

### DETAILED ACTION

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 2, 4 and 6-18 are rejected under 35 U.S.C. 102(a) as being anticipated by Veselic (US 2004/0251878). The reference discloses a usb charger for a mobile device wherein the usb cord is attached to the ac power outlet 130 of a conventional house or not (dc source in this case). The device is configured to identify the operating characteristics of the charger signal 115 (this case whether the usb cord is connected to the ac or dc (i.e. hub)). See column 2.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Veselic (US 2004/0251878). The reference does not disclose the type of power plugs being used. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected any type of plugs being American or European, since it has been held to be within the general skill of a worker in the art to

select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

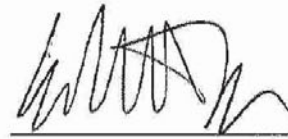
**Conclusion**

Any inquiry concerning this communication should be directed to the Examiner at the below-listed number on every Tuesday, Thursday and Saturday.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Karl Easthom, can be reached at (571) 272-1989 on Monday-Thursday.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist at (571) 272-2800, Monday-Friday, 8:30am to 5:00pm, EST.

By: \_\_\_\_\_



EDWARD H TSO  
Primary Examiner  
(571) 272-2087

<b>Notice of References Cited</b>	Application/Control No. 11/175,885	Applicant(s)/Patent Under Reexamination FISCHER ET AL.	
	Examiner Edward H. Tso	Art Unit 2838	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A US-			
	B US-			
	C US-			
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

**NON-PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
X	U	US 2004/0251878 A1 (Veselic) 16 Dember 2004. 320/141.			
	V				
	W				
	X				

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
 Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

**Index of Claims**



Application/Control No.

11/175,885

Examiner

Edward H. Tso

Applicant(s)/Patent under Reexamination

FISCHER ET AL.

Art Unit

2838

√	Rejected
≡	Allowed

—	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claim		Date	
Final	Original	3/1/06	
1	v		
2	v		
3	v		
4	v		
5	v		
6	v		
7	v		
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9	v		
10	v		
11	v		
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Claim		Date	
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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.

**PATENT APPLICATION FEE DETERMINATION RECORD**  
 Substitute for Form PTO-875

Application or Docket Number  
**11-175,885**

**APPLICATION AS FILED - PART I**

(Column 1)		(Column 2)		SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)	
BASIC FEE (37 CFR 1.18(a), (b), or (c))								
SEARCH FEE (37 CFR 1.18(k), (l), or (m))								
EXAMINATION FEE (37 CFR 1.18(o), (p), or (q))								
TOTAL CLAIMS (37 CFR 1.18(j))		minus 20 *	X		OR	X		
INDEPENDENT CLAIMS (37 CFR 1.18(h))		minus 3 *	X		OR	X		
APPLICATION SIZE FEE (37 CFR 1.16(e))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 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			TOTAL		

**APPLICATION AS AMENDED - PART II**

*1-20-06*

(Column 1)		(Column 2)		(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
Total (37 CFR 1.16(b))	20	Minus 20	—				OR		
Independent (37 CFR 1.16(d))	3	Minus 3	—				OR		
Application Size Fee (37 CFR 1.16(s))							OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIMS (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

(Column 1)		(Column 2)		(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
Total (37 CFR 1.16(b))		Minus					OR		
Independent (37 CFR 1.16(d))		Minus					OR		
Application Size Fee (37 CFR 1.16(s))							OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIMS (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter 20.  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter 3.  
 The "Highest Number Previously Paid For" (Total or independently) is the highest number found in the appropriate box in column 2.

This collection of information is required by 37 CFR 1.16. The information is required by this form unless a fee is paid by the applicant to the USPTO to process an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.16. The fee is estimated to be \$125, plus the amount for preparing, preparing, and submitting the completed application form to the USPTO. The fee is dependent on the number of claims. Any comments on the amount of time you require to complete this form and/or suggestions for reducing the burden should be sent to the Patent and Trademark Office, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. FEE INFORMATION FOR THIS FORM IS AVAILABLE AT: [www.uspto.gov](http://www.uspto.gov). ADDRESS: SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

If you need a 22 starting in the morning, call 1-800-351-7000.

FW



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. 555255-012844

Group Art Unit: 2838 )  
 Examiner: Edward H. Tso )  
 Inventor: Fischer, et al. )  
 Serial No.: 11/175,885 )  
 Filed: July 06, 2005 )  
 For: Multifunctional Charger System )  
 and Method )

Amendment

**CERTIFICATE OF MAILING**

*I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on Jan 18, 2006.*

By Debra Pejean (DEBRA PEJEAN)

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

Sir:

In response to the Office Action mailed on October 20, 2005, please amend the application as follows and consider the following remarks. Any fees due should be charged to Jones Day Deposit Account No. 501432, ref: 555255-012844.

**AMENDMENT TO THE SPECIFICATION**

**Please amend the title of the application as follows:**

~~Multifunctional Charger System and Method~~ A Universal Serial Bus Adapter for a Mobile Device"

**Please amend the paragraph beginning at page 1, line 4 of the specification, as follows:**

This application is a continuation United States Patent Application No. 10/087,629, entitled "Multifunctional Charger System and Method," which was filed on March 1, 2002, and issued as United States Patent No. 6,936,936. United States Patent Application No. 10/087, 629 claims priority from and is related to United States Provisional Application No. 60/273,021, entitled "System and Method for Adapting a USB to Provide Power for Charging a Mobile Device," which was filed on March 1, 2001, and United States Provisional Application No. 60/330,486, entitled "Multifunctional Charger System and Method", which was filed on October 23, 2001. The entirety of these prior applications are hereby incorporated into the present application by reference.

## REMARKS

This Amendment responds to the office action mailed on October 20, 2005. The specification has been amended to amend the title of the application and to add the patent number of the parent application. Claims 1-18 remain pending as originally filed. Reconsideration is respectfully requested in light of the following remarks.

### *Objection to the Specification*

The title is objected to in the office action as not being descriptive of the invention. The title has been amended to more clearly indicate the invention being claimed.

### *Claim Rejections under 35 U.S.C. § 102*

Claims 1, 2, 4 and 6-18 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Gabehart (U.S. 6,130,518). These rejections are respectfully traversed. Among other distinctions, the Gabehart reference does not disclose or suggest the generation of an identification signal which is configured to indicate to the mobile device that the power socket is not a USB host or hub, as claimed in independent claims 1, 17 and 18. That is, the Gabehart reference does not determine if an attached power source is a USB source. Rather, Gabehart assumes an existing connection to a databus (204), and determines if power is available from another external source (EXT B+) (i.e., a non-USB source). If power is not available from the external source (EXT B+), then the Gabehart system "allows the battery 210 to be charged from the power available from the data bus 204." (Gabehart, col. 3, lines 16-17). The Gabehart reference does not even contemplate a situation in which the device is not connected to a databus. Consequently, the Gabehart reference clearly does not disclose or even remotely suggest determining if a connected power source is or is not a USB host or hub, as claimed. For this reason alone, the patent owner submits that claims 1, 17 and 18 are patentable over the Gabehart reference and are in condition for allowance. The remaining claims 2-16 each ultimately depend from claim 1, and are thus also in condition for allowance.



Moreover, the patent owner further submits that the rejections under 35 U.S.C. § 102(b) completely fail to show correspondence between the cited Gabehart reference and the language of the claims, and therefore fail to make out a prima facie rejection under 35 U.S.C. § 102(b). Particularly with respect to the rejected dependent claims, the office action does not even make an attempt to demonstrate that the claim language is anticipated by the cited Gabehart reference. For example, claim 7 recites that "the identification subsystem comprises a hard-wired connection of a voltage level to one or more data lines in the USB connector." Even a cursory review of the Gabehart reference clearly shows that this limitation and other claimed limitations are not disclosed. The patent owner therefore respectfully requests that these improper rejections under section 102(b) be withdrawn.

