(No Model.)

G. T. WOODS.

GALVANIC BATTERY.

No. 387,839. Patented Aug. 14, 1888.

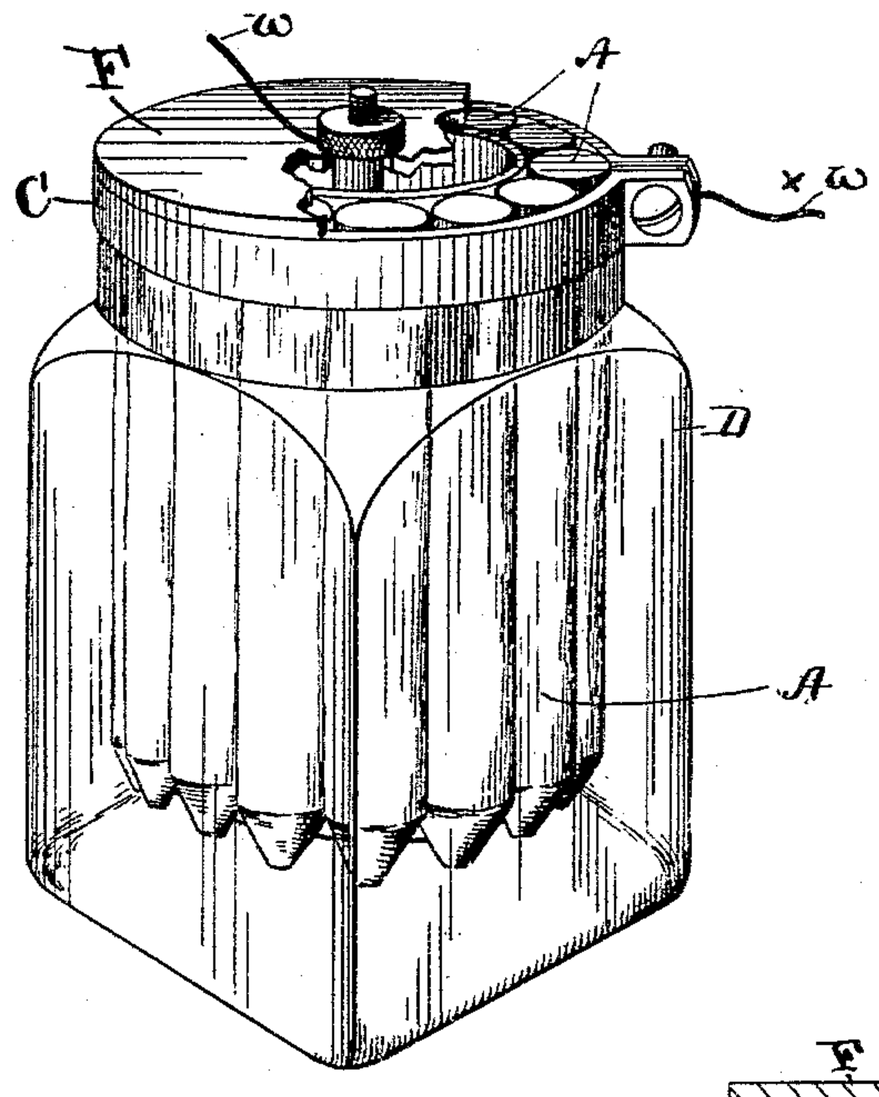

Fig. 1.

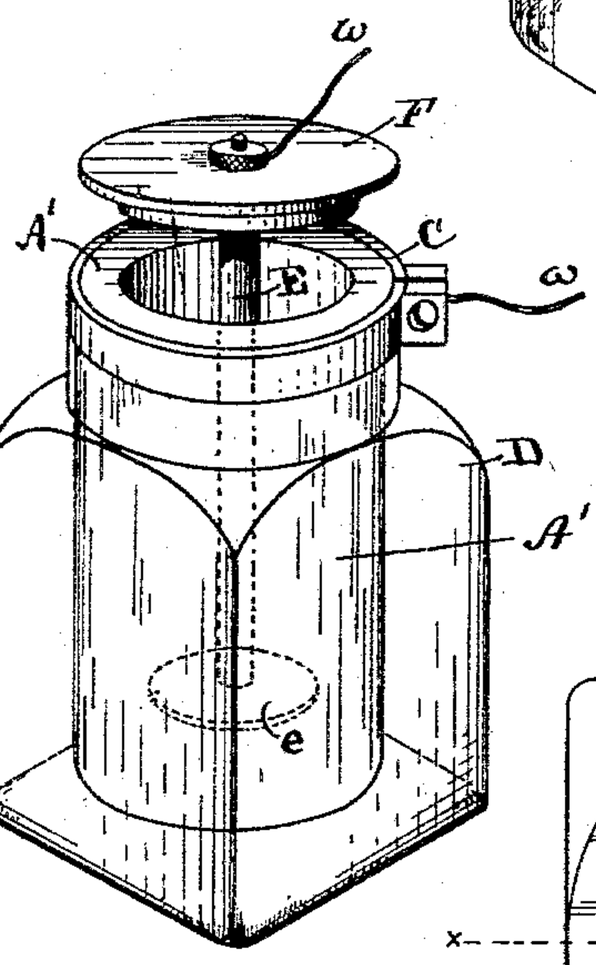

Fig. 4.

