

(No Model.)

J. EMMNER, Jr.
GALVANIC BATTERY.

No. 454,724.

Patented June 23, 1891.

Fig. 1.

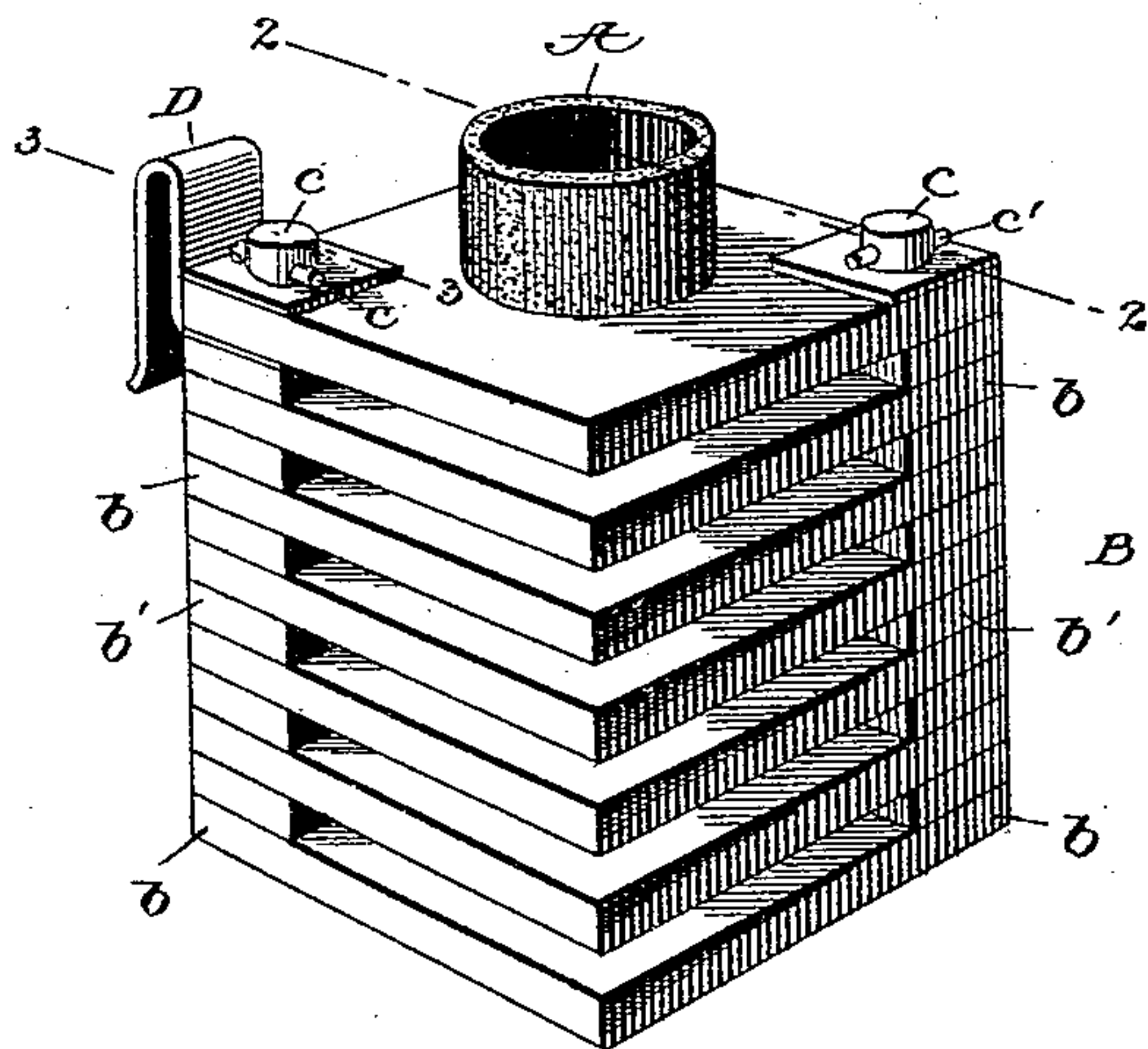


Fig. 2.

