"	EPO; JPO; DERWENT	OR	OFF	2013/03/01 10:42
S302	807	"wireless power transfer"	US-PGPUB; USPAT	OR	OFF	2013/03/01 10:46
S303	110	"contactless power transfer"	US-PGPUB; USPAT	OR	OFF	2013/03/01 10:51
S304	3053	((contactless or wireless\$ or inductive\$) adj power)	EPO; JPO; DERWENT	OR	ON	2013/03/01 10:57
S305	7642	((contactless or wireless or inductive or inductively) adj3 power)	EPO; JPO; DERWENT	OR	ON	2013/03/01 10:58
S306	3011	((contactless or wireless or inductive or inductively) adj power)	EPO; JPO; DERWENT	OR	ON	2013/03/01 10:58
S307	56	((contactless or wireless or inductive or inductively) adj3 power) same q	EPO; JPO; DERWENT	OR	ON	2013/03/01 10:58
S308	115	((contactless or wireless or inductive or inductively) adj3 power) and ("near" adj field)	EPO; JPO; DERWENT	OR	ON	2013/03/01 11:00
S309	522	((contactless or wireless or inductive or inductively) adj3 power) same ("near" adj field)	US-PGPUB; USPAT	OR	ON	2013/03/01 11:01
S310	392	(self adj resonance) same q	US-PGPUB; USPAT	OR	ON	2013/03/01 11:04
S311	2569	(307/104).OCLS.	US-PGPUB; USPAT;	OR	OFF	2013/03/01 11:10

			USOCR			
S312	48	S311 and quality	USPAT	OR	OFF	2013/03/01 11:10
S313	331	S311 and quality	US-PGPUB; USPAT	OR	OFF	2013/03/01 11:10
S314	264	S311 and (q adj factor)	US-PGPUB; USPAT	OR	OFF	2013/03/01 11:11
S315	303	(self adj (resonance or resonating)) and (q adj factor)	US-PGPUB; USPAT	OR	OFF	2013/03/01 11:12
S316	102	(loop adj antenna) same q same resonance	US-PGPUB; USPAT	OR	ON	2013/03/01 11:15
S317	1	("7741734").PN.	USPAT; USOCR	OR	OFF	2013/03/01 11:26
S318	0	S317 and yates	USPAT	OR	OFF	2013/03/01 11:26
S319	1	S317 and optimal	USPAT	OR	OFF	2013/03/01 11:26
S320	1	S317 and markoff	USPAT	OR	OFF	2013/03/01 11:26
S321	1	("7741734").PN.	USPAT; USOCR	OR	OFF	2013/03/01 23:46
S322	4	"3824972"	EPO; DERWENT	OR	OFF	2013/03/02 00:54
S323	235	magnetic adj antenna	EPO; JPO; DERWENT	OR	OFF	2013/03/02 01:48
S324	252	magnetic adj antenna	EPO; JPO; DERWENT	OR	ON	2013/03/02 01:48
S325	680	magnetic adj antenna	US-PGPUB; USPAT	OR	ON	2013/03/02 02:05
S326	28	S325 same q	US-PGPUB; USPAT	OR	ON	2013/03/02 02:06
S327	290	S325 and "near field"	US-PGPUB; USPAT	OR	ON	2013/03/02 02:08
S328	10	("20040046663" "20050086264" "20050178832" "6236315" "6259369" "6839035" "7005968").PN. OR ("7280045").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/03/02 02:17
S329	133	(quality adj factor) same (loss adj rate)	US-PGPUB; USPAT; USOCR	OR	ON	2013/03/02 02:51
S330	70	(quality adj factor) same (loop adj antenna)	US-PGPUB; USPAT; USOCR	OR	ON	2013/03/02 02:52
S331	11	(quality adj factor) and (loop adj antenna)	EPO; JPO; DERWENT	OR	ON	2013/03/02 02:59
S332	321	(quality adj factor) and (resonant adj frequency)	EPO; JPO; DERWENT	OR	ON	2013/03/02 03:08
S333	265	(quality adj factor) same (resonant adj frequency)	EPO; JPO; DERWENT	OR	ON	2013/03/02 03:08
S334	1587	(quality adj factor) same (resonant adj frequency)	USPAT	OR	ON	2013/03/02 03:12
S335	1	("20100207458").PN.	US-PGPUB; USPAT	OR	OFF	2013/06/02 08:29

S336	0	S335 and dynamically	USPAT	OR	OFF	2013/06/02 08:34
S337	0	S335 and dynamic\$	USPAT	OR	OFF	2013/06/02 08:55
S338	0	S335 and intrinsic	USPAT	OR	OFF	2013/06/02 09:09
S339	0	S335 and dynamically	US-PGPUB; USPAT	OR	OFF	2013/06/02 09:11
S340	1	S335 and intrinsic	US-PGPUB; USPAT	OR	OFF	2013/06/02 09:11
S341	0	S335 and " high intrinsic"	US-PGPUB; USPAT	OR	OFF	2013/06/02 09:13
S342	1	S335 and high	US-PGPUB; USPAT	OR	OFF	2013/06/02 09:13
S343	1	S335 and rate	US-PGPUB; USPAT	OR	OFF	2013/06/02 09:16
S344	1	("20110089895").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/06/03 01:10
S345	1	S344 and repeater	US-PGPUB; USPAT	OR	OFF	2013/06/03 01:10
S346	1	S344 and enhances	US-PGPUB; USPAT	OR	OFF	2013/06/03 01:12
S347	1	S344 and "coupling mode region"	US-PGPUB; USPAT	OR	OFF	2013/06/03 01:13
S348	0	qualcom and "coupling mode region"	US-PGPUB; USPAT	OR	OFF	2013/06/03 01:14
S349	0	qualcom and (wireless same repeater same "near" same field)	US-PGPUB; USPAT	OR	OFF	2013/06/03 01:15
S350	16	qualcom and (wireless same repeater)	US-PGPUB; USPAT	OR	OFF	2013/06/03 01:15
S351	6	nigel and (wireless same repeater)	US-PGPUB; USPAT	OR	OFF	2013/06/03 01:16
S352	1	("20090284218").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/06/03 01:20
S353	1	("20090286470").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/06/03 01:23
S354	2	((("20100207458") or ("20110089895")).PN.	US-PGPUB; USPAT	OR	OFF	2013/06/03 15:30
S355	2	((("20090224856") or ("20110089895")).PN.	US-PGPUB; USPAT	OR	OFF	2013/06/03 15:32
S356	1	("20090286470").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/06/03 15:39
S357	1	S356 and (resonant or resonator)	US-PGPUB; USPAT	OR	ON	2013/06/03 15:39
S358	0	S356 and q	US-PGPUB; USPAT	OR	ON	2013/06/03 15:57
S359	66	("2274557" "3694803" "3723966" "3798642" "3806905" "3911434" "3990041" "4067235" "4074227" "4174515" "4303910").PN. OR ("4450431").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/06/03 17:03

S360	11	("20040046663" "20050086264" "20050178832" "6236315" "6259369" "6839035" "7005968").PN. OR ("7280045").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/06/03 17:20
S361	36228	(rfid or (rf adj2 id)) smae passive same repeater	EPO; JPO; DERWENT	OR	ON	2013/06/03 17:26
S362	6	(rfid or (rf adj2 id)) same passive same repeater	EPO; JPO; DERWENT	OR	ON	2013/06/03 17:26
S363	11	(rfid or (rf adj2 id)) near2 passive near2 repeater	US-PGPUB; USPAT	OR	ON	2013/06/03 19:50
S364	73	(rfid or (rf adj2 id)) near2 repeater	US-PGPUB; USPAT	OR	ON	2013/06/03 19:51
S365	3	((("8097983") or ("7825543") or ("7741734")).PN.	USPAT; USOCR	OR	OFF	2013/06/03 20:13
S366	3	((("8097983") or ("7825543") or ("7741734") or ("201100898985")).PN.	US-PGPUB; USPAT	OR	OFF	2013/06/03 20:15
S367	0	S366 and repeater	US-PGPUB; USPAT	OR	ON	2013/06/03 20:16
S368	4	((("8097983") or ("7825543") or ("7741734") or ("201100898985")).PN.	US-PGPUB; USPAT	OR	OFF	2013/06/03 20:17
S369	1	S368 and repeater	US-PGPUB; USPAT	OR	OFF	2013/06/03 20:17
S370	0	transponder same resonator	EPO; JPO; DERWENT	OR	OFF	2013/06/05 09:37
S371	64	transponder same resonator	EPO; JPO; DERWENT	OR	ON	2013/06/05 09:37
S372	103	transponder near5 resonator	US-PGPUB; USPAT	OR	ON	2013/06/05 09:45
S373	36	transponder same resonator same q	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/05 09:50
S374	36	transponder same resonator same q and resonator	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/05 09:56
S375	7	("20030161511" "20030200814" "20070176773" "5443987" "5663072" "6025725" "6204764").PN. OR ("7714593").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/06/05 09:58
S376	32	rfid same resonator same q	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/05 09:59
S377	7	rfid and resonator and q	EPO; JPO; DERWENT	OR	ON	2013/06/05 10:01

S378	112	tire and pressure and resonator	EPO; JPO; DERWENT	OR	ON	2013/06/05 10:02
S379	1	("4450431").PN.	USPAT; USOCR	OR	OFF	2013/06/05 17:13
S380	0	S379 and resonator	USPAT	OR	OFF	2013/06/05 17:13
S381	1	S379 and resonant	USPAT	OR	OFF	2013/06/05 17:13
S382	4	((("8097983") or ("7825543") or ("7741734") or ("20110089895")).PN.	US-PGPUB; USPAT	OR	OFF	2013/06/11 08:29
S383	4	S382 and enhanc\$	US-PGPUB; USPAT	OR	OFF	2013/06/11 08:29
S384	1	S382 and "loop inductor"	US-PGPUB; USPAT	OR	OFF	2013/06/11 09:05
S385	2	hochstein and tire and pressure and "267,261"	US-PGPUB; USPAT	OR	OFF	2013/06/11 10:28
S386	6	("3662335" "3806905" "3858174" "4006449" "4074227" "4174515").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/06/11 10:43
S387	2	("2274557").PN.	USPAT; USOCR	OR	OFF	2013/06/11 10:49
S388	3	((("2274557") or ("3723966"))).PN.	USPAT; USOCR	OR	OFF	2013/06/11 10:49
S389	4	(tire adj pressure) same resonant same repeat\$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/11 13:44
S390	39	(tire adj pressure) same resonant same passive	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/11 13:52
S391	2	contactless same resonant same repeater	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 13:54
S392	87	wireless\$ same resonant same repeater	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 13:54
S393	1	wireless\$ same resonant same extender	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 13:56

S394	2	rfid same resonant same extender	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 13:56
S395	5	rfid same resonant same repeater	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 13:57
S396	1	rfid and resonant and repeater	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 13:58
S397	0	rfid and resonant and extender	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 13:58
S398	6	rfid and extender	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 13:58
S399	73	rfid and booster	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 14:01
S400	14	rfid and booster and range	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 14:01
S401	176	rfid and passive and range	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 14:02
S402	1150	rfid same range same (boost\$ or (extend or extender or extending))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 14:28
S403	814	rfid same range same (extend or extender or extending)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 14:29
S404	172	rfid same range same (extend or extender or extending) same passive\$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 14:29
S405	7	("5379455" "5600333" "6107910"	US-PGPUB;	OR	OFF	2013/06/11