*Claim Rejections under 35 U.S.C. § 103*

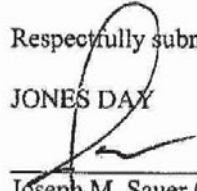
Claims 3 and 5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Gabehart reference and the knowledge generally recognized as being within the level of ordinary skill in the art. The patent owner respectfully disagrees. Nonetheless, claims 3 and 5 are patentable over the cited references for at least the same reasons stated above with respect to independent claim 1.

*Conclusion*

For the foregoing reasons, the patent owner respectfully submits that claims 1-18 are in condition for allowance. The Examiner is, therefore, respectfully requested to enter this amendment and pass this case to issue.

Respectfully submitted,

JONES DAY

  
\_\_\_\_\_  
Joseph M. Sauer (Reg. No. 47,919)  
Jones Day  
North Point, 901 Lakeside Avenue  
Cleveland, Ohio 44114  
(216) 586-7506



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/175,885	07/06/2005	Daniel M. Fischer	555255012844	5606

33070 7590 10/20/2005  
JOSEPH M. SAUER  
JONES DAY REAVIS & POGUE  
NORTH POINT, 901 LAKESIDE AVENUE  
CLEVELAND, OH 44114

EXAMINER

TSO, EDWARD H

ART UNIT PAPER NUMBER

2838

DATE MAILED: 10/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

12

<b>Office Action Summary</b>	<b>Application No.</b> 11/175,885	<b>Applicant(s)</b> FISCHER ET AL.	
	<b>Examiner</b> Edward H. Tso	<b>Art Unit</b> 2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on \_\_\_\_\_.
- 2a)  This action is FINAL.                      2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-18 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1-18 is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some \* c)  None of:
1.  Certified copies of the priority documents have been received.
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/8/05</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Information Disclosure Statement***

The IDS filed 7/6/05 has been considered and placed of record. An initialed copy is attached herewith.

***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The disclosure should be carefully reviewed to ensure that any and all grammatical, idiomatic, and spelling or other minor errors are corrected.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4 and 6-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Gabehart et al. (US 6,130,518). The reference discloses a method of charging a battery whereby the device has, *inter alia*, sensor to sense whether the power source is

external or from a usb port. The arrangement allows the battery to be charged from the internal usb hub or not from the usb hub. See column 2, line 25 to column 3, line 20.

***Claim Rejections - 35 USC § 103***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gabehart et al. (US 6,130,518). The reference is silent on the external power source plug being a variety of plugs. It would have been an obvious matter of design choice to have changed the type of plug to fit the right application, since such a modification would have involved a mere change in the size and shape of a component. A change in

Application/Control Number: 11/175,885  
Art Unit: 2838

Page 4

size is generally recognized as being within the level of ordinary skill in the art. *In re*  
*Rose*, 105 USPQ 237 (CCPA 1955).

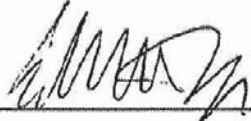
### **Conclusion**

Any inquiry concerning this communication should be directed to the Examiner at  
the below-listed number.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's  
supervisor, Mike Sherry, can be reached on 571 272 2084.

Any inquiry of a general nature or relating to the status of this application should  
be directed to the receptionist whose telephone number is 571 272 2800, Monday-  
Friday, 8:30am to 5:00pm, EST.

By: \_\_\_\_\_

  
EDWARD H TSO  
Primary Examiner  
571 272 2087

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>	<b>Complete if Known</b>	
	Application Number	
	Filing Date	
	First Named Inventor	Daniel M. Fischer
	Art Unit	
	Examiner Name	
Sheet 1 of 3	Attorney Docket Number	555255012844

U. S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number-Kind Code <sup>2</sup> (if known)			
	AA	US- 3,775,659	11/27/1973	Carlsen, II	
	AB	US- 4,433,251	02/21/1984	Banks, et al.	
	AC	US- 4,510,431	04/09/1985	Winkler	
	AD	US- 5,173,855	12/22/1992	Nelsen, et al.	
	AE	US- 5,229,649	07/20/1993	Nielsen, et al.	
	AF	US- 5,272,475	12/21/1993	Eaton, et al.	
	AG	US- 5,444,378	08/22/1995	Rogers	
	AH	US- 5,631,503	05/20/1997	Cioffi	
	AI	US- 5,638,540	06/10/1997	Aldous	
	AJ	US- 5,651,057	07/22/1997	Blood, et al.	
	AK	US- 5,769,877	06/23/1998	Barreras, Sr.	
	AL	US- 5,850,113	12/15/1998	Weimer, et al.	
	AM	US- 5,939,860	08/17/1999	William	
	AN	US- 6,104,162	08/15/2000	Sainsbury, et al.	
	AO	US- 6,104,759	08/15/2000	Carkner, et al.	
	AP	US- 6,252,375	06/26/2001	Richter, et al.	
	AQ	US- 6,211,649	04/03/2001	Matsuda	
	AR	US- 6,184,652	02/06/2001	Yang	
	AS	US- 6,006,088	12/21/1999	Couse	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>4</sup>
		Country Code <sup>3</sup> Number <sup>4</sup> Kind Code <sup>5</sup> (if known)				
	BA	WO 0101330A1	01/04/2001	McClurg, et al.		

Examiner Signature	<i>[Signature]</i>	Date Considered	10/05
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kind Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours 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, 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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Substitute for form 1449/PTO		<i>Complete If Known</i>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  <i>(Use as many sheets as necessary)</i>		Application Number	
		Filing Date	
		First Named Inventor	Daniel M. Fischer
		Art Unit	
		Examiner Name	
Sheet 3 of 3	Attorney Docket Number	555255012844	

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
D	CA	Electric Double-Layer Capacitors, Vol. 2, 10/25/1996 (Japan, Tokin Corp., Cat. No. EC-200E)	
D	CB	Supercapacitor: User's Manual, Vol. 2 (Japan, Tokin Corp., date unknown)	
D	CC	Charging Big Supercaps, Portable Design, p. 26, March 1997	

Examiner Signature 	Date Considered	10/05
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 608. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.  
 1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.  
 This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours 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, 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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**Index of Claims**



Application/Control No.

11/175,885

Examiner

Edward H. Tso

Applicant(s)/Patent under Reexamination

FISCHER ET AL.