on line 2-2

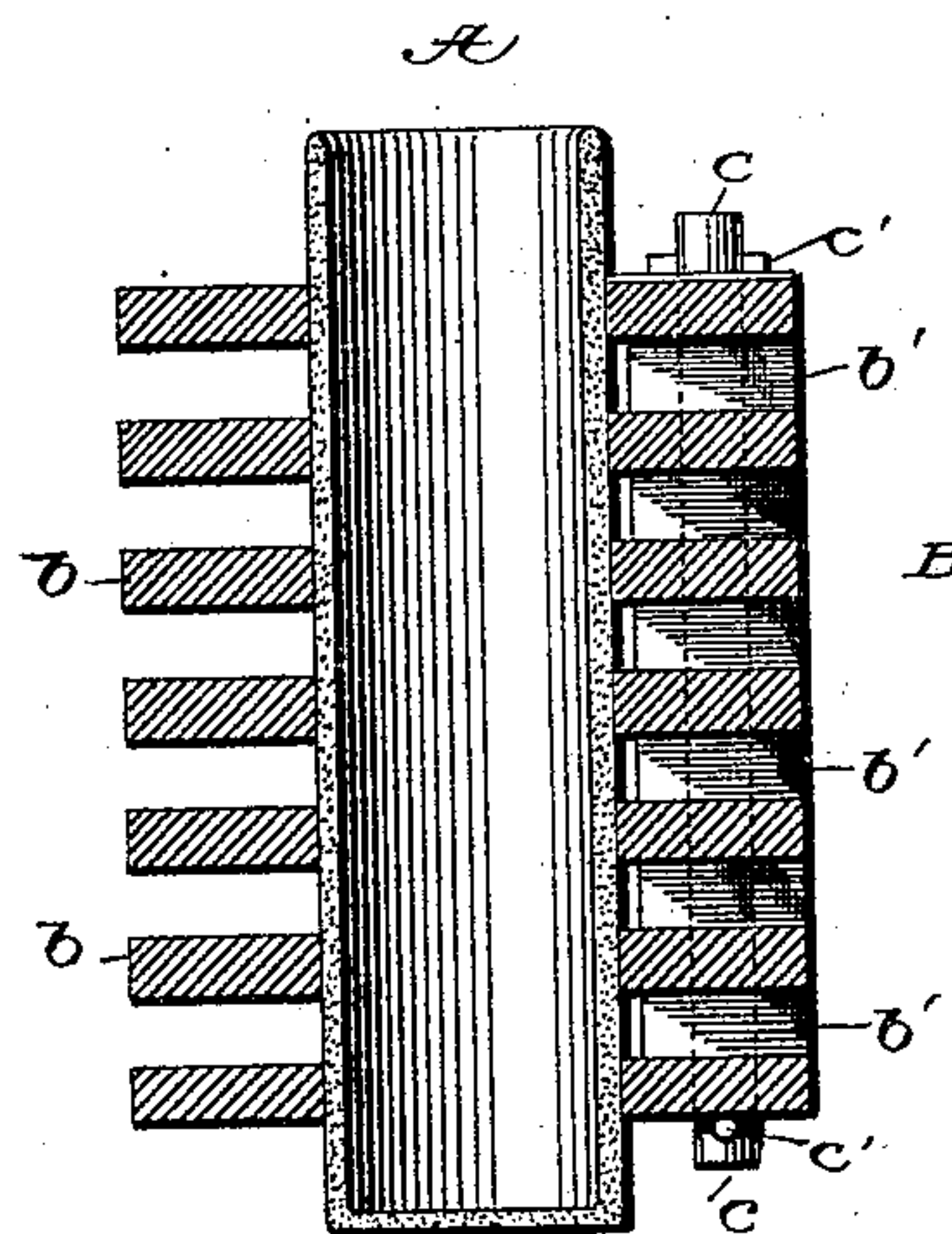


Fig. 3.
