

(12) **United States Patent**  
**Kerai et al.**

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(54) **BATTERY CHARGING**

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(73) Assignee: **Nokia Mobile Phones Limited**, Espoo (FI)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(51) **Int. Cl.**<sup>7</sup> ..... **H02J 7/00**

(52) **U.S. Cl.** ..... **320/107**

(58) **Field of Search** ..... 320/106, 107,  
320/110

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,371,453 A	12/1994	Fernandez	320/136
5,592,528 A	1/1997	Nelson et al.	324/538
5,814,969 A *	9/1998	Banyas	320/112
6,087,804 A *	7/2000	Suda	320/106

6,118,251 A *	9/2000	Atwater	320/131
6,184,652 B1	2/2001	Yang	320/110
6,184,660 B1 *	2/2001	Hatular	320/139
6,211,649 B1	4/2001	Matsuda	320/115

**FOREIGN PATENT DOCUMENTS**

EP	1085400	3/2000	.....	G06F/1/26
GB	2 286 732	8/1995		
GB	2 293 283	3/1996		
JP	200020175	1/2000	.....	G06F/1/26
JP	200020176	1/2000	.....	G06F/1/26
JP	200029544	1/2000	.....	G05F/1/00
JP	2000139032	5/2000	.....	H02J/7/00
JP	2000165513	6/2000	.....	H04M/1/72

\* cited by examiner

*Primary Examiner*—Edward H. Tso

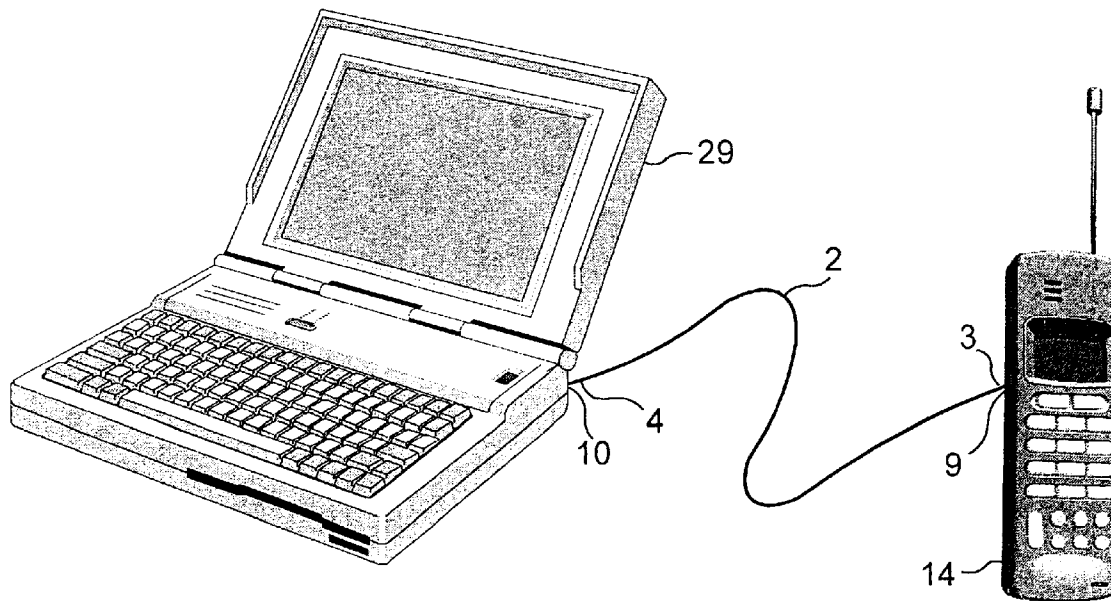
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(57) **ABSTRACT**

A battery charging circuit is described in which power is derived from a communications port such as a USB interface (22) and is supplied to a rechargeable battery of a communications device. The communications device, which may be a mobile radio telephone, can be charged from the power supply or internal battery of a laptop computer equipped with a USB port and connected thereto with a suitable cable thereby avoiding the need for a user to carry a dedicated battery charger for the radio telephone.

**44 Claims, 6 Drawing Sheets**



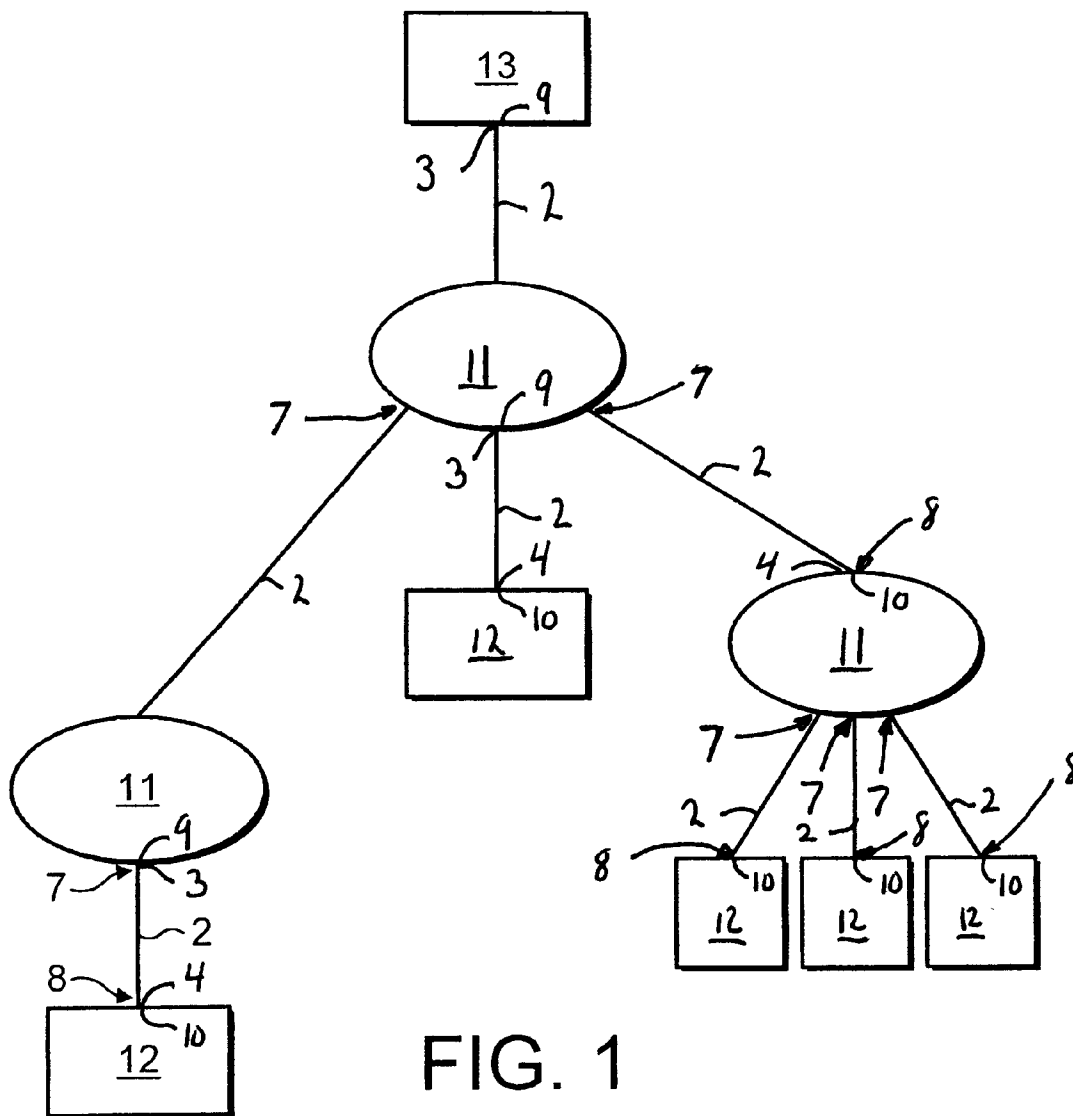


FIG. 1

(PRIOR ART)

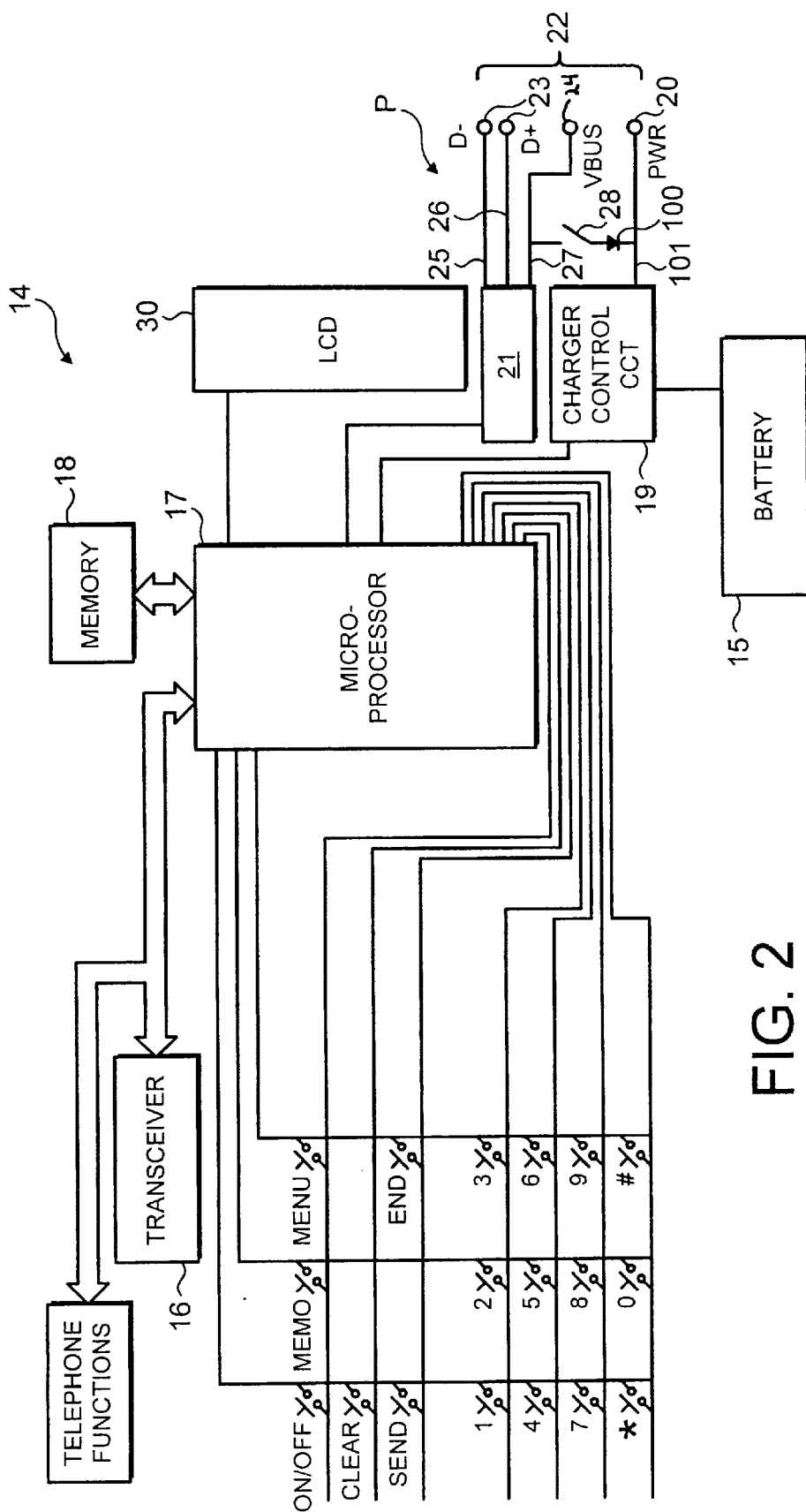


FIG. 2

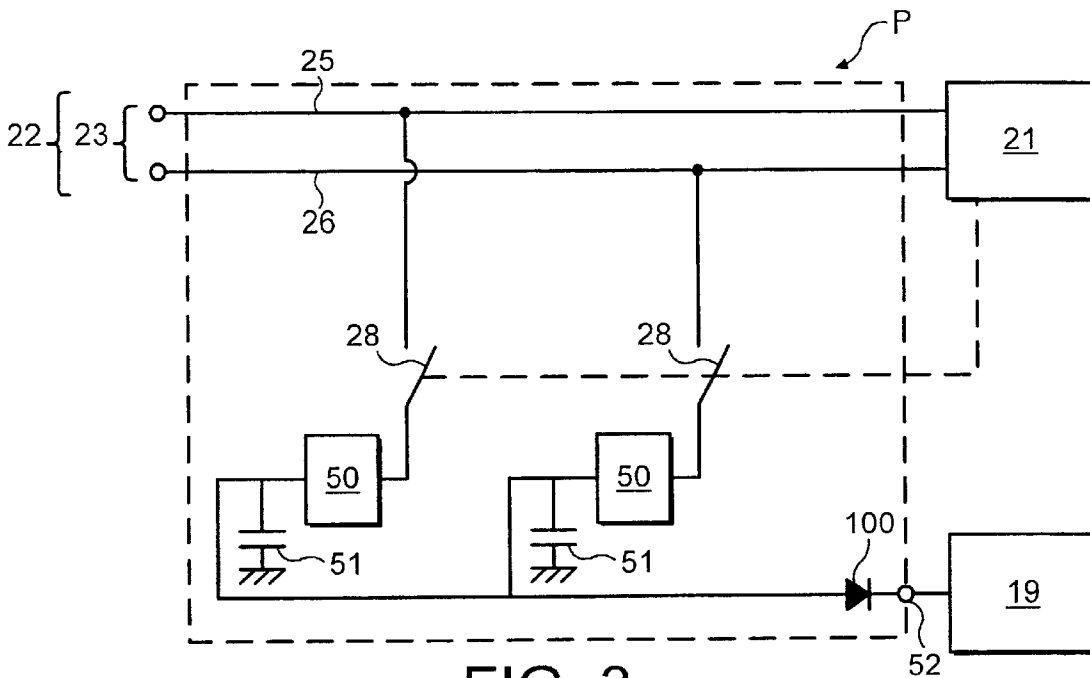


FIG. 3

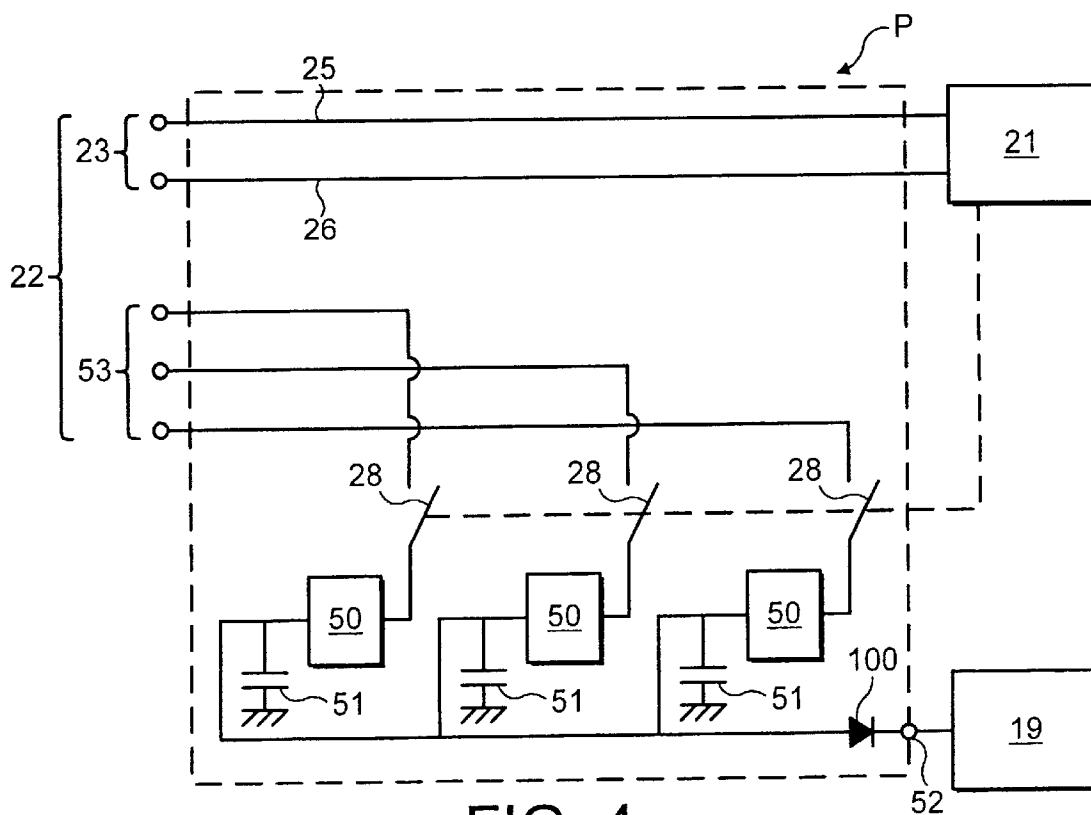


FIG. 4

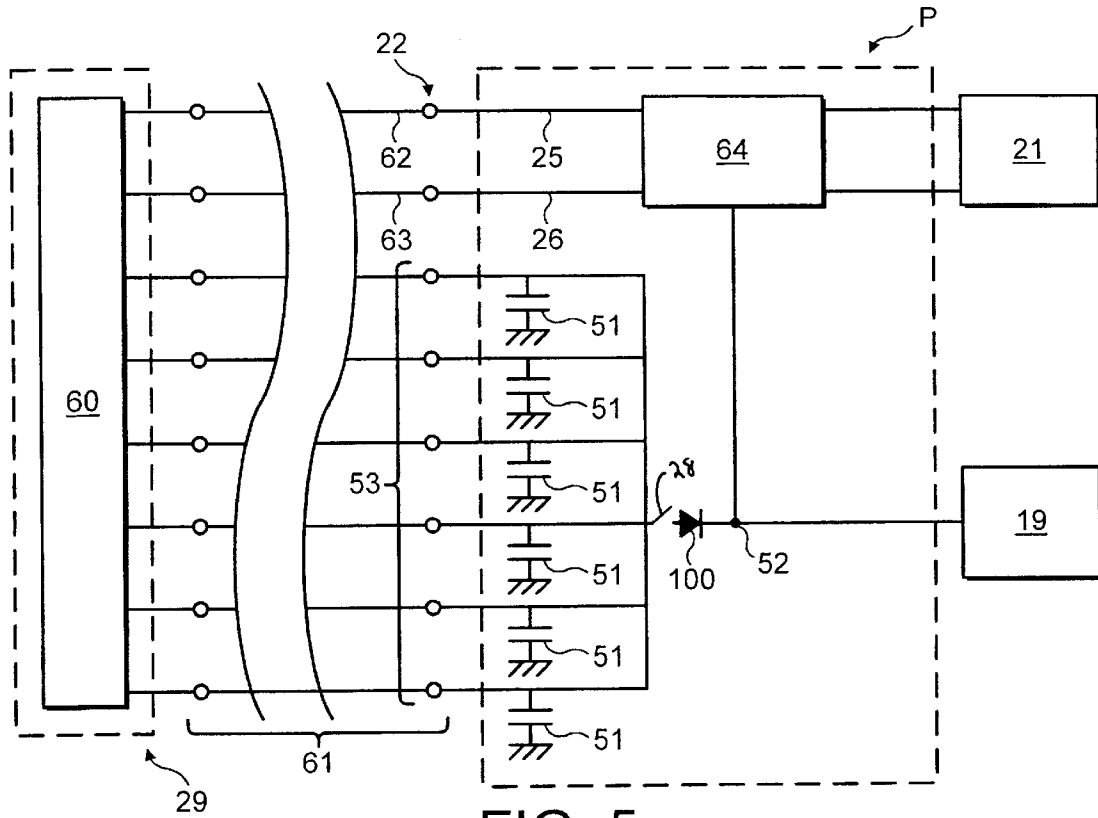


FIG. 5