		"6137403" "6223990" "6278413" "6359444").PN.	USPAT; USOCR			14:34
S406	284	rfid same range same improved same antenna	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/11 14:37
S407	1	("8097983").PN.	USPAT; USOCR	OR	OFF	2013/06/12 00:16
S408	1	("5053774").PN.	USPAT; USOCR	OR	OFF	2013/06/12 00:40
S409	97	rfid same resonant same detun\$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2013/06/12 01:44
S410	97	rfid same resonant same detun\$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/12 01:44
S411	76	resonator same resonant same frequency same q same l same c	USPAT	OR	OFF	2013/06/12 16:27
S412	148	resonator same resonant same frequency same q same l same c	US-PGPUB	OR	OFF	2013/06/12 16:31
S413	0	rfid same resonant same frequency same q same l same c	US-PGPUB	OR	OFF	2013/06/12 16:33
S414	12	transponder same resonant same frequency same q same l same c	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/12 17:19
S415	112	transponder same resonant same frequency same q	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/12 17:44
S416	4206	l same c same resonant same frequency same q	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/12 17:52
S417	19	l same c same resonant same frequency same q	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/06/12 17:52
S418	1	charger same resonant same	FPRS;	OR	ON	2013/06/12

		frequency same q	EPO; JPO; DERWENT; IBM_TDB			17:54
S419	47	charger same resonant same frequency same q	US-PGPUB; USPAT	OR	ON	2013/06/12 17:55
S420	429	(resonant adj circuit) near5 resonator	USPAT	OR	ON	2013/06/12 18:58
S421	51	(resonant adj circuit) near5 resonator same q	USPAT	OR	ON	2013/06/12 18:58
S422	74	("3440633" "4429314" "4712070" "5084699").PN. OR ("5373303").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/06/12 19:03
S423	56	(resonant adj circuit) near5 resonator same LC	USPAT	OR	ON	2013/06/12 19:06
S424	2101	(307/104).OCLS.	US-PGPUB; USPAT	OR	OFF	2013/06/12 19:08
S425	1298	(320/108).OCLS.	US-PGPUB; USPAT	OR	OFF	2013/06/12 19:08
S426	1432	S424 or S425	USPAT	OR	OFF	2013/06/12 19:09
S427	62	S426 and resonator	USPAT	OR	OFF	2013/06/12 19:09
S428	1	("20100127575").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/06/12 23:35
S429	1	S428 and resonator	US-PGPUB; USPAT	OR	ON	2013/06/12 23:35
S430	35	mouse and pad and (cordless or noncontact\$ or contactless\$ or inductive\$) and power	EPO; JPO; DERWENT	OR	ON	2013/09/30 13:26
S431	19	mouse same pad same (cordless or noncontact\$ or contactless\$ or inductive\$) same power	EPO; JPO; DERWENT	OR	ON	2013/09/30 13:46
S432	72	mouse same pad same (cordless or noncontact\$ or contactless\$ or inductive\$) same power	US-PGPUB; USPAT	OR	ON	2013/09/30 13:48
S433	20	("20070090790" "7518267" "20070090790" "20100109445" "20080278112" "7741734" "20100041332" "7826873" "8013568" "20090284083" "20100045114" "7825543" "20080278264" "20100289449" "20080278264" "8339096" "20050134213" "8040103" "20100148589" "6008622" "20090237029" "20100127660").PN.	US-PGPUB; USPAT	OR	ON	2013/09/30 14:18
S434	8	q same (resonant or resonance or resonator) same charging same ("near" adj field)	US-PGPUB; USPAT	OR	ON	2013/09/30 14:24
S435	5	q and (resonant or resonance or resonator) and charging and ("near" adj field)	EPO; JPO; DERWENT	OR	ON	2013/09/30 14:26
S436	45	q and (resonant or resonance or resonator) and ("near" adj field)	EPO; JPO; DERWENT	OR	ON	2013/09/30 14:27
S437	503	q same (resonant or resonance or resonator) same ("near" adj field)	US-PGPUB; USPAT	OR	ON	2013/09/30 14:28

S438	296	q same (resonant or resonance or resonator) same ("near" adj field) same power	US-PGPUB; USPAT	OR	ON	2013/09/30 14:29
S439	854	(q same (resonant or resonance or resonator) same power) and ("near" adj field)	US-PGPUB; USPAT	OR	ON	2013/09/30 14:32
S440	120	q and (resonant or resonance or resonator) and transmitter and power	EPO; JPO; DERWENT	OR	ON	2013/09/30 15:07
S441	23	q same (resonant or resonance or resonator) same transmitter same power	EPO; JPO; DERWENT	OR	ON	2013/09/30 15:13
S442	418	q same (resonant or resonance or resonator) same transmitter same power	US-PGPUB; USPAT	OR	ON	2013/09/30 15:13
S443	184	(US-20030114769-\$ or US-20110281528-\$ or US-20090153273-\$ or US-20050206479-\$ or US-20050174197-\$ or US-20040037363-\$ or US-20090010028-\$ or US-20080197710-\$ or US-20070276538-\$ or US-20070267918-\$ or US-20070145830-\$ or US-20050288740-\$ or US-20050085873-\$ or US-20020105343-\$ or US-20020032471-\$ or US-20050288741-\$ or US-20040233043-\$ or US-20040032363-\$ or US-20040030260-\$ or US-20030130708-\$ or US-20070142872-\$ or US-20060025830-\$ or US-20040199212-\$ or US-20020097770-\$ or US-20090051224-\$ or US-20030135971-\$).did. or (US-20030124050-\$ or US-20030126948-\$ or US-20040263307-\$ or US-20050007067-\$ or US-20030210106-\$ or US-20050151511-\$ or US-20040189246-\$ or US-20020089305-\$ or US-20110285214-\$ or US-20110101790-\$ or US-20100066176-\$ or US-20100036773-\$ or US-20100007307-\$ or US-20090174263-\$ or US-20060071632-\$ or US-20100289449-\$ or US-20080001572-\$ or US-20060012371-\$ or US-20050258966-\$ or US-20040000974-\$ or US-20040134985-\$ or US-20080218314-\$ or US-20070241762-\$ or US-20030137446-\$ or US-20020130778-\$ or US-20050237198-\$ or US-20050104790-\$).did. or (US-20050275629-\$ or US-20040196262-\$ or US-20040145567-\$ or US-20100127660-\$ or US-20040130425-\$).did. or (US-6047214-\$ or US-6307468-\$ or US-6483202-\$ or US-7994880-\$ or US-4654573-\$ or US-5367242-\$ or US-6430069-\$ or US-6906495-\$ or US-7521890-\$ or US-7599743-\$ or US-6009350-\$ or US-5630835-\$ or US-7622891-\$ or US-5519262-\$ or US-6561975-\$ or US-4516097-\$ or US-5455467-\$ or US-	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2013/09/30 15:22

		7825543-\$ or US-7741734-\$ or US-6307440-\$ or US-6217604-\$ or US-5057809-\$ or US-6170026-\$ or US-7084605-\$ or US-6844702-\$ or US-6184651-\$).did. or (US-5923544-\$ or US-4082097-\$ or US-7495414-\$ or US-5654621-\$ or US-5702431-\$ or US-5498948-\$ or US-5703461-\$ or US-5084699-\$ or US-4450431-\$ or US-4630044-\$ or US-5317330-\$ or US-5703573-\$ or US-8310108-\$ or US-6424820-\$ or US-4471343-\$ or US-5374930-\$ or US-5053774-\$ or US-5250944-\$ or US-5099227-\$ or US-4560445-\$ or US-5541604-\$ or US-5420579-\$ or US-5287112-\$ or US-6489745-\$ or US-4656472-\$ or US-7541930-\$ or US-7280045-\$).did. or (US-6839035-\$ or US-4588978-\$ or US-2274557-\$ or US-5373303-\$ or US-5550536-\$ or US-5864323-\$ or US-5033295-\$ or US-7075435-\$ or US-6563425-\$ or US-6650227-\$ or US-7826873-\$ or US-7518267-\$ or US-6008622-\$ or US-3949388-\$ or US-6211799-\$ or US-4059801-\$).did. or (EP-1538558-\$ or WO-2004015885-\$ or EP-1434160-\$ or EP-558316-\$ or DE-3824972-\$ or EP-549832-\$ or DE-3941509-\$ or EP-849700-\$).did. or (JP-2002075736-\$ or JP-2005026741-\$ or JP-2004206383-\$ or JP-2004206245-\$ or JP-11075329-\$ or JP-2008125127-\$ or JP-02162222-\$).did. or (JP-11144962-\$ or JP-02097005-\$ or DE-20016655-\$ or DE-10221484-\$ or EP-1408456-\$ or EP-945829-\$ or US-7147604-\$ or KR-2004072581-\$ or US-20040127248-\$ or EP-1071038-\$ or EP-1071039-\$ or JP-2000270501-\$ or JP-11305848-\$ or DE-19651719-\$ or US-5374930-\$ or US-5287112-\$ or US-4802080-\$ or DE-10152863-\$ or DE-10152858-\$ or EP-473957-\$ or JP-11075329-\$ or JP-08126230-\$ or US-20050063488-\$ or US-5697076-\$ or DD-225565-\$ or US-20070145830-\$).did. or (WO-2007034421-\$ or WO-9811505-\$ or WO-9811504-\$ or US-4275377-\$ or US-4180795-\$ or FR-2896898-\$ or SG-112842-\$ or WO-2005055121-\$ or WO-0215112-\$ or US-20060061324-\$ or US-20050275629-\$ or US-20040189246-\$ or US-20030103039-\$ or JP-2001159948-\$ or JP-10260781-\$).did.				
S444	52841	S443 and q or ("near" adj field)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2013/09/30 15:23
S445	90	S443 and (q or ("near" adj field))	US-PGPUB; USPAT;	OR	ON	2013/09/30 15:23

			EPO; JPO; DERWENT			
S446	2	((("20020070718") or ("20100164292")).PN.	US-PGPUB	OR	OFF	2013/09/30 15:43
S447	1	("7906871").PN.	US-PGPUB; USPAT	OR	OFF	2013/09/30 15:45
S448	1000	(307/104).CCLS.	USPAT	OR	OFF	2013/09/30 15:57
S449	13	S448 and fleming and young	USPAT	OR	OFF	2013/09/30 15:57
S450	12	((("20040046663" "20050086264" "20050178832" "6236315" "6259369" "6839035" "7005968").PN. OR ("7280045").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/30 16:22
S451	28	((("20020044058" "20030043949" "5168282" "5285177" "5420579" "6069564" "6118379" "6147606" "6278413" "6281794" "6396438" "6400274" "6480110" "6516182").PN. OR ("6839035").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/30 16:23
S452	14	((("20070080804" "6016409" "6259369" "6351621" "6377764" "6839035").PN. OR ("7504951").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/30 16:25
S453	9	((("20050162331" "5270717" "5580664" "6480110" "6839035" "6924777" "7119671" "7126552" "7439863").PN. OR ("7696884").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/30 16:26
S454	30	((("4737789" "5057844").PN. OR ("5270717").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/30 16:29
S455	95	wireless\$ and powered and television	EPO; JPO; DERWENT	OR	ON	2013/09/30 18:03
S456	1577132	wireless\$ said powered said television	US-PGPUB; USPAT	OR	ON	2013/09/30 18:06
S457	722	wireless\$ same powered same television	US-PGPUB; USPAT	OR	ON	2013/09/30 18:07
S458	129	wireless\$ and powered and appliance	EPO; JPO; DERWENT	OR	ON	2013/09/30 18:10
S459	20	inductive\$ and powered and appliance	EPO; JPO; DERWENT	OR	ON	2013/09/30 18:12
S460	81	inductive\$ same powered same appliance	US-PGPUB; USPAT	OR	ON	2013/09/30 18:13
S461	32	((("2133494" "2415688" "3320512" "3530499" "3710062").PN. OR ("3761668").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/09/30 18:23
S462	47	("2133494").URPN.	USPAT	OR	OFF	2013/09/30 18:35
S463	11	inductive\$ and energiz\$ and appliance	EPO; JPO; DERWENT	OR	ON	2013/09/30 18:38
S464	676	(noncontact or (non adj contact) or contactless\$) and appliance	EPO; JPO; DERWENT	OR	ON	2013/09/30 18:40
S465	4095392	(noncontact or (non adj contact) or	EPO; JPO;	OR	ON	2013/09/30