Art Unit

2838

√	Rejected
≡	Allowed

-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claim		Date	
Final	Original	10/1/05	
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Effective on 12/08/2004. Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4918). <h2 style="margin: 0;">FEE TRANSMITTAL</h2> <h3 style="margin: 0;">For FY 2005</h3>		<b>Complete if Known</b>	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27		Application Number	
		Filing Date	
		First Named Inventor	Daniel M. Fischer
		Examiner Name	
		Art Unit	
		Attorney Docket No.	555255012844
<b>TOTAL AMOUNT OF PAYMENT</b> (\$) 1000			

**METHOD OF PAYMENT** (check all that apply)

Check  
  Credit Card  
  Money Order  
  None  
  Other (please identify): \_\_\_\_\_

**Deposit Account**  
 Deposit Account Number: 501432 (555255012844)  
 Deposit Account Name: Jones Day

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

Charge fee(s) indicated below  
  Charge fee(s) indicated below, except for the filing fee

Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17  
  Credit any overpayments

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**FEE CALCULATION**

**1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	1000
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

**2. EXCESS CLAIM FEES**

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

**Total Claims**    **Extra Claims**    **Fee (\$)**    **Fee Paid (\$)**    **Multiple Dependent Claims**  
 18 - 20 or HP = 0 x 50 = 0.00    **Fee (\$)**    **Fee Paid (\$)**  
 HP = highest number of total claims paid for, if greater than 20.    360    0

**Indep. Claims**    **Extra Claims**    **Fee (\$)**    **Fee Paid (\$)**  
 3 - 3 or HP = 0 x 200 = 0.00    **Fee (\$)**    **Fee Paid (\$)**  
 HP = highest number of independent claims paid for, if greater than 3.    360    0

**3. APPLICATION SIZE FEE**

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 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).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
30	- 100 = 0	/ 50 = 0 (round up to a whole number)	x 250 =	0

**4. OTHER FEE(S)**

Description	Amount	Fees Paid (\$)
Non-English Specification	\$130 fee (no small entity discount)	0
Other (e.g., late filing surcharge):		0

<b>SUBMITTED BY</b>		
Signature	Registration No. (Attorney/Agent) 47,919	Telephone 216/688-7506
Name (Print/Type) Joseph M. Sauer		Date 7/5/05

This collection of information is required by 37 CFR 1.136. 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 30 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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**Multifunctional Charger System and Method**CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation United States Patent Application No. 10/087,629,  
5 entitled "Multifunctional Charger System and Method," which was filed on March 1, 2002.  
United States Patent Application No. 10/087, 629 claims priority from and is related to United  
States Provisional Application No. 60/273,021, entitled "System and Method for Adapting a  
USB to Provide Power for Charging a Mobile Device," which was filed on March 1, 2001, and  
United States Provisional Application No. 60/330,486, entitled "Multifunctional Charger System  
10 and Method", which was filed on October 23, 2001. The entirety of these prior applications are  
hereby incorporated into the present application by reference.

BACKGROUND1. Field of the Invention

15 This invention relates generally to power adapters. More particularly, the invention  
relates to power adapters for use with mobile devices.

2. Description of the Related Art

20 Providing an external source of power to a mobile device, such as a personal digital  
assistants ("PDA"), mobile communication device, cellular phone, wireless two-way e-mail  
communication device, and others, requires design considerations with respect to both the mobile  
device and the power source. With regard to the mobile device, most mobile devices provide a  
distinct power interface for receiving power from a power source, for instance to recharge a  
battery, and a separate data interface for communicating. For example, many mobile devices

presently use USB (Universal Serial Bus) interfaces for communicating and use a separate power interface, such as a barrel connector, for receiving power.

It is desirable, however, to have a combined power and data interface. The mobile devices that do have combined power and data interfaces typically use non-standard and sometimes proprietary interfaces. Consequently, combined interfaces for a particular manufacturer's mobile device may not be compatible with combined interfaces for mobile devices provided by other manufacturers.

Although the USB interface can be used as a power interface, the USB is typically not used for that purpose by mobile devices. In accordance with the USB specification, typical USB power source devices, such as hubs and hosts, require that a USB device participate in a host-initiated process called enumeration in order to be compliant with the current USB specification in drawing power from the USB interface. Although a mobile device could be adapted to participate in enumeration when drawing power over the USB interface, it would be preferable in many situations, such as when a host would not be available, as often happens during normal use of a mobile device, to be able to utilize alternate power sources such as conventional AC outlets and DC car sockets that are not capable of participating in enumeration to supply power to the mobile device via a USB interface.

#### SUMMARY

An adapter for providing a source of power to a mobile device through an industry standard port is provided. In accordance with one aspect of the invention, the adapter comprises a plug unit, a power converter, a primary connector, and an identification subsystem. The plug unit is operative to couple the adapter to a power socket and operative to receive energy from the

power socket. The power converter is electrically coupled to the plug unit and is operable to regulate the received energy from the power socket and to output a power requirement to the mobile device. The primary connector is electrically coupled to the power converter and is operative to couple to the mobile device and to deliver the outputted power requirement to the mobile device. The identification subsystem is electrically coupled to the primary connector and is operative to provide an identification signal.

In accordance with another aspect, a USB adapter for providing a source of power to a mobile device through a USB port is provided. The USB adapter comprises a plug unit, a power converter, a primary USB connector, and an identification subsystem. The plug unit is operative to couple the USB adapter to a power socket and operative to receive energy from the power socket. The power converter is electrically coupled to the plug unit and is operable to regulate the received energy from the power socket and to output a power requirement to the mobile device. The primary USB connector is electrically coupled to the power converter and is operative to couple to the mobile device and to deliver the outputted power requirement to the mobile device. The identification subsystem is electrically coupled to the primary connector and is operative to provide an identification signal.

Another aspect provides a USB adapter for providing a source of power to a mobile device through a USB port. The USB adapter comprises a plug unit, a power converter, a primary USB connector, and an auxiliary USB adapter. The plug unit is operative to couple the USB adapter to a power socket and operative to receive energy from the power socket. The power converter is electrically coupled to the plug unit and is operable to regulate the received energy from the power socket and to output a power requirement to the mobile device. The primary USB connector is electrically coupled to the power converter and is operative to couple



to the mobile device and to deliver the outputted power requirement to the mobile device. The auxiliary USB connector has data lines that are electrically coupled to the data lines of the primary USB connector.

Yet another aspect provides a method for providing energy to a mobile device using a  
5 USB adapter that comprises a plug unit, a primary USB connector, a power converter electrically coupled between the plug unit and the primary USB connector, and an identification subsystem electrically coupled to the primary USB connector. The method comprising the steps of coupling the USB connector to the mobile device, coupling the plug unit to a power socket, outputting a power requirement to the mobile device via the power converter and the USB  
10 connector, and providing an identification signal to the mobile device, via the identification subsystem and the USB connector, that is operative to inform the mobile device that the USB adapter is not limited by the power limits imposed by the USB specification.

In accordance with another aspect, a powering system for a mobile device having a USB connector is provided. The powering system comprises a power distribution subsystem in the  
15 mobile device that is operable to receive energy through the USB connector and to distribute the energy to at least one component in the mobile device and a USB adapter that is operative to couple to the USB connector.. The USB adapter comprises a plug unit for coupling to a power socket and that is operable to receive energy from the power socket, a power converter electrically coupled to the plug unit for regulating the received energy and for providing a power  
20 requirement to the power distribution subsystem, and an identification subsystem that is operable to transmit an identification signal that is operative to identify the USB adapter as not being limited by the power limits imposed by the USB specification.

## BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention identified in the claims may be more clearly understood, preferred embodiments thereof will be described in detail by way of example, with reference to the accompanying drawings, in which:

5 Fig. 1 is a schematic diagram of an exemplary mobile device which has an industry standard interface;

Fig. 2 is a schematic diagram of a first embodiment of a USB adapter that is coupled to an exemplary mobile device;

10 Fig. 3 is a flow chart illustrating an exemplary use of a USB adapter with a mobile device; and

Fig. 4 is a schematic diagram of an additional exemplary embodiment of a USB adapter that is coupled to both an exemplary mobile device and an external battery.

## DETAILED DESCRIPTION

### 15 **Exemplary Mobile Device**

Turning now to the drawing figures, shown in Fig. 1 is a schematic diagram of an exemplary mobile communication device **10** which has an industry standard interface. The mobile communication device **10** is preferably a two-way communication device having at least voice or data communication capabilities. Preferably, the mobile device **10** is also capable of  
20 communicating over the Internet, for example, via a radio frequency (“RF”) link. Examples of types of devices that could be classified as a mobile device **10** include a data messaging device, a two-way pager, a cellular telephone with data messaging capabilities, a wireless Internet appliance, a data communication device (with or without telephony capabilities), a personal digital assistants (“PDA”), a wireless two-way e-mail communication device, and others.

