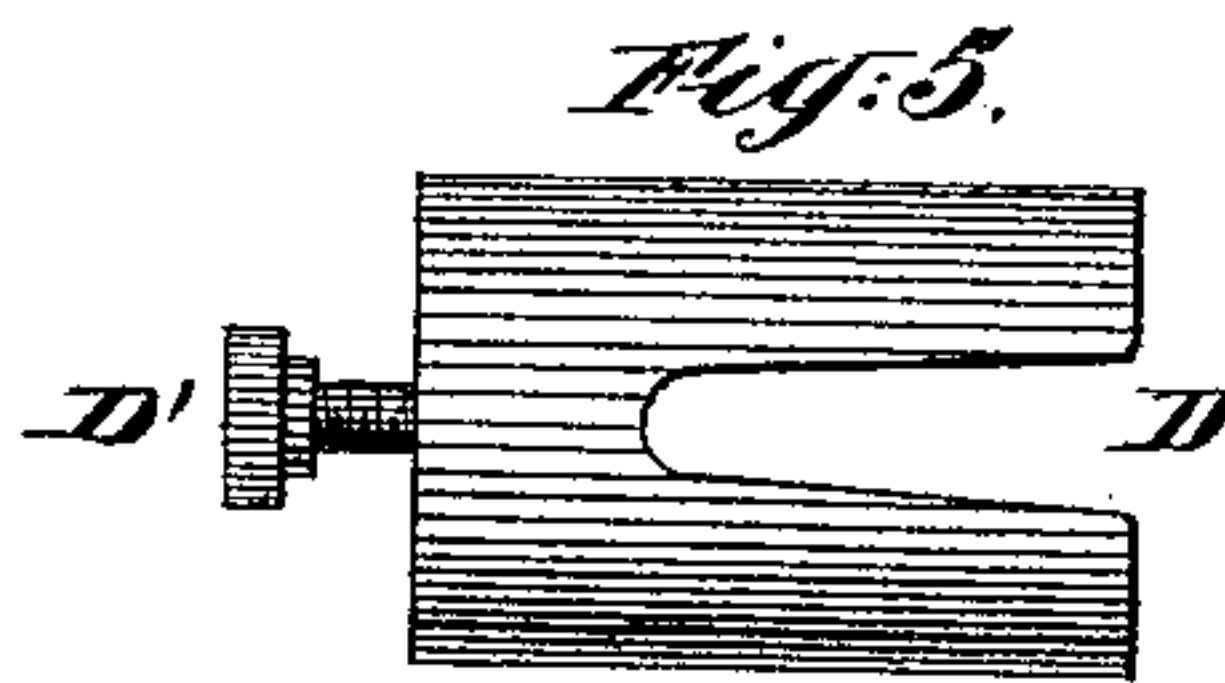