		contactless\$) and appliance (power or energy)	DERWENT			18:40
S466	213	(noncontact or (non adj contact) or contactless\$) and appliance and (power or energy)	EPO; JPO; DERWENT	OR	ON	2013/09/30 18:40
S467	120	(noncontact or (non adj contact) or contactless\$) and tv and (power or energy)	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:11
S468	51	(noncontact or (non adj contact) or contactless\$) same tv same (power or energy)	US-PGPUB; USPAT	OR	ON	2013/09/30 19:14
S469	14	(noncontact or (non adj contact) or contactless\$) and desktop and (power or energy)	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:17
S470	256	(noncontact or (non adj contact) or contactless\$) and (desk or table) and (power or energy)	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:18
S471	1297	(noncontact or (non adj contact) or contactless\$) and distance and (power or energy)	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:26
S472	2368531	(noncontact or (non adj contact) or contactless\$) and distance and (power or energy) separat\$	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:26
S473	104	(noncontact or (non adj contact) or contactless\$) and distance and (power or energy) and separat\$	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:26
S474	30	(noncontact or (non adj contact) or contactless\$) same distance same (power or energy) same separat\$	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:36
S475	322	(noncontact or (non adj contact) or contactless\$) same distance same (power or energy) same separat\$	US-PGPUB; USPAT	OR	ON	2013/09/30 19:36
S476	844	(noncontact or (non adj contact) or contactless\$) same (desk or table or shelf) same (power or energy)	US-PGPUB; USPAT	OR	ON	2013/09/30 19:41
S477	361	(noncontact or (non adj contact) or contactless\$) and distance and (power or energy) and transmission	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:49
S478	1735	(wireless\$ or inductive\$) and distance and (power or energy) and transmission	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:57
S479	75	(wireless\$ or inductive\$) and distance and (power or energy) and transmission and meter	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:57
S480	119	(wireless\$ or inductive\$) and distance and (power or energy) and transmission and separat\$	EPO; JPO; DERWENT	OR	ON	2013/09/30 19:58
S481	1	("20120086867").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/12/15 15:56
S482	1	S481 and television	US-PGPUB; USPAT	OR	OFF	2013/12/15 15:57
S483	21	(wireless\$ or contactless\$ or noncontact or inductive\$) same powered same television	EPO; JPO; DERWENT	OR	OFF	2013/12/15 15:58
S484	659	(wireless\$ or contactless\$ or noncontact or inductive\$) same	US-PGPUB; USPAT	OR	OFF	2013/12/15 16:01

		powered same television				
S485	537	(wireless\$ or contactless\$ or noncontact or inductive\$) same powered same (computer or display or monitor)	EPO; JPO; DERWENT	OR	OFF	2013/12/15 16:04
S486	9	("20050162331" "5270717" "5580664" "6480110" "6839035" "6924777" "7119671" "7126552" "7439863").PN. OR ("7696884").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/12/15 16:42
S487	3623	q and (inductive or contactless or wireless) and (power adj supply)	EPO; JPO; DERWENT	OR	ON	2013/12/15 17:04
S488	45	q and (inductive or contactless or wireless) and (power adj supply) and resonant	EPO; JPO; DERWENT	OR	ON	2013/12/15 17:05
S489	197	(US-20030114769-\$ or US-20110281528-\$ or US-20090153273-\$ or US-20050206479-\$ or US-20050174197-\$ or US-20040037363-\$ or US-20090010028-\$ or US-20080197710-\$ or US-20070276538-\$ or US-20070267918-\$ or US-20070145830-\$ or US-20050288740-\$ or US-20050085873-\$ or US-20020105343-\$ or US-20020032471-\$ or US-20050288741-\$ or US-20040233043-\$ or US-20040032363-\$ or US-20040030260-\$ or US-20030130708-\$ or US-20070142872-\$ or US-20060025830-\$ or US-20040199212-\$ or US-20020097770-\$ or US-20090051224-\$ or US-20030135971-\$).did. or (US-20030124050-\$ or US-20030126948-\$ or US-20040263307-\$ or US-20050007067-\$ or US-20030210106-\$ or US-20050151511-\$ or US-20040189246-\$ or US-20020089305-\$ or US-20110285214-\$ or US-20110101790-\$ or US-20100066176-\$ or US-20100036773-\$ or US-20100007307-\$ or US-20090174263-\$ or US-20060071632-\$ or US-20100289449-\$ or US-20080001572-\$ or US-20060012371-\$ or US-20050258966-\$ or US-20040000974-\$ or US-20040134985-\$ or US-20080218314-\$ or US-20070241762-\$ or US-20030137446-\$ or US-20020130778-\$ or US-20050237198-\$ or US-20050104790-\$).did. or (US-20050275629-\$ or US-20040196262-\$ or US-20040145567-\$ or US-20100127660-\$ or US-20040130425-\$ or US-20120086867-\$).did. or (US-6047214-\$ or US-6307468-\$ or US-6483202-\$ or US-7994880-\$ or US-4654573-\$ or US-5367242-\$ or US-6430069-\$ or US-6906495-\$ or US-7521890-\$ or US-7599743-\$ or US-6009350-\$ or US-5630835-\$ or US-7622891-\$ or US-5519262-\$ or US-	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2013/12/15 17:44

6561975-\$ or US-4516097-\$ or US-
 5455467-\$ or US-7825543-\$ or US-
 7741734-\$ or US-6307440-\$ or US-
 6217604-\$ or US-5057809-\$ or US-
 6170026-\$ or US-7084605-\$ or US-
 6844702-\$ or US-6184651-\$).did. or
 (US-5923544-\$ or US-4082097-\$ or
 US-7495414-\$ or US-5654621-\$ or
 US-5702431-\$ or US-5498948-\$ or
 US-5703461-\$ or US-5084699-\$ or
 US-4450431-\$ or US-4630044-\$ or
 US-5317330-\$ or US-5703573-\$ or
 US-8310108-\$ or US-6424820-\$ or
 US-4471343-\$ or US-5374930-\$ or
 US-5053774-\$ or US-5250944-\$ or
 US-5099227-\$ or US-4560445-\$ or
 US-5541604-\$ or US-5420579-\$ or
 US-5287112-\$ or US-6489745-\$ or
 US-4656472-\$ or US-7541930-\$ or
 US-7280045-\$).did. or (US-6839035-\$
 or US-4588978-\$ or US-2274557-\$ or
 US-5373303-\$ or US-5550536-\$ or
 US-5864323-\$ or US-5033295-\$ or
 US-7075435-\$ or US-6563425-\$ or
 US-6650227-\$ or US-7826873-\$ or
 US-7518267-\$ or US-6008622-\$ or
 US-3949388-\$ or US-6211799-\$ or
 US-4059801-\$ or US-7696884-\$ or
 US-7504951-\$ or US-5270717-\$ or
 US-2133494-\$).did. or (EP-1538558-\$
 or WO-2004015885-\$ or EP-1434160-
 \$ or EP-558316-\$ or DE-3824972-\$
 or EP-549832-\$ or DE-3941509-\$ or
 EP-849700-\$ or WO-9827561-\$).did.
 or (JP-2002075736-\$ or JP-
 2005026741-\$ or JP-2004206383-\$ or
 JP-2004206245-\$ or JP-11075329-\$
 or JP-2008125127-\$ or JP-02162222-
 \$ or JP-2004275417-\$ or JP-
 2002345104-\$).did. or (JP-11144962-
 \$ or JP-02097005-\$ or DE-20016655-
 \$ or DE-10221484-\$ or EP-1408456-\$
 or EP-945829-\$ or US-7147604-\$ or
 KR-2004072581-\$ or US-
 20040127248-\$ or EP-1071038-\$ or
 EP-1071039-\$ or JP-2000270501-\$ or
 JP-11305848-\$ or DE-19651719-\$ or
 US-5374930-\$ or US-5287112-\$ or
 US-4802080-\$ or DE-10152863-\$ or
 DE-10152858-\$ or EP-473957-\$ or
 JP-11075329-\$ or JP-08126230-\$ or
 US-20050063488-\$ or US-5697076-\$
 or DD-225565-\$ or US-20070145830-
 \$).did. or (WO-2007034421-\$ or WO-
 9811505-\$ or WO-9811504-\$ or US-
 4275377-\$ or US-4180795-\$ or FR-
 2896898-\$ or SG-112842-\$ or WO-
 2005055121-\$ or WO-0215112-\$ or
 US-20060061324-\$ or US-
 20050275629-\$ or US-20040189246-
 \$ or US-20030103039-\$ or JP-
 2001159948-\$ or JP-10260781-\$ or
 US-6331744-\$ or JP-09182323-\$ or
 DE-102011101478-\$ or US-

		20060176239-\$ or US-6803744-\$).did.				
S490	76	S489 and q	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2013/12/15 17:45
S491	21	S489 and falls	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	OFF	2013/12/15 18:03
S492	1	("6047214").PN.	USPAT; USOCR	OR	OFF	2013/12/15 19:14
S493	1	("20120086867").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2013/12/15 20:31
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 2896898-\$ or SG-112842-\$ or WO-
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EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S150	0	((resonator or resonant or resonance) same intrinsic same loss same characteristic same size).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2012/09/10 11:55
S151	0	((resonator or resonant or resonance) and intrinsic and loss and characteristic and size).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2012/09/10 11:56
S152	15	((resonator or resonant or resonance) and intrinsic and loss and characteristic and size)	US-PGPUB; USPAT; UPAD	OR	ON	2012/09/10 11:57
S153	0	((resonator or resonant or resonance) same characteristic same size).clm.	US-PGPUB; USPAT; UPAD	OR	ON	2012/09/10 11:59
S154	147	((resonator or resonant or resonance) same	US-	OR	ON	2012/09/10

		characteristic same size).clm.	PGPUB; USPAT; UPAD			12:03
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S158	1	(resonator same (resonance or resonant) same frequency same intrinsic same loss same "near" same field same q same factor).clm.	US- PGPUB; USPAT; UPAD	OR	ON	2012/09/10 14:50
S182	10	(resonator same (resonance or resonant) same frequency same intrinsic same loss same transfer same rate).clm.	US- PGPUB; USPAT; UPAD	OR	ON	2012/09/21 20:55
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6/ 2/ 2014 7:58:30 AM

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Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		First Named Inventor John D. Joannopoulos	
		Filing Date December 30, 2009	Group Art Unit 2836

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	3,780,425	12/25/1973	Alan, William			
	2	3,871,176	3/18/1975	Schukei, Glen Elwin			
	3	4,095,998	6/20/1978	Hanson, Charles M.			
	4	4,280,129	7/21/1981	Wells, Donald H.			
	5	5,229,652	7/20/1993	HOUGH, WAYNE			
	6	5,408,209	4/18/1995	Tanzer, Herbert J., et al.			
	7	5,522,856	6/4/1996	Reineman, Henk			
	8	5,541,604	7/30/1996	Meier, Herbert			
	9	5,565,763	10/15/1996	Arrendale, Hubert G., et al.			
	10	5,630,835	5/20/1997	Brownlee, Robert R.			
	11	5,697,956	12/16/1997	Bornzin, Gene A.			
	12	5,703,461	12/30/1997	Minoshima, Norimoto et al.			
	13	5,710,413	1/20/1998	KING, JAMES et al.			
	14	5,742,471	4/21/1998	Barbee Jr., Troy W., et al.			
	15	5,821,728	10/13/1998	SCHWIND, JOHN			
	16	5,821,731	10/13/1998	Kuki, Heiji et al.			
	17	5,903,134	5/11/1999	TAKEUCHI, YASUO			
	18	5,923,544	7/13/1999	Urano, Takashi			
	19	5,940,509	8/17/1999	Jovanovich, Alan et al.			
	20	5,957,956	9/28/1999	Kroll, Mark W., et al.			
	21	5,959,245	9/28/1999	Moe et al.			
	22	5,993,996	11/30/1999	Firsich, David W.			
	23	6,012,659	1/11/2000	Nakazawa, Yuji et al.			
	24	6,047,214	4/4/2000	Mueller, Jeffrey S., et al.			
	25	6,066,163	5/23/2000	John, Michael Sasha			

Examiner Signature /Fritz Fleming/ (06/02/2014)	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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Receipt date: 04/16/2014

12649635 - GAU: 2836

Sheet 2 of 5

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		First Named Inventor John D. Joannopoulos	
		Filing Date December 30, 2009	Group Art Unit 2836

