- the easy connection of the battery pack with the battery management system (BMS);
- the capacity (related to the BMS) to diagnose the state of the cells in a maintenance context;
- the necessary size reduction for the connection between the cells and the PCBs of the pack;
- the reduction of the space required for attachment of the PCBs of the pack.

Definitions

[0016] The capacity of a battery is the amount of current continuously supplied by the battery. It is expressed in ampere-hours (Ah). If the capacity of a battery is multiplied by its (nominal) voltage in volts (V), the energy of the battery (in watt-hours, Wh) is obtained. To characterize a battery, the capacity and voltage must therefore be known.

[0017] A battery management system (BMS) is an intelligent electronic safety system, particularly intended for the management of battery packs including cells in series and in parallel, able to ensure protection mainly against overvoltage, undervoltage, and overcurrent. In addition to basic functions, the BMS can ensure additional control and management functions such as element balancing, personalized settings, via smartphone and Bluetooth connection, etc.

Goals of the invention

[0018] The present invention aims to provide a solution that does not require welding on the unit cells, nor the use of glue to bond the cells together, which allows for easy design and realization of new batteries with different and variable capacities and/or voltages, ultimately improving the maintenance of the battery pack as well as its recycling.

[0019] This type of battery pack should be usable in/as any type of pack integrating smaller unit cells.

Summary

[0020] In an aspect, the present disclosure relates to a rechargeable battery pack comprising:

- the fastenings of the printed circuit boards respectively to the lower plate and to the upper plate of the mechanical structure are located outside the cells.

[0021] According to preferred examples, the rechargeable battery pack further comprises at least one of the following features or an appropriate combination of several of them:

- the printed circuit boards have an identical size or a variable size depending on the number of cell connections they possess;
- the housings in the lower plate and the upper plate are generally cylindrical in shape and have a low and high edge respectively to allow the location and blocking of the corresponding battery cell at each of its ends;
- the support structures are made of an insulating material, for example, plastic or a conductive material such as metal;
- in the case where at least one of the support structures is made of a conductive material, the battery cells, except for their connections, are wrapped in whole or in part in an insulating film, the insulating film stopping if necessary before one end of the cell in order to allow its connection on its periphery;
- the support structures are provided with fins on their edge to allow better heat transfer to the outside;
- the means of electrical interconnection by contact and without welding comprise connectors or spring contacts;
- the printed circuit boards are bus bars;
- the rechargeable battery pack comprises an integrated battery management system on one of the printed circuit boards serving as a bus bar or connected to all the printed circuit boards via an edge connector;
- the integrated battery management system is configured to know the status of sub-groups of cells;
- the integrated battery management system comprises a dedicated circuit to identify a defective cell;
- the integrated battery management system is configured to adapt the charging parameters of the battery pack or each sub-group of cells in case of detection of one or more defective unit cells;