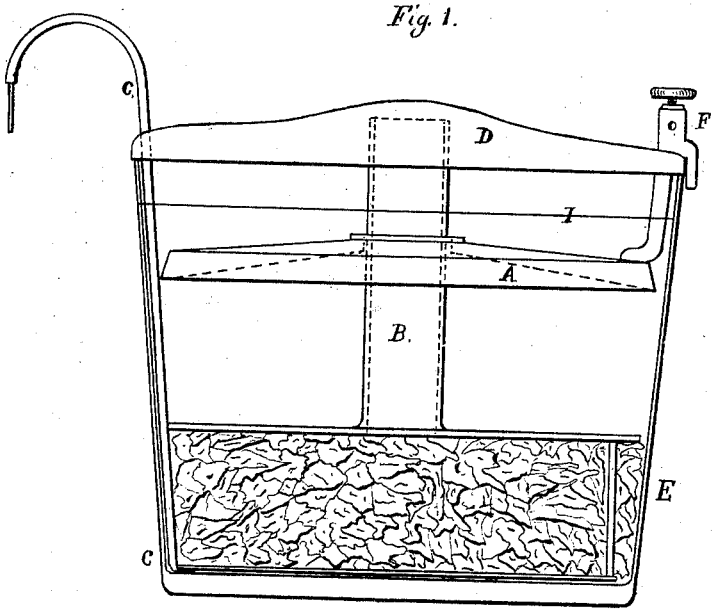
E. A. HILL.

Galvanic-Battery.

No. 167,173. Patented Aug. 31, 1875.

Fig. 1.



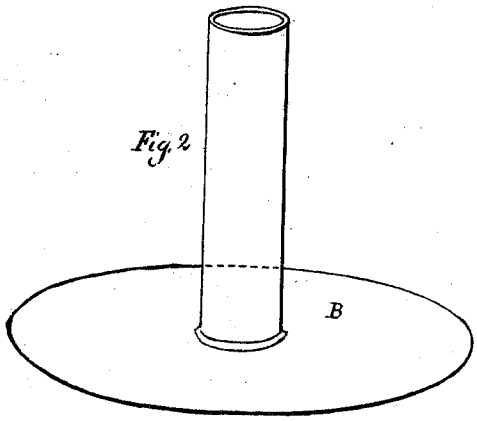
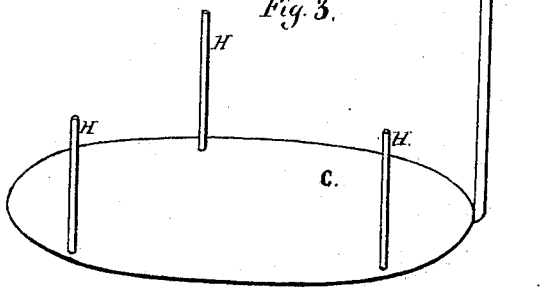


Fig. 2

Fig. 3.



Witnesses.

J. D. Haines

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EDWARD A. HILL, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN GALVANIC BATTERIES.

Specification forming part of Letters Patent No. 167,173, dated August 31, 1875; application filed July 20, 1875.

To all whom it may concern:

Be it known that I, EDWARD A. HILL, of Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Galvanic Batteries, of which the following is a specification, reference being had to the accompanying drawings.

As is well known to those conversant with galvanic batteries, especially their care and management, there is considerable difficulty in preventing the flow of solution of sulphate of copper to the zinc in the sulphate-of-copper battery, thereby not only wasting material, but lowering the electro-motive force of the zinc, in consequence of the metallic coating which is reduced thereon. Especially is this the case whenever crystals of the salt are added in considerable quantities as charges. Various means have been resorted to to overcome this difficulty, but these are liable to some objections. Whenever the copper plate is placed above the crystals the battery cannot be made to work, with any degree of efficiency, faster than the solution flows above the plate. If, as has been done, a copper plate is placed above the charge, and in metallic connection with a plate below or in the midst of the crystals, and the battery works faster than the copper solution rises above the upper plate, the latter is eaten away, and portions of it disappear and have to be renewed. Besides, the battery cannot be replenished without very seriously disturbing the solids and liquids, and very materially interfering with the working of it.

