

R. M. LOCKWOOD.  
Galvanic-Batteries.

No. 149,320.

Patented April 7, 1874.

Fig. 1.

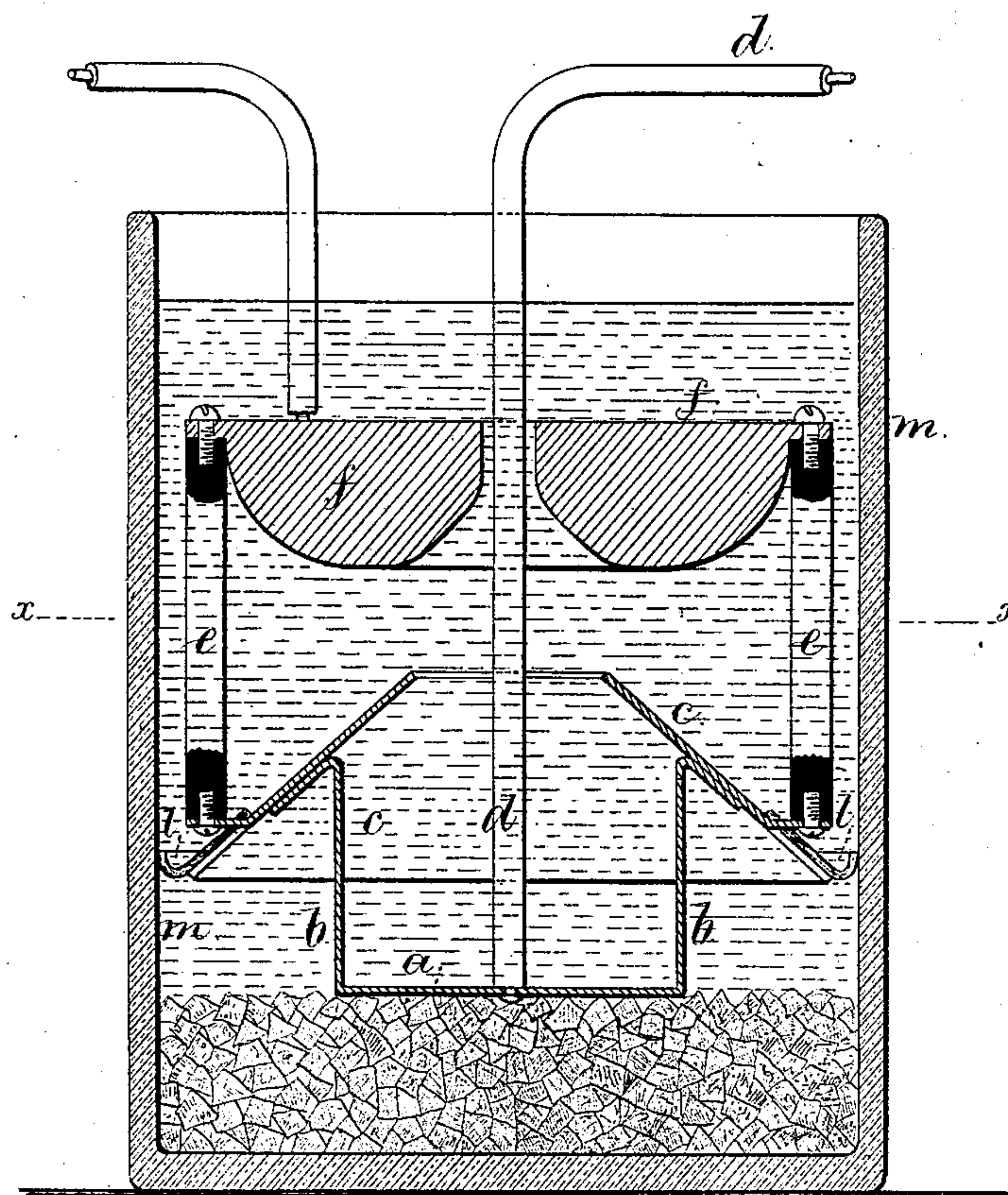
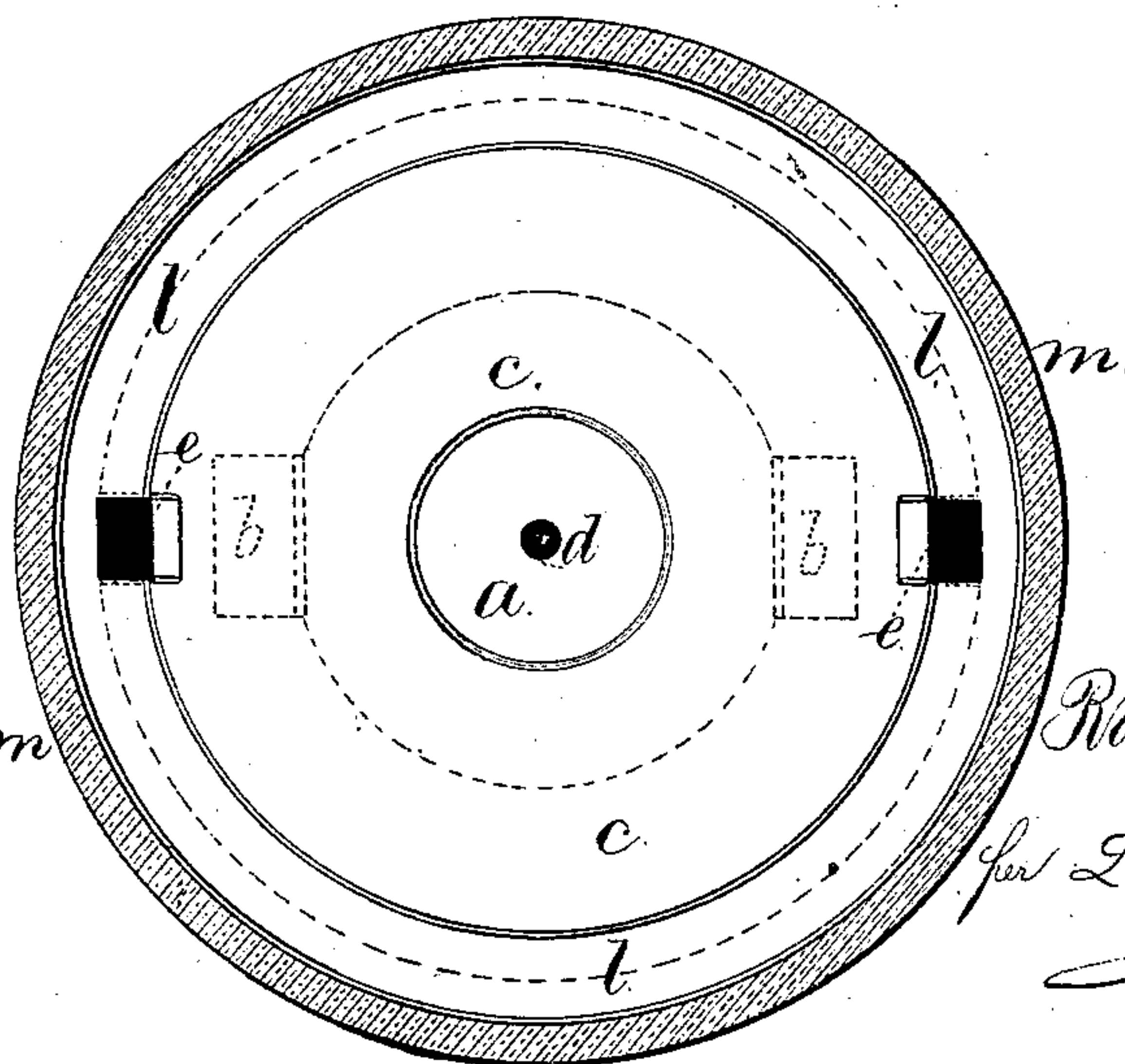