The exemplary mobile device 10 comprises a microprocessor 12, a communication subsystem 14, input/output ("I/O") devices 16, an industry standard interface 18 which in this example is a USB port, and a power subsystem 20. The microprocessor 12 controls the overall operation of the mobile device 10. The communication subsystem 14 provides the mobile device 10 with the ability to communicate wirelessly with external devices such as other mobile devices and other computers. The I/O devices 16 provide the mobile device 10 with input/output capabilities for use with a device user. The USB port 18 provides the mobile device 10 with a serial port for linking directly with other computers and/or a means for receiving power from an external power source. The power subsystem 20 provides the mobile device 10 with a local power source.

The exemplary communication subsystem 14 comprises components such as a receiver 22, a transmitter 24, antenna elements 26 and 28, local oscillators (LOs) 30, and a processing module such as a digital signal processor (DSP) 32. The particular design of the communication subsystem 14 and the components used therein can vary. It would be apparent to one of ordinary skill in the art to design an appropriate communication subsystem using conventional methods and components to operate over a communication network 34 based on the parameters necessary to operate over that communication network. For example, a mobile device 10 geographically located in North America may include a communication subsystem 14 designed to operate within the Mobitex™ mobile communication system or DataTAC™ mobile communication system, whereas a mobile device 10 intended for use in Europe may incorporate a General Packet Radio Service (GPRS) communication subsystem 14.

Network access requirements will also vary depending upon the type of network 34. For example, in the Mobitex and DataTAC networks, mobile devices 10 are registered on the

network using a unique personal identification number or PIN associated with each device. In GPRS networks however, network access is associated with a subscriber or user of a mobile device 10. A GPRS device therefore requires a subscriber identity module (not shown), commonly referred to as a SIM card, in order to operate on a GPRS network. Without a SIM card, a GPRS device will not be fully functional. Local or non-network communication functions (if any) may be operable, but the mobile device 10 will be unable to carry out any functions involving communications over the network 34.

When required, after the network registration or activation procedures have been completed, a mobile device 10 may send and receive communication signals over the network 34. Signals received by the receiver antenna 26 through a communication network 34 are input to the receiver 22, which may perform such common receiver functions as signal amplification, frequency down conversion, filtering, channel selection and the like, and in the exemplary system shown in Fig. 1, analog to digital conversion. Analog to digital conversion of a received signal allows more complex communication functions such as demodulation and decoding to be performed in a DSP 32. Similarly, signals to be transmitted are processed, including modulation and encoding for example, by the DSP 32 and input to the transmitter 24 for digital to analog conversion, frequency up conversion, filtering, amplification and transmission over the communication network 34 via the transmitter antenna 28.

Also, in the exemplary communication subsystem 14, the DSP 32 processes communication signals and also provides for receiver and transmitter control. For example, the gains applied to communication signals in the receiver 22 and transmitter 24 may be adaptively controlled through automatic gain control algorithms implemented in the DSP 32.

In implementing its control function, the microprocessor 12 in the exemplary mobile device 10 executes an operating system. The operating system software used by the microprocessor 12 is preferably stored in a persistent store such as flash memory 36, or alternatively read only memory (ROM) or similar storage element. The microprocessor 12 may also enable the execution of specific device applications, which preferably are also stored in a persistent store. The operating system, specific device applications, or parts thereof, may also be temporarily loaded into a volatile store such as in RAM 38.

A predetermined set of applications which control basic device operations, including at least data and voice communication applications for example, will normally be installed on the mobile device 10 during manufacture. One such application loaded on the mobile device 10 could be a personal information manager (PIM) application. The PIM application preferably is an application for organizing and managing user inputted data items such as e-mail, calendar events, voice mails, appointments, and task items. The PIM data items may be stored in the RAM 38 and/or the flash memory 36.

The PIM application preferably has the ability to send and receive data items, via the wireless network 34. The PIM data items are preferably seamlessly integrated, synchronized and updated, via the wireless network 34, with corresponding data items stored or associated with a host computer system (not shown) used by the device user. The synchronization of PIM data items is a process by which the PIM data items on the mobile device 10 and the PIM data items on the host computer system can be made to mirror each other.

There are several possible mechanisms for loading applications onto the mobile device 10. For example, applications may be loaded onto the mobile device 10 through the wireless network 34, an auxiliary I/O subsystem 40, the serial port 18, a short-range communications

subsystem 42, such as an infrared ("IR") communication system, or any other suitable subsystem 44. When loading the applications onto the mobile device 10, the device user may install the applications in the RAM 38, the flash memory 36, or preferably a non-volatile store (not shown) such as ROM for execution by the microprocessor 12. The available application installation mechanisms can increase the utility of the mobile device 10 by providing the device user with a way of upgrading the mobile device 10 with additional and/or enhanced on-device functions, communication-related functions, or both. For example, a secure communication application may be loaded onto the mobile device 10 that allows for electronic commerce functions or other financial transactions to be performed using the mobile device 10.

The I/O devices 16 may be used to display and/or compose data communication messages. In one mode of operation, a signal received by the mobile device 10, such as a text message or web page download, will be received and processed by the communication subsystem 14, forwarded to the microprocessor 12, which will preferably further process the received signal, and provide the processed signal to one or more of the I/O devices 16 such as a display 46. Alternatively, a received signal such as a voice signal can be provided to a speaker 48, or alternatively to an auxiliary I/O device 40. In another mode of operation a device user may compose a data item such as an e-mail message using a keyboard 50 in cooperation with the display 46 and possibly an auxiliary I/O device 40. Alternatively, a device user may compose a voice message via a microphone 52. The composed data item may then be transmitted over a communication network 34 using the communication subsystem 14.

A short-range communications subsystem 42 may be provided in the mobile device 10 to allow the mobile device 10 to communicate with other systems or devices, which need not necessarily be similar to device 10. For example, the short-range communications subsystem 42

may include an infrared device and associated circuitry and components or a Bluetooth™ communication module to allow the device 10 to communicate with similarly-enabled systems and devices.

The USB port 18 provides the mobile device 10 with a serial port for linking directly with other computers to exchange data and/or to receive power. The USB port 18 also provides the mobile device 10 with a means for receiving power from an external power source. For example, in a personal digital assistant (PDA)-type communication device, the USB port 18 could be used to allow the mobile device 10 to synchronize data with a user's desktop computer (not shown). The USB port 18 could also enable a user to set parameters in the mobile device 10 such as preferences through the use of an external device or software application. In addition the USB port 18 may also be used to provide a means for downloading information or software to the mobile device 10 without using the wireless communication network 34. The USB port 18 can provide a direct and thus reliable and trusted connection that may for example be used to load an encryption key onto the mobile device 10 thereby enabling secure device communication.

Coupled to the USB port 18 is a USB connector 54. The USB connector 54 is the physical component that couples the USB port to the outside world. In the exemplary mobile device 10, the USB connector 54 is used to transmit and receive data from an external data/power source 56, receive power from the external data/power source 56, direct the transmitted/received data from/to the USB port 18, and direct the received power to the power subsystem 20.

