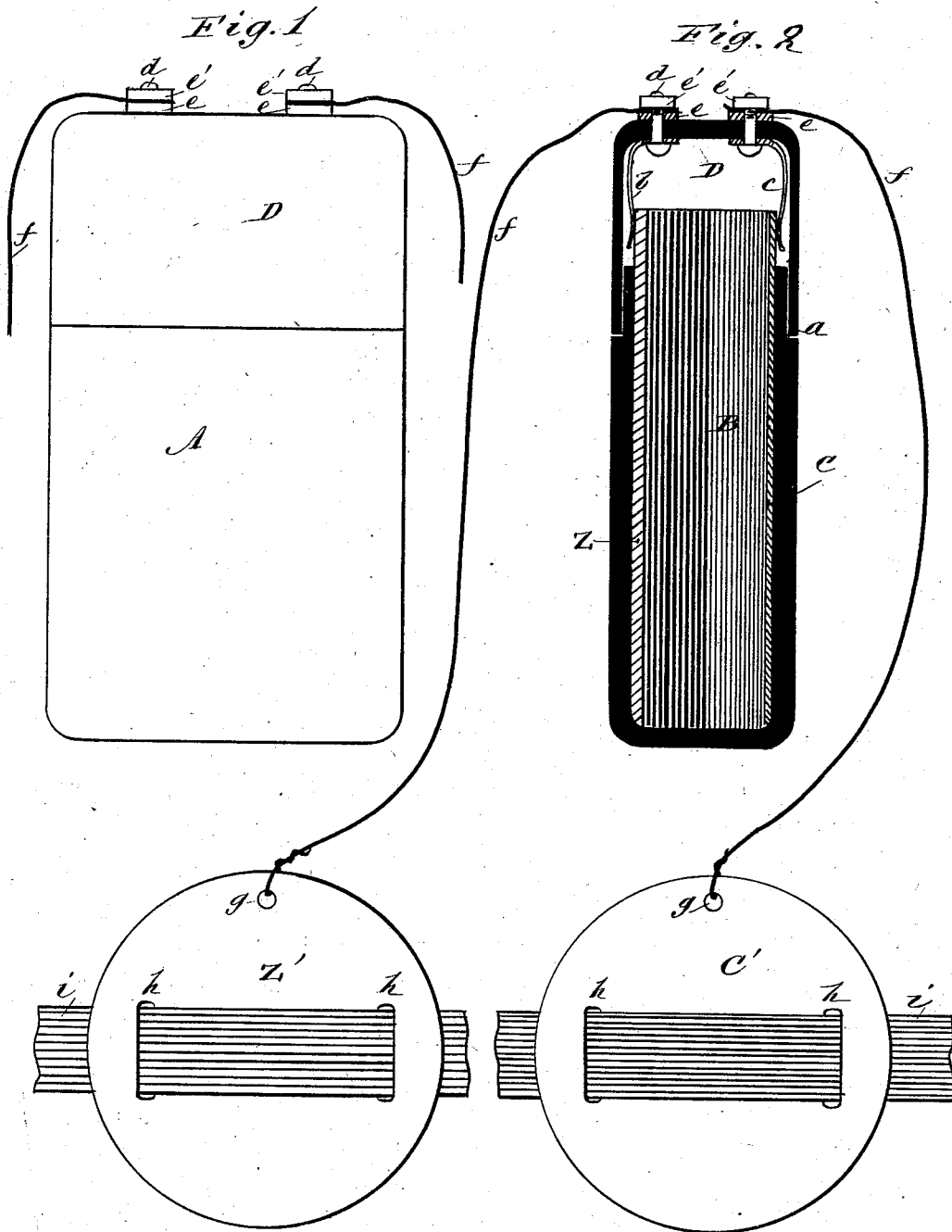


(No Model.)

G. M. HOPKINS.  
GALVANIC BATTERY.

No. 256,691.

Patented Apr. 18, 1882.



WITNESSES:

*C. Neveu*  
*James Richardson*

INVENTOR:

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# UNITED STATES PATENT OFFICE.

GEORGE M. HOPKINS, OF BROOKLYN, NEW YORK.

## GALVANIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 256,691, dated April 18, 1882.

Application filed February 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. HOPKINS, of Brooklyn, in the county of Kings and State of New York, have invented an Improved Galvanic Battery, of which the following is a description, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side elevation of my improved battery; and Fig. 2 is a vertical transverse section, showing the relation of the various parts.

Like letters of reference refer to like parts in the two figures of the drawings.

My invention relates to the class of voltaic batteries employed for curative purposes; and it consists of a case containing zinc and copper electrodes separated by sheets of bibulous paper saturated with an exciting fluid, and a cover fitted to the case and carrying two contact-springs for making connection with the two electrodes, one spring touching the zinc, the other touching the copper, the two springs being clamped to the case-cover by bolts passing through holes in the cover, and each provided with two milled nuts, between which the conducting cords or wires are clamped.

The case A is made in rectangular form, of hard rubber or other material capable of resisting the action of the fluids of the battery. In the case A, and at opposite sides thereof, there are zinc and copper plates, the zinc plate Z and the copper plate C being separated by a number of sheets, B, of bibulous paper. One-half of the sheets lying next to the zinc are saturated with a strong solution of sulphate of zinc. The other sheets are saturated with a strong solution of sulphate of copper.

The case-cover D is of the same material as the rest of the case, and is fitted snugly on a shoulder, a, leaving a space above the zinc and copper plates and the bibulous paper.

Two angled springs, b c, are attached to the top of the cover D by bolts d, each fitted with two milled nuts, e e', the nuts e being screwed tightly down upon the cover, while the nuts e' are screwed down upon the conducting-wires f. The free ends of the springs are bent inward toward each other, with their extremities bent outward to insure their slipping over

the zinc and copper plates when the cover is placed on the case. The zinc and copper plates extend beyond the top of the body of the case to allow the springs b c to press upon their outer sides.

The electrodes Z' C' are attached to the extremities of the wire f, the electrode Z' being connected with the spring b, touching the zinc plate Z, and the electrode C' being connected with the spring c, touching the copper plate C. Each electrode Z' C' is perforated with a hole, g, for receiving the end of the conducting-wire f, and with two slots, h, near diametrically opposite edges, for receiving a flexible band, i, for binding the electrode on some part of the body to convey the current to that part or upon a sponge for bathing purposes.

This form of battery is particularly well adapted to curative purposes, having great internal resistance, and as a consequence capable of overcoming great external resistance, and the electrodes, being broad flat surfaces of thin metal, are readily adapted to any portion of the body to which they may be secured by means of the flexible bands. This form of battery maintains a constant current for a long time, and requires no attention except the moistening of the bibulous paper from time to time.

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

1. In a medical battery having zinc and copper electrodes separated by bibulous paper, the combination of the springs b c with the cover D and inclosing-case A, substantially as herein specified.

2. In a medical battery, the combination of the case A, cover D, plates Z C, bibulous paper B, springs b c, and bolts d, having nuts e e', substantially as specified.

3. As an improved article of manufacture, a medical battery consisting of zinc and copper plates separated by bibulous paper, and inclosed in a case having a close-fitting cover provided with contact-springs, as herein specified.

GEO. M. HOPKINS.

Witnesses:

JAMES RICHARDSON,  
C. SEDGWICK.