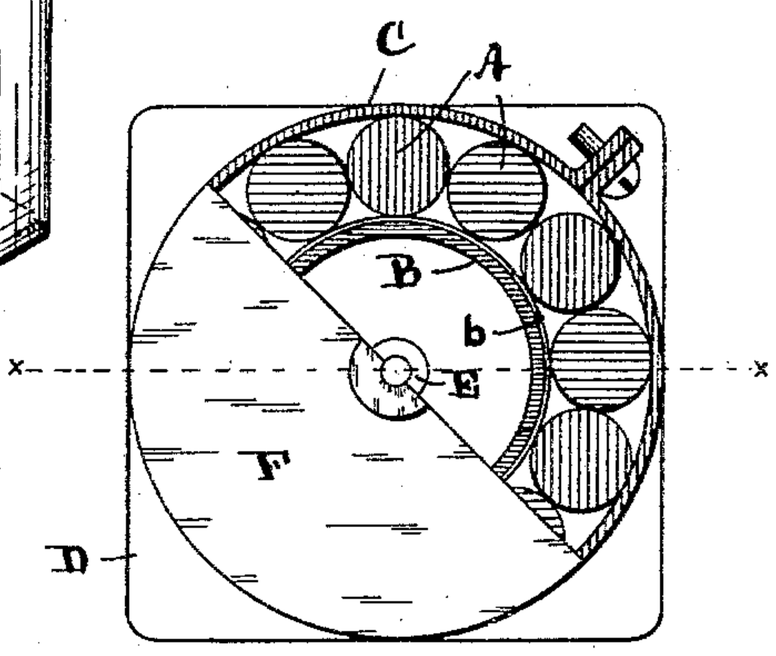

Fig. 2.

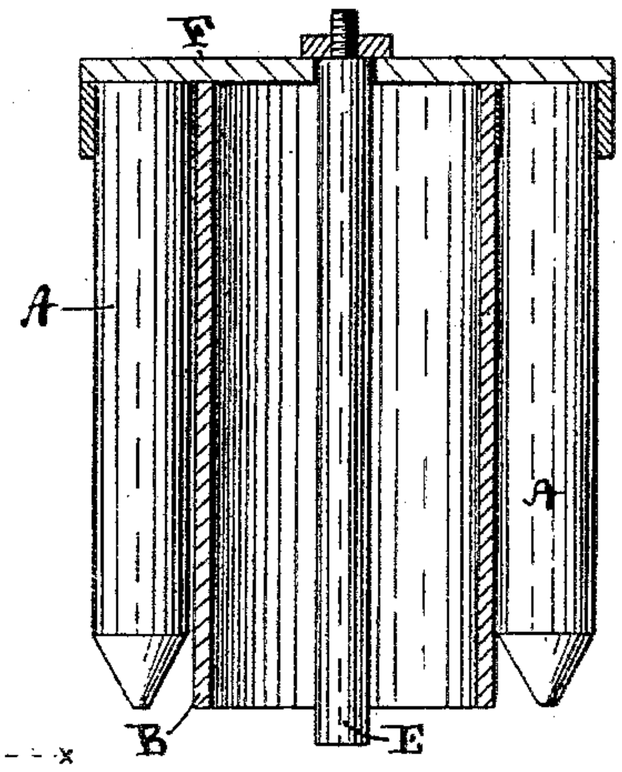

Fig. 3.

Attest.
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UNITED STATES PATENT OFFICE.

GRANVILLE T. WOODS, OF CINCINNATI, OHIO.

GALVANIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 387,839, dated August 14, 1888.

Application filed July 9, 1887. Serial No. 243,834. (No model.)

To all whom it may concern:

Be it known that I, GRANVILLE T. WOODS, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Galvanic Batteries, of which the following is a specification.

My invention relates to galvanic batteries, its object being to produce a simple, cheap, convenient, and durable battery for the ordinary purposes to which such apparatus is applied in daily and increasing use.

To this end it consists in the construction and arrangement of the battery and elements, as hereinafter more fully set forth.

My invention is embodied in the apparatus shown in the accompanying drawings, in which—

Figure 1 is a perspective elevation of my improved battery complete in its preferred form. Fig. 2 is a plan view, partly sectioned to show the construction. Fig. 3 is a vertical section in the plane *x x* of Fig. 2 of the interposed cylinder, showing its relation to the battery elements; and Fig. 4 is a perspective elevation of a modified form of a battery more fully referred to and described in the following specification.