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	26	6,067,473	5/23/2000	Greeninger, Daniel R., et al.			
	27	6,108,579	8/22/2000	Snell, Jeffrey D., et al.			
	28	6,127,799	10/3/2000	Krishnan, Rajesh			
	29	6,207,887	3/27/2001	Bass, John C., et al.			
	30	6,232,841	5/15/2001	Bartlett, James L., et al.			
	31	6,238,387	5/29/2001	Miller, III			
	32	6,252,762	6/26/2001	Amatucci, Glenn G.			
	33	6,473,028	10/29/2002	Luc, Wuidart			
	34	6,483,202	11/19/2002	Boys, John Talbot			
	35	6,535,133	3/18/2003	Gohara, Takashi			
	36	6,561,975	5/13/2003	Pool, Nancy P., et al.			
	37	6,609,023	8/19/2003	Fischell, David R., et al.			
	38	6,631,072	10/7/2003	Paul, George L., et al.			
	39	6,683,256	1/27/2004	Kao			
	40	6,696,647	2/24/2004	Ono et al.			
	41	6,703,921	3/9/2004	Wuidart, Luc et al.			
	42	6,803,744	10/12/2004	Sabo, Anthony			
	43	6,858,970	2/22/2005	Malkin, Matthew C., et al.			
	44	6,961,619	11/1/2005	Casey, Don E.			
	45	6,967,462	11/22/2005	Landis, Geoffrey A.			
	46	6,988,026	1/17/2006	Breed, David S., et al.			
	47	7,027,311	4/11/2006	Vanderelli, Timm A., et al.			
	48	7,035,076	4/25/2006	Stevenson, Robert A.			
	49	7,084,605	8/1/2006	Mickle et al.			
	50	7,127,293	10/24/2006	MacDonald, Stuart G.			
	51	7,193,418	3/20/2007	Freytag, Nicolas			

Examiner Signature /Fritz Fleming/ (06/02/2014)	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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		First Named Inventor John D. Joannopoulos	
		Filing Date December 30, 2009	Group Art Unit 2836

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	52	7,233,137	6/19/2007	Nakamura, Jimichi et al.			
	53	7,251,527	7/31/2007	Lyden, Michael J.			
	54	7,288,918	10/30/2007	DiStefano, Michael Vincent			
	55	2002/0130642	9/19/2002	Ettes, Wilhelmus G., et al.			
	56	2002/0167294	11/14/2002	Odaohara, Shigefumi			
	57	2003/0071034	4/17/2003	Thompson, Leslie L., et al.			
	58	2003/0160590	8/28/2003	Schaefer et al.			
	59	2004/0026998	2/12/2004	Henriott, Jay M., et al.			
	60	2004/0130425	7/8/2004	Dayan, Tal et al.			
	61	2004/0142733	7/22/2004	Parise, Ronald J.			
	62	2004/0189246	9/30/2004	Bulai, Claudiu et al.			
	63	2004/0227057	11/18/2004	Tuominen, Juha et al.			
	64	2005/0021134	1/27/2005	Opie, John C.			
	65	2005/0033382	2/10/2005	Single, Peter			
	66	2005/0104453	5/19/2005	Vanderelli, Timm A., et al.			
	67	2005/0116683	6/2/2005	Cheng, Lily K., et al.			
	68	2005/0140482	6/30/2005	Cheng, Lily K., et al.			
	69	2005/0189945	9/1/2005	Reiderman, Arcady			
	70	2005/0194926	9/8/2005	Di Stefano, Michael Vincent			
	71	2005/0253152	11/17/2005	Klimov, Victor I., et al.			
	72	2005/0288742	12/29/2005	Giordano, James R., et al.			
	73	2006/0001509	1/5/2006	Gibbs, Phillip R.			
	74	2006/0053296	3/9/2006	Busboom, Axel et al.			
	75	2006/0066443	3/30/2006	Hall, David M.			
	76	2006/0164866	7/27/2006	Vanderelli, Timm A., et al.			

Examiner Signature /Fritz Fleming/ (06/02/2014)	Date Considered
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		Filing Date December 30, 2009	Group Art Unit 2836

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	77	2006/0184209	8/17/2006	John, Constance M., et al.			
	78	2006/0184210	8/17/2006	Singhal, Ruchika et al.			
	79	2006/0199620	9/7/2006	Greene, Charles E., et al.			
	80	2006/0214626	9/28/2006	Nilson, Lee A., et al.			
	81	2006/0219448	10/5/2006	Grieve, Malcolm J., et al.			
	82	2006/0238365	10/26/2006	Vecchione, Elio et al.			
	83	2006/0281435	12/14/2006	Shearer, John G., et al.			
	84	2007/0010295	1/11/2007	Greene, Charles E., et al.			
	85	2007/0013483	1/18/2007	Stewart, Robert			
	86	2007/0016089	1/18/2007	Fischell, David R., et al.			
	87	2007/0024246	2/1/2007	Flaughner, David J.			
	88	2007/0069687	3/29/2007	Suzuki, Katsuya			
	89	2007/0096875	5/3/2007	Waterhouse, Paul et al.			
	90	2007/0105429	5/10/2007	Kohl et al.			
	91	2007/0117596	5/24/2007	Greene, Charles E., et al.			
	92	2007/0126650	6/7/2007	Guenther			
	93	2007/0176840	8/2/2007	Pristas, James et al.			
	94	2007/0208263	9/6/2007	John, Michael S., et al.			

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	95	JP 4-265875	9/22/1992	Japan	G01R	33/035	English Abstract Only	
	96	JP 9-298847	11/18/1997	Japan	H02J	7/10	English Abstract Only	
	97	JP 10-164837	6/19/1998	Japan	H02M	3/28	English Abstract Only	
	98	JP 2001-309580	11/2/2001	Japan	H02J	17/00	Machine Translation	

Examiner Signature /Fritz Fleming/ (06/02/2014)	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.	

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		Filing Date December 30, 2009	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	No
	99	JP 2002-10535	1/11/2002	Japan	H02J	17/00	Machine Translation	
	100	JP 2005-149238	6/9/2005	Japan	G06K	19/00	Machine Translation	
	101	JP 2007-505480	3/8/2007	Japan	H01F	38/14	Machine Translation	
	102	JP 2007-537637	12/20/2007	Japan	H01Q	7/08	See US 2007/0126650	
	103	WO 2007/020583	2/22/2007	WIPO				
	104	WO 2007/042952	4/19/2007	WIPO	A61B	5/117		

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	105	JACKSON, J. D. , "Classical Electrodynamics", 3rd Edition, Wiley, New York, 1999, pp. 201-203
	106	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
	107	VILLENEUVE, PIERRE R. et al., "Microcavities in photonic crystals: Mode symmetry, tunability, and coupling efficiency", Physical Review B, Volume 54, Number 11, 15 September 1996, pp. 7837-7842
	108	Copy of Non-Final Office Action for U.S. Application Serial No. 12/639,963 by Examiner Fritz M. Fleming dated February 27, 2014 (19 pages)
	109	Copy of Non-Final Office Action for U.S. Application Serial No. 12/649,777 by Examiner Fritz M. Fleming dated February 26, 2014 (16 pages)
	110	Copy of Non-Final Office Action for U.S. Application Serial No. 12/649,813 by Examiner Fritz M. Fleming dated February 27, 2014 (16 pages)
	111	Copy of Non-Final Office Action for U.S. Application Serial No. 12/649,852 by Examiner Fritz M. Fleming dated February 27, 2014 (17 pages)
	112	Ahmadian 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
	113	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)

Examiner Signature /Fritz Fleming/ (06/02/2014)	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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Issue Classification 	Application/Control No. 12649635	Applicant(s)/Patent Under Reexamination JOANNOPOULOS ET AL.	
	Examiner FRITZ M FLEMING	Art Unit 2836	

CPC					
Symbol				Type	Version
Y02T	90	/	14	A	2013-01-01
Y02T	90	/	122	A	2013-01-01
Y02T	10	/	7005	A	2013-01-01
H02J	5	/	005	I	2013-01-01
H01Q	9	/	04	I	2013-01-01
H02J	17	/	00	F	2013-01-01
B60L	11	/	182	I	2013-01-01
Y02T	10	/	7088	A	2013-01-01
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CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 48	
/FRITZ M FLEMING/ Primary Examiner, Art Unit 2836 (Primary Examiner) _____ (Date) _____		06/02/2014 O.G. Print Claim(s) 1	O.G. Print Figure 3

Issue Classification 	Application/Control No. 12649635	Applicant(s)/Patent Under Reexamination JOANNOPOULOS ET AL.
	Examiner FRITZ M FLEMING	Art Unit 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	22	18	42	34	6	50								
3	3	23	19	47	35	11	51								
	4	24	20	48	36	12	52								
7	5	29	21	-	37										
8	6	30	22	25	38										
9	7	31	23	26	39										
	8	32	24	27	40										
13	9	33	25	-	41										
14	10	34	26	43	42										
15	11	35	27	44	43										
16	12	36	28	45	44										
17	13	37	29	4	45										
18	14	38	30	10	46										
19	15	39	31	28	47										
20	16	40	32	46	48										

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 48	
/FRITZ M FLEMING/ Primary Examiner.Art Unit 2836 (Primary Examiner) _____ (Date) _____		06/02/2014 O.G. Print Claim(s) 1	O.G. Print Figure 3

U.S. Patent and Trademark Office

Part of Paper No. 20140602

Search Notes 	Application/Control No. 12649635	Applicant(s)/Patent Under Reexamination JOANNOPOULOS ET AL.
	Examiner FRITZ M FLEMING	Art Unit 2836

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
307	104	12/17/2012	FMF

SEARCH NOTES		
Search Notes	Date	Examiner
EAST, PLUS	12/17/2012	FMF
updated search.	6/17/2013	FMF
updated search, reviewed related applications.	5/5/14	FMF

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	see interference search printout	5/5/14	FMF

	/FRITZ M FLEMING/ Primary Examiner, Art Unit 2836
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<i>Index of Claims</i> 	Application/Control No. 12649635	Applicant(s)/Patent Under Reexamination JOANNOPOULOS ET AL.
	Examiner FRITZ M FLEMING	Art Unit 2836

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant		☐ CPA		☒ T.D.		☐ R.1.47			
CLAIM		DATE							
Final	Original	12/17/2012	06/17/2013	06/02/2014					
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41	33	✓	✓	=					
42	34	✓	✓	=					
47	35	✓	✓	=					
48	36	✓	✓	=					

<i>Index of Claims</i> 	Application/Control No. 12649635	Applicant(s)/Patent Under Reexamination JOANNOPOULOS ET AL.
	Examiner FRITZ M FLEMING	Art Unit 2836

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47									
CLAIM		DATE							
Final	Original	12/17/2012	06/17/2013	06/02/2014					
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25	38		✓	=					
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6	50			=					
11	51			=					
12	52			=					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor : John D. Art Unit : 2836
Joannopoulos Examiner : Fritz Fleming
Serial No. : 12/649,635 Confirmation No. : 5891
Filed : December 30, 2009 Notice of Allowance Date: June 6, 2014
Title : WIRELESS ENERGY TRANSFER TO A MOVING DEVICE
BETWEEN HIGH-Q RESONATORS

MAIL STOP ISSUE FEE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NOTICE OF ALLOWANCE

In response to the Notice of Allowance mailed June 6, 2014, enclosed is a completed Part B - Fee(s) Transmittal.

The issue fee in the amount of \$960 is being paid concurrently herewith. In addition, please apply any other necessary charges or credits to Deposit Account 06-1050, referencing the above attorney docket number.

Respectfully submitted,

Date: June 11, 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

23236096.doc

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **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 06/06/2014

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.
12/649,635	12/30/2009	John D. Ioannopoulos	01997-0359015	5891

TITLE OF INVENTION: WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS

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	09/06/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
FLEMING, FRITZ	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,

1 Fish & Richardson P.C.

(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.

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

Massachusetts Institute of Technology

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Cambridge, Massachusetts

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 in the amount of the fee(s) is enclosed.

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☒ 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

☐ Applicant asserting small entity status. See 37 CFR 1.27.

☐ Applicant changing to regular undiscounted fee status.

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.

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.

