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International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H02J 7/00 — A1

(11) International Publication Number: **WO 00/02299**

(43) International Publication Date: 13 January 2000 (13.01.00)

(21) International Application Number: PCT/US99/15162

(22) International Filing Date: 2 July 1999 (02.07.99)

(30) Priority Data:
09/110,631 6 July 1998 (06.07.98) US

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(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: IMPROVED POWER SUPPLY ASSEMBLY FOR HAND–HELD COMMUNICATIONS DEVICE

(57) Abstract

A portable phone has an internal battery (10) and an external battery pack (12) that is releasably attachable to the phone. A control unit (72) in the phone controls connection of the respective batteries to a phone power input (40), depending on the detection of the external battery voltage. Whenever an external battery is present with a voltage above a predetermined minimum value, the external battery will be connected (51) to the phone power input to provide power to operate the phone, so that the internal battery lifetime is extended. When the external battery voltage falls below the minimum value, or the external battery is removed, the unit automatically switches to internal battery power (50), so that the external battery can be changed without interrupting power supply to the phone, if the phone is on or during a call. An improved multi–phase software controlled battery–charging method and apparatus is used to charge the internal and external battery packs. The preferred battery–charging method (200) uses a multi–phased charging approach comprising a trickle–charging phase (206), a fast–charging phase (208), and a top–off charging phase (214). The internal battery is charged to near–full capacity by trickle–charging (when required) and subsequently fast–charging the battery. The external battery is similarly charged to near–full capacity. Thus, both batteries are charged to near–full capacity in a substantially reduced charging time period as compared with the total charging time.



