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Lee et al.

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(54) **WIRELESS BATTERY CHARGING OF ELECTRONIC DEVICES SUCH AS WIRELESS HEADSETS/HEADPHONES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 196 days.

7,042,196 B2	5/2006	Ka-Lai et al.	
2003/0050011 A1*	3/2003	Palermo et al.	455/41
2005/0017677 A1*	1/2005	Burton et al.	320/108
2006/0058076 A1	3/2006	Mickle et al.	
2006/0061323 A1	3/2006	Cheng et al.	
2006/0061324 A1	3/2006	Oglesbee	
2006/0061325 A1	3/2006	Tang et al.	
2006/0061326 A1	3/2006	Vine et al.	
2006/0063568 A1	3/2006	Mickle et al.	
2006/0071632 A1	4/2006	Ghabra et al.	
2006/0076922 A1	4/2006	Cheng et al.	

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(51) **Int. Cl.**
H02J 7/00 (2006.01)

(52) **U.S. Cl.** **320/108**; 320/114; 320/115

(58) **Field of Classification Search** 320/108
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,031,449 A	6/1977	Trombly
5,323,099 A	6/1994	Bruni et al.
5,568,036 A	10/1996	Hulsey et al.
5,959,433 A	9/1999	Rohde
6,016,046 A	1/2000	Kaite et al.
6,215,981 B1	4/2001	Borchardt et al.
6,633,155 B1	10/2003	Liang

OTHER PUBLICATIONS

“RCA 900MHz Wireless Headphones WHP170/WHP175,” Product Manual, 44 pages, 2004, http://accessories.rca.com/rcaaccessories/productdownloads/whp175_ib.pdf.

(Continued)

Primary Examiner—Edward Tso

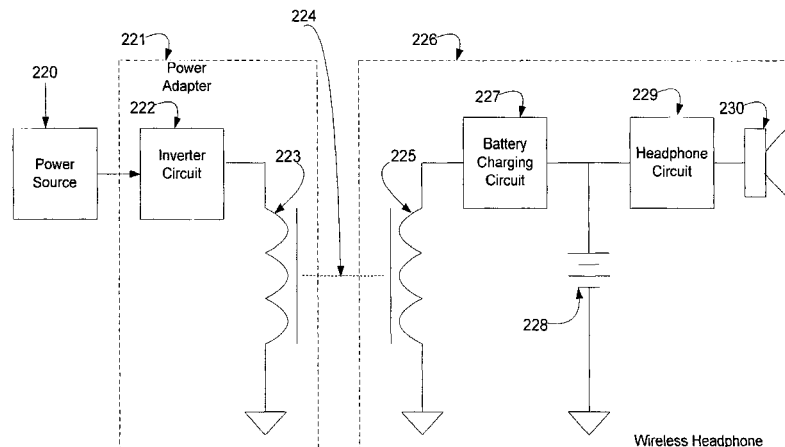
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(57) **ABSTRACT**

This disclosure relates to wireless battery charging of electronic devices such as wireless headsets/headphones. In one embodiment, an electronic device is provided comprising a speaker comprising a coil, and the coil is operative both to cause the speaker to produce sound and to receive energy transferred to the coil via inductive coupling. The received energy is used to recharge a rechargeable battery in the electronic device. In other embodiments, the coil used to receive the energy that recharges the battery is received by a coil other than the coil in the speaker.

18 Claims, 24 Drawing Sheets



OTHER PUBLICATIONS

“RCA 900MHz Wireless Stereo Headphones with Induction Charging and Auto-Tuning, WHP175,” 1 page, printed Jul. 24, 2006, <http://accessories.rca.com/en-US/modeldetail.html?maincat=Wireless+Solutions>

&subcat=900+MHZ+Wireless+Headphones
&modelnum=WHP175.

“RCA 900MHz Music and TV Headphones,” 2 pages, 2006, <http://www.activeandable.com/products/253>.

