Patents of Robert B. Dopp

#	Patent #	Title
1	4,299,593	Method and apparatus for detecting and measuring a gas
2	4,343,869	Seal for metal-air batteries
3	4,369,568	Method for manufacturing cells utilizing centrifuging techniques
4	4,591,539	Metal-air cathode button cell
5	4,617,242	Organic siliconate additive for alkaline zinc electrochemical cells
6	4,649,090	Seal tab for a metal-air electrochemical cell
7	4,791,034	Sealing sleeve
8	4,857,424	Zinc alkaline electrochemical cells with reduced mercury anodes
9	4,999,265	*Alkaline cells containing fluorescent dyes*
10	5,308,711	Metal-air cathode and cell having catalytically active manganese compounds of valence state +2
11	5,378,562	Method of making air cathode material having catalytically active manganese compounds of valance state +2
12	5,451,473	Long life metal-air (battery and button cells therefor) cell having increased current pulse capability
13	5,567,538	Metal-air cell having thin-walled anode and cathode cans
14	5,582,930	High energy density metal-air cell
15	5,587,259	Metal-air cathode and cell having a hardened current collecting substrate
16	5,637,117	Method of hardening a metal current collecting strip of an air cathode and a method of making a button type battery
17	5,650,246	Metal-air cathode and cell having a hardened current collecting substrate
18	5,656,395	Metal-air cathode and cell having a hardened current collecting substrate
19	5,721,065	Low mercury, high discharge rate electrochemical cell
20	5,733,676	Metal-air cathode can and electrochemical cell made therewith
21	5,795,667	Metal-air cathode can, and electrochemical cell made therewith
22	5,904,998	Metal-air cathode can, and electrochemical cell made therewith
23	5,932,367	Low Mercury High Discharge Rate Electrochemical Cell
24	5,958,615	Metal-air cathode can, and electrochemical cell made therewith
25	6,040,074	Metal-air cathode can, and electrochemical cell made therewith
26	6,087,030	Electrochemical cell anode and high discharge rate
27	6,197,445	Air Depolarized Electrochemical Cell

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28	6,203,940	Tubular air depolarized cell
29	6,210,826	Seals, and electrochemical cells made therewith
30	6,210,827	Elongate air depolarized electrochemical cells
31	6,248,463	Metal-air cathode can, and electrochemical cell made therewith
32	6,265,102	Prismatic metal-air cells
33	6,284,400	Metal-air cathode can, and electrochemical cell made therewith
34	6,296,961	Composite carbon sheet, and electrochemical cells made therewith
35	6,436,571	Bottom Seals in air depolarized electrochemical cells
36	6,461,761	Air depolarized electrochemical cell
37	7,455,929	Air cell with improved leakage resistance
38	7,709,127	Electro-catalytic recharging composition
39	7,713,043	Apparatus for uniform feeding of powders
40	EP2111660	Process for making an electrochemical cell with a catalytic electrode
41	8,377,149	Process for making a catalytic electrode and electrochemical cell using the electrode

Some Patent Highlights:

- #1. My first patent. An innovative way to sense HCN in air using an optical feedback system to maintain constant flow of reagents over a large surface-area, very thin layer of chemicals. Continuous spectrophotometer analysis was used to obtain a decade improvement over any other HCN detector.
- #3. All zinc air manufacturers have a need to move the anode mass toward the cathode. This method allowed ROV to achieve uniform wet-up and uniform performance by controlling the forces moving the anode mass against the cathode.
- #5. The use of an additive with two characteristics in one molecule was unique among corrosion controlling additives. The active ingredient uses a functional siliconate with the organic portion being a PEG. The siliconate end is surface active and coats the zinc particle easily. The Functional portion extends into the electrolyte. This is akin to phospholipids of the biological world. Unexpectedly, type III zinc oxide does not form in the presence of this additive, so the high zinc voltage is maintained through battery life, increasing the cell's capacity by at least 5%.
- #7. The use of sealing groves cast into the grommet was extremely successful in giving ROV the strongest seal in the market at that time.
- #9. The use of a unique fluorescent dye allowed for automatic sensing of electrolyte splash out on the production floor. Since the activated carbon in the cathode destroyed the fluorescent characteristic of the additive, failure analysis was improved since the peak absorption indicted if the electrolyte had passed through the cathode or circumvented it.

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- #10. This patent describes what was at that time, the most powerful air electrode on the market. It summarizes the work I had led for ten year.
- #11. Deals with the use of the cathode so well described in #10 in the zinc air cell.
- #12. The use of tiny holes to increase rate capability and decrease moisture sensitivity is counter to the literature. Some of ROV's competitors implemented this patent much better than ROV ever did.
- #14. The use of ultra-thin metals and thinner cathode lead to the highest energy density in the field.
- #15. Sandblasting the nickel screen also hardened the screen dramatically improving the conductivity.
- #29. This innovative cylindrical zinc air cell uses a tubular, seamless air electrode whose seal is established using a beading crimp method of new design. The cathode was manufactures using unique three-roller compression system to compact the carbon without distorting the current collector.
- #32. To seal a prismatic alkaline cell is a physical challenge. The solution was to eliminate all radial forces, leaving only axial closing forces. One could seal any shaped battery using this technique. Eight other EFC patents were abandoned after allowance when they changed corporate direction.
- #41. Describes making and using the world's highest rate air cathode for metal-air batteries.