

(12) **United States Patent**  
**Gardner et al.**

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(54) **BATTERY CELL DESIGN AND METHODS OF ITS CONSTRUCTION**

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(51) **Int. Cl.**

**H01M 2/26** (2006.01)

**H01M 2/20** (2006.01)

**H01M 4/66** (2006.01)

(52) **U.S. Cl.** ..... **429/94; 429/161; 429/164; 429/211**

(58) **Field of Classification Search** ..... None  
See application file for complete search history.

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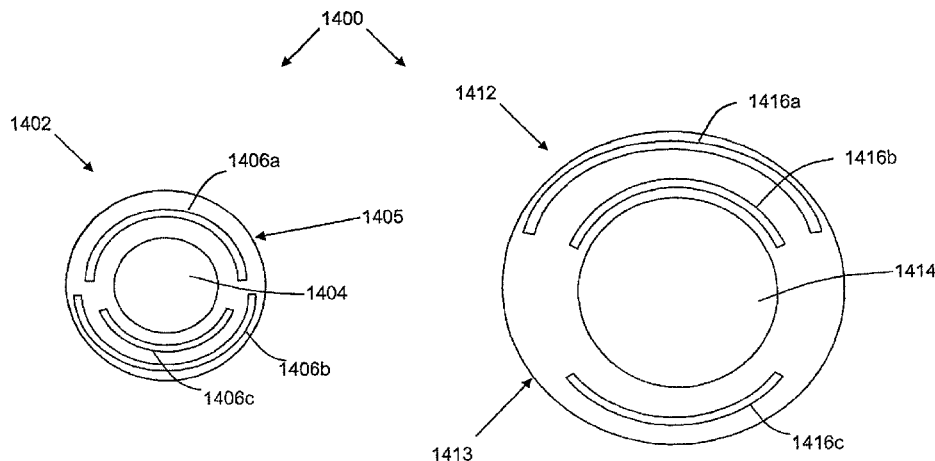
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(57) **ABSTRACT**

In some embodiments, a battery cell can include an assembly having an anode sheet and a cathode sheet separated by separator membranes, each sheet having an electroactive layer on a current collector. At least one of the current collectors can be in electrical communication with conducting tabs that extend from at least one of the anode sheet and the cathode sheet, the conducting tabs extends from an end face of the spirally wound assembly. In addition, the cell can include a first tab insulator having concentrically positioned outer and inner members, each of the outer and inner members having at least one slot that allows one or more of the plurality of conducting tabs to pass through. The inner and outer members are adjustable with respect to relative angular orientation of the at least one slot on the outer and inner members of the first tab insulator.

**15 Claims, 13 Drawing Sheets**



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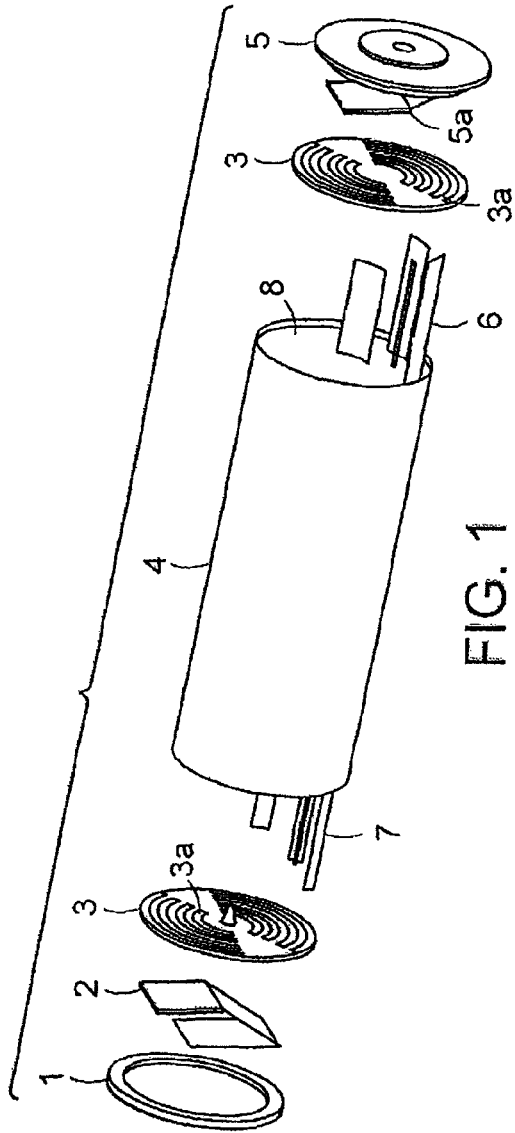