on line 3-3

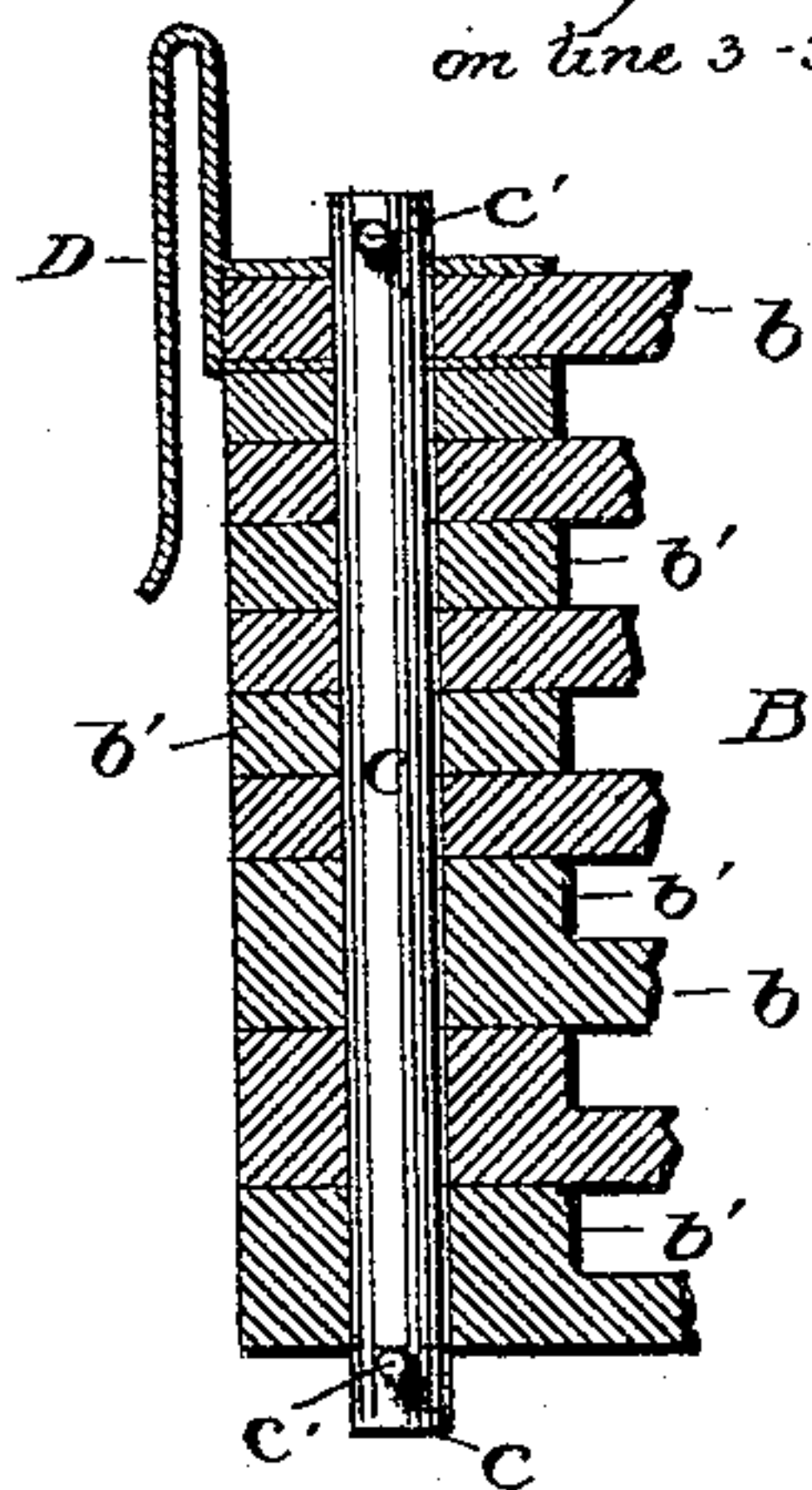


Fig. 4.

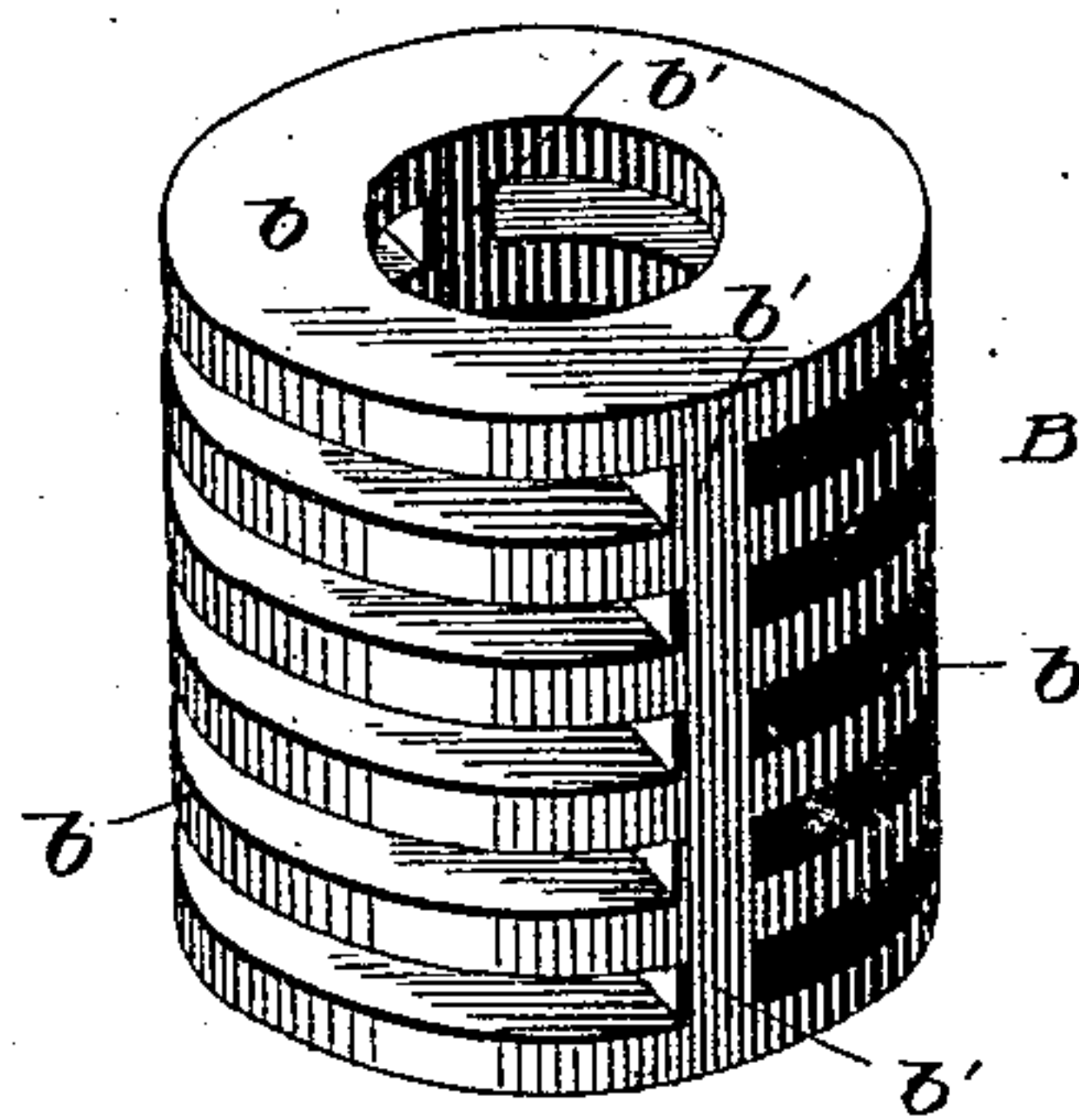