The class of batteries to which my invention is applied is that in which a central zinc core is surrounded by a series of carbon strips or pencils concentrically arranged to form, practically, an open-ended cylinder. I construct and arrange these in the following manner:

A number of carbon strips or pencils, A, are placed concentrically around an open-ended cylinder, B, parallel to its axis and secured by a metallic band-clamp, C, near the top. The cylinder B is a thin shell of rubber or other insulating material capable of resisting the decomposing action of the exciting-fluid, is open at both ends, and is of a length corresponding with that of the carbons. A thin band of elastic rubber, *b*, may be interposed between the carbons and the cylinder B to prevent breakage and form a secure holding when the clamp C is drawn tight around the carbons. These parts are so proportioned and arranged in relation to the glass jar D that the band C forms a circular support for the carbon elements upon the upper margin of the neck of the jar, with the carbons projecting downward within the same. The zinc element, E, is a rod or cylinder centrally suspended from a wooden disk constituting a cover, F, resting upon and over the upper ends of the carbons. The conducting-wires *w w* are connected in any convenient manner to the upper end of the zinc bar and to the side of the clamp C, respectively. As thus constituted, it will be seen that the battery presents certain advantages relating to convenience of handling. For example, the cover may be lifted off, carrying the zinc element, and the exciting-fluid (for example, a solution of sal-ammoniac) may be replenished by pouring into the open end of the cylinder B. If necessary to remove the carbon elements, they may also be removed intact without individual displacement; but a further and more important advantage of this construction is that the construction and arrangement of the cylinder B, interposed between the zinc and carbon elements, compels the circulation of the exciting-fluid downward and upward around the bottom of said cylinder, thereby compelling the electrolytic action to take place, as it were, in the direction of the length of the elements rather than in direct lines between their exposed sides. It will also be obvious that the lines of such action instead of being, as in ordinary batteries, at right angles to the zinc surface, will be inclined downward and outward thereform, whence it follows that the effect of decomposition would be more strongly felt at the lower end of the zinc bar, where it is most deeply immersed in the liquid and under conditions most favorable to setting up a thorough circulation of the liquid itself, tending to keep up a uniform strength of solution in all parts of the liquid. Another effect is to prevent the surface accumulations which in such batteries as ordinarily constructed form a temporary conducting-bridge between the elements of the battery at the surface of the liquid, thereby weakening its effective action by short-circuiting locally.

I have shown in the present illustration the carbon element as composed of a number of cylinders or pencils such as are ordinarily used in electric-arc lamps; but the form of the carbons is not material. It is desirable, however, that the largest possible surface of carbon should be exposed, and the cylindrical form of the carbons favors this condition; but

it will be obvious that rectangular strips or bars may be employed and a still larger surface thereby obtained by slightly separating the contiguous carbons and permitting the circulation of fluid between them. Thus it will be seen that while the interposition of the insulating cylinder B tends to some extent to impair the direct intensity of the electrolytic action between the elements, the increase of surface in the carbon element more than compensates, while the regularity and durability of the action is much enhanced.

In Fig. 4 I present a modified form of the battery in which the annulus of carbon pencils is replaced by a carbon cylinder, A′, which may be ribbed or corrugated externally to increase the exposed surface, and may be coated on the inside with a covering of shellac, rubber, or any other suitable insulating material, this latter being in effect a substitute for the cylinder B. A disk, *e*, of rubber may also be placed at the lower end of the zinc rod to preserve the central position of the zinc and prevent contact with the carbon. The construction of the battery otherwise is as already described; but while possessing the same advantages as to convenience in handling, &c., it is inferior in capacity.

The improvement hereinbefore described, while it cheapens the cost of construction over any batteries of similar character with which I am acquainted, gives a much more durable and constant action.

I claim and desire to secure by Letters Patent of the United States—

1. The improved galvanic cell embodying the negative electrode arranged as an annulus concentrically around the positive electrode, and an intervening insulating-shield, in combination with the containing-vessel and exciting-liquid, substantially as described.

2. In a galvanic cell, the carbon sticks A, insulating-cylinder B, and clamp C, combined and arranged, as shown, to constitute a single structure removable from the containing-vessel, substantially as described.

3. A galvanic cell embodying a carbon or negative electrode, combined with an open insulating-annulus around which it is secured as one removable structure, and the zinc or positive electrode, combined with an insulated bridge which it is suspended upon and within the insulating-annulus, also as a removable structure, the whole combined with and arranged within and upon a containing-jar, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GRANVILLE T. WOODS.

Witnesses:
L. M. HOSEA,
CHESTER W. MERRILL.