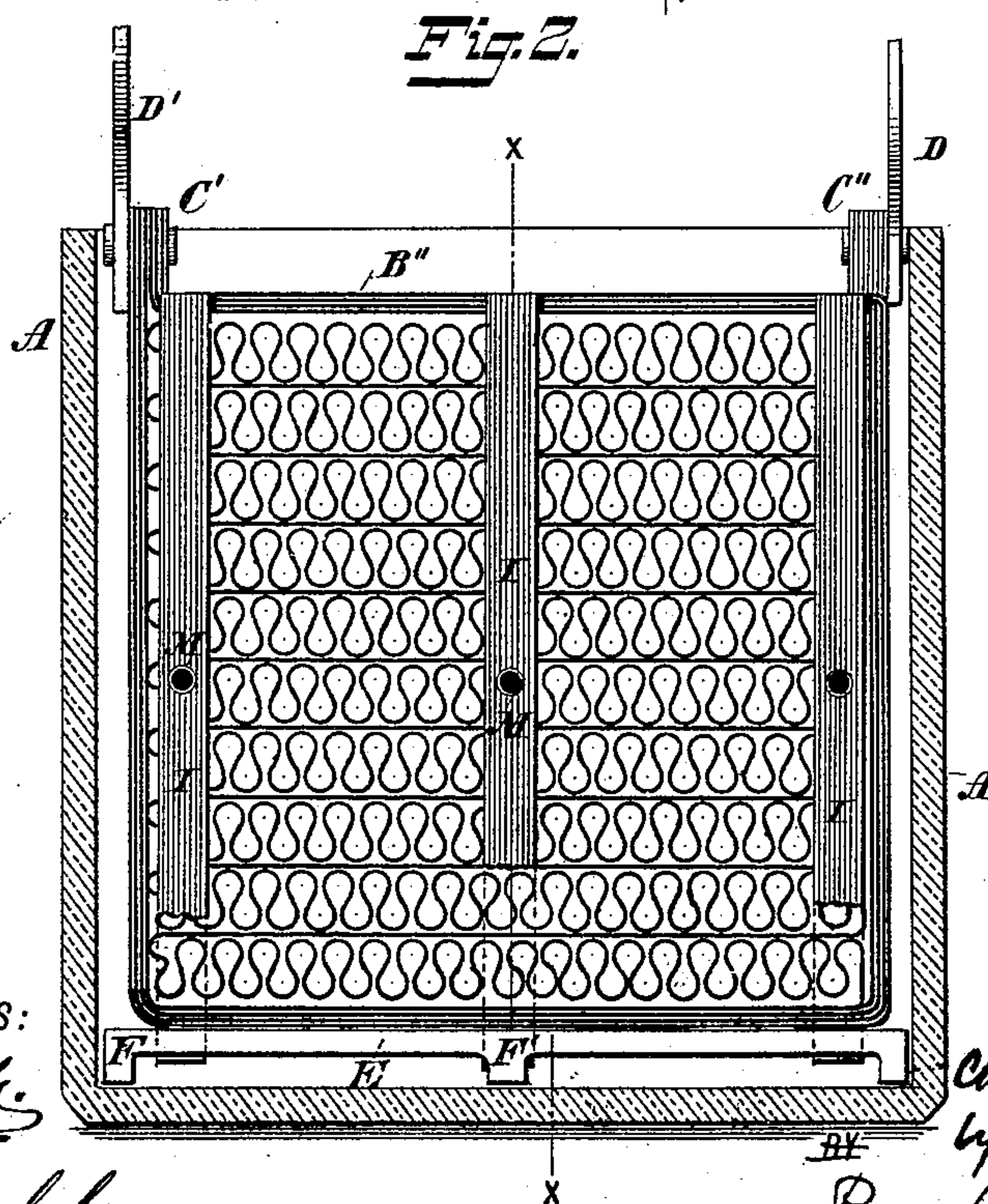
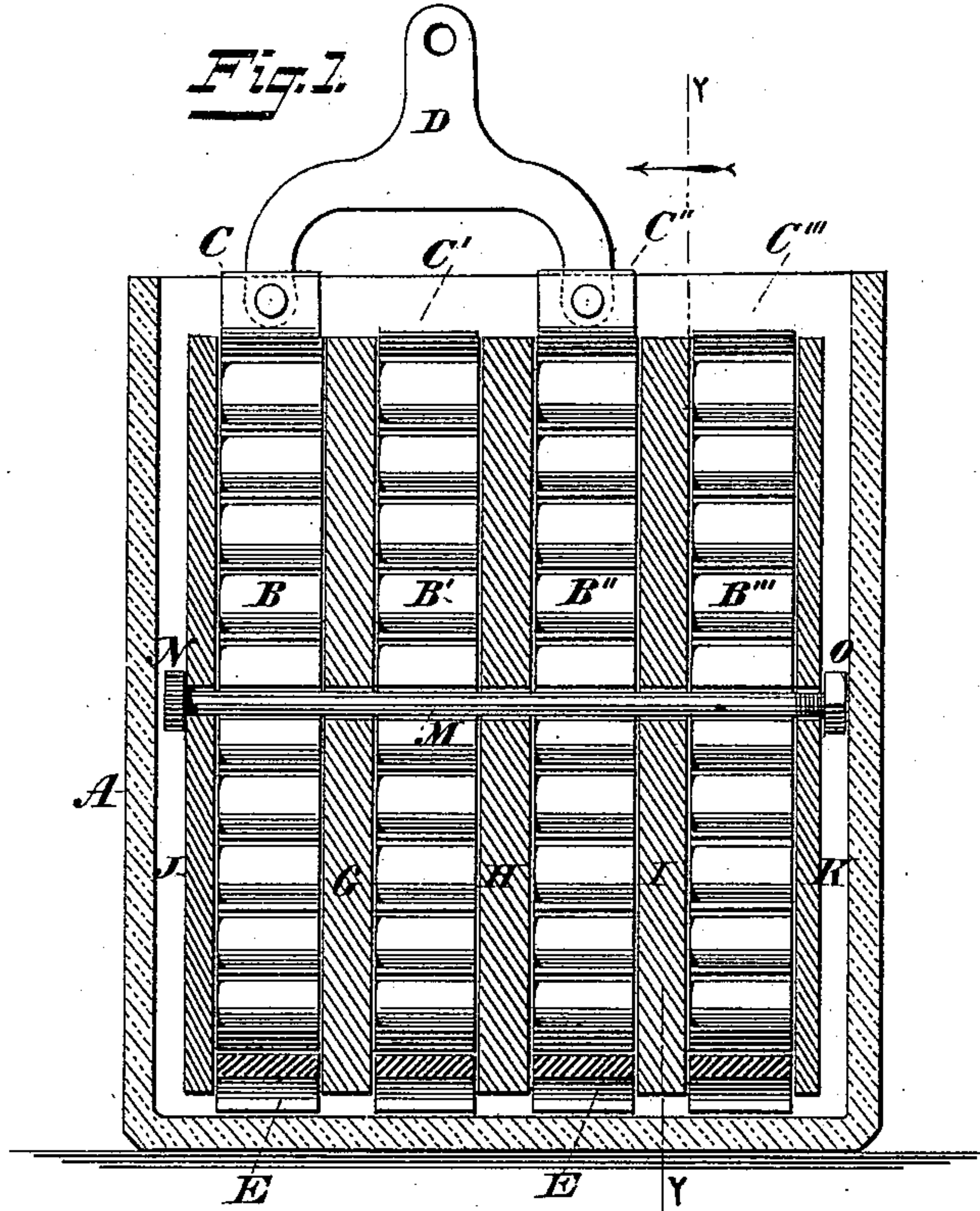


(No Model.)

C. SORLEY.
STORAGE BATTERY.

No. 420,975.

Patented Feb. 11, 1890.



WITNESSES:
Leitch
William Goebel

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UNITED STATES PATENT OFFICE.

CHARLES SORLEY, OF NEW YORK, N. Y., ASSIGNOR TO THE ANGLO-AMERICAN ELECTRIC LIGHT MANUFACTURING COMPANY, OF WEST VIRGINIA.

STORAGE-BATTERY.

SPECIFICATION forming part of Letters Patent No. 420,975, dated February 11, 1890.

Application filed November 12, 1889. Serial No. 330,051. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SORLEY, of the city, county, and State of New York, have invented a new and useful Improvement in Storage-Batteries, of which the following is a specification.

My invention relates to a new construction of storage-cell; and it consists in the combination, as hereinafter set forth, of the electrodes with the supporting bridge-pