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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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(30) **Foreign Application Priority Data**

May 26, 2000 (GB) 0012946

(51) **Int. Cl.**⁷ **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

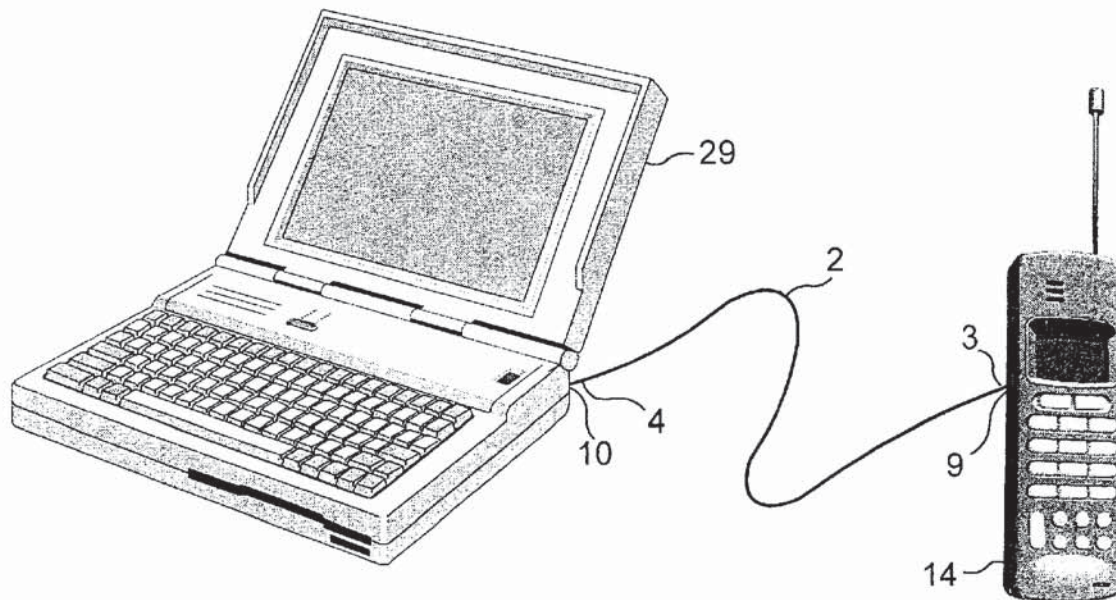
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(57) **ABSTRACT**

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



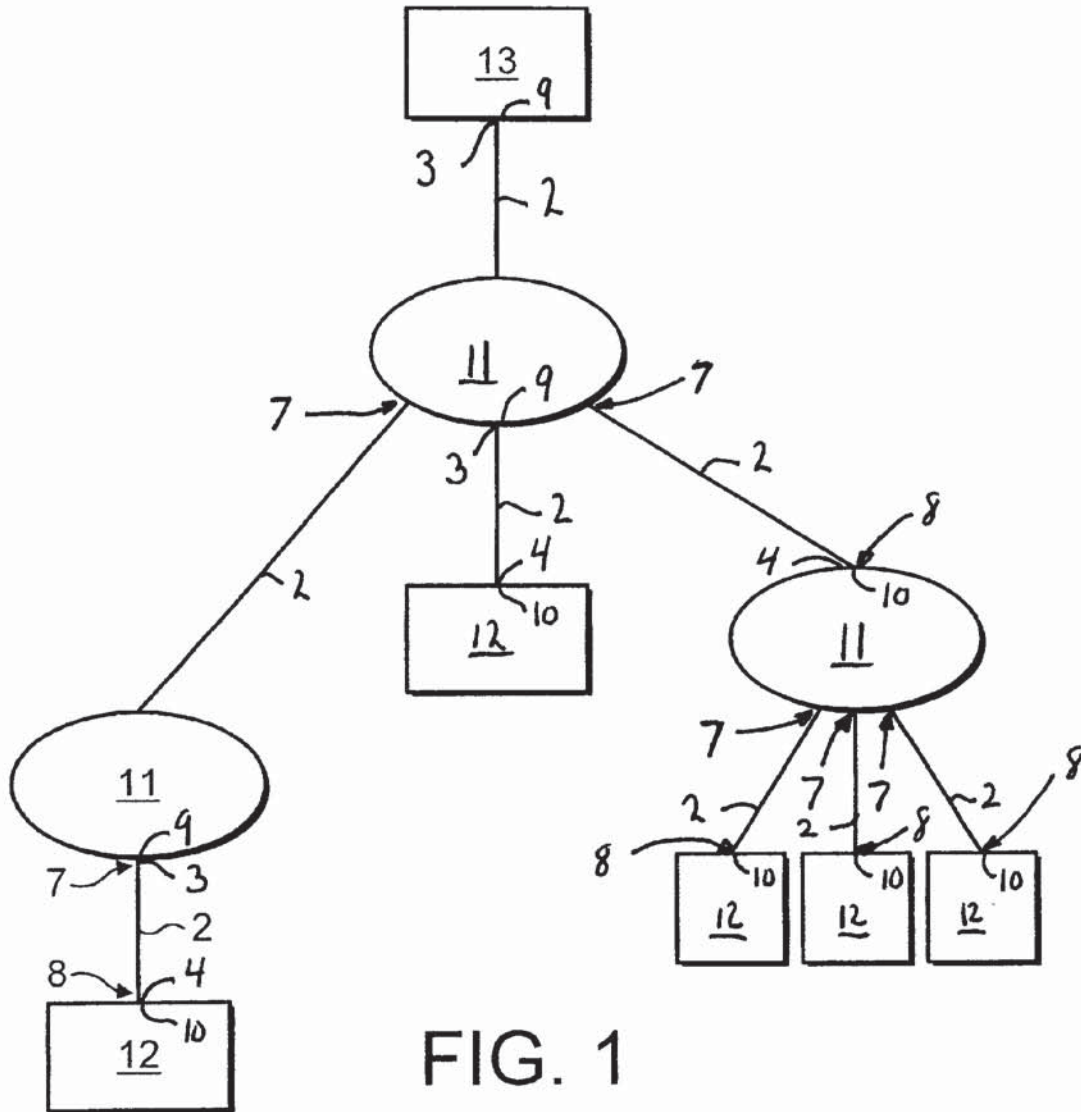


FIG. 1

(PRIOR ART)

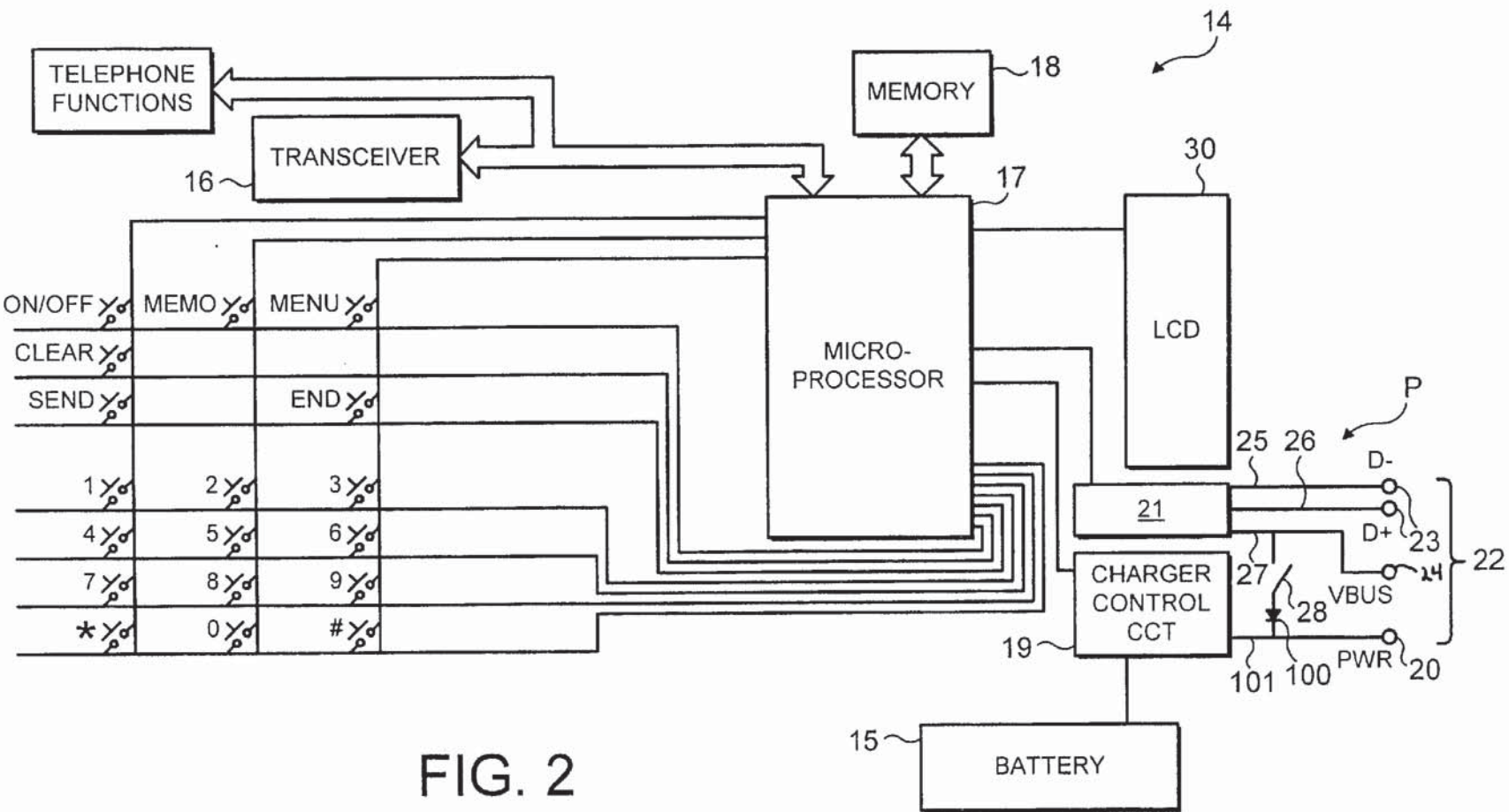


FIG. 2

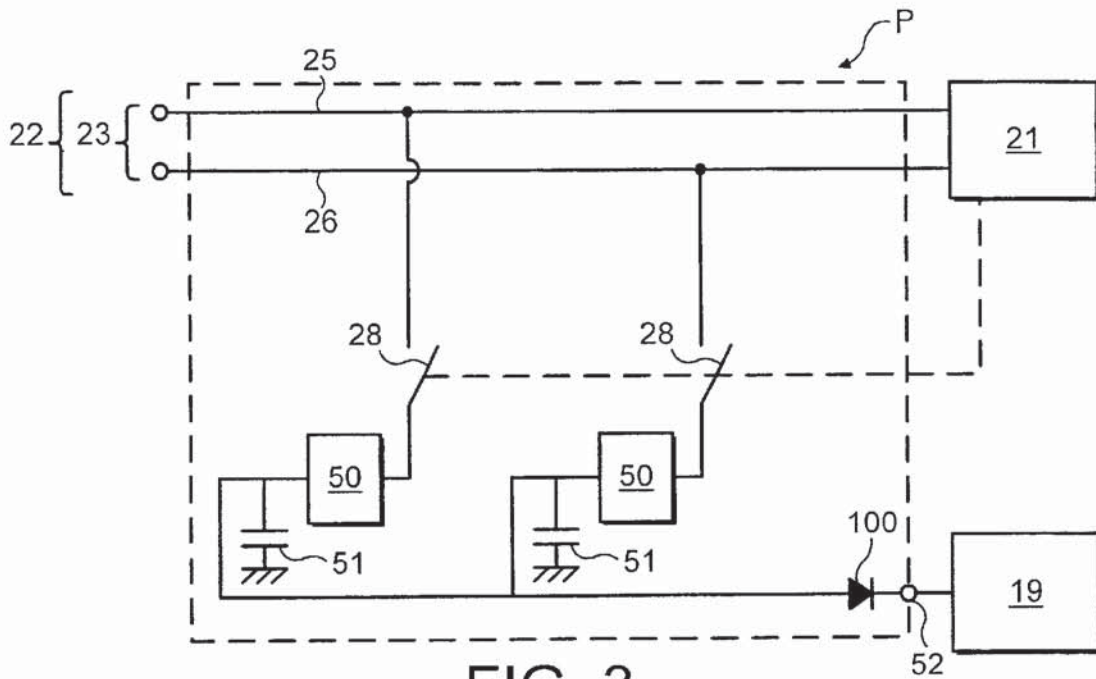


FIG. 3

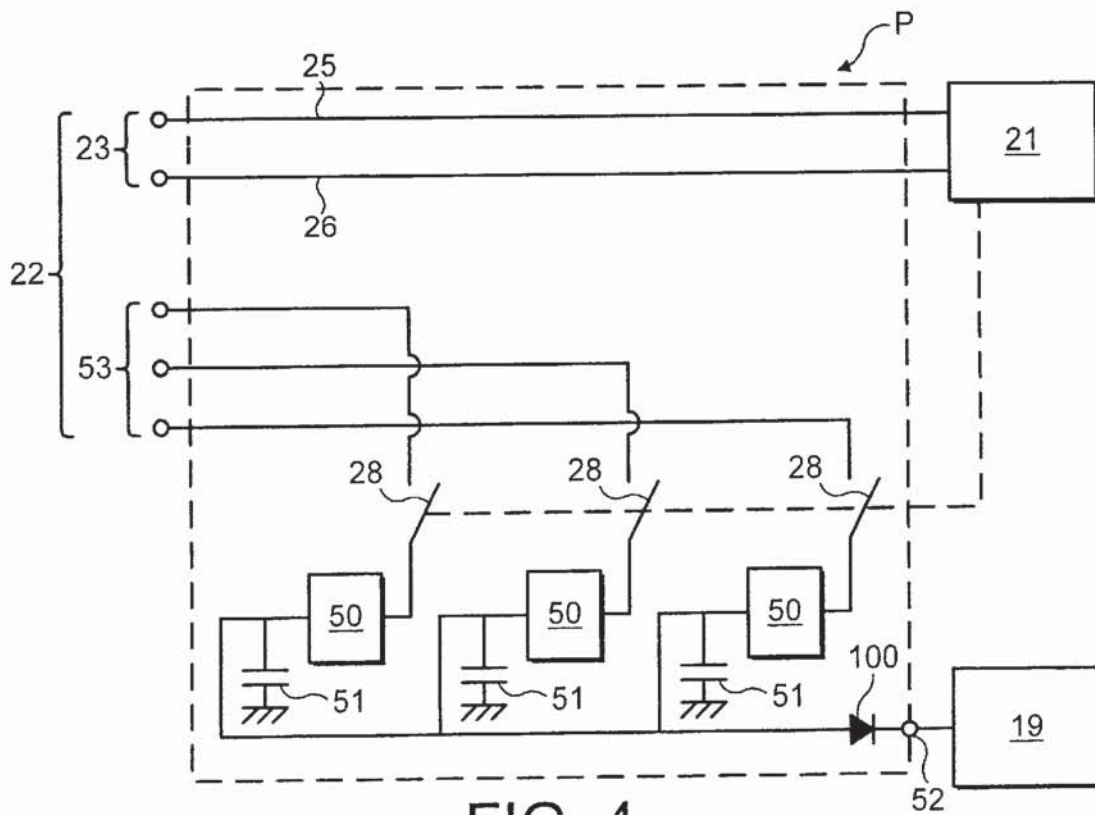


FIG. 4

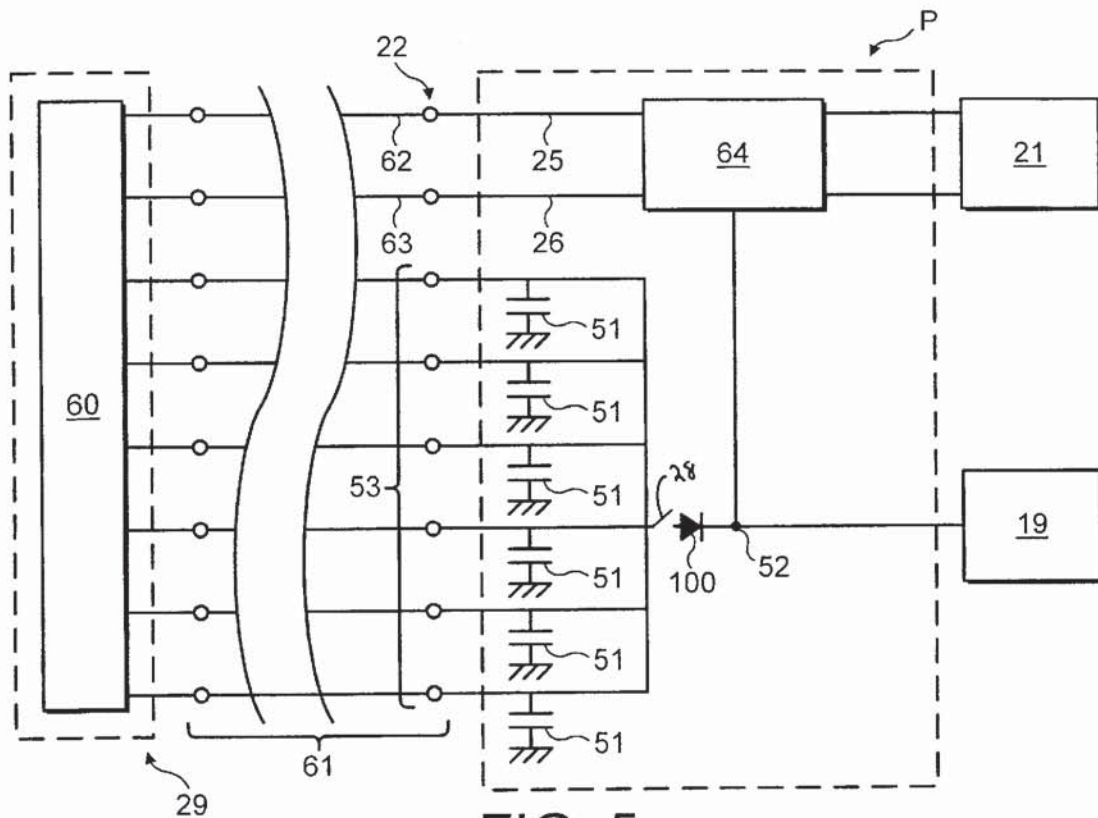


FIG. 5

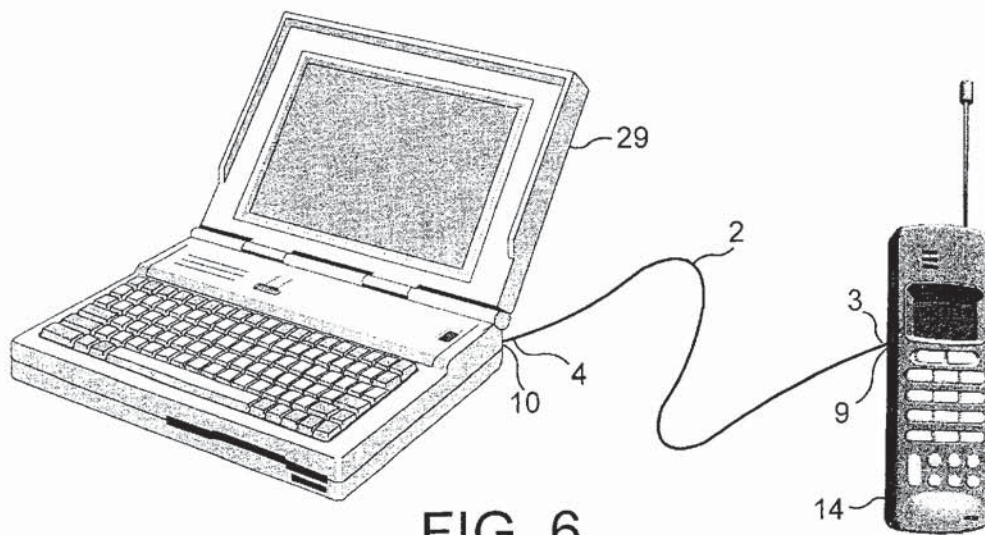


FIG. 6

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