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 /Marc M. Wefers Reg. No. 56,842/

Date June 11, 2014

Typed or printed name Marc M. Wefers

Registration No. 56,842

23236097.doc

Electronic Patent Application Fee Transmittal				
Application Number:		12649635		
Filing Date:		30-Dec-2009		
Title of Invention:		WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS		
First Named Inventor/Applicant Name:		John D. Joannopoulos		
Filer:		Marc M. Wefers/Cheryl Forrest		
Attorney Docket Number:		01997-0359015 / MIT 11757		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
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
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
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Total in USD (\$)				960

Electronic Acknowledgement Receipt	
EFS ID:	19271586
Application Number:	12649635
International Application Number:	
Confirmation Number:	5891
Title of Invention:	WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS
First Named Inventor/Applicant Name:	John D. Joannopoulos
Customer Number:	26161
Filer:	Marc M. Wefers/Renee Neuman
Filer Authorized By:	Marc M. Wefers
Attorney Docket Number:	01997-0359015 / MIT 11757
Receipt Date:	11-JUN-2014
Filing Date:	30-DEC-2009
Time Stamp:	13:32:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

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Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 960
RAM confirmation Number	10312
Deposit Account	061050
Authorized User	

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12649635 - GAU: 2836

Sheet 1 of 12

Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	787,412	4/18/1905	Tesla			
	2	1,119,732	12/1/1914	Tesla			
	3	2,133,494	10/18/1938	H.F. Waters			
	4	3,517,350	6/23/1970	Beaver			
	5	3,535,543	10/20/1970	Dailey			
	6	4,088,999	5/9/1978	Fletcher et al.			
	7	5,027,709	7/2/1991	Slagle			
	8	5,070,293	12/3/1991	Ishii et al.			
	9	5,216,402	6/1/1993	Carosa			
	10	5,341,083	8/23/1994	Klontz et al.			
	11	5,367,242	11/22/1994	Hulman			
	12	5,437,057	7/25/1995	Richley et al.			
	13	5,493,691	2/20/1996	Barrett			
	14	5,528,113	6/18/1996	Boys et al.			
	15	5,550,452	8/27/1996	Shirai et al.			
	16	5,898,579	4/27/1999	Boys et al.			
	17	5,999,308	12/7/1999	Nelson et al.			
	18	6,184,651	2/6/2001	Fernandez et al.			
	19	6,436,299	8/20/2002	Baarma et al.			
	20	6,450,946	9/17/2002	Forsell			
	21	6,452,465	9/17/2002	Brown et al.			
	22	6,515,878	2/4/2003	Meins et al.			
	23	6,597,076	7/22/2003	Scheible et al.			
	24	6,673,250	1/6/2004	Kuennen et al.			
	25	6,731,071	5/4/2004	Baarma			
	26	6,749,119	6/15/2004	Scheible et al.			
	27	6,798,716	9/28/2004	Charych			

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12649635 - GAU: 2836

Sheet 2 of 12

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U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	28	6,806,649	10/19/2004	Mollema et al.			
	29	6,812,645	11/2/2004	Baarmaan			
	30	6,825,620	11/30/2004	Kuennen et al.			
	31	6,831,417	12/14/2004	Baarmaan			
	32	6,856,291	2/15/2005	Mickle et al.			
	33	6,844,702	1/18/2005	Giannopoulos et al.			
	34	6,906,495	6/14/2005	Cheng et al.			
	35	6,917,431	7/12/2005	Soljacic et al.			
	36	6,917,163	7/12/2005	Baarmaan			
	37	6,937,130	8/30/2005	Scheible et al.			
	38	6,960,968	11/1/2005	Odendaal et al.			
	39	6,975,198	12/13/2005	Baarmaan			
	40	7,042,196	5/9/2006	Ka-Lai et al.			
	41	7,069,064	6/27/2006	Govorgian et al.			
	42	7,116,200	10/3/2006	Baarmaan et al.			
	43	7,118,240	10/10/2006	Baarmaan et al.			
	44	7,126,450	10/24/2006	Baarmaan et al.			
	45	7,132,918	11/7/2006	Baarmaan et al.			
	46	7,180,248	2/20/2007	Kuennen et al.			
	47	7,212,414	5/1/2007	Baarmaan			
	48	7,239,110	7/3/2007	Cheng et al.			
	49	7,248,017	7/24/2007	Cheng et al.			
	50	7,375,492	5/20/2008	Calhoon et al.			
	51	7,375,493	5/20/2008	Calhoon et al.			
	52	7,378,817	5/27/2008	Calhoon et al.			
	53	7,382,636	6/3/2008	Baarmaan et al.			
	54	7,385,357	6/10/2008	Kuennen et al.			

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12649635 - GAU: 2836

Sheet 3 of 12

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U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	55	7,462,951	12/9/2008	Baarman			
	56	7,466,213	12/16/2008	Lobl et al.			
	57	7,474,058	1/6/2009	Baarman			
	58	7,492,247	2/17/2009	Schmidt et al.			
	59	7,518,267	4/14/2009	Baarman			
	60	7,525,283	4/28/2009	Cheng et al.			
	61	7,615,936	11/10/2009	Baarman et al.			
	62	2002/0032471	3/14/2002	Loftin et al.			
	63	2002/0105343	8/8/2002	Scheible et al.			
	64	2002/0118004	8/29/2002	Scheible et al.			
	65	2003/0038641	2/27/2003	Scheible			
	66	2003/0062794	4/3/2003	Scheible et al.			
	67	2003/0062980	4/3/2003	Scheible et al.			
	68	2003/0199778	10/23/2003	Mickle et al.			
	69	2003/0214255	11/20/2003	Baarman et al.			
	70	2004/0000974	1/1/2004	Odenaal et al.			
	71	2004/0113847	6/17/2004	Qi et al.			
	72	2004/0130915	7/8/2004	Baarman			
	73	2004/0130916	7/8/2004	Baarman			
	74	2004/0150934	8/5/2004	Baarman			
	75	2004/0201361	10/14/2004	Koh et al.			
	76	2004/0222751	11/11/2004	Mollema et al.			
	77	2004/0232845	11/25/2004	Baarman			
	78	2004/0267501	12/30/2004	Freed et al.			
	79	2005/0007067	1/13/2005	Baarman et al.			
	80	2005/0085873	4/21/2005	Gord et al.			
	81	2005/0093475	5/5/2005	Kuennen et al.			

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12649635 - GAU: 2836

Sheet 4 of 12

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		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	82	2005/0104064	5/19/2005	Hegarty et al.			
	83	2005/0116650	6/2/2005	Baarman			
	84	2005/0122058	6/9/2005	Baarman et al.			
	85	2005/0122059	6/9/2005	Baarman et al.			
	86	2005/0127849	6/16/2005	Baarman et al.			
	87	2005/0127850	6/16/2005	Baarman et al.			
	88	2005/0127866	6/16/2005	Hamilton et al.			
	89	2005/0156560	7/21/2005	Shimaoka et al.			
	90	2006/0022636	2/2/2006	Xian et al.			
	91	2006/0061323	3/23/2006	Cheng et al.			
	92	2006/0132045	6/22/2006	Baarman			
	93	2006/0181242	8/17/2006	Freed et al.			
	94	2006/0185809	8/24/2006	Elfrink et al.			
	95	2006/0205381	9/14/2006	Beart et al.			
	96	2006/0270440	11/30/2006	Shearer et al.			
	97	2007/0064406	3/22/2007	Beart			
	98	2007/0171681	7/26/2007	Baarman			
	99	2007/0178945	8/2/2007	Cook et al.			
	100	2007/0222542	9/27/2007	Joannopoulos et al.			
	101	2007/0267918	11/22/2007	Gyland			
	102	2007/0276538	11/29/2007	Kjellsson et al.			
	103	2008/0014897	1/7/2008	Cook et al.			
	104	2008/0191638	8/14/2008	Kuennen et al.			
	105	2008/0197710	8/21/2008	Kreitz et al.			
	106	2008/0211320	9/4/2008	Cook et al.			
	107	2008/0278264	11/13/2008	Karalis et al.			
	108	2009/0010028	1/8/2009	Baarmen et al.			

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12649635 - GAU: 2836

Sheet 5 of 12

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		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	109	2009/0015075	1/15/2009	Cook et al.			
	110	2009/0033564	2/5/2009	Cook et al.			
	111	2009/0045772	2/19/2009	Cook et al.			
	112	2009/0051224	2/26/2009	Cook et al.			
	113	2009/0058189	3/5/2009	Cook et al.			
	114	2009/0072627	3/19/2009	Cook et al.			
	115	2009/0072628	3/19/2009	Cook et al.			
	116	2009/0072629	3/19/2009	Cook et al.			
	117	2009/0079268	3/26/2009	Cook et al.			
	118	2009/0102292	4/23/2009	Cook et al.			
	119	2009/0127937	5/21/2009	Widmer et al.			
	120	2009/0134712	5/28/2009	Cook et al.			
	121	2009/0153273	6/18/2009	Chen			
	122	2009/0167449	7/2/2009	Cook et al.			
	123	2009/0179502	7/16/2009	Cook et al.			
	124	2009/0195332	8/6/2009	Joannopoulos et al.			
	125	2009/0195333	8/6/2009	Joannopoulos et al.			
	126	2009/0212636	8/27/2009	Cook et al.			
	127	2009/0213028	8/27/2009	Cook et al.			
	128	2009/0224856	9/10/2009	Karalis et al.			
	129	2009/0224608	9/10/2009	Cook et al.			
	130	2009/0224609	9/10/2009	Cook et al.			
	131	2009/0243394	10/1/2009	Levine			
	132	2009/0243397	10/1/2009	Cook et al.			
	133	2009/0273242	11/5/2009	Cook			
	134	2009/0299918	12/3/2009	Cook et al.			
	135	2010/0038970	2/18/2010	Cook et al.			

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12649635 - GAU: 2836

Sheet 6 of 12

Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	136						

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	137	CA 142352	08/13/1912	Canada				
	138	DE 10 2005 036290	02/15/2007	Germany				
	139	DE 38 24 972	01/12/1989	Germany				
	140	DE 100 29147	12/21/2001	Germany				
	141	DE 102006044057	4/10/2008	Germany				
	142	DE 103 04584	08/19/2004	Germany				
	143	EP 1,335,477	08/13/2003	Europe				
	144	WO 92/17929	10/15/1992	WIPO				
	145	WO 93/23908	11/25/1993	WIPO				
	146	WO 94/28560	12/08/1994	WIPO				
	147	WO 96/02970	02/01/1996	WIPO				
	148	WO 98/50993	11/12/1998	WIPO				
	149	WO 00/79910	12/21/2000	WIPO				
	150	WO 03/092329	11/6/2003	WIPO				
	151	WO 03/096361	11/20/2003	WIPO				
	152	WO 03/096512	11/20/2003	WIPO				
	153	WO 2004/038888	5/6/2004	WIPO				
	154	WO 2004/055654	7/1/2004	WIPO				
	155	WO 2004/073150	8/26/2004	WIPO				
	156	WO 2004/073166	8/26/2004	WIPO				
	157	WO 2004/073176	8/26/2004	WIPO				
	158	WO 2004/073177	8/26/2004	WIPO				
	159	WO 2004/112216	12/23/2004	WIPO				

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Sheet 7 of 12

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Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	160	WO 2005/024865	3/17/2005	WIPO				
	161	WO 2005/060068	6/30/2005	WIPO				
	162	WO 2005/109597	11/17/2005	WIPO				
	163	WO 2005/109598	11/17/2005	WIPO				
	164	WO 2007/008646	01/18/2007	WIPO				
	165	WO 2007/084716	7/26/2007	WIPO				
	166	WO 2007/084717	7/26/2007	WIPO				
	167	WO 2007/020583	2/22/2007	WIPO				
	168	WO 2007/042952	4/19/2007	WIPO				
	169	WO 2008/109489	9/12/2008	WIPO				
	170	WO 2008/118178	10/02/2008	WIPO				
	171	WO 2009/009559	1/5/2009	WIPO				
	172	WO 2009/018568	2/5/2009	WIPO				
	173	WO 2009/023155	2/19/2009	WIPO				
	174	WO 2009/023646	2/19/2009	WIPO				
	175							

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	176	Abe et al. "A Noncontact Charger Using a Resonant Converter with Parallel Capacitor of the Secondary Coil". IEEE, 36(2):444-451, March/April 2000.
	177	Altchev et al. "Efficient Resonant Inductive Coupling Energy Transfer Using New Magnetic and Design Criteria". IEEE, pp. 1293-1298, 2005.
	178	T. Aoki et al. "Observation of strong coupling between one atom and a monolithic microresonator". Nature 443:671-674 (2006).
	179	Apneseth et al. "Introducing wireless proximity switches" ABB Review 4/2002.
	180	Baker et al., "Feedback Analysis and Design of RF Power Links for Low-Power Bionic Systems," IEEE Transactions on Biomedical Circuits and Systems, 1(1):28-38 (March 2007)
	181	Balanis, C.A., "Antenna Theory: Analysis and Design," 3rd Edition, Sections 4.2, 4.3, 5.2, 5.3 (Wiley, New Jersey, 2005).
	182	Burri et al. "Invention Description" February 5, 2008

Examiner Signature /Fritz Fleming/ (06/18/2014)	Date Considered
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		Filing Date December 30, 2009	Group Art Unit