The exemplary power subsystem 20 comprises a charging and power distribution subsystem 58 and a battery 60. The charging and power distribution subsystem 58 performs

many functions. It may be used to transfer energy to the battery 60 from the external data/power source 56 to charge the battery 60 and also to distribute power to the many power requiring components within the mobile device 10. The charging subsystem 58 may be capable of determining the presence of a battery 60 and/or a power circuit coupled to the mobile device 10, such as an AC adapter, USB connection, or car adapter, which alternatively can act as power sources 56 to provide power for the mobile device 10 and to charge the battery 60. Additionally, the charging subsystem 58 may have the ability to determine if a power source 56 is coupled to the mobile device 10 and, in the absence of such a coupling, cause the mobile device 10 to be powered by the battery 60.

The power distributed by the charging and power distribution subsystem 58 may be derived from energy stored in the battery 60 and/or energy received from the external data/power source 56. When the battery 60 is depleted, the charging and power distribution subsystem 58 transfers energy from the power source 56 to recharge the battery 60. Optionally, the charging and power distribution subsystem 58 may also transfer energy from the power source 56 to other components in the mobile device 10 to power the mobile device 10 when the battery 60 has been depleted and is recharging. When the data/power source 56 is not connected to the mobile device 10, power for the device 10 is derived from the battery 60.

#### **Exemplary USB Adapter**

Fig. 2 is a schematic diagram of a first embodiment of an adapter 100 that can be used to couple the mobile device 10 of fig. 1 to the data/power source 56 of fig. 1. In this example the adapter 100 is a USB adapter 100 that comprises a primary USB connector 102, a power converter 104, a plug unit 106, and an identification subsystem 108. The power converter is a known element in the art and typically includes at least one of the following components: switching converter, transformer, DC source, voltage regulator, linear regulator and rectifier. In



the embodiment shown in fig. 2, the USB adapter 100 is shown coupling a mobile device 10 to one of one or more types of power sockets 110N, 110D, 110B, and 100. Also shown in fig. 2 is an optional auxiliary USB connector 112 that can be used to couple the mobile device 10 to a data source (not shown) such as a personal computer.

5 In the embodiment shown in fig. 2, the primary USB connector 102 is configured to mate with the USB connector 54 of the mobile device 10. The USB adapter 100 is operable to provide power to the mobile device 10 through the Vbus and Gnd power pins in the USB connectors 54 and 102. The USB adapter 100 also optionally provides a communication path for data across the D+ and D- data pins in the USB connectors 54 and 102.

10 The plug unit 106 is preferably a conventional plug unit that can be used to couple with a conventional power socket to receive power therefrom. For example, the plug unit 106 can be a two prong or three prong plug of the type used in North America that can couple to a North American AC power socket 110N that provides 115 VAC. In the embodiment shown in figure 2, the plug unit 106 can accept one or more types of plug adapters 114N, 114B, 114D, and 114 that  
15 are configured to couple to the plug unit 106 and are further configured to directly mate with one or more types of power sockets 110N, 110D, 110B, and 100. The plug unit 106 can be configured to receive energy from a power socket 110N, 110D, 110B, or 100, either directly or through the use of a plug adapter, and is operative to transfer the received energy to the power converter 104.

20 The power converter 104 is operative to receive energy from a power socket 110N, 110D, 110B, or 100 and to convert that received energy to a form that can be used by the mobile device 10. For example, the power converter 104 can be of conventional construction such as a switching power converter that converts 115 VAC to 5 VDC. Also, the power converter 104

could comprise a D.C. regulator circuit that converts a D.C. input to a D.C. output. The power converter 104 could also be adapted to accept a wide range of input energy levels and frequencies. Alternatively, the power converter 104 could be adapted to accept a limited range of input energy levels and frequencies, wherein the plug adapters are operable to convert the possible input energy levels and frequencies to a range that the power converter can accommodate. The power converter 104 provides its energy output to the mobile device 10 via the Vbus and Gnd pins of the primary USB connector 102.

Through the use of a variety of different types of plug adapters, the USB adapter 100 can be adapted to receive energy from various types of power sockets 110N, 110D, 110B, or 100. For example, using the appropriate plug adapter 114, 114B, 114D, and 114N, the USB adapter 100 can receive energy from a power socket such as an 115 VAC North American power socket 110N, or a 12 VDC automobile power socket, or an air power socket, or others.

For example, in North America, a type "N" power socket is commonly available. The plug adapter 114N can be releasably attached to the plug unit 106 thereby allowing any North American power socket 114N to be used as a power source. When traveling to a locale which does not have the North American power socket 114N, an alternate plug adapter such as adapters 114, 114B, or 114D may be selected by the user, according to the power socket 110D, 110B, or 100 available at the locale. The plug adapter 114, 114B, or 114D may then be releasably attached to plug unit 106 in place of the plug adapter 114N, thereby allowing the USB power adapter 100 to connect to a local power supply via the local power socket. Various other plug adapters are envisioned that can be configured to operate with alternate power sources such as for instance car sockets.

The power distribution and charging subsystem 58 of the mobile device 10 can selectively use the power provided on the Vbus and Gnd lines of the USB connector 54 to provide power to the mobile device 10, charge the battery 60, or both. A more detailed discussion of how the charging function of mobile device 10 can be implemented is described in  
5 United States Provisional Application No. 60/273021 filed on March 1<sup>st</sup>, 2001 and entitled "System and Method for Adapting a USB to Provide Power for Charging a Mobile Device" which has been incorporated herein by reference.

Typically when a mobile device 10 receives power over the USB from a USB host, it is required to draw power in accordance with the USB specification. The USB specification  
10 specifies a process for transferring energy across the USB called enumeration and limits the electrical current that can flow across the USB.

The USB adapter 100 contributes to a system wherein a device 10 that follows the USB specification when coupled to a typical USB host via its USB port can be informed that the USB adapter 100 has been coupled to the device 10 and that the device 10 can now draw power  
15 without regard to the USB specification and the USB specification imposed limits.

The identification subsystem 108 provides an identification signal to the mobile device 10 that the power source is not a USB limited source. The identification signal could be the communication of a single voltage on one or more of the USB data lines, different voltages on the two data lines, a series of pulses or voltage level changes, or other types of electrical signals.  
20 The identification subsystem 108 that generates the identification signal could have multiple types of configurations. In one embodiment, the identification subsystem 108 comprises a hard-wired connection of a single voltage level to both data lines. In another embodiment, the identification subsystem 108 comprises a USB controller that is operable to communicate an

identification signal to the mobile device. Additional embodiments are contemplated. The identification subsystem 108 may optionally be configured to have the capability of electrically connecting or disconnecting the power output from the power converter 104 from the USB connector 102 and/or to connect or disconnect any data inputs from the USB adapter 100 to the  
5 USB connector 102.

In addition to providing power to the mobile device 10 over the primary USB connector 102, the USB adapter 100 may optionally be equipped with an auxiliary USB connector 112 that allows the USB adapter 100 to create a communication path between the mobile device 10 and some other device capable of communicating over the USB such as a personal computer, another  
10 mobile device or some other type of device.

The USB adapter 100 preferably provides a communication path between the D+ and D- pins of the Primary USB connector 102 and the D+ and D- pins of the auxiliary USB connector 112. In the embodiment shown, the communication path also traverses the identification subsystem 108. Alternatively, the communication path could bypass the identification  
15 subsystem 108. The USB adapter 100 can thus act as a pass through device for communication between a USB hub or host and a mobile device 10.

Optionally, the USB adapter 100 could also transfer energy from the power converter 104 to the auxiliary USB connector 112 thereby providing a device coupled to the auxiliary USB connector 112 with power. In this arrangement, the identification subsystem 108 could also  
20 provide an identification signal to the device coupled to the auxiliary USB connector 112 to inform that device that the power source is not a USB limited source.

