

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.

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AUTOMATIC CHARGING APPARATUS

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An automatic charging apparatus comprises a rectifier circuit composed of a plurality of diodes and thyristors, said diodes and thyristors being arranged in a bridge connection, a phase control circuit for obtaining the charging voltage of a battery by controlling the phase of said thyristors, a voltage setting resistor for setting a charging voltage suitable for the state of said battery, a current setting resistor for setting a charging current suitable for the state of said battery and a current control circuit which obtains the charging current best suited to the state of the battery by controlling the pulse width of base current flowing in a transistor connected to the outputs of said thyristors. As a result, it is possible to efficiently charge the battery with charging voltage and current best suited to the state of the battery even if the battery is of large capacity.

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BATTERY PACK WITH SHORT CIRCUIT PROTECTION

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Connection between internal batteries and external terminals of the battery pack is controlled by semiconductor switching devices, rather than by switches with mechanical contacts. When the battery pack is not connected, battery short circuits are prevented by non-conduction of the switching devices. When the battery pack is attached to electrical equipment, a control circuit turns the switching devices on to supply power to the equipment. If the electrical equipment is a battery charger, the switching devices are turned on to supply power to the battery pack.

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ELECTRIC MOTOR VEHICLE AND BATTERY UNIT FOR ELECTRIC MOTOR VEHICLE

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A battery for an electrically powered vehicle includes a vehicle body having a battery unit operatively connected to the vehicle body for supplying electricity to the electrically powered vehicle. The battery unit is of an elongated shape in outer configuration and is located under the vehicle body with the length direction extending along the longitudinal direction of the vehicle body. A battery unit for an electric motor vehicle includes a battery assembly including a plurality of elongated batteries extending in the longitudinal direction of the motor vehicle and being disposed adjacent to one another with a small gap being provided therebetween. A battery box is provided for accommodating the battery assembly. The battery box includes a front portion, side portions and a rear portion. Ventilation holes are provided in the front portion of the battery box for introducing cool air at positions corresponding to the gap spaces between adjacent individual batteries. At least one exhaust hole is formed in at least one of the side portions and the rear portion of the battery box.

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METHOD OF MAKING ELECTRODES FOR BIPOLAR ELECTROCHEMICAL BATTERY

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The subject invention relates to electrode structures that are adaptable for primary and electrically rechargeable electrochemical wafer cells. A flat wafer cell is disclosed that includes conductive, carbon-filled polymeric outer layers that serve as electrode contacts and as a means of containment of the cell. Multi-cell, higher voltage batteries may be constructed by stacking individual cells. Specially formulated electrodes and processing techniques that are compatible with the wafer cell construction are disclosed for a nickel-metal hydride battery system. The cell design and electrode formulations provide for individual operation of a vented or low pressure sealed cell and/or for operation of these cells in a stacked array in an outer battery housing.

5478665

BATTERY WITH STRENGTH INDICATOR

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A battery strength tester used on a battery which has indicating means to indicate the strength of the battery and switching means which can easily be employed to complete a circuit so as to place the indicator means across the terminals of the battery and display the charge of the battery and wherein said switch, after a predetermined interval or temperature is reached, automatically opens to break the electrical contact across the battery terminals. A light emitting material employed as the indicator material is another special feature of the battery strength tester.

5478667

HEAT DISSIPATING CURRENT COLLECTOR FOR A BATTERY

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A current collector in electrical contact with an anode of a battery is extended beyond the anode to serve as a heat sink and presents a substantial surface area through

which heat is dissipated from inside the battery to the atmosphere. When multiple battery cells are stacked, the current collectors extend to form fins across which air flows to efficiently dissipate heat.

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CURRENT COLLECTOR HAVING A CONDUCTIVE PRIMER LAYER

Turi Eran; Ray Marie B Springfield, MA, UNITED STATES assigned to Rexam Graphics

A current collector which uses a conductive primer layer under an electrode layer to improve the contact and adhesion of the electrode layer to a supporting member, wherein the conductive primer layer is composed of a polymeric material having pendant carboxylic acid groups crosslinked with a multifunctional crosslinking agent, and a conductive filler. The current collector may be used inter alia for making batteries.

5478677

COMPOSITE GAUNTLET/SEPARATOR

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A battery separator for tubular positive electrodes composed of a microporous, composite sheet product having first and second major surface, formed from a uniform mixture of a polymer, a filler, a processing aid a porous form stable layer at least partially embedded in either the first or second major surface and having a series of vertical tubes arranged across its surface. The tubular sleeve/separator can be formed of individual tubes, flat sheets formed into a series of tubes or sheets containing half tubes and which are aligned and bonded together to form the series of tubes.

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RESISTIVE ELECTRODE

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