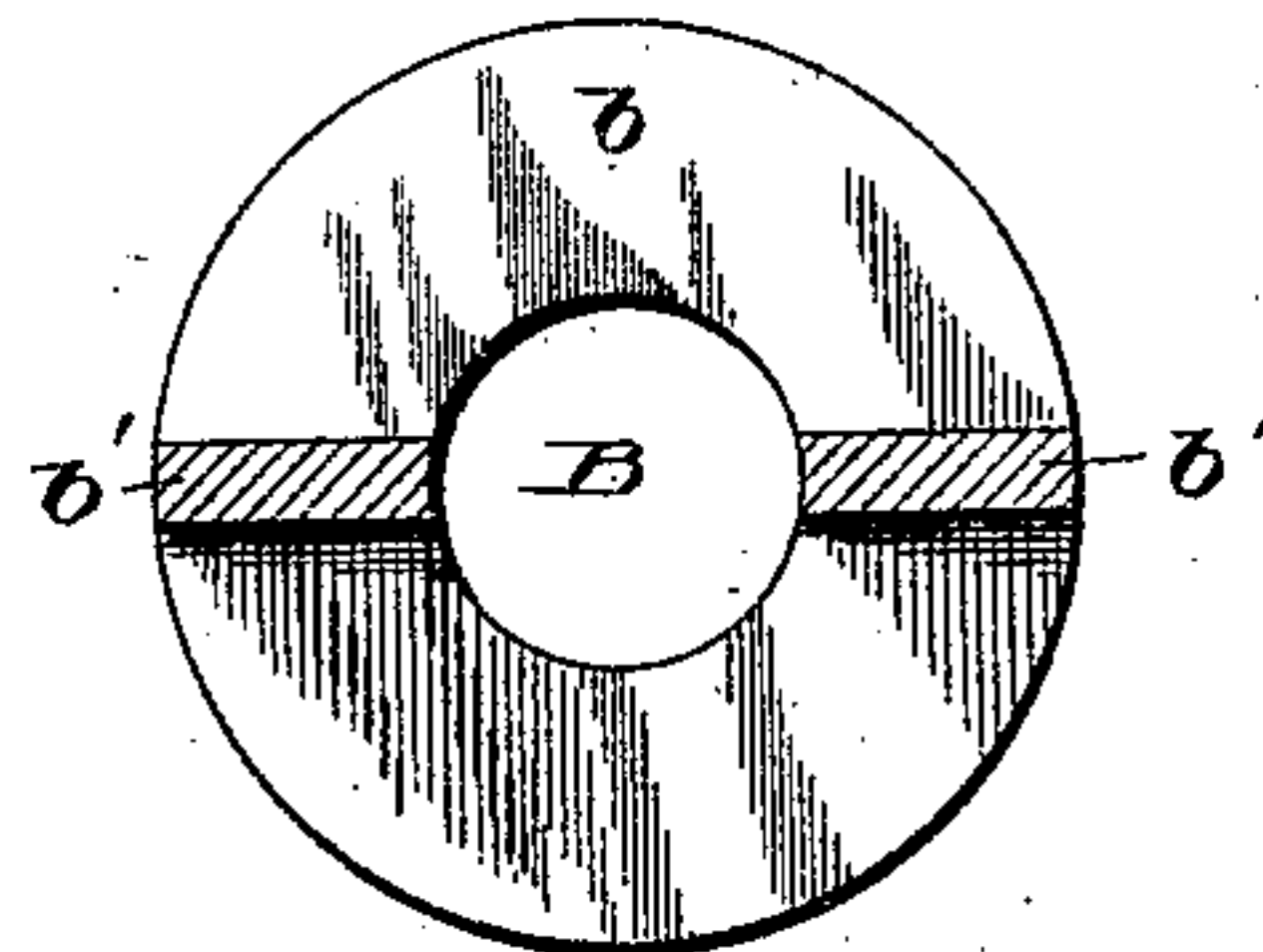


Fig. 5.



Witnesses:

William W. Mortimer
A. R. Kennedy

Inventor:

Julius Emmner Jr
By his Atty
Phil. T. Dodge

UNITED STATES PATENT OFFICE.

JULIUS EMMNER, JR., OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR,
BY DIRECT AND MESNE ASSIGNMENTS, TO PHILIP T. DODGE, TRUSTEE,
OF SAME PLACE.

GALVANIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 454,724, dated June 23, 1891.

Application filed December 15, 1890. Serial No. 374,788. (No model.)

To all whom it may concern:

Be it known that I, JULIUS EMMNER, JR., of Washington, in the District of Columbia, have invented certain Improvements in Primary Batteries, of which the following is a specification.

This invention has reference more particularly to primary batteries of the Bunsen type in which carbon or zinc elements are employed in connection with porous cells.

The object of the invention is to produce a cheap, compact, and efficient battery in which the carbon elements shall present a very great surface area. To this end I construct my carbon element in a series of horizontal plates or sections adapted to encircle the porous cup and connected firmly with each other, their horizontal surfaces being separated to permit the free circulation of the exciting-fluid between them.

In the accompanying drawings, Figure 1 represents in perspective a porous cell in connection with a carbon element in accordance with my invention. Fig. 2 is a vertical cross-section through the same on the line 2 2. Fig. 3 is a vertical section through one corner on the line 3 3 of Fig. 1, showing the connection of the plates. Fig. 4 is a perspective view of the carbon element in another form. Fig. 5 is a horizontal cross-section of the same.

Referring to Figs. 1, 2, and 3, A represents an upright cylindrical porous cup of ordinary construction, and B my laminated carbon element.

In the forms shown in the various figures the element consists of a series of horizontal carbon plates *b b*, arranged one above another and centrally perforated so as to encircle the porous cup which is passed vertically through the entire series. The plates are separated at opposite corners by intervening blocks *b'*, which may be formed integral with the plates, as shown in the lower part of Fig. 3, or separately formed, as shown in the upper part of the same figure.

The series of plates are bound firmly together and an electric connection established between them by means of rods of carbon *c* or other suitable material passed vertically

through the entire series of plates and the intervening blocks and secured at their ends by transverse pins *c'* or other fastening devices of any suitable character, such as are known to the skilled mechanic. Electric connection is established with the carbon element by a conductor *D* of aluminium or other metal applied as shown in the drawings.

It will be observed that the element constructed as above presents a very great surface to the action of the exciting-fluid and that it permits a free circulation of the fluid between the plates and through and around the porous carbon.

Instead of building up the elements of a series of independent plates it may be molded or otherwise formed in a single piece with a series of horizontal slots or openings there-through. This construction is shown in one of its forms in Figs. 4 and 5, in which B represents the carbon of cylindrical form with a central opening to receive the porous cup and with a series of horizontal slots or openings therethrough. These slots or openings in effect divide the body into a series of horizontal plates which are connected but prevented from coming in contact by the intervening blocks or portions *b'*.

As regards my element the only essential requirement is that it shall consist of a series of horizontal plates or sections firmly connected, and it is manifest that they may be varied in form and in details of construction in many ways, which will be obvious to the skilled mechanic without departing from the limits of my invention.

I find in practice that a considerable advantage attends the use of plates which are disposed in horizontal as distinguished from vertical positions.

While I prefer to have the plates or sections of flat form, as shown, on account of the cheapness and convenience of manufacture, it is understood that a limited departure from a flat form is allowable within the limits of my invention.

Having thus described my invention, what I claim is—

1. In a voltaic battery, the combination,

with an element composed of a series of horizontal connected plates or sections, of a porous cup extending through the plates.

2. In a voltaic battery, the combination, 5 with a porous cup, of a series of horizontal surrounding plates and separating-blocks located between the plates and beyond the cup, whereby unobstructed spaces are left between the plates adjacent to the cup to permit a free circulation of the fluid.

3. In a voltaic battery, the combination of a porous cup, an element consisting of a se-

ries of horizontal plates encircling said cup and blocks separating said plates, and a conducting-rod passing through the series of 15 plates and blocks and binding the same together.

In testimony whereof I hereunto set my hand, this 5th day of December, 1890, in the presence of two attesting witnesses.

JULIUS EMMNER, JR.

Witnesses:

PHIL. T. DODGE,
W. R. KENNEDY.