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	183	Electricity Unplugged, Feature: Wireless Energy, <i>Physics World</i> , pp. 23-25 (February 2009)
	184	Esser et al. "A New Approach to Power Supplies for Robots". <i>IEEE</i> , 27(5):872-875, September/October 1991.
	185	Fenske et al. "Dielectric Materials at Microwave Frequencies". <i>Applied Microwave & Wireless</i> , pp. 92-100, 2000.
	186	C. Fernandez et al., "A simple dc-dc converter for the power supply of a cochlear implant", <i>IEEE</i> , pp. 1965-1970 (2003)
	187	D.H.Freedman. "Power on a Chip". <i>MIT Technology Review</i> , November 2004.
	188	Geyi, Wen. A Method for the Evaluation of Small Antenna Q. <i>IEEE Transactions on Antennas and Propagation</i> , Vol. 51, No. 8, August 2003.
	189	Haus, H.A., "Waves and Fields in Optoelectronics," Chapter 7 "Coupling of Modes --- Resonators and Couplers" (Prentice-Hall, New Jersey, 1984).
	190	Heikkinen et al. "Performance and Efficiency of Planar Rectennas for Short-Range Wireless Power Transfer at 2.45 GHz". <i>Microwave and Optical Technology Letters</i> , 31(2):86-91, October 20, 2001.
	191	Hirai et al. "Integral Motor with Driver and Wireless Transmission of Power and Information for Autonomous Subspindle Drive". <i>IEEE</i> , 15(1):13-20, January 2000.
	192	Hirai et al. "Practical Study on Wireless Transmission of Power and Information for Autonomous Decentralized Manufacturing System". <i>IEEE</i> , 46(2):349-359, April 1999.
	193	Hirai et al. "Study on Intelligent Battery Charging Using Inductive Transmission of Power and Information". <i>IEEE</i> , 15(2):335-345, March 2000.
	194	Hirai et al. "Wireless Transmission of Power and Information and Information for Cableless Linear Motor Drive". <i>IEEE</i> 15(1):21-27, January 2000.
	195	"Intel CTO Says Gap between Humans, Machines Will Close by 2050", <i>Intel News Release</i> , (See intel.com/.../20080821comp.htm?iid=S...) (Printed 11/6/2009)
	196	M. V. Jacob et al. "Lithium Tantalate - A High Permittivity Dielectric Material for Microwave Communication Systems". <i>Proceedings of IEEE TENCON - Poster Papers</i> , pp. 1362-1366, 2003.
	197	Jackson, J.D., "Classical Electrodynamics," 3rd Edition, Sections 1.11, 5.5, 5.17, 6.9, 8.1, 8.8, 9.2, 9.3 (Wiley, New York, 1999).
	198	Aristeidis Karalis et al., "Efficient Wireless <i>non-radiative mid-range</i> energy transfer", <i>Annals of Physics</i> , Vol. 323, pp. 34-48 (2008)
	199	Kawamura et al. "Wireless Transmission of Power and Information Through One High-Frequency Resonant AC Link Inverter for Robot Manipulator Applications". <i>IEEE</i> , 32(3):503-508, May/June 1996.
	200	Yoshihiro Konishi, <i>Microwave Electronic Circuit Technology</i> , Chapter 4, pp. 145-197 (Marcel Dekker, Inc., New York, NY 1998)
	201	Andre Kurs et al., "Wireless Power Transfer via Strongly Coupled Magnetic Resonances", <i>Science</i> Vol. 317, pp. 83-86 (July 6, 2007)
	202	Lee, "Antenna Circuit Design for RFID Applications," Microchip Technology Inc., AN710, 50 pages (2003)
	203	Lee, "RFID Coil Design," Microchip Technology Inc., AN678, 21 pages (1998)
	204	Liang et al., "Silicon waveguide two-photon absorption detector at 1.5 μm wavelength for autocorrelation measurements," <i>Applied Physics Letters</i> , 81(7):1323-1325 (August 12, 2002)
Examiner Signature /Fritz Fleming/ (06/18/2014)		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 (PTO-1449)

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		Filing Date December 30, 2009	Group Art Unit
(37 CFR §1.98(b))			

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	205	Microchip Technology Inc., "microID 13.56 MHz Design Guide - MCRF355/360 Reader Reference Design," 24 pages (2001)
	206	MIT Team Experimentally Demonstrates Wireless Power Transfer, Potentially Useful for Power Laptops, Cell-Phones Without Cords - Goodbye Wires ..., by Franklin Hadley, Institute for Soldier Nanotechnologies, Massachusetts Institute of Technology (June 7, 2007)
	207	O'Brien et al. "Analysis of Wireless Power Supplies for Industrial Automation Systems". IEEE, pp. 367-372, 2003.
	208	O'Brien et al. "Design of Large Air-Gap Transformers for Wireless Power Supplies". IEEE, pp. 1557-1562, 2003.
	209	J. B. Pendry. "A Chiral Route to Negative Refraction". Science 306:1353-1355 (2004).
	210	Gary Peterson, "MIT WiTricity Not So Original After All", <u>Feed Line No. 9</u> , (See http://www.tfcbooks.com/articles/witricity.htm) printed 11/12/2009
	211	"Physics Update, Unwired Energy", <u>Physics Today</u> , pp. 26, (January 2007) (See http://arxiv.org/abs/physics/0611063 .)
	212	Powercast LLC. "White Paper" Powercast simply wire free, 2003.
	213	Sakamoto et al. "A Novel Circuit for Non-Contact Charging Through Electro-Magnetic Coupling". IEEE, pp. 168-174, 1992.
	214	Sekitani et al. "A large-area flexible wireless power transmission sheet using printed plastic MEMS switches and organic field-effect transistors". [PUBLICATION UNKNOWN]
	215	Sekitani et al. "A large-area wireless power-transmission sheet using printed organic transistors and plastic MEMS switches" www.nature.com/naturematerials . Published online April 29, 2007.
	216	S. Sensiper. Electromagnetic wave propagation on helical conductors. PhD Thesis, Massachusetts Institute of Technology, 1951.
	217	Soljacic. "Wireless Non-Radiative Energy Transfer - PowerPoint presentation". Massachusetts Institute of Technology, October 6, 2005.
	218	Someya, Takao. "The world's first sheet-type wireless power transmission system". University of Tokyo, December 12, 2006
	219	Splashpower, "Splashpower - World Leaders in Wireless Power," PowerPoint presentation, 30 pages (September 3, 2007)
	220	David H. Staelin et al., <u>Electromagnetic Waves</u> , Chapters 2, 3, 4, and 8, pp. 46-176 and 336-405 (Prentice Hall Upper Saddle River, New Jersey 1998)
	221	Nikola Tesla, "High Frequency Oscillators for Electro-Therapeutic and Other Purposes", <u>The Electrical Engineer</u> , Vol. XXVI, No. 50 (November 17, 1898)
	222	Nikola Tesla, "High Frequency Oscillators for Electro-Therapeutic and Other Purposes", <u>Proceedings of the IEEE</u> , Vol. 87, No. 7, pp 1282-1292 (July 1999)
	223	Texas Instruments, "HF Antenna Design Notes - Technical Application Report," Literature Number 11-08-26-003, 47 pages (September 2003)
	224	"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.
	225	"The world's first sheet-type wireless power transmission system: Will a socket be replaced by e-wall?" Press Release, Tokyo, Japan, December 12, 2006.

Examiner Signature /Fritz Fleming/ (06/18/2014)	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 (PTO-1449)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit
(37 CFR §1.98(b))			

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	226	Thomsen et al., "Ultrahigh speed all-optical demultiplexing based on two-photon absorption in a laser diode," <i>Electronics Letters</i> , 34(19):1871-1872 (September 17, 1998)
	227	"Unwired energy questions asked, answered", <i>Physics Today</i> , pp. 16-17 (September 2007)
	228	UPM Rafsec, "Tutorial overview of inductively coupled RFID Systems," 7 pages (May 2003)
	229	Vandevoorde et al. "Wireless energy transfer for stand-alone systems: a comparison between low and high power applicability". <i>Sensors and Actuators, A</i> 92:305-311, 2001.
	230	David Vilkomerson et al., "Implantable Doppler System for Self-Monitoring Vascular Grafts", <i>IEEE Ultrasonics Symposium</i> , pp. 461-465 (2004)
	231	"Wireless Energy Transfer Can Potentially Recharge Laptops, Cell Phones Without Cords", by Marin Soljacic of Massachusetts Institute of Technology and Davide Castelvetti of American Institute of Physics (November 14, 2006)
	232	Clemens M. Zierhofer et al., "High-Efficiency Coupling-Insensitive Transcutaneous Power and Data Transmission Via an Inductive Link", <i>IEEE Transactions on Biomedical Engineering</i> , Vol. 37, No. 7, pp. 716-722 (July 1990)
	233	Copy of Examination Report for Australia Application No. 2006269374, dated September 18, 2008
	234	Copy of International Search Report and Written Opinion for International Application No. PCT/US2006/026480, dated December 21, 2007
	235	Copy of International Preliminary Report on Patentability for International Application No. PCT/US2006/026480, dated January 29, 2008
	236	Copy of International Search Report and Written Opinion for International Application No. PCT/US2007/070892, dated March 3, 2008
	237	Copy of International Search Report and Written Opinion for International Application No. PCT/US09/43970, dated July 14, 2009
	238	European Examination Report dated January 15, 2009 in connection with Application No. 06 786 588.1 - 1242, Examined by Michael Lund.
	239	Copy of International Preliminary Report on Patentability with regard to International Application No. PCT/US2007/070892 by Examiner Philippe Becamel dated September 29, 2009
	240	"Recharging, The Wireless Way - Even physicists forget to recharge their cell phones sometimes." By Angela Chang - PC Magazine, <i>ABC News Internet Ventures</i> , (2006)
	241	"Physics Promises Wireless Power" by Jonathan Fildes, Science and Technology Reporter, <i>BBC News</i> , (November 15, 2006)
	242	"Wireless energy promise powers up" by Jonathan Fildes, Science and Technology Report, <i>BBC News</i> , (See http://news.bbc.co.uk/2/hi/technology/6725955.stm) (June 7, 2007)
	243	"The technology with impact 2007", by Jonathan Fildes, <i>BBC News</i> , (December 27, 2007)
	244	"In pictures: A year in technology", <i>BBC News</i> , (December 28, 2007)
	245	"Man tries wirelessly boosting batteries", by Seth Borenstein, AP Science Writer, <i>Boston.com</i> , (See http://www.boston.com/business/technology/articles/2006/11/15/man_tries_wirelessly_b...) (November 15, 2006)
	246	"The vision of an MIT physicist: Getting rid of pesky rechargers" by Gareth Cooks, <i>Globe Staff, Boston.com</i> , (December 11, 2006)
Examiner Signature /Fritz Fleming/ (06/18/2014)		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 (PTO-1449)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	247	"MIT discovery could unplug your iPod forever", by Chris Reidy, Globe staff, Boston.com, (See http://www.boston.com/business/ticker/2007/06/mit_discovery_c.html) (June 7, 2007)
	248	"Scientists light bulb with 'wireless electricity' ", www.Chinaview.cn, (See http://news.xinhuanet.com/english/2007-06/08/content_6215681.htm) (June, 2007)
	249	"Look, Ma – no wires! - Electricity broadcast through the air may someday run your home", by Gregory M. Lamb, Staff writer, The Christian Science Monitor, (See http://www.csmonitor.com/2006/1116/p14s01-stct.html) (November 15, 2006)
	250	"The end of the plug? Scientists invent wireless device that beams electricity through your home", by David Derbyshire, Daily Mail, (See http://www.dailymail.co.uk/pages/live/articles/technology/technology.html?in_article_id=4...) (June 7, 2007)
	251	"Lab report: Pull the plug for a positive charge", by James Morgan, The Herald, Web Issue 2680 (November 16, 2006)
	252	"Recharging gadgets without cables", Infotech Online, Printed from infotech.indiatimes.com (November 17, 2006)
	253	"Electro-nirvana? Not so fast", by Alan Boyle, MSNBC, (June 8, 2007)
	254	"'Evanescence coupling' could power gadgets wirelessly" by Celeste Biever, NewScientistsTech.com, (see http://www.newscientisttech.com/article.ns?id=dn10575&print=true) (November 15, 2006)
	255	"Wireless Energy", by Clay Risen, The New York Times, (December 9, 2007)
	256	"Wireless power transfer possible", PressTV, (See http://www.presstv.ir/detail.aspx?id=12754&sectionid=3510208) (June 11, 2007)
	257	"Outlets Are Out", by Phil Berardelli, ScienceNOW Daily News, Science Now, (See http://sciencenow.sciencemag.org/cgi/content/full/2006/1114/2) (November 14, 2006)
	258	"The Power of Induction – Cutting the last cord could resonate with our increasingly gadget-dependent lives", by Davide Castelvecchi, Science News Online, Vol. 172, No. 3, (Week of July 21, 2007)
	259	"Wireless Energy Transfer May Power Devices at a Distance", ScientificAmerican.com, (November 14, 2006)
	260	"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", by JR Minkel, ScientificAmerican.com, (See http://www.sciam.com/article.cfm?articleid=07511C52-E7F2-99DF-3FA6ED2D7DC9AA2...) (June 7, 2007)
	261	"Air Power – Wireless data connections are common -- now scientists are working on wireless power", by Stephen Cass, Sponsored by Spectrum, (See http://spectrum.ieee.org/computing/hardware/air-power) (November 2006)
	262	"Wireless revolution could spell end of plugs", by Roger Highfield, Science Editor, Telegraph.co.uk, (See http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2007/06/07/nwireless107.xml) (June 7, 2007)

