



**(12) Invention Patent Application**

**(10) Application Publication No.:** CN 101826609 A

**(43) Application Publication Date:** Sep 8, 2010

**(21) Application No.:** 200910311927.6

**(22) Application Date:** Dec 22, 2009

**(71) Applicant:** Hunan Keba Automobile Power  
Battery Limited Liability Company

**Address:** 348 Tongzipo West Rd., Lugu  
National High- and New-Technology  
Industrial Development Zone,  
Changsha, Hunan 410205

**(72) Inventor:** DENG Jiangnan YANG Yanan

**(74) Patent Agency:** Changsha Xingyao Patent Firm  
43205

**Agent:** NING Xingyao

**(51) Int. Cl.**

*H01M 2/26 (2006.01)*

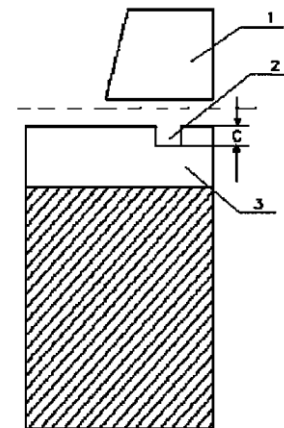
Claims: 1 page Description: 2 pages Drawings: 2 pages

**(54) Name of Invention**

METHOD FOR CONNECTING ELECTRODE AND TAB OF BATTERY

**(57) Abstract**

A method for connecting an electrode and a tab of a battery; the method is as follows: before welding, at least 1 notch is made at a to-be-welded area on the tab or the electrode, the notch being in a direction perpendicular to a welding direction; then the electrode and the tab are connected by welding to form a whole. This method can effectively reduce warping of a current collector and improve electrical performance of the battery; in addition, this method is simple in this technique and easy to operate.



C101826609 A

1. A method for connecting an electrode and a tab of a battery using welding, wherein before welding, at least 1 notch is made at a to-be-welded area on the tab or the electrode, the notch being in a direction perpendicular to a welding direction; then the electrode and the tab are connected by welding to form a whole.
2. A method for connecting an electrode and a tab of a battery of claim 1, wherein the sum of widths of all the notches is less than a length of the to-be-welded area of the tab or the electrode, and a length of each of the notches is less than a width of an overlay connection portion of the tab between the tab and the electrode.
3. A method for connecting an electrode and a tab of a battery of claim 1 or 2, wherein the number of notches is 2-10.

## METHOD FOR CONNECTING ELECTRODE AND TAB OF BATTERY

### TECHNICAL FIELD

[0001] The present invention relates to a method for connecting components inside a battery and more particularly to a method for connecting an electrode and a tab of a battery.

### BACKGROUND

[0002] Among components in a battery, current collector connection comprises connection between a tab and a center pin and connection between a tab and an electrode; the former typically uses riveting, welding, or a combination of both, and the latter typically uses electric resistance welding. Currently, the whole welding area is continuous in the welding of the tab and the electrode. In the welding process, the accumulation of heat and stress cannot be eliminated. Therefore, this welding method easily results in deformation caused by heat and stress accumulation. The accumulation of the deformation will lead to serious warping of the tab or wrinkling of the welding area of the electrode, and such deformation is detrimental to electrical performance of the battery.

### SUMMARY

[0003] The purpose of the present invention is to provide a method for connecting an electrode and a tab of a battery, the method featuring simple techniques and little deformation of connecting components.

[0004] The technical solution provided by the present invention is as follows: before welding, at least one notch is made at a to-be-welded area on the tab or the electrode, the notch being in a direction perpendicular to a welding direction; then the electrode and the tab are connected by welding using a conventional welding method so that they are connected to form a whole (the electrode and the tab are welded together into a member called current collector).

[0005] A width direction of the notch is defined as an axis direction of the notch parallel to the welding direction, and a length direction of the notch is an axis direction perpendicular to the width direction of the notch. Directions of the tab are perpendicular to the directions of the notch; in other words, a length direction of the tab is an axis direction of the tab parallel to the welding direction, and a width direction of the tab is an axis direction perpendicular to the welding direction. The sum of widths of all the notches is best if it is less than an effective welding length of the tab, and a length of each of the notches is best if it is less than a width of a mutually overlay connection portion between the tab and the electrode.

[0006] The number of notches may be selected based on current collector length, welding temperature, and welding direction for the electrode and the tab. In general, if the electrode and the tab are welded at the top, one notch will do. If the electrode and the tab are welded at the side, it is best to make a plurality of notches; in general, 2-10 are preferred.

[0007] In comparison with currently available connecting methods, the present invention changes the structure of a welding area of the tab or the electrode by making a notch at the welding area of the tab or the electrode, so that the welding area is discontinuous, and heat or deformation is also discontinuous and stops at the notch rather than accumulates into the next section. As a result, accumulation of heat in the welding is reduced, and accumulation of warping is also reduced. This enables reduction of warping of the current collector to a very large extent, demonstrates good results, and improves outcome of battery cell assembly, thereby enhancing electrical performance of batteries. In addition, this method is simple in this technique and delivers good operational performance.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIGS. 1(a) and (b) are diagrams illustrating a notch configuration and its welding outcome in one embodiment (top welding) of the present invention;

[0009] FIGS. 2(a) and (b) are diagrams illustrating a currently available welding method and its outcome (top welding);

[0010] FIGS. 3(a) and (b) are diagrams illustrating a notch configuration and its welding outcome in another embodiment (side welding) of the present invention;

[0011] FIGS. 4(a) and (b) are diagrams illustrating a currently available welding method and its outcome (side welding).