* cited by examiner

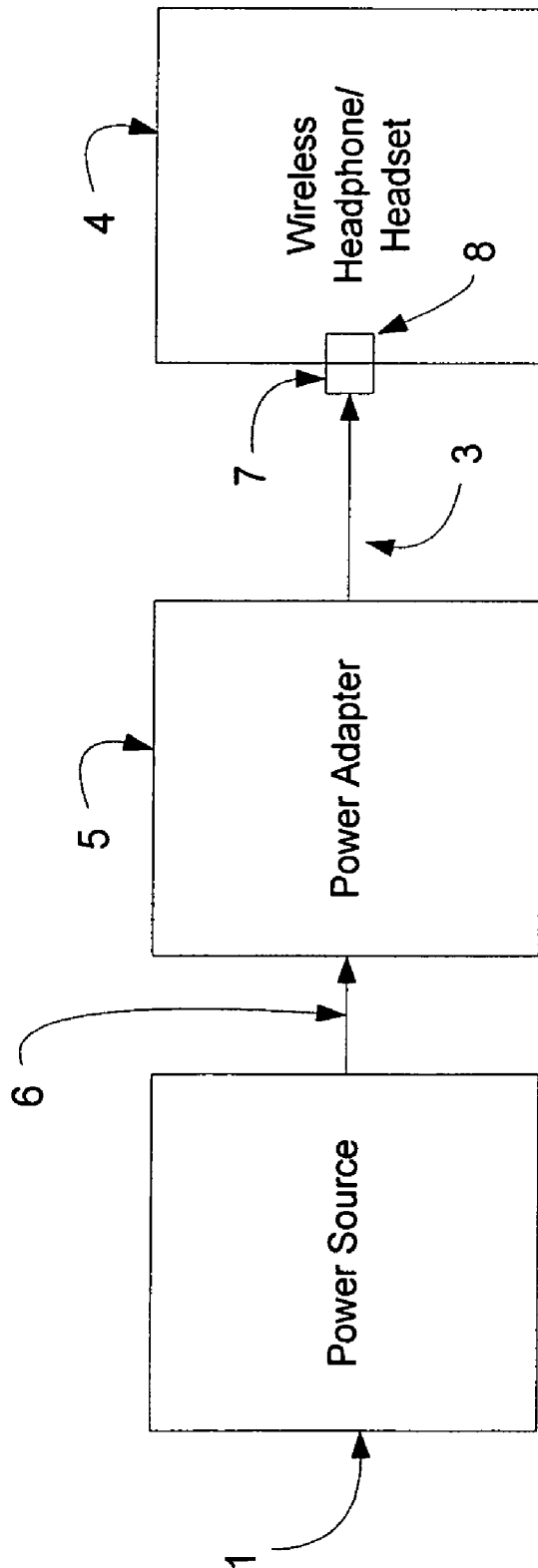


FIG. 1
(Prior Art)