Examiner Signature /Fritz Fleming/ (06/18/2014)	Date Considered
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Substitute Disclosure Form (PTO-1449)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

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		Filing Date December 30, 2009	Group Art Unit

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	263	"Man tries wirelessly boosting batteries", by Seth Borenstein, The Associated Press, <u>USA Today</u> , (November 16, 2006)
	264	"MIT's wireless electricity for mobile phones", by Miebi Senge, <u>Vanguard</u> , (See http://www.vanguardngr.com/articles/2002/features/gsm/gsm211062007.htm) (June 11, 2007)
	265	"MIT Scientists Pave the Way For Wireless Battery Charging", by William M. Bulkeley, <u>The Wall Street Journal</u> , (See http://online.wsj.com/article/SB118123955549228045.html?mod=googlenews_wsj) (June 8, 2007)
	266	Copy of Provisional Application, Application Serial No. 60/908,383 filed on March 27, 2007
	267	"Intel Moves to Free Gadgets of Their Recharging Cords", By John Markoff, The New York Times - <u>nytimes.com</u> , August 21, 2008
	268	G. Scheible et al., "Novel Wireless Power Supply System for Wireless Communication Devices in Industrial Automation Systems", <u>IEEE</u> , (2002)
	269	J. Schutz et al., "Load Adaptive Medium Frequency Resonant Power Supply", <u>IEEE</u> , (2002)
	270	Marin Soljacic et al., "Photonic-crystal slow-light enhancement of nonlinear phase sensitivity", <u>J. Opt. Soc. Am B</u> , Vol. 19, No. 9, pp. 2052-2059 (September 2002)
	271	Amnon Yariv et al., "Coupled-resonator optical waveguide: a proposal and analysis", <u>Optics Letters</u> , Vol. 24, No. 11, pp. 711-713 (June 1, 1999)
	272	Copy of International Search Report for International Application No. PCT/US09/58499 by Examiner Lee W. Young dated December 10, 2009
	273	Copy of PCT International Search Report and Written Opinion for PCT/US09/59244, December 7, 2009, 12 pages.
	274	

Examiner Signature /Fritz Fleming/ (06/18/2014)	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 (PTO-1449)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Receipt date: 07/31/2012

12649635 - GAU: 2836

Sheet 1 of 2

Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	2010/0102639	4/29/2010	Joannopoulos et al.			
	2	2010/0117455	5/13/2010	Joannopoulos et al.			
	3	2010/0117456	5/13/2010	Karalis et al.			
	4	2010/0171370	7/8/2010	Karalis et al.			
	5	2010/0181844	7/22/2010	Karalis et al.			
	6	2010/0201205	8/12/2010	Karalis et al.			
	7	2010/0225175	9/9/2010	Karalis et al.			
	8	2010/0231053	9/16/2010	Karalis et al.			
	9	2010/0237706	9/23/2010	Karalis et al.			
	10	2010/0237707	9/23/2010	Karalis et al.			
	11	2010/0237708	9/23/2010	Karalis et al.			
	12	2010/0253152	10/7/2010	Karalis et al.			
	13	2010/0264745	10/21/2010	Karalis et al.			
	14	2010/0277005	11/4/2010	Karalis et al.			
	15	2010/0327660	12/30/2010	Karalis et al.			
	16	2010/0327661	12/30/2010	Karalis et al.			
	17	2011/0012431	1/20/2011	Karalis et al.			
	18	2011/0018361	1/27/2011	Karalis et al.			
	19	2011/0025131	2/3/2011	Karalis et al.			
	20	2011/0049996	3/3/2011	Karalis et al.			
	21	2011/0049998	3/3/2011	Karalis et al.			
	22	2011/0140544	6/16/2011	Karalis et al.			
	23	2011/0148219	6/23/2011	Karalis et al.			
	24	2011/0162895	7/7/2011	Karalis et al.			
	25	2011/0169339	7/14/2011	Karalis et al.			
	26	2011/0181122	7/28/2011	Karalis et al.			
	27	2011/0198939	8/18/2011	Karalis et al.			

Examiner Signature /Fritz Fleming/ (06/18/2014)	Date Considered
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Substitute Disclosure Form (PTO-1449)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

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Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	28	2011/0221278	9/15/2011	Karalis et al.			
	29	2011/0227528	9/22/2011	Karalis et al.			
	30	2011/0227530	9/22/2011	Karalis et al.			
	31	2011/0241618	10/6/2011	Karalis et al.			

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	32	38 24 972	1/12/1989	Germany			Machine Translation	
	33	100 29147	12/20/2001	Germany			Machine Translation	
	34	6-341410	12/13/1994	Japan	F15B	15/18	English Abstract Only	
	35	11-188113	7/13/1999	Japan	A61N	1/378	English Abstract Only	
	36	2006/011769	2/2/2006	WIPO	H04B	7/14		

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	37	

Examiner Signature /Fritz Fleming/ (06/18/2014)	Date Considered
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12649635 - GAU: 2836

Sheet 1 of 2

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		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	8,022,576	9/20/2011	Joannopoulos et al.			
	2	2009/0174263	7/9/2009	Baarman et al.			
	3	2009/0267709	10/29/2009	Joannopoulos et al.			
	4	2009/0267710	10/29/2009	Joannopoulos et al.			
	5	2009/0284083	11/19/2009	Karalis et al.			
	6	2010/0096934	4/22/2010	Joannopoulos et al.			
	7	2010/0102641	4/29/2010	Joannopoulos et al.			
	8	2010/0123353	5/20/2010	Joannopoulos et al.			
	9	2010/0123354	5/20/2010	Joannopoulos et al.			
	10	2010/0123355	5/20/2010	Joannopoulos et al.			
	11	2010/0127573	5/27/2010	Joannopoulos et al.			
	12	2010/0127574	5/27/2010	Joannopoulos et al.			
	13	2010/0127575	5/27/2010	Joannopoulos et al.			
	14	2010/0133918	6/3/2010	Joannopoulos et al.			
	15	2010/0133919	6/3/2010	Joannopoulos et al.			
	16	2010/0133920	6/3/2010	Joannopoulos et al.			
	17	2010/0148589	6/17/2010	Hamam et al.			
	18	2010/0187911	7/29/2010	Joannopoulos et al.			
	19	2010/0207458	8/19/2010	Joannopoulos et al.			
	20	2011/0043046	2/24/2011	Joannopoulos et al.			
	21	2011/0074218	3/31/2011	Karalis et al.			
	22	2011/0074347	3/31/2011	Karalis et al.			
	23	2011/0089895	4/21/2011	Karalis et al.			
	24	2011/0193419	8/11/2011	Karalis et al.			

Examiner Signature /Fritz Fleming/ (06/18/2014)	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 (PTO-1449)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Receipt date: 11/30/2011

12649635 - GAU: 2836

Sheet 2 of 2

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		Filing Date December 30, 2009	Group Art Unit

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
	25						Yes	No

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	26	

Examiner Signature /Fritz Fleming/ (06/18/2014)	Date Considered
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Substitute Disclosure Form (PTO-1449)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Receipt date: 02/08/2011

12649635 - GAU: 2836

Sheet 1 of 3

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Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	5,118,997	6/2/1992	El-Hamamsy			
	2	5,986,895	11/16/1999	Stewart et al.			
	3	7,147,604	12/12/2006	Allen et al.			
	4	7,191,007	3/13/2007	Desai et al.			
	5	7,599,743	10/6/2009	Hassler, Jr. et al.			
	6	7,639,514	12/29/2009	Baarman			
	7	7,825,543	11/2/2010	Karalis et al.			
	8	7,843,288	11/30/2010	Lee et al.			
	9	2005/0288739	12/29/2005	Hassler, Jr. et al.			
	10	2005/0288740	12/29/2005	Hassler, Jr. et al.			
	11	2007/0182367	8/9/2007	Partovi			
	12	2008/0012569	1/17/2008	Hall et al.			
	13	2008/0030415	2/7/2008	Homan et al.			
	14	2008/0067874	3/20/2008	Tseng			
	15	2008/0265684	10/30/2008	Farkas			
	16	2009/0015075	1/15/2009	Cook et al.			
	17	2009/0067198	3/12/2009	Graham et al.			
	18	2009/0085408	4/2/2009	Bruhn			
	19	2009/0085706	4/2/2009	Baarman et al.			
	20	2009/0096413	4/16/2009	Patovi et al.			
	21	2009/0180679	4/30/2009	Porwal			
	22	2009/0108997	4/30/2009	Patterson et al.			
	23	2009/0146892	6/11/2009	Shimizu et al.			
	24	2009/0160261	6/25/2009	Elo			
	25	2009/0174263	9/9/2009	Baarman et al.			
	26	2009/0189458	7/30/2009	Kawasaki			
	27	2009/0230777	9/17/2009	Baarman et al.			

Examiner Signature /Fritz Fleming/ (06/18/2014)	Date Considered
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Substitute Disclosure Form (PTO-1449)

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12649635 - GAU: 2836

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		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	28	2009/0237194	9/24/2009	Waffenschmidt et al.			
	29	2009/0251008	10/8/2009	Sugaya			
	30	2009/0267558	10/29/2009	Jung			
	31	2009/0271047	10/29/2009	Wakamatsu			
	32	2009/0271048	10/29/2009	Wakamatsu			
	33	2009/0281678	11/12/2009	Wakamatsu			
	34	2009/0284082	11/19/2009	Mohammadian			
	35	2009/0284218	11/19/2009	Mohammadian et al.			
	36	2009/0284220	11/19/2009	Toncich et al.			
	37	2009/0284227	11/19/2009	Mohammadian et al.			
	38	2009/0284245	11/19/2009	Kirby et al.			
	39	2009/0284369	11/19/2001	Toncich et al.			
	40	2009/0286470	11/19/2009	Mohammadian et al.			
	41	2009/0286475	11/19/2009	Toncich et al.			
	42	2009/0286476	11/19/2009	Toncich et al.			
	43	2009/0289595	11/26/2009	Chen et al.			
	44	2010/0231163	9/19/2010	Mashinsky			
	45	2010/0289449	11/18/2010	Elo			
	46						

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	47	WO 2009/033043	3/12/2009	WIPO				
	48	WO 2009/070730	6/4/2009	WIPO				
	49	WO 2009/126963	10/15/2009	WIPO				
	50	WO 2009/149464	12/10/2009	WIPO				
	51	WO 2009/155000	12/23/2009	WIPO				

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Receipt date: 02/08/2011

12649635 - GAU: 2836

Sheet 3 of 3

Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	52							
	53							

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	54	A. 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, pp. 484-492, (2007)
	55	H. Sekiya et al. "FM/PWM control scheme in class DE inverter", IEEE Trans. Circuits Syst. I, vol. 51, no. 7 (July 2004)
	56	

Examiner Signature /Fritz Fleming/ (06/18/2014)	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 (PTO-1449)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Receipt date: 05/24/2012

12649635 - GAU: 2836

Sheet 1 of 2

Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	5,053,774	10/1/1991	Schuermann et al.			
	2	5,287,112	2/15/1994	Schuermann			
	3	5,455,467	10/3/1995	Young et al.			
	4	6,772,011	8/3/2004	Dolgin			
	5	7,741,734	6/22/2010	Joannopoulos et al.			
	6	8,076,800	12/13/2011	Joannopoulos et al.			
	7	8,076,801	12/13/2011	Karalis et al.			
	8	8,084,889	12/27/2011	Joannopoulos et al.			
	9	8,097,983	1/17/2012	Karalis et al.			
	10	2003/0124050	7/3/2003	Yadav et al.			
	11	2003/0126948	7/10/2003	Yadav et al.			
	12	2004/0100338	5/27/2004	Clark			
	13	2004/0233043	11/25/2004	Yazawa et al.			
	14	2006/0202665	9/14/2006	Hsu			
	15	2012/0068549	3/22/2012	Karalis et al.			