My improvements relate to that form of sulphate-of-copper battery commonly known as the "gravity battery;" and consist in the means, hereafter described, of preventing, to a great extent, the flow of the sulphate of copper to the zinc element, while allowing a free supply of the crystals to be made from time to time, as required, without disarranging the parts or interfering with the working of the battery.

Figure 1 is a vertical section of my battery, showing A, the zinc or + electrode; B, a lead disk, perforated at or near the center, and a tube attached; C, the copper, or — electrode or plate; and D, the cover. Fig. 2 shows the tube and disk B in perspective; and Fig. 3 shows the copper plate C and the standards H, also in perspective.

E is the battery-cell or jar which, in this form, is usually made of glass, so as to afford a plain view of its contents. On the bottom of the cell rests the copper or — electrode, having a covered wire attached thereto, and rising by the side of the cell and over its top, as shown. It has three metal (wire) standards H fixed thereto, near the periphery, in such a manner as to support the disk B. Another method contemplated is to make simply a trussed or bent wire, which should be placed on the — plate, and support in this manner the disk B. A is the zinc or + electrode. It has an opening through its center to allow the tubular portion of B to pass through and leave some space to insure non-contact between the two metals, and is suspended from the rim or upper edge of the jar by a hook, F, which has a binding-screw for wire connection. B is a disk and tube combined, the tube being attached to or near the center of the disk, and the latter perforated so as to allow whatever is put into the tube to pass through the disk. It rests, by its disk portion, horizontally upon the standards H, its tubular portion rising perpendicularly through the central opening in the zinc, and above the surface I of the liquid, to the mouth of the jar and under the cover. The horizontal or disk portion should be somewhat less in diameter than that of the jar, leaving space enough for the deposition of the copper from whatever of blue solution chances to rise above its edge, without thereby obstructing the flow of the current of electricity. D is the cover to the jar, spun out of sheet metal, (zinc, preferably,) turned out of wood, or molded out of paper or other plastic material. It has a curved outline in order to give it strength and improve its looks, and a narrow rim overlapping and inclosing the mouth of the jar. It is notched on two sides for the passage of the hooked hanger F and the wire C, and to allow of its removal readily.

My object in employing the device B, and making it of lead, is twofold: first, to allow of supplying from time to time, as required, crystals of copper sulphate, without disturbing the liquids or disarranging the solids of my battery; and, second, lead, being indissoluble

when subjected to battery action, cannot be eaten away and lost, in whole or in part, as copper is. Any other incorrodible metal might be substituted, but lead is probably the cheapest and best. I do not claim using lead as an electrode as its sole or chief function, nevertheless one of its functions is to electrolyze whatever of solution of copper sulphate rises above it, otherwise a non-metallic diaphragm would answer instead. The height from the bottom may, of course, be varied by varying the length of the standards or supports upon which it rests, in order to allow charges varying in quantity. The standards might be fixed to the lead disk, but I prefer the arrangement described, as it facilitates the removal of B when necessity requires, for the purpose of removing a deposit of dirt thereon.

To set up and charge the battery I first place the copper or electrode in the bottom of the jar, and on this I place a pound or two, more or less, of copper sulphate in crystals; but the quantity should not be so great as to rise above the standards H. I then place the disk B and the zinc or + electrode in place and pour in, first, water up to a level of B, and then a solution of zinc sulphate sufficient to cover the zinc. This solution should be about half saturated if for a local battery, but for a main battery, or when slower action is no objection, the solution may be thinner. Lastly, the cover is put on and the battery is ready for work.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The device B, constructed of lead or other incorrodible metal, when supported above the bottom of the containing-cell, substantially as and for the purpose herein specified.

2. The combination of the device B with the copper or — plate, having supports fixed or resting thereon, substantially as and for the purpose specified.

EDWARD A. HILL.

Witnesses:
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