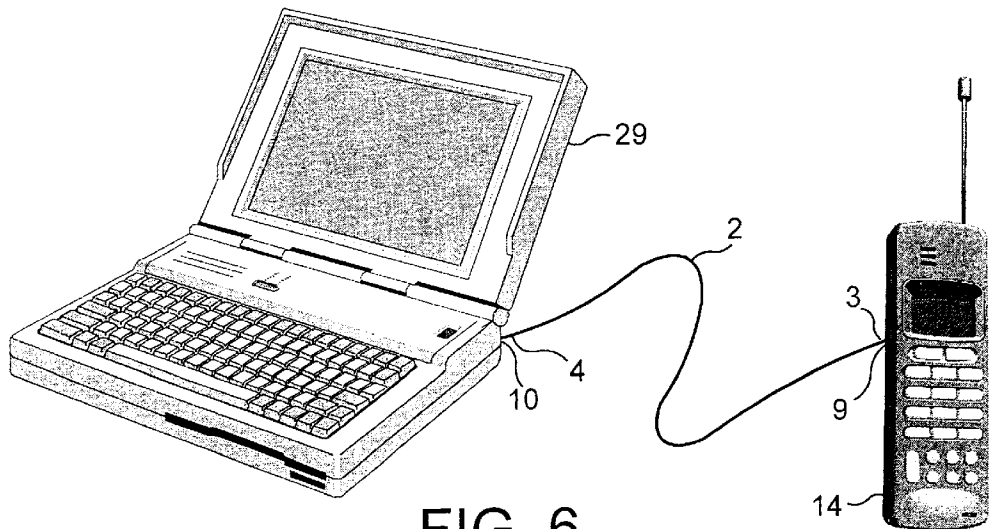


FIG. 6

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