#### **Exemplary Illustration Of The Use of A USB Adapter With A Mobile Device**

When a USB adapter 100 is connected to a mobile device 10, the identification subsystem 108 of the USB adapter 100 preferably provides an identification signal to the mobile

device 10 to notify the mobile device 10 that the device 10 is connected to a power source that is not subject to the power limits imposed by the USB specification. Preferably, the mobile device 10 is programmed to recognize the identification signal and therefore recognizes that an identification signal has been transmitted by the USB adapter 100. After recognizing a valid  
5 identification signal, the mobile device 10, draws power through the USB adapter 100 without waiting for enumeration or charge negotiation.

The detection of the identification signal may be accomplished using a variety of methods. For example, the microprocessor 12 may detect the identification signal by detecting the presence of an abnormal data line condition at the USB port 18. The detection may also be  
10 accomplished through the use of other device subsystems 44 in the mobile device 10. The preferred identification signal results from the application of voltage signals greater than 2 volts to both the D+ and D- lines in the USB connector. The preferred method of identification is described below in greater detail with reference to Fig. 3.

At step 210, the mobile device 10 detects the presence of a voltage on the Vbus line of  
15 the USB connector 54 via the USB port 18. At step 220, the mobile device checks the state of the D+ and D- lines of the USB connector. In the example shown in the drawings, the D+ and D- lines are compared to a 2V reference. Also, in this example, the identification subsystem 108 of the USB adapter 100 may have applied a logic high signal, such as +5V reference, to both the D+ and D- lines to identify the attached device as a USB adapter 100. If the voltages on both the  
20 D+ and D- lines of the USB connector are greater than 2 Volts (step 220), then the mobile device 10 determines that the device connected to the USB connector 54 is not a typical USB host or hub and that a USB adapter 100 has been detected (step 230). The mobile device 10 can then

charge the battery or otherwise use power provided via the Vbus and Gnd lines in the USB connector 54 (step 260) without waiting for enumeration.

If, however, after the mobile device 10 detects the presence of a voltage on the Vbus line of the USB connector 54 and determines that the voltages on both the D+ and D- lines of the USB connector are not greater than 2 Volts (step 220), then the mobile device 10 determines that a USB host or hub has been detected (step 240). A typical USB host or hub weakly holds its D+ and D- lines at zero volts when it is not connected to another device. The mobile device 10 can then signal the USB host or hub to initiate the enumeration process (step 250) and can charge the battery or otherwise use power provided via the Vbus and Gnd lines in the USB connector (step 260) in accordance with the power limits imposed by the USB specification. The enumeration process is typically initiated after the mobile device 10 applies approximately zero volts to the D- line and approximately 5 volts to the D+ line to inform the host of the mobile device's 10 presence and communication speed.

Therefore, when a USB adapter 100 is coupled to the mobile device 10 and has been identified as a USB adapter 100, the mobile device 10 can forego the enumeration process and charge negotiation process and immediately draw energy from the USB power adapter 100 at a desired rate, for instance at 5 unit loads, i.e. 500mA. While the mobile device 10 charges its battery using the USB adapter 100, the mobile device 10 can disable its typical USB functions. If, however, the mobile device 10 detects that a USB host or hub is coupled to the mobile device 10, the mobile device 10 can apply a voltage to the D+ line to indicate to the USB host or hub that the mobile device 10 is coupled thereto and await enumeration and USB charge negotiation.

If the USB adapter 100, is coupled to the mobile device 10, and the mobile device 10 does not identify the USB adapter 100 through communications with the identification module

108, the mobile device 10 may stop drawing energy from the Vbus and Gnd lines of the USB connector 54. This may occur, for example, if the mobile device 10 is not programmed to identify the USB adapter 100. The mobile device 10 may mistakenly identify the USB adapter 100 as a typical USB host or hub and await enumeration before drawing substantial energy. To guard against this, the USB adapter 100 can optionally be adapted to function with mobile devices that are not programmed to recognize the USB adapter 100.

In that scenario, the USB adapter 100 can be adapted to provide energy to a mobile device by using the knowledge that the mobile device will draw energy from a connected device for a period of time before it stops drawing energy due to lack of enumeration. The USB adapter 100 can optionally provide power for charging a battery 60 in a mobile device by periodically switching the voltages on the Vbus and Gnd lines between on and off states. When the USB adapter 100 is coupled to the mobile device, the identification subsystem 108 can apply an on-voltage (5 V for example) between the Vbus and Gnd lines. The mobile device will draw energy while awaiting enumeration. After a period of time, the identification subsystem 108 can apply an off-voltage (0 volts) between the Vbus and Gnd lines thereby fooling the mobile device into determining that the unidentified USB device has been disconnected from the mobile device. The identification subsystem 108 can then reapply an on-voltage between the Vbus and Gnd lines. The mobile device will draw energy again while awaiting enumeration. This cycle can be repeated to periodically apply energy to the mobile device, for example, to recharge the battery 60 of the mobile device.

#### **Additional Exemplary Embodiments Of USB Adapters**

Shown in fig. 4 is a schematic diagram of an additional exemplary embodiment of a USB adapter 300 that is coupled to a mobile device 10. The exemplary USB adapter 300 comprises a USB connector 302, a power converter 304, a plug unit 306, and an identification subsystem

308. The USB connector 302, plug unit 306, and identification subsystem 308, preferably correspond to the USB connector 102, plug unit 106, and identification subsystem 108 which were described earlier with respect to the first embodiment. Similar to the first embodiment, the additional embodiment may optionally be equipped with various plug adapters 314N, 314D, 5 314B, and 314 that preferably are releasably attachable to plug unit 306 so that the appropriate plug adapter 314N, 314D, 314B, or 314 can be selected by a user to allow the USB adapter 300 to couple to and receive energy from an available power socket 310N, 310D, 310B, or 310. The exemplary USB power converter 300 further comprises a charging subsystem 316 and battery receptacle 318 for coupling the USB adapter 300 to an external battery 320 that may be 10 optionally coupled thereto.

The battery receptacle 318 provide a location for releasably coupling an external battery 320 thereto so that the external battery can be charged via the USB adapter 300. This provides the USB adapter 300 with a mechanism for charging, for example, a mobile device's primary or spare battery when the battery has been separated from or is not coupled to the mobile device 10.

15 To accommodate this functionality, the power converter 304 is capable of providing the proper voltage levels for the USB connector 302 and also capable of providing necessary voltage and current levels to drive a battery charging subsystem 316. The power converter 304 is preferably a dual power converter that may be constructed using conventional or non-conventional architectures. With respect to the portion of the power converter 304 that provides 20 energy to the USB connector 302, that portion is preferably similar in construction and function to the power converter 104 of the first embodiment.

Preferably, the charging subsystem 316 performs in a substantially similar manner to charging subsystem 58 of the mobile device 10. But, for efficiency and simplicity of design,



certain aspects of the dual power converter 304 and the charging subsystem 316 may be combined, as both are local to the USB adapter 300.

Other alternative embodiments of the USB adapter may include various combinations of components described above with respect to the first and additional embodiments. Another  
5 embodiment of the USB adapter may include a second or more auxiliary USB connectors. A USB adapter having one or more auxiliary USB connectors may optionally be configured such that one or more of the auxiliary USB connectors may have power from the USB adapter's power converter made available to it so that multiple USB devices may draw power simultaneously. Preferably, a USB adapter having multiple auxiliary USB connectors will be  
10 configured such that the data lines in the auxiliary connectors can, on a selective basis, be electrically connected to or disconnected from the data lines in the primary USB connector. This allows a mobile device connected to the primary USB connector to receive energy from the adapter regardless of whether a USB host or hub is connected to an auxiliary USB connector. It is also contemplated that a USB adapter may be embodied in a USB host or hub.