### DETAILED DESCRIPTION

[0012] Further description of the present invention is provided below in conjunction with embodiments.

[0013] Embodiment 1

[0014] This embodiment applies welding at the top, as illustrated in FIG. 1. FIG. 1a shows a notch configuration, and FIG. 1b shows an after-welding state. Before welding, a notch 2 is made at a to-be-welded area on an electrode 3, the notch being in a direction perpendicular to a welding direction (the direction is indicated by the dotted line in the drawing); then a tab 1 and the electrode 3 are welded to form a current collector 4. A width of the notch (distance A between two arrows in the drawing) is less than an effective welding length of the electrode 3 (distance B between two arrows), and a length of the notch (distance C between two arrows) is less than a width of an overlay connection portion between the tab and the electrode (distance D between two arrows). Observation under a magnification device finds that a welding portion 5 between the electrode and the tab is smooth without deformation or wrinkles.

[0015] FIG. 2 illustrates a scenario where welding is performed using a method provided by currently available technique under the same conditions. FIG. 2a shows a before-welding state (no notch), and FIG. 2b shows an after-welding state. Observation under a magnification device finds that the welding area 5 between the electrode and the tab has wrinkles 6.

[0016] Embodiment 2

[0017] This embodiment applies welding at the side, as illustrated in FIG. 3. FIG. 3a shows a notch configuration, and FIG. 3b on the right shows an after-welding state. Before welding, five notches 2 are made at a to-be-welded area on a tab 1, the notches being in a direction perpendicular to a welding direction (the direction is indicated by the dotted line in the drawing); then the tab 1 and an electrode 3 are welded to form a current collector 4. The sum of widths of all the notches (distance E between two arrows in the drawing) is less than an effective welding length of the tab (distance F between two arrows), and a length of each of the notches (distance G between two arrows) is less than a width of an overlay connection portion between the tab and the electrode (distance H between two arrows). Observation under a magnification device finds that a welding portion 5 between the electrode and the tab is smooth without deformation or wrinkles.

[0018] FIG. 4 illustrates a scenario where welding is performed using a method provided by currently available technique under the same conditions. FIG. 4a shows a before-welding state (no notch), and FIG. 4b shows an after-welding state. Observation under a magnification device finds that the welding area 5 between the electrode and the tab has wrinkles 6.

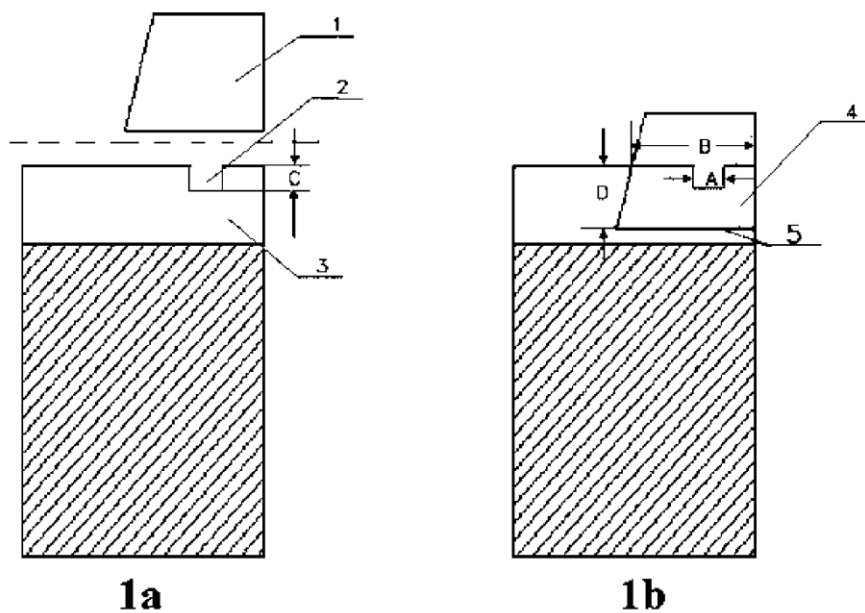


FIG. 1

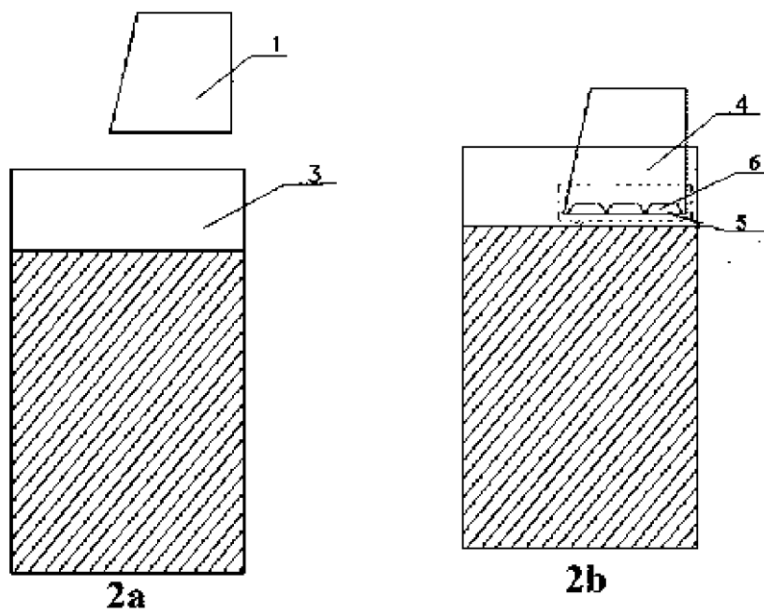


FIG. 2

# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.