FIG. 1

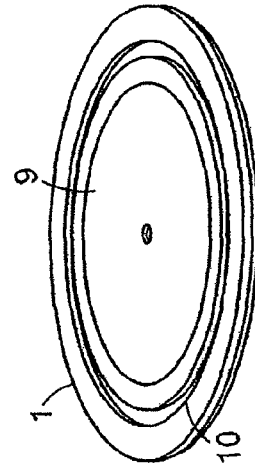


FIG. 3

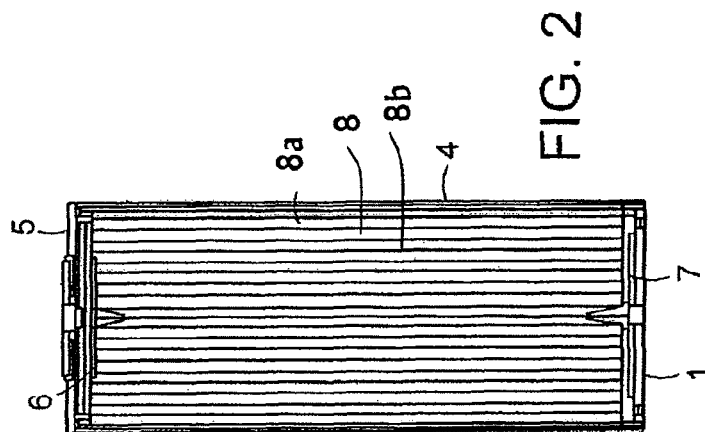


FIG. 2

FIG. 4A

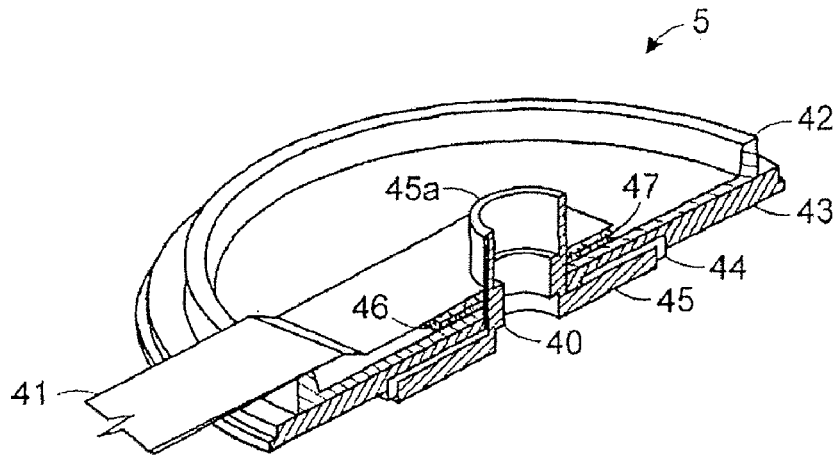
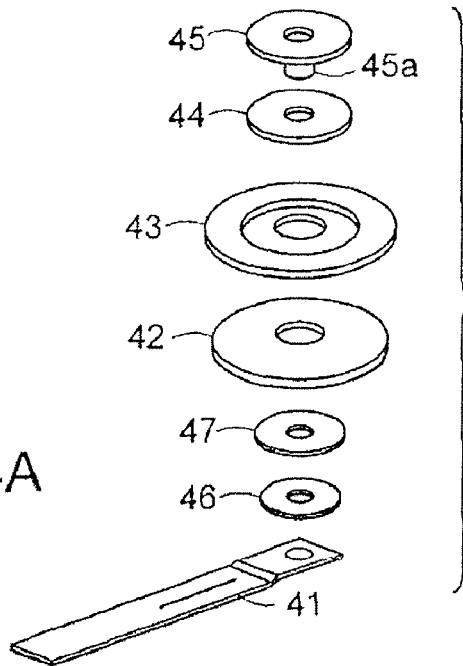


