of the battery no more than few percent as compared to what the terminal voltage of the battery would be without the electronically conductive polymeric layer. The electronically conductive polymeric layer limits the amount of current that will flow through the battery in the event of a short circuit either external to or internal to the battery. Alternatively, a battery is made up of a plurality of electrochemical hi-fold cells each having a relatively thin layer of anode material and a relatively thin strip of cathode material separated from said anode layer by an interposing solid electrolyte layer, thereby forming a cell laminate with the electrolyte layer and the anode layer, the cell laminate being folded at a fold so as to form a bi-fold cell; a cathode current collector strip; and a resistive adhesive polymer applied to a contact area of the cathode current collector strip so as to attach the cathode current collector strip to each of the bi-fold cells at the fold, the adhesive having a resistivity within a range so as to limit current flow through the battery but reducing a terminal voltage of the battery no more than few percent as compared to what the terminal voltage of the battery would be without the resistive adhesive. The resistive adhesive polymer equalizes charge rates of individual battery cells.

5498950

BATTERY MONITORING, CHARGING AND BALANCING APPARATUS

Ouwerkerk David Torrance, CA, UNITED STATES assigned to Delco Electronics Corp

Battery charging apparatus comprising a power source coupled to a battery pack comprising a series connected plurality of batteries, and a charge controller and battery balancer coupled to the battery pack that monitors, controls the charging of, and balances the plurality of batteries of the battery pack. The power source is used to charge all of the batteries under control of a controller. The controller is coupled to an isolated current source in the battery balancer and to a battery voltage sensor. The controller is coupled to a plurality of sensors that monitor predetermined battery conditions. The isolated current source and battery voltage sensor are coupled to each battery of the battery pack by way of a monitoring bus and a plurality of controlled switches. The controller monitors the individual battery voltages using the battery voltage sensor and controls the isolated current source to individually balance low-voltage batteries based upon voltages sensed by the battery voltage sensor.

5499234

METHOD FOR RECHARGING FLOODED CELL BATTERIES

Rider Robert; Bendert Richard M Indianapolis, IN, UNITED STATES assigned to General Motors Corporation

Maintenance free flooded electrolyte battery cycle life is extended by controlling charge acceptance and gassing during recharge. Charge acceptance is improved by periodically discharging the battery during a portion of the recharge which removes surface charge and reduces overall cell voltage. Gassing is purposefully introduced during periodic supply currents which are interspersed with the periodic discharges of the battery. The supply currents both restore energy to the battery and agitate the electrolyte sufficient to destratify same thereby reducing plate damage and charge gradients thereon. The method results in shorter charge times, full capacity recharges and extended cycle life resulting therefrom and from reductions in corrosive interactions of the electrolyte with the battery plates.

5500177

MANUFACTURING METHOD FOR BATTTERY COVERS

Uemichi Sachio; Takahashi Shuj Takatsuki, JAPAN assigned to Yuasa Corporation; Honda Giken Kogyo Kabushiki Kais

A manufacturing method for a battery cover, in which plural molds are used for forming a space corresponding to a shape of the cover, the tab terminals are disposed in the space, synthetic resin is filled in the space to embed the tab terminals, characterized by that plural pieces made of the same material as the filled synthetic resin are installed with distances left between

them on both surfaces of embedded portions of the tab terminals, and the tab terminals are disposed in the space under this state.

5500583

METHODS FOR EXTENDING THE CYCLE LIFE OF SOLID, SECONDARY ELECTROLYTIC CELLS DURING RECHARGE OF THE ELECTROLYTIC CELLS

Buckley James; Masuda William; Lundquist Joseph Los Gatos, CA, UNITED STATES

Disclosed are methods for extending the cycle life of solid, secondary electrolytic cells employing a solid electrolyte which methods comprise (a) charging the discharged electrolytic cell at a rate of from at least about 0.1 to about 0.5 milliamp per square centimeter; (b) interrupting charging step (a) and conducting a high magnitude discharge pulse in said cell of from about 10 seconds to 2 minutes in duration; and (c) reestablishing the charging rate of step (a) and maintaining this rate until the potential of the electrolytic cell increases by at least 0.5 volts.

5500584

BATTERY CHARGING METHOD AND APPARATUS USING INITIAL CHARGING STEP WITH GRADUALLY INCREASING CHARGING CURRENT, QUICK CHARGING STEP WITH LARGE CHARGING CURRENT AND FINAL CHARGING STEP WITH DECREASING CHARGING CURRENT

Shimomoto Kenkich Osaka, JAPAN assigned to Hanashiro Kiyomi

PCT No. PCT/JP92/00959 Sec. 371 Date Nov. 3, 1993 Sec. 102(e) Date Nov. 3, 1993 PCT Filed Jul. 27, 1992 PCT Pub. No. WO93/16518 PCT Pub. Date Aug. 19, 1993. A battery charging method for charging a battery such as a lead acid storage battery quickly, and a battery charging apparatus used in carrying out the battery charging method, includes an initial charging process between times 0 to t1, a quick charging process between times t1 to t2 and a final charging process between times t2 to t3, carried out step-wise and continuously. In the initial charging process, a charging current whose volume of electricity is increased gradually is applied. In the quick charging process, a charging current whose volume of electricity is larger than the initial charging process is applied intermittently to a battery while watching a voltage. In the final charging process, a charging current whose volume of electricity is reduced gradually is applied to the battery when the voltage has reached a charge-end voltage. Thereby, it is possible to charge in a very short time, and to penetrate the charging into electrodes without damaging the battery.

5501289

FLOOR STRUCTURE OF ELECTRIC VEHICLE

Nishikawa Masahar; Chiba Kouji; Masusaki Tatsuo; Hanyu Atsushi Hadano, JAPAN assigned to Nissan Motor Co Ltd

A floor structure of an electric vehicle powered by batteries mounted thereon comprises an upper unit and a lower unit which are detachably coupled. The upper unit includes a first panel and a first base structure. The first panel is securely mounted on the first base structure in a manner to define a first given space which faces downward. The lower unit includes a second panel and a second base structure. The second base structure is securely mounted on the second panel in a manner to define a second given space which faces upward. Bolts and nuts are used for detachably coupling the upper and lower units in such a manner that the first and second given spaces are merged to constitute a united space. A grid structure is further employed which divides the united space into a plurality of container spaces. Each container space is sized to contain therein at least one of the batteries.