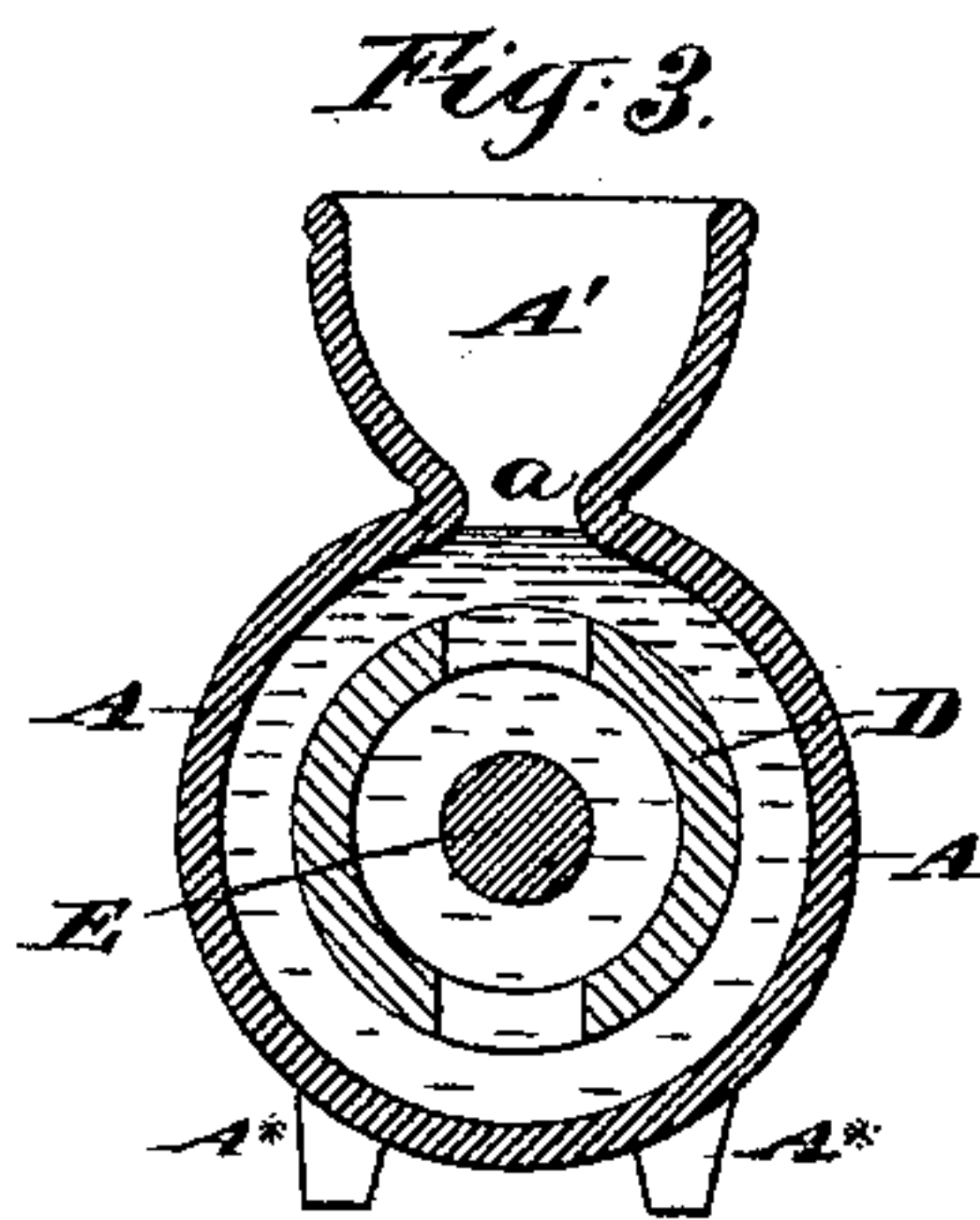
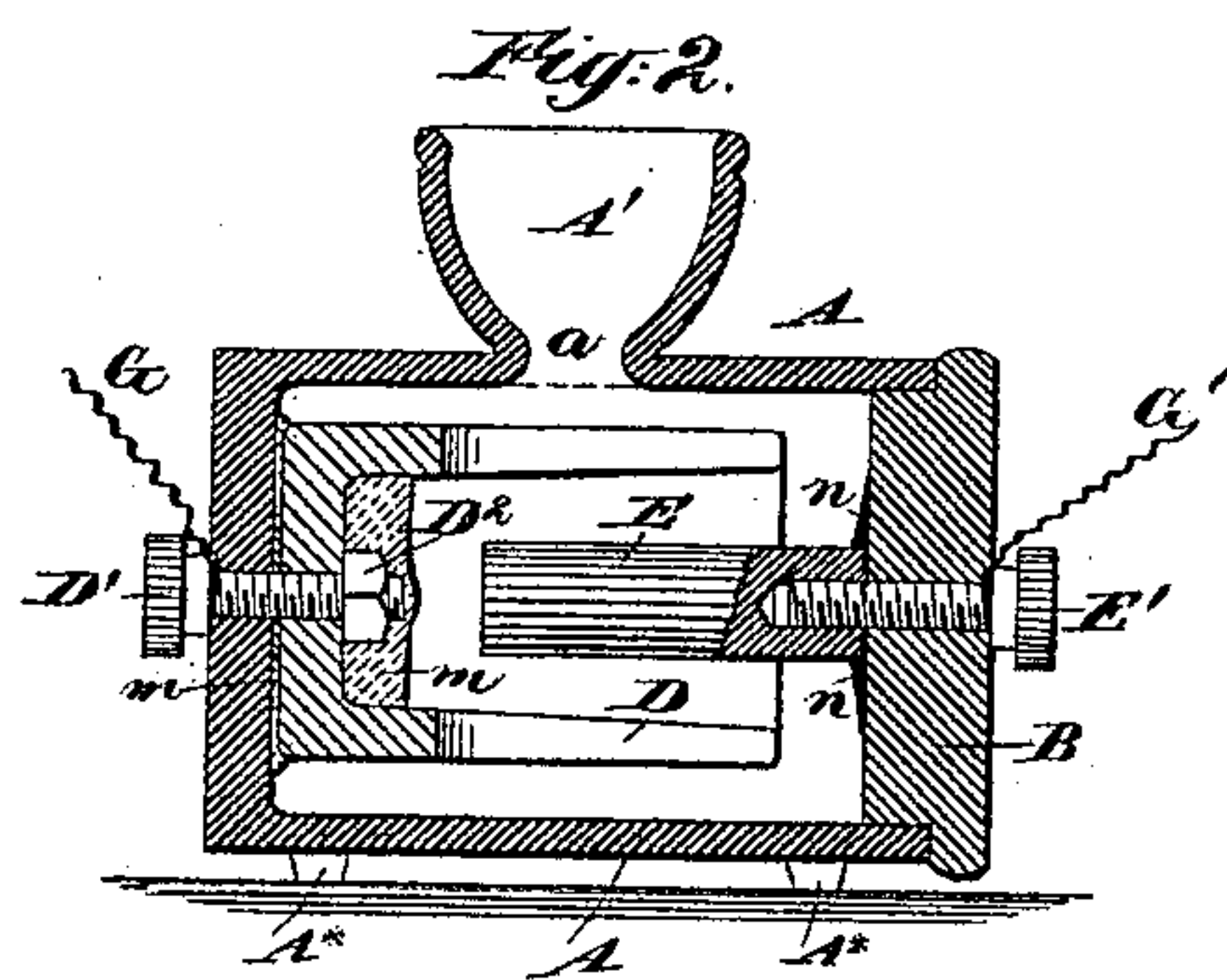