FIG. 4B

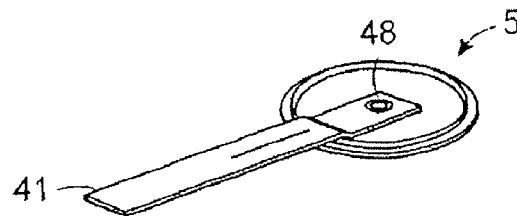


FIG. 4C

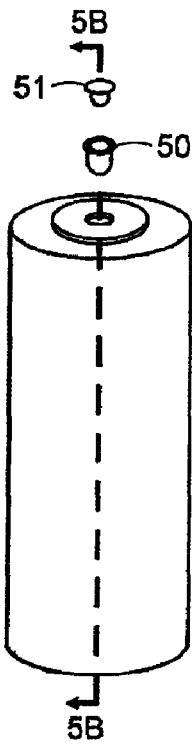


FIG. 5A

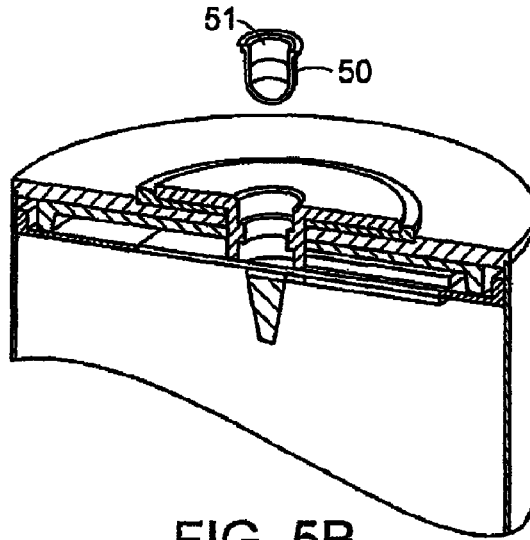


FIG. 5B

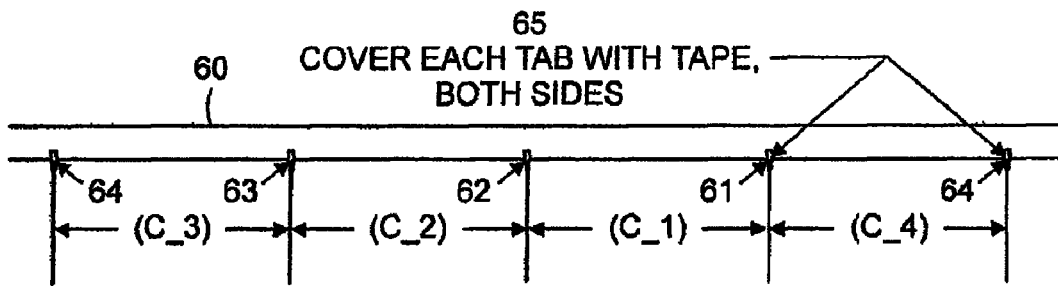


FIG. 6A

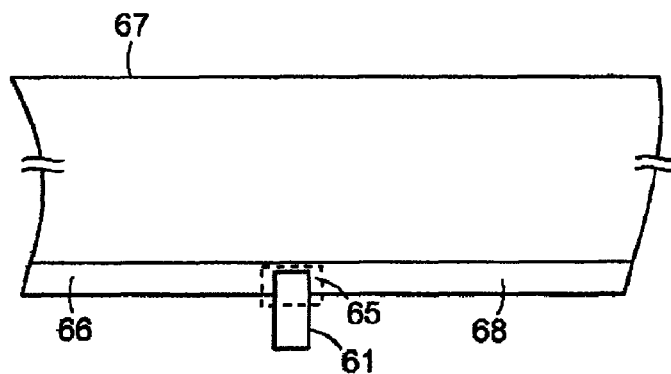


FIG. 6B

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