Foreign Patent Documents or Published Foreign Patent Applications								
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation	
							Yes	No
	16	JP 02-097005	04/09/1990	Japan	H01F	21/06		X
	17	WO 2009/140506	11/19/2009	WIPO				
	18	WO 2010/039967	4/8/2010	WIPO				

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	19	Copy of Non-Final Office Action for U.S. Application Serial No. 12/648,604 by Examiner Justen Fauth dated December 5, 2011
	20	Copy of Non-Final Office Action for U.S. Application Serial No. 13/036,177 by Examiner Fritz M. Fleming dated May 15, 2012
	21	Copy of Non-Final Office Action for U.S. Application Serial No. 13/078,511 by Examiner Fritz M. Fleming dated May 15, 2012

Examiner Signature /Fritz Fleming/ (06/18/2014)	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.	

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Receipt date: 05/24/2012

12649635 - GAU: 2836

Sheet 2 of 2

Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	22	Copy of Non-Final Office Action for U.S. Application Serial No. 12/726,742 by Examiner Fritz M. Fleming dated May 11, 2012
	23	Copy of Non-Final Office Action for U.S. Application Serial No. 13/030,395 by Examiner Fritz M. Fleming dated May 17, 2012
	24	Copy of Non-Final Office Action for U.S. Application Serial No. 13/040,810 by Examiner Fritz M. Fleming dated May 17, 2012

Examiner Signature /Fritz Fleming/ (06/18/2014)	Date Considered
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Substitute Disclosure Form (PTO-1449)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Amendments to the Specification

0035

Change(s) applied
to document,

/K.C./

6/13/2014

Please replace paragraph [0034] with the following amended paragraph:

0035

[0034] The omnidirectional by stationary (non-lossy) nature of the near field makes this mechanism suitable for mobile wireless receivers. It could therefore have a variety of possible applications including for example, placing a source connected to a wired electricity network on the ceiling of a factory room, while devices, such as robots, vehicles, computers, or similar are roaming freely within the room. Other possible applications include electric-engine buses, RFIDs, and perhaps even nano-robots. Similarly, in some embodiments multiple sources can transfer energy to one or more device objects. For example, as explained at in the paragraph bridging pages 4-5 of U.S. Provisional Application No. 60/698,442 to which the present application claims benefit and which is incorporated by reference above, for certain applications having uneven power transfer to the device object as the distance between the device and the source changes, multiple sources can be strategically placed to alleviate the problem, and/or the peak amplitude of the source can be dynamically adjusted.

Receipt date: 02/08/2011

12649635 - GAU: 2836

Sheet 1 of 3

Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant John D. Joannopoulos et al.	
		Filing Date December 30, 2009	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	5,118,997	6/2/1992	El-Hamamsy			
	2	5,986,895	11/16/1999	Stewart et al.			
	3	7,147,604	12/12/2006	Allen et al.			
	4	7,191,007	3/13/2007	Desai et al.			
	5	7,599,743	10/6/2009	Hassler, Jr. et al.			
	6	7,639,514	12/29/2009	Baarman			
	7	7,825,543	11/2/2010	Karalis et al.			
	8	7,843,288	11/30/2010	Lee et al.			
	9	2005/0288739	12/29/2005	Hassler, Jr. et al.			
	10	2005/0288740	12/29/2005	Hassler, Jr. et al.			
	11	2007/0182367	8/9/2007	Partovi			
	12	2008/0012569	1/17/2008	Hall et al.			
	13	2008/0030415	2/7/2008	Homan et al.			
	14	2008/0067874	3/20/2008	Tseng			
	15	2008/0265684	10/30/2008	Farkas			
	16	2009/0015075	1/15/2009	Cook et al.			
	17	2009/0067198	3/12/2009	Graham et al.			
	18	2009/0085408	4/2/2009	Bruhn			
	19	2009/0085706	4/2/2009	Baarman et al.			
	20	2009/0096413	4/16/2009	Patovi et al.			
	21	~~2009/0180679~~	4/30/2009	Porwal	2009/0108679		
	22	2009/0108997	4/30/2009	Patterson et al.			
	23	2009/0146892	6/11/2009	Shimizu et al.			
	24	2009/0160261	6/25/2009	Elo			
	25	2009/0174263	~~9/9/2009~~	Baarman et al.	7/2009		
	26	2009/0189458	7/30/2009	Kawasaki			
	27	2009/0230777	9/17/2009	Baarman et al.			

Change(s) applied
to document,
/M.A.H./

6/25/2011

Examiner Signature /Fritz Fleming/ (06/18/2014)	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 (PTO-1449)

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./

Receipt date: 04/16/2014

12649635 - GAU: 2836

Sheet 1 of 5

Substitute Disclosure Form	U.S. Department of Commerce Patent and Trademark Office	Attorney Docket No. 01997-0359015	Application No. 12/649,635
Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		First Named Inventor John D. Joannopoulos	
		Filing Date December 30, 2009	Group Art Unit 2836

Change(s) applied
to document,
/M.A.H./
6/25/2014

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	1	3,780,425	12/25/1973	~~Alan, William Penn~~ et al.			
	2	3,871,176	3/18/1975	Schukei, Glen Elwin			
	3	4,095,998	6/20/1978	Hanson, Charles M.			
	4	4,280,129	7/21/1981	Wells, Donald H.			
	5	5,229,652	7/20/1993	HOUGH, WAYNE			
	6	5,408,209	4/18/1995	Tanzer, Herbert J., et al.			
	7	5,522,856	6/4/1996	Reineman, Henk			
	8	5,541,604	7/30/1996	Meier, Herbert			
	9	5,565,763	10/15/1996	Arrendale, Hubert G., et al.			
	10	5,630,835	5/20/1997	Brownlee, Robert R.			
	11	5,697,956	12/16/1997	Bornzin, Gene A.			
	12	5,703,461	12/30/1997	Minoshima, Norimoto et al.			
	13	5,710,413	1/20/1998	KING, JAMES et al.			
	14	5,742,471	4/21/1998	Barbee Jr., Troy W., et al.			
	15	5,821,728	10/13/1998	SCHWIND, JOHN			
	16	5,821,731	10/13/1998	Kuki, Heiji et al.			
	17	5,903,134	5/11/1999	TAKEUCHI, YASUO			
	18	5,923,544	7/13/1999	Urano, Takashi			
	19	5,940,509	8/17/1999	Jovanovich, Alan et al.			
	20	5,957,956	9/28/1999	Kroll, Mark W., et al.			
	21	5,959,245	9/28/1999	Moe et al.			
	22	5,993,996	11/30/1999	Firsich, David W.			
	23	6,012,659	1/11/2000	Nakazawa, Yuji et al.			
	24	6,047,214	4/4/2000	Mueller, Jeffrey S., et al.			
	25	6,066,163	5/23/2000	John, Michael Sasha			

Examiner Signature /Fritz Fleming/ (06/02/2014)	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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /F.F./



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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/649,635	07/29/2014	8791599	01997-0359015 / MIT 11757	5891

26161 7590 07/09/2014
FISH & RICHARDSON P.C. (BO)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

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 734 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):

John D. Joannopoulos, Belmont, MA;
Aristeidis Karalis, Boston, MA;
Marin Soljacic, Belmont, MA;

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 USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor : John D. Joannopoulos Art Unit : 2836
Patent No. : 8,791,599 Examiner : Fritz Fleming
Issue Date : July 29, 2014 Conf. No. : 5891
Serial No. : 12/649,635
Filed : December 30, 2009
Title : WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS

Attention Certificate of Corrections Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CERTIFICATE OF CORRECTION

Please issue a certificate of correction in accordance with the attached form.

One or more of the errors to be corrected were made by applicant. The fee of \$100 is being paid with this request.

Apply any other necessary charges or credits to Deposit Account 06- 1050, referencing the above attorney docket number.

Respectfully submitted,

Date: September 10, 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

23280374.doc

**UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION**

Page 1 of 1

PATENT NO. : 8,791,599
APPLICATION NO. : 12/649,635
ISSUE DATE : July 29, 2014
INVENTOR(S) : John D. Joannopoulos, Aristeidis Karalis, Marin Soljacic and

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Page 5

Other Publications, Column 1, Line 62, Delete "nextlittle" and insert -- next_little --

Page 6

Other Publications, Column 1, Line 30, Delete "Photomic" and inset -- photonic --

Other Publications, Column 2, Line 52, Delete "Reasonators" and inset -- Resonators --

Other Publications, Column 2, Line 55, After "Microwave" insert -- and --

Page 7

Other Publications, Column 1, Line 49, Delete "propogation" and insert -- propagation --

Page 8

Other Publications, Column 1, Line 13, Delete "127548" and insert -- 12754& --

Other Publications, Column 1, Line 23, Delete "Awav" and insert -- Away --

Other Publications, Column 1, Line 25, Delete "lust" and insert -- just --

Column 12

Line 44, In Claim 7, delete " $Q_2 = \cap_2 / (2\Gamma_2)$ " and insert -- $Q_2 = \omega_2 / (2\Gamma_2)$ --

Column 15

Line 37, In Claim 37, delete "method system" and insert -- method --

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Fish & Richardson P.C.
P.O. Box 1022
Minneapolis, MN 55440-1022

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. 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 1.0 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: Attention Certificate of Corrections Branch, 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 selection option2.

Electronic Patent Application Fee Transmittal				
Application Number:		12649635		
Filing Date:		30-Dec-2009		
Title of Invention:		WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS		
First Named Inventor/Applicant Name:		John D. Joannopoulos		
Filer:		Marc M. Wefers/Cheryl Forrest		
Attorney Docket Number:		01997-0359015 / MIT 11757		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
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:				
Certificate of Correction	1811	1	100	100
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				100

Electronic Acknowledgement Receipt	
EFS ID:	20094859
Application Number:	12649635
International Application Number:	
Confirmation Number:	5891
Title of Invention:	WIRELESS ENERGY TRANSFER TO A MOVING DEVICE BETWEEN HIGH-Q RESONATORS
First Named Inventor/Applicant Name:	John D. Joannopoulos
Customer Number:	26161
Filer:	Marc M. Wefers/Cheryl Forrest
Filer Authorized By:	Marc M. Wefers
Attorney Docket Number:	01997-0359015 / MIT 11757
Receipt Date:	10-SEP-2014
Filing Date:	30-DEC-2009
Time Stamp:	10:38:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$100
RAM confirmation Number	5337
Deposit Account	061050
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Request for Certificate of Correction	RequestforCOC.pdf	118888 6af30e5aa14e9872a310c39d0524ce221775860	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30412 76f62c11651759799dc491620491da917c60abb8	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			149300		
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
CERTIFICATE OF CORRECTION

PATENT NO. : 8,791,599 B2
APPLICATION NO. : 12/649635
DATED : July 29, 2014
INVENTOR(S) : John D. Joannopoulos et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page under item (56),

Page 5

Other Publications, Column 1, Line 62, Delete "nextlittle" and insert -- next_little --

Page 6

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Other Publications, Column 1, Line 25, Delete "lust" and insert -- just --

In the Claims,

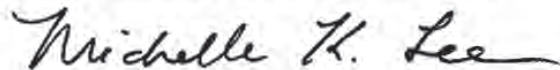
Column 12

Line 44, In Claim 7, delete " $Q_2 = \cap_2 / (2\Gamma_2)$ " and insert -- $Q_2 = \omega_2 / (2\Gamma_2)$ --

Column 15

Line 37, In Claim 37, delete "method system" and insert -- method --

Signed and Sealed this
Sixteenth Day of December, 2014



Michelle K. Lee
Deputy Director of the United States Patent and Trademark Office