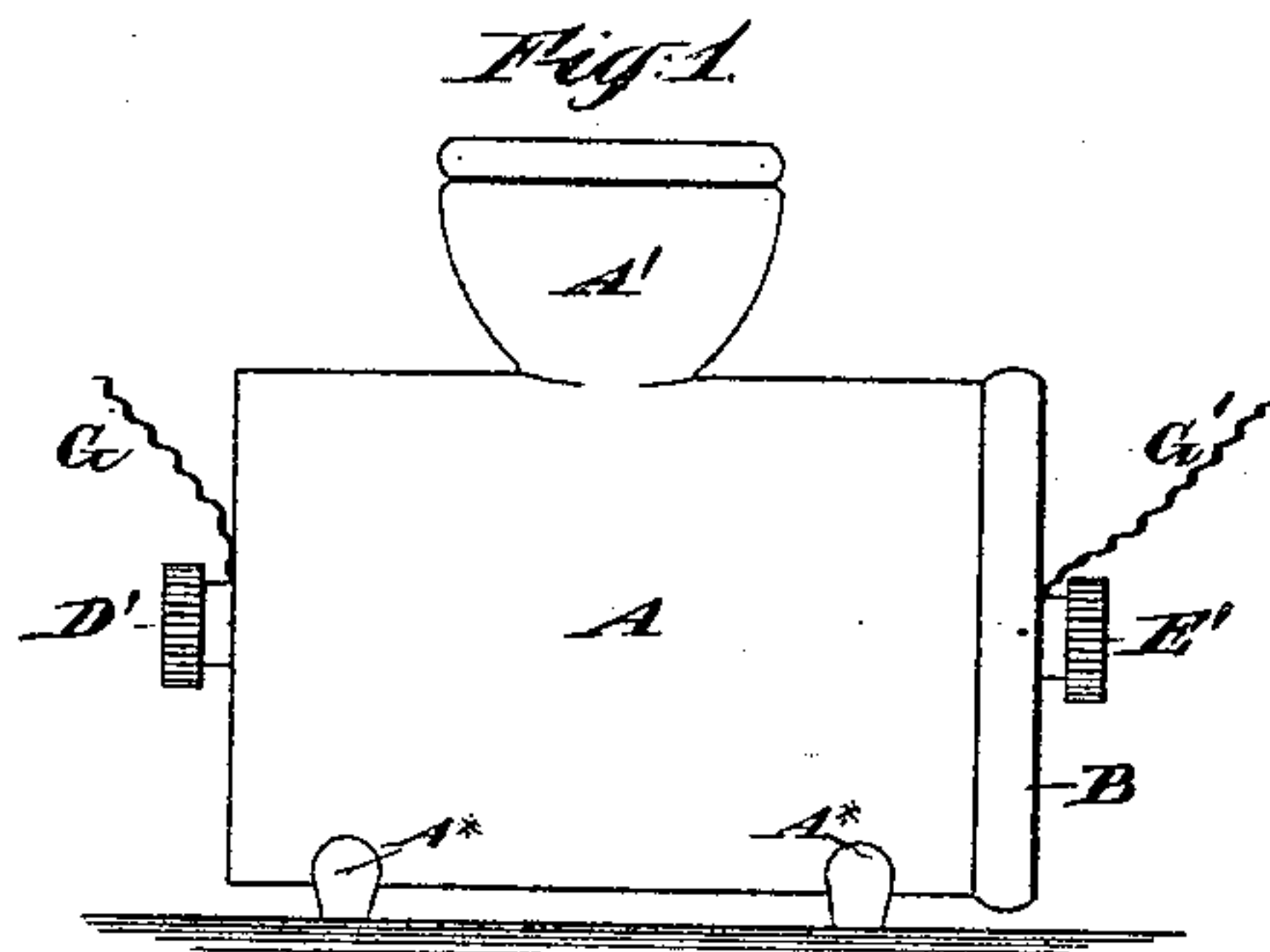


