



CRANE DIVISION

NAVAL SURFACE WARFARE CENTER



DISTRIBUTION STATEMENT A: Distribution approved for public release; distribution is unlimited.



Energy, Power & Interconnect Technologies Division

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METHOD AND SYSTEM FOR DETECTING LEAKAGE OF ENERGY STORAGE STRUCTURE LIQUID

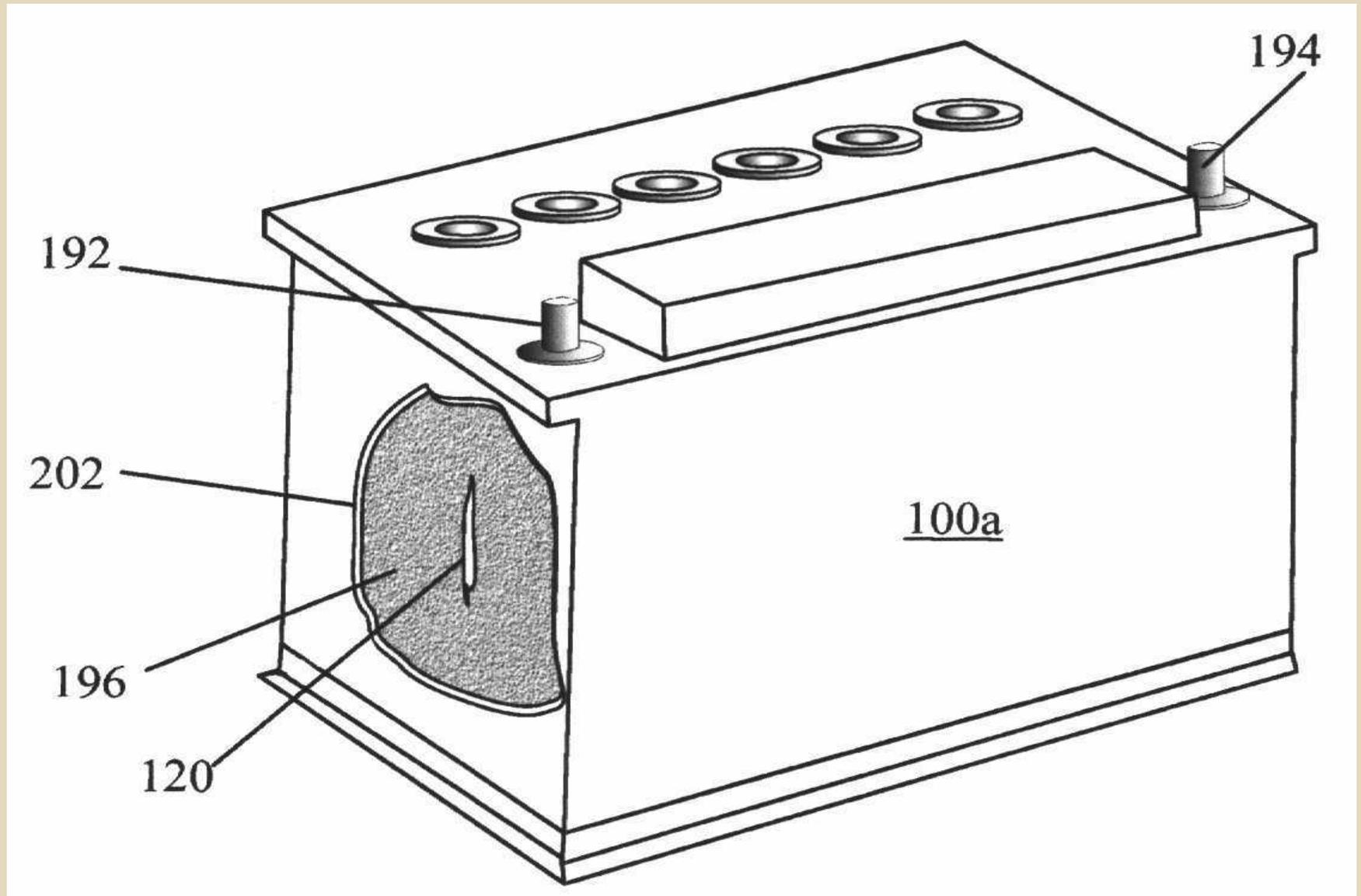
Inventor: Susan Waggoner

Patent Application 12/023,218

Technology Description

- **Causes of leaks:**
 - **Cracked cells or monoblocks cause electrolyte to leak through the wall into the battery case**
 - **Electrolyte can also leak if the battery is overcharged, as the overcharging can cause the electrolyte to spew out of the cells or monoblocks**
 - **Vibration, shock, drop, bad seals**

Technology Description



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Technology Description

- **Effects of leaks (SAFETY HAZARD):**
 - **Corrosion:** Leaked electrolyte corrodes the battery case, and it is particularly corrosive to metal battery cases and the trays securing the battery, as well as adjacent equipment
 - **Electrolyte poisoning:** Contamination destroys batteries (leaks from vented lead-acid electrolyte affect vented nickel-cadmium batteries and vice versa)
 - **Capacity:** If one of the middle cells of a 12-cell aircraft battery becomes leaky or is shorted to the case, the upper half of the cells connected to the generator bus become excessively overcharged. The remaining cells will discharge because the negative terminal is normally grounded directly to the aircraft ground
 - **Pollution of immediate environment**

Technology Description

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- **Fast, simple automated liquid leak detector**
 - **Easily and rapidly checks for the presence of leaked electrolyte with the battery in place**
 - **Lends itself to automation and hierarchical network testing**
 - **Especially useful for batteries with nonconductive cases**
 - **Avoids/minimizes contamination of immediate environment**

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Commercial Applications

- **Applicability**
 - **Containers with a conductive fluid**

- **Potential uses**
 - **Batteries**
 - **Vehicular –**
 - **Automobiles**
 - **Aircraft**
 - **Marine**
 - **Backup batteries**
 - **Uninterruptible power supplies**
 - **Fluid containment devices (tanks)**

Commercial Applications

- **Potential users:**
 - **Consumers (batteries in cars, boats, trucks, aircraft)**
 - **Computer server farms**
 - **Telecommunications battery banks**
 - **Shop maintainers**
 - **Manufacturers**
 - **Commercial fleet owners**

Commercial Applications

- **NSWC Crane is seeking partners interested in:**
 - **Licensing the technology**
 - **CRADAs**