

# UNITED STATES PATENT OFFICE.

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## BATTERY-ZINC.

SPECIFICATION forming part of Letters Patent No. 440,173, dated November 11, 1890.

Application filed February 20, 1890. Serial No. 341,198. (No specimens.)

*To all whom it may concern:*

Be it known that I, ARCHIBALD J. MACDONALD, of North Tiverton, in the county of Newport and State of Rhode Island, have invented  
5 a new and useful Improvement in Battery-Zincs, of which the following, taken in connection with the accompanying drawing, is a specification.

The zincs now generally used in galvanic  
10 batteries are coated with mercury, which forms an amalgam upon the surface of the zinc and prevents the adhesion of hydrogen to the zinc and the consequent weakening of the battery. The mercury also acts to render the zinc more  
15 positive than unamalgamated zincs. In the use of these amalgamated zincs the amalgam becomes detached by the wasting away of the zinc, thereby leaving the unamalgamated zinc exposed.

20 It is the object of my invention to produce a battery-zinc in which the mercury will be so united with the zinc that the plate will act as an amalgamated plate until wholly consumed, and will be unaffected by the exciting  
25 solution when the circuit is broken, thereby increasing the power of the battery and preventing waste of zinc.

This battery-zinc is made in the following manner: First, a certain quantity of mercury  
30 is placed in a ladle and gradually heated, a suitable temperature being between 212° and 300° Fahrenheit. An amalgam of mercury and sodium or potassium, or other suitable metal, is then made in a separate vessel, and  
35 some of this amalgam is placed in a jar containing a solution of a salt of ammonia, which

is decomposed by the metal with which the mercury is amalgamated, a suitable salt being chloride of ammonium. Chemical action  
40 takes place, and the product is an amalgam of mercury and ammonium. This amalgam is formed in quantities as may be desired. A small portion of this—say in the proportion of one-quarter of an ounce of the amalgam to six  
45 pounds of mercury—is then added to the heated mercury, and then sufficient zinc in small pieces is added to harden the mercury. This alloy is then added to the melted zinc from which the plates are to be cast in any  
50 desired proportion, and then a small portion of magnesium, preferably in a powdered form, is added to the melted zinc.

What I claim as my invention, and desire to secure by Letters Patent of the United  
55 States, is—

The process, substantially as described, of making battery-zincs, which consists in adding to heated mercury an amalgam of mercury and ammonium, then hardening the  
60 mercury by the addition of zinc, and then adding a portion of this alloy to the melted zinc from which the battery-zincs are cast, and finally adding magnesium.

In testimony whereof I have signed my name to this specification, in the presence of  
65 two subscribing witnesses, on this 28th day of January, A. D. 1890.

ARCHIBALD J. MACDONALD.

Witnesses:

J. H. GUEST,  
ALEX. L. HAYES.