(No Model.)

W. L. GATES.  
GALVANIC BATTERY.

No. 344,523.

Patented June 29, 1886.



Witnesses:  
Charles R. Seale  
T. A. Richmond

Inventor:  
Waldo L. Gates  
by his attorney  
James D. Sisson

# UNITED STATES PATENT OFFICE.

WALDO L. GATES, OF SALTERSVILLE, ASSIGNOR TO WILLIAM HENRY WILLIAMS, OF ORANGE, NEW JERSEY, AND JOHN HURTIN KING, OF BROOKLYN, NEW YORK.

## GALVANIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 344,523, dated June 29, 1886.

Application filed March 11, 1886. Serial No. 194,768. (No model.)

*To all whom it may concern:*

Be it known that I, WALDO L. GATES, of Saltersville, Bayonne City, in the county of Hudson and State of New Jersey, have invented a certain new and useful Improvement in Galvanic Batteries, of which the following is a specification.

My improved battery is intended more especially for use with the "automatic instructor" set forth in the patent to me, dated June 2, 1885, No. 319,224; but I believe it may be used with advantage in many other situations.

My invention will serve for a portable battery for use by physicians and surgeons in various exigencies where electricity is required. It will serve well in sending or receiving telegraphic or telephonic messages on railway-trains in motion. It is open, yet without danger of slopping or overflowing. In what I esteem the preferable proportions, it may be inverted without spilling, because, although the aperture is open, the escape of fluid is prevented by the pressure of the air. The main body of the case or vessel in which my battery is mounted is a horizontal hollow cylinder with one flat end formed in one therewith. Another corresponding flat end is fitted to extend a little way into the interior of the main part, and to form an absolutely tight-fitting plug therefor. The elements are bedded in pitch and held by screws, which are kept out of contact with the exciting-fluid by a covering of pitch. A screw holds one element against one end, and a corresponding screw holds the other element at the other end. The conducting-wires are attached to the screws. When the removable end or plug is in place, the only orifice connecting the interior of the casing with the outer atmosphere is about the mid-length, and connects with an open-ended funnel. The opposite side or lower side of the cylindrical case is provided with legs.

The entire construction may be rested on or sunk into a recess in the board or body of my instructor. It is firmly supported on legs formed in one with the cylindrical body.

The accompanying drawings form a part of this specification, and represent what I con-

sider the best means of carrying out the invention.