Fig. 2.



Witnesses.

Chas H. Smith  
Harold Smith

Inventor

Robert M. Lockwood.

per L. W. Perrell

att'y.



# UNITED STATES PATENT OFFICE.

ROBERT M. LOCKWOOD, OF NEW YORK, N. Y.

## IMPROVEMENT IN GALVANIC BATTERIES.

Specification forming part of Letters Patent No. **149,320**, dated April 7, 1874; application filed March 7, 1874.

*To all whom it may concern;*

Be it known that I, ROBERT M. LOCKWOOD, of the city and State of New York, have invented an Improvement in Galvanic Batteries, of which the following is a specification:

This invention is made for equalizing the action of the battery, and keeping the sulphate of zinc separate from the sulphate of copper.

I make use of a vertical cell or vessel, with the blue-vitriol crystals in the bottom, and upon these the copper plate rests, and above that plate is a copper cone, with an opening at its apex from which the copper solution passes, as required, to be decomposed. The copper deposits upon the under side of the cone and the copper plate. The zinc or positive metal is connected to the copper pole by insulated columns, so as to remain at a regular distance, and the poles resting upon the sulphate-of-copper crystals descend gradually as said crystals are dissolved. Around the cone is a skirt of felt or similar material to catch the sulphate of zinc that falls from the negative pole; hence preventing loss of copper by deposit on such particles, and keeping the copper solution free from foreign matter.

In the drawing, Figure 1 is a vertical section of the battery complete, and Fig. 2 is a sectional plan below the line *x x*.

The copper plate *a* is connected by the arms *b* to the cone *c*, which is preferably of copper, with an opening at its upper end through which passes the insulated conducting-wire *d* that is attached at the lower end to the plate *a*. The columns *e e* support the zinc or negative pole *f*, and preserve a uniform distance between the two poles. These columns are to be of insulating material. The under side of the zinc is convex, and the central hole for the conductor *d* allows of the escape of hydrogen

gas that is generated upon the under surface of the zinc. Around the outer portions of the cone *c* there is a skirt, *l*, of felt or other flexible material, that catches any particles of sulphate of zinc, and prevents them passing between the cone and the glass vessel *m*, and thereby keeps the copper solution clean.

The poles rest upon the sulphate of copper, and descend as that is dissolved and consumed. The solution of sulphate of copper passes out at the top of the cone *c* as rapidly as required for the battery, according to the intensity in the action thereof, and as the decomposition and recomposition take place the copper is deposited upon the under side of the cone and the plate *a*, and the sulphate-of-zinc solution remains comparatively free from impurities, especially above the zinc, which solution may be drawn off, and becomes an article of commerce.

I claim as my invention—

1. The copper plate *a* resting upon the sulphate-of-copper crystals, and connected to the negative pole by the columns *e*, substantially as set forth.

2. The cone *c* above the plate *a*, and connected therewith, and having an opening at the top through which the conductor *d* passes, substantially as set forth.

3. The skirt of felt or other flexible material applied to the cone *c*, and closing the space between the other portion of the cone and the cell, substantially as set forth.

Signed by me this 4th day of March, A. D. 1874.

R. M. LOCKWOOD.

Witnesses:

GEO. T. PINCKNEY,  
CHAS. H. SMITH.