15 **Conclusion**

The embodiments described herein are examples of structures, systems or methods having elements corresponding to the elements of the invention recited in the claims. This written description may enable those skilled in the art to make and use embodiments having alternative elements that likewise correspond to the elements of the invention recited in the  
20 claims. The intended scope of the invention thus includes other structures, systems or methods that do not differ from the literal language of the claims, and further includes other structures, systems or methods with insubstantial differences from the literal language of the claims. Although the embodiments have been described with reference to the USB interface, it is

contemplated that the invention could be applicable to devices and systems that use other standard interfaces such as the IEEE 1394 interface.

**The following is claimed:**

1. A Universal Serial Bus ("USB") adapter for providing power to a mobile device through a USB port, comprising:

a plug unit configured to receive energy from a power socket;

a power converter coupled to the plug unit, the power converter being configured to regulate the received energy from the power socket to generate a power output;

an identification subsystem configured to generate an identification signal, wherein the identification signal is configured to indicate to the mobile device that the power socket is not a USB host or hub; and

a USB connector coupled to the power converter and the identification subsystem, the USB connector being configured to couple the power output and the identification signal to the mobile device.

2. The USB adapter of claim 1, wherein the plug unit is configured to couple directly with the power socket.

3. The USB adapter of claim 2, wherein the plug unit is configured to couple to at least one power socket selected from the group consisting of: North American power socket, United Kingdom power socket, European power socket, Australian power socket, airplane power socket, and automobile power socket.

4. The USB adapter of claim 1, further comprising a plug adapter that is configured to couple the plug unit to the power socket.

5. The USB adapter of claim 4, wherein the plug adapter is configured to couple to at least one power socket selected from the group consisting of: North American power socket, United Kingdom power socket, European power socket, Australian power socket, airplane power socket, and automobile power socket.

6. the USB adapter of claim 1, wherein the identification signal comprises a voltage level that is applied to at least one data line in the USB connector.

7. The USB adapter of claim 1, wherein the identification subsystem comprises a hard-wired connection of a voltage level to one or more data lines in the USB connector.

8. The USB adapter of claim 1, wherein the identification subsystem comprises a USB controller that is configured to provide a voltage level to one or more data lines in the USB connector.

9. The USB adapter of claim 1, wherein the identification subsystem further comprises a switch that is configured to couple the power output to the USB connector.

10. The USB adapter of claim 9, wherein the identification subsystem is configured to cause the switch to disconnect the power output from the USB connector.

11. The USB adapter of claim 10, wherein the identification subsystem is configured to cause the switch to reconnect the power output to the USB connector.

12. The USB adapter of claim 1, further comprising an auxiliary USB connector.

13. The USB adapter of claim 12, wherein one or more data lines of the auxiliary USB connector are coupled to one or more data lines of the USB connector via the identification subsystem.

14. The USB adapter of claim 12, wherein the power converter is operable to generate a second power output that is coupled to the auxiliary USB connector.

15. The USB adapter of claim 1, further comprising:

a battery receptacle configured to attach a rechargeable battery; and

a battery charging subsystem coupled between the battery receptacle and the power converter, the battery charging subsystem being configured to receive energy from the power converter and to provide power at the battery receptacle.

16. The USB adapter of claim 1, wherein the power converter comprises at least one component selected from the group consisting of: switching converter, transformer, DC source, voltage regulator, linear regulator and rectifier.

17. A method for providing energy to a mobile device using a USB adapter that includes a USB connector for coupling the USB adapter to the mobile device, comprising:

receiving a power input from a power socket;

generating a regulated DC power output from the power input;

generating an identification signal that is configured to indicate to the mobile device that the power socket is not a USB host or hub;

providing the identification signal on one or more data pins of the USB connector; and

providing the power output on one or more power pins of the USB connector.

18. A Universal Serial Bus ("USB") adapter for providing a source of power to a mobile device through a USB port, comprising:

means for receiving energy from a power socket;

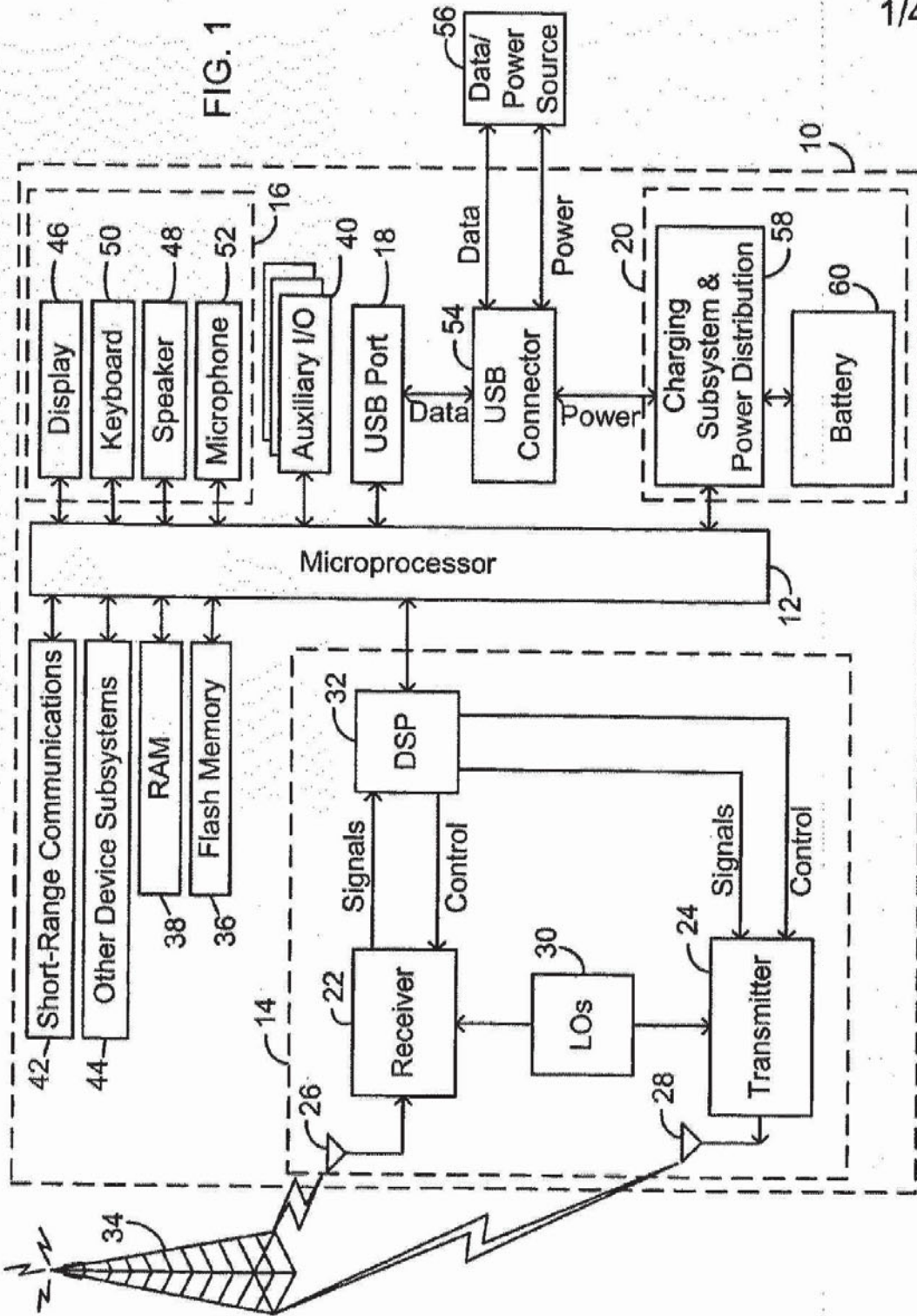
means for regulating the received energy from the power socket to generate a power output;

means for generating an identification signal that indicates to the mobile device that the power socket is not a USB hub or host; and

means for coupling the power output and identification signal to the mobile device.

