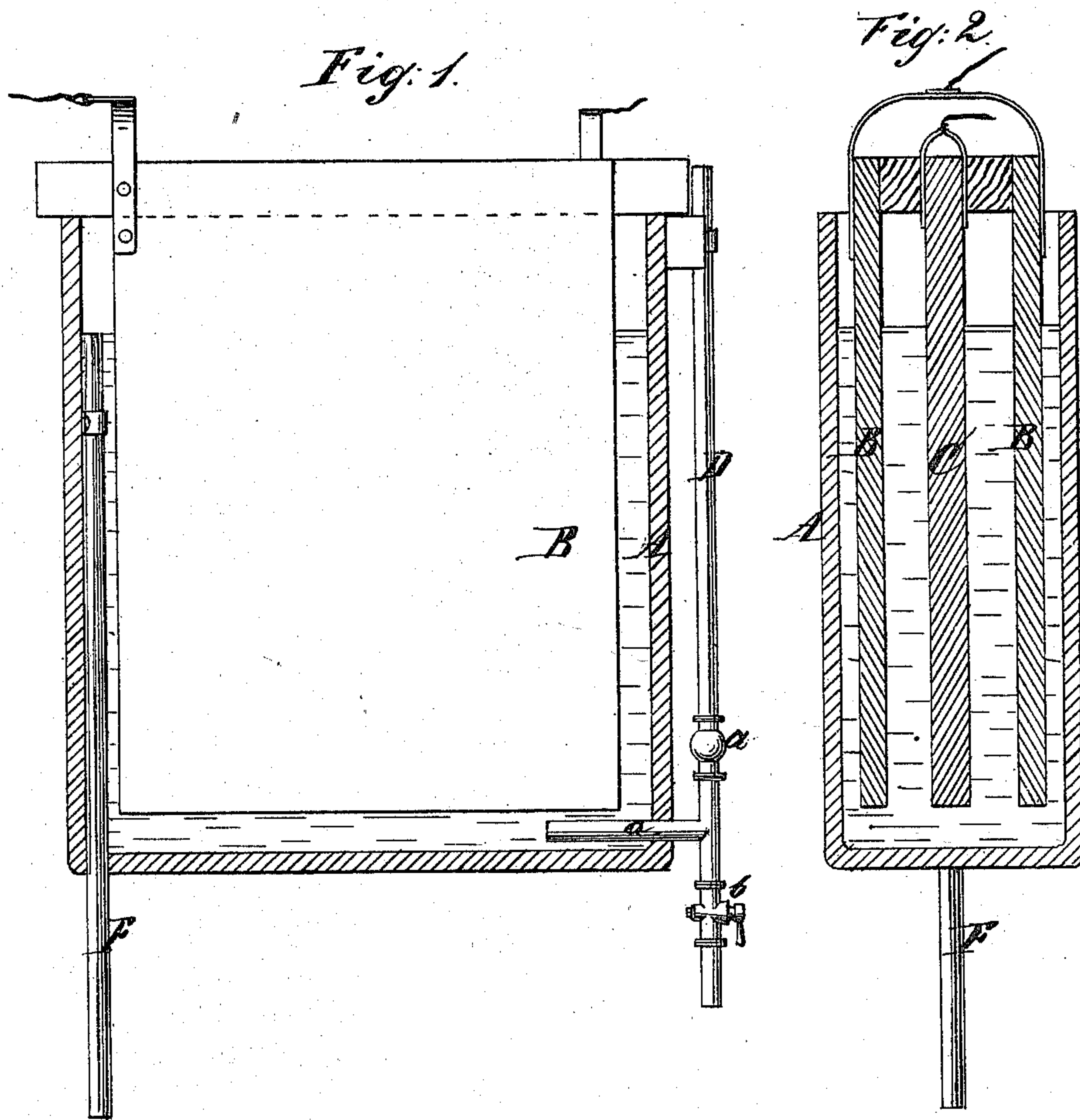


**A. L. NOLF.**  
**Galvanic Batteries.**

No. 142,502.

Patented September 2, 1873.



Witnesses:  
Ernst Bilhuber.  
Chas. Haklers.

Inventor.  
Andrew Leopold Wolf  
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Attys



# UNITED STATES PATENT OFFICE.

ANDREW L. NOLF, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND VICTOR BARJON, OF SAME PLACE.

## IMPROVEMENT IN GALVANIC BATTERIES.

Specification forming part of Letters Patent No. 142,502, dated September 2, 1873; application filed June 6, 1873.

*To all whom it may concern:*

Be it known that I, ANDREW LEOPOLD NOLF, of the city, county, and State of New York, have invented a new and useful Improvement in Galvanic Batteries; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 represents a sectional front view of my invention. Fig. 2 is a transverse section of the same.

Similar letters indicate corresponding parts.

This invention consists in the arrangement of a pipe for the injection of atmospheric air or of ozone on the cup of a galvanic battery in such a manner that the current of air or ozone strikes the elements of the battery, whereby the polarization of the negative element is avoided, and the power, constancy, and durability of the galvanic current produced by the battery are materially increased.

In the drawing, the letter A designates the cup or cistern of a galvanic battery, which may be made in any desirable form or size, and which contains the negative elements B and the positive element C, the negative elements being made, by preference, of graphite or carbon, and the positive element of amalgamated zinc. It must be remarked, however, that my invention is applicable to galvanic batteries of any suitable construction. On one side of the cup A is secured a pipe, D, which connects with an air-forcing apparatus of any suitable construction, and from which extends a branch pipe, *a*, into the cup close down to its bottom. Beneath this branch pipe is a stop-cock, *b*, which is closed when the battery is in operation.

By opening this stop-cock the liquid contained in the cup A can be trained off. Above the branch pipe *a* is a check-valve, *c*, which

opens inward, and which prevents the liquid in the cup from flowing back into the pipe D. Through this pipe I inject into the cup A atmospheric air or ozone, and by this air the liquid in the cup is agitated, and the surfaces of the negative elements are kept clean and prevented from becoming polarized.

The pipe D also serves to introduce fresh liquid into the cup, and in practice I connect this pipe with a double-acting pump which connects with a reservoir containing the liquid, and which is so constructed that the same, by one stroke, injects liquid, and, by the return stroke, air or ozone into the cup A.

If desired, however, a separate pipe may be used for the introduction of the air, and another for the introduction of the liquid.

In the cup A is arranged an overflow-pipe, F, and as the spent liquid rises up it passes off through this overflow-pipe, the fresh liquid being constantly injected at the bottom of the cup.

By this arrangement a battery is obtained which produces a constant, uniform, and powerful current of electricity.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the cup of a galvanic battery, a pipe communicating with the same, substantially as described, for injecting air or ozone through the liquid in the cup for the purpose of agitating the same, as set forth.

2. The pipe D, having a branch pipe, *a*, and cocks or valves *b c*, for alternately introducing and regulating the supply of liquid into the cup of a battery, or for injecting air or ozone through the liquid, substantially as and for the purpose described.

This specification signed by me this 29th day of May, 1873.

A. L. NOLF.

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.