Figure 1 is a side elevation. Fig. 2 is a central vertical longitudinal section. Fig. 3 is a vertical transverse section. Figs. 4 and 5 are elevations representing certain parts detached.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A is the body of the casing, made of hard rubber or other suitable strong non-conducting material, in the form of a hollow cylinder, with one end closed and the other end open. A' is a funnel extending out at right angles to the axis of the cylinder A. The interior of A connects with the external atmosphere through a small orifice, *a*, at the junction of A' with A.

B is a plane end adapted to match tightly within the open end of A, and to form a practically-tight joint all around.

D is the carbon, and E the zinc. Each is made in the form represented, the part D being a hollow cylinder deeply notched, as shown, and the part E being a solid cylinder of smaller diameter fitting within D, but out of contact therewith. The carbon D is held in place by a thumb-screw, D', inserted through a hole in the closed end of the cylinder. The nut D<sup>2</sup> aids in making a strong and reliable job. Pitch, *m*, is applied between the carbon D and the interior of the closed end of the cylinder. Pitch (correspondingly marked) is also applied around and over the nut. The zinc E is held by a thumb-screw, E', inserted through the removable end or plug B. Paraffine, *n*, is applied between the end of E and the adjacent surface of B.

G is the positive conducting-wire. It is connected by being wound around the screw D'. G' is the negative wire. It is connected by being wound around the screw E'.

The pitch, *m*, and the paraffine, *n*, seal the joints around and prevent leakage around the screws D' and E'.

The legs A\* are formed in one with the cylindrical body A.

To charge my battery I introduce the chemicals in the form of a dry powder, using one-



third ( $\frac{1}{3}$ ) bisulphate of mercury and two-thirds ( $\frac{2}{3}$ ) sal-ammoniac, simply pulverized and mixed. When required for use, add sufficient water through the funnel A'.

5 I attach importance to the fact that the body A is cylindrical, and that the plug B is of corresponding form. This form makes it easy to make and maintain a tight joint between A and B.

10 I attach importance to the legs, because they serve to reliably support the cylindrical battery in the required position.

I attach importance to the fact that the orifice  $a$  is on the top side and about the mid-length. The battery may be shaken without much disposition of the fluid contents to escape through this orifice.

I attach importance to the funnel A'. It is a convenience in filling with water, and a safe-guard against overflow.

20 I have in my experiments made the orifice  $a$  so small that the entire apparatus may be inverted without spilling, the fluid contents being retained by the pressure of the atmosphere.

Care should be taken in securing the carbon to have the deep notches lie in the position represented, one at the upper side immediately under the orifice  $a$  and the other at the lower side. I attach importance to these notches as allowing upward escape of hydrogen gas, and serving in a measure to reduce polarization. The notches also provide a clear space in line with the aperture  $a$ , through which the powder may descend to the bottom, instead of lodging on the carbon and obstructing the necessarily limited space which exists between the latter and the interior of the body A. These notches also, to a less degree, facilitate the emptying of the device. They should be so narrow as to subtract but little

from the effective action of this element of the battery.

The removable end B, carrying one of the elements and making a tight joint with the part A, enables me to open and close the battery at any time with little trouble, and to exchange an element as such shall become necessary without damage to the body or cell A, or to any other part of the apparatus.

I claim as my invention—

1. The battery described, having the body A, with its orifice  $a$  in the mid-length, in combination with the closing end or plug B, fitting tightly within it, and with provisions, as D' E', for attaching the connecting-wires G G', as herein specified.

2. The carbon D, having two deep notches,  $d d$ , arranged as shown relatively to the case A, having an aperture,  $a$ , and to the plug B, zinc E, and suitable connecting-wires, and means for attaching the same, as herein specified.

3. The funnel A', in combination with the casing A, having an aperture,  $a$ , at the point of junction with A', and with the tight-fitting end or plug B, and with provisions, as D' E', for attaching the connecting-wires G G', as herein specified.

4. The cylindrical body A, provided with a filling-orifice,  $a$ , in combination with legs A\*, and with the removable end or plug B, and with provisions, as D' E', for attaching the connecting-wires G G', as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, this 9th day of March, 1886, in the presence of two subscribing witnesses.

WALDO L. GATES.

Witnesses:

H. A. JOHNSTONE,  
EDW. WM. FRANCIS.