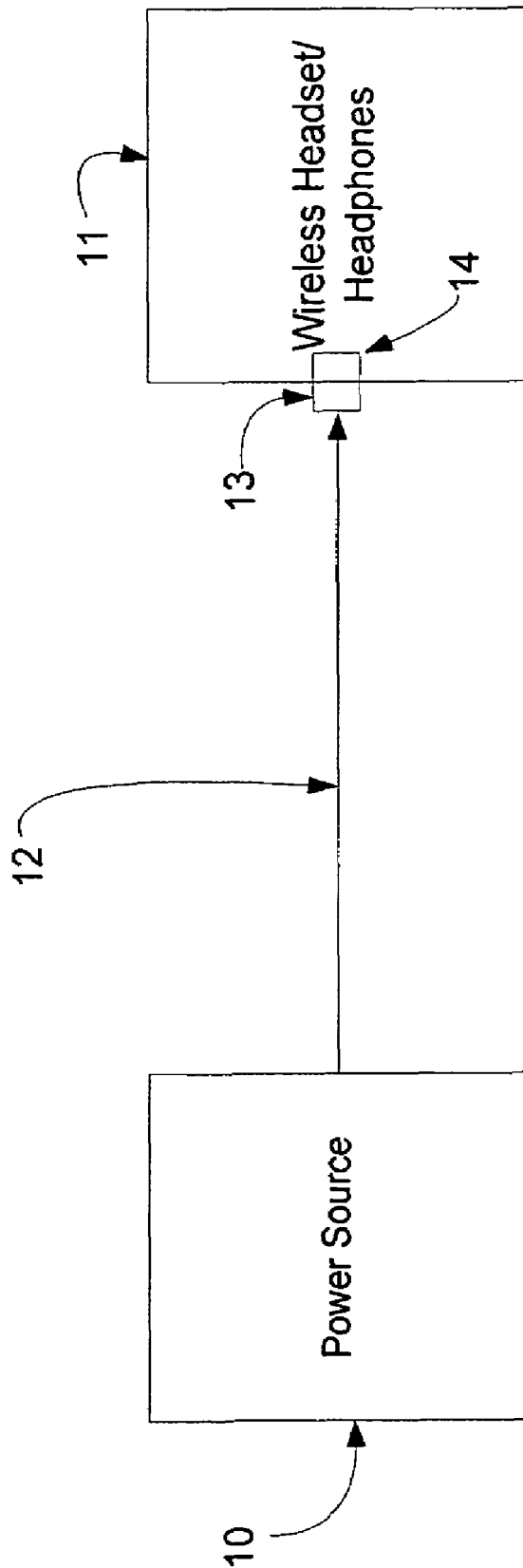


FIG. 2
(Prior Art)

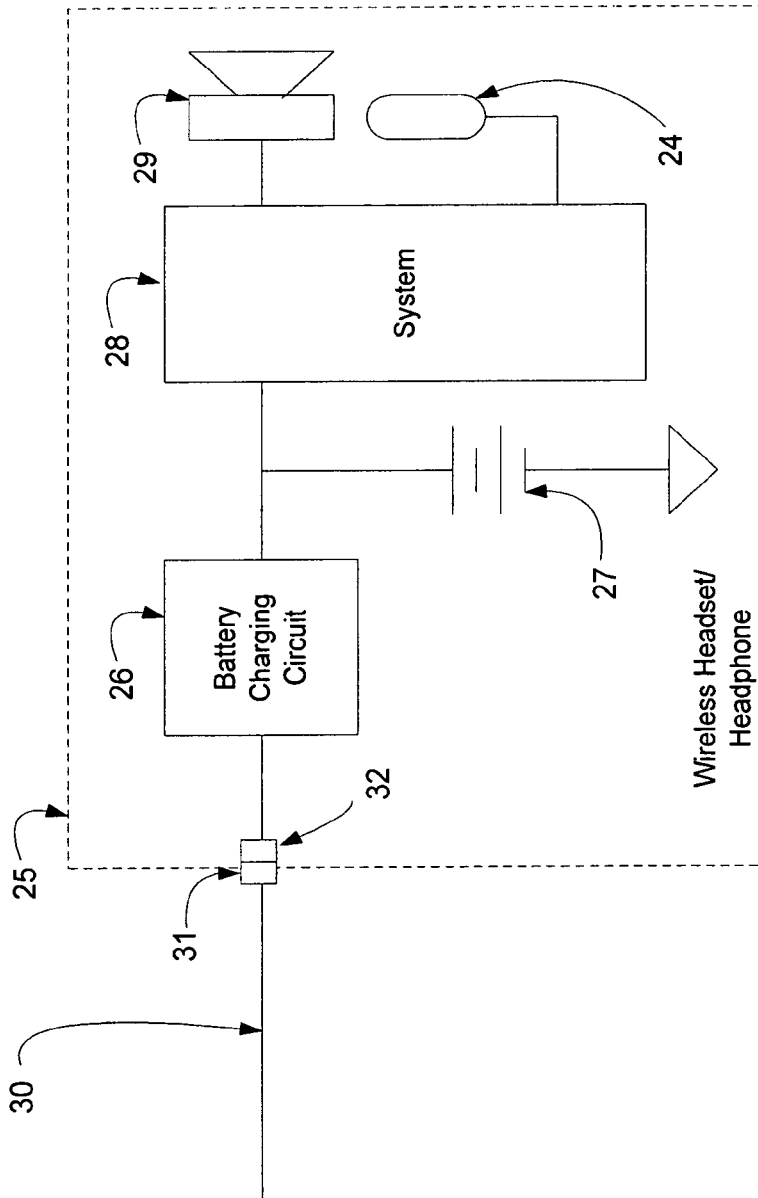


FIG. 3
(Prior Art)

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