## ABSTRACT

An adapter for providing a source of power to a mobile device through an industry standard port is provided. In accordance with one aspect of the invention, the adapter comprises a plug unit, a power converter, a primary connector, and an identification subsystem. The plug unit is operative to couple the adapter to a power socket and operative to receive energy from the power socket. The power converter is electrically coupled to the plug unit and is operable to regulate the received energy from the power socket and to output a power requirement to the mobile device. The primary connector is electrically coupled to the power converter and is operative to couple to the mobile device and to deliver the outputted power requirement to the mobile device. The identification subsystem is electrically coupled to the primary connector and is operative to provide an identification signal.





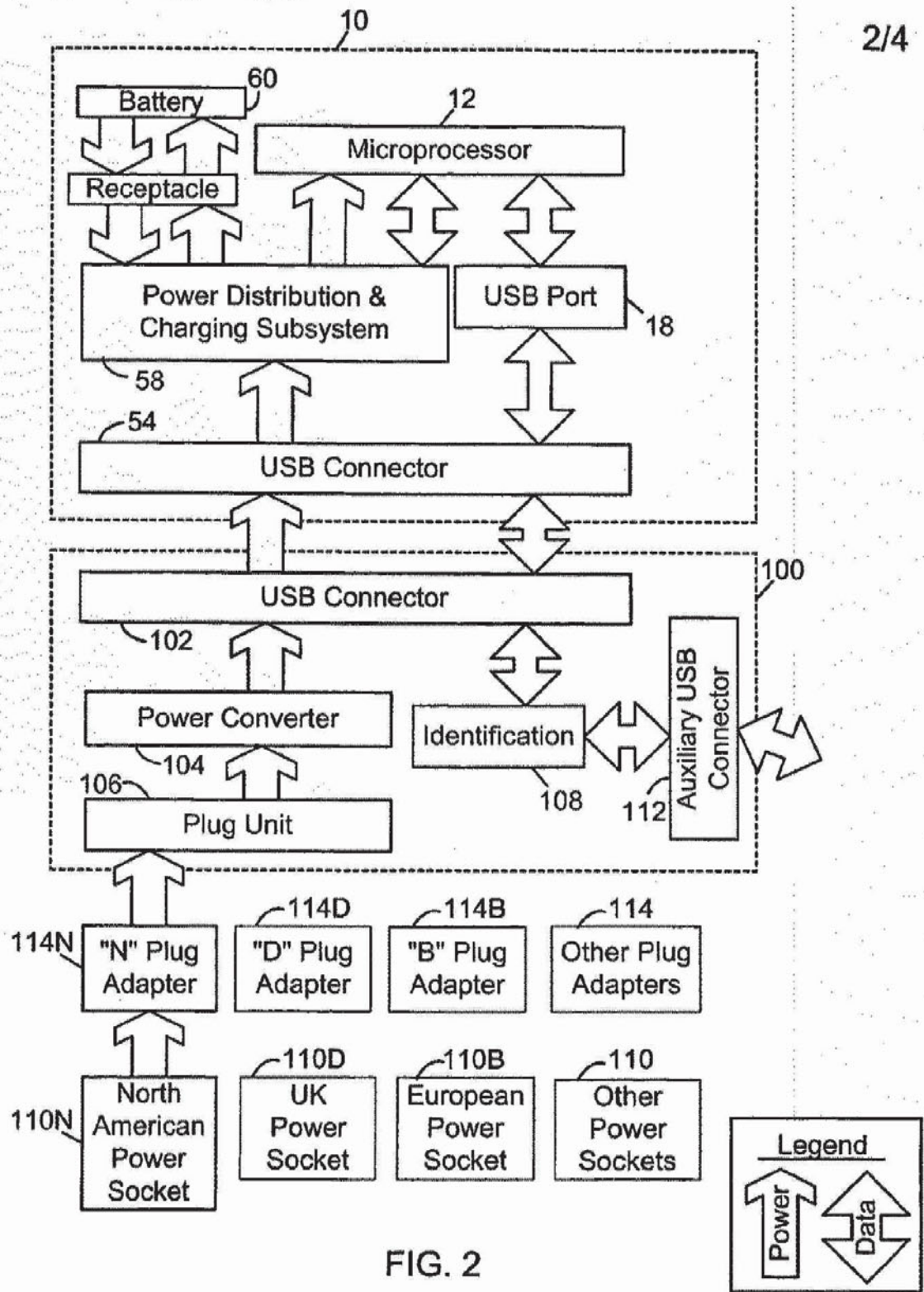


FIG. 2

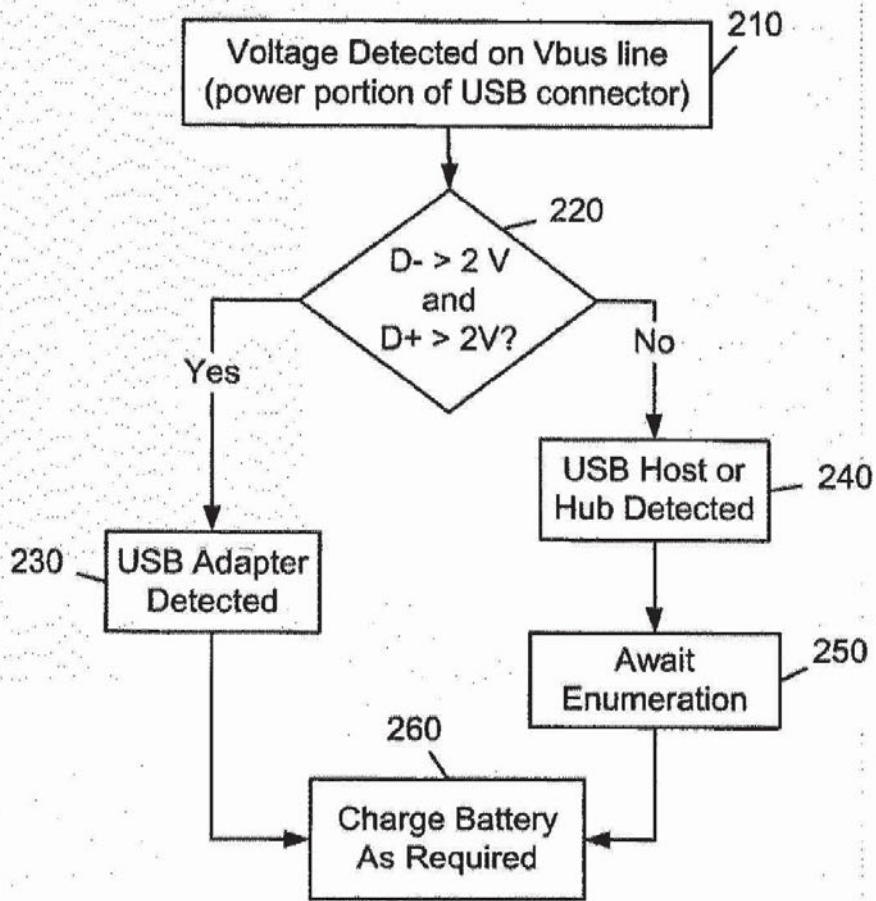


FIG. 3