

5477123**CONNECTION MULTIPLE BATTERIES
TO BATTERY POWERED DEVICES**

Allen Paul M; Kuhn John R Cincinnati, OH, UNITED STATES assigned to Technoggin Inc

A circuit for serially connecting multiple batteries to a battery-powered device such as a notebook computer or camcorder so that the device will serially charge or discharge the batteries. The device includes at least two controllable switch circuits for selectively connecting batteries to the battery-powered device, a power flow sensor for sensing power flow from the device to the selected battery or vice-versa, and a selector circuit for sequentially enabling the switch circuits to sequentially connect the batteries to the battery-powered device so that the batteries will sequentially charge or discharge.

5477124**CIRCUIT TO PREVENT EXCESSIVE
RECHARGEABLE BATTERY DISCHARGE**

Tamai Mikitak Sumoto, JAPAN assigned to Sanyo Electric Co Ltd

A circuit effectively prevents excessive discharge of a rechargeable battery that is either detachable from, or internal to an electrical apparatus. The circuit has a battery voltage detector, a comparator to compare the battery voltage with a reference voltage, and a controller to cut-off power drain from a discharged battery when its voltage drops below the reference voltage. The discharged battery is electrically cut-off from both the load and the comparator.

5477125**BATTERY CHARGER**

Ettel Victor; Hohercak Jan; Nor Jiri K; Soltys Josef; Charles Dougl Mississauga, CANADA assigned to Inco Limited; Norvik Technologies Inc

A battery charge is provided which automatically controls the charging process independent of individual battery construction or temperature. Control of the charging process is achieved by periodically

interrupting the charging current, determining resistance-free voltage of the battery in fixed intervals after interruptions of current, and comparing the resistance-free voltage with a reference voltage. Reference voltage is automatically determined for each recharging subject by analyzing the change in resistance-free voltage with respect to time during an initial, constant current period to locate certain characteristic points indicative of the onset of overcharge. The charging current is reduced as necessary, so that the resistance-free voltage does not exceed the reference voltage and significant overcharge is avoided.

5477126**SECONDARY BATTERY CHARGING
CIRCUIT**

Shiojima Nobuo Tokyo, JAPAN assigned to Toshiba Battery Co Ltd

A secondary battery charging circuit of this invention includes a charging source for supplying a charging current to a secondary battery, a temperature detection unit for generating an output which changes almost linearly with respect to a change in temperature of the secondary battery during a charging operation, a differential unit for obtaining a differential value of an output from the temperature detection unit, a comparator unit for comparing the differential value during the charging operation with a setting value, and for, when the relationship between the two values is reversed, generating an inverted output, a timer circuit unit, started simultaneously with start of the charging operation of the secondary battery, for generating a timer output after an elapse of a predetermined period of time, and a charge control unit for controlling the charging operation of the secondary battery in response to one, generated earlier, of the inverted output from the comparator unit, and the timer output from the timer circuit unit.

5477127**SECONDARY BATTERY CHARGING
CIRCUIT**

Shiojima Nobuo; Enomoto Sadakazu Tokyo, JAPAN assigned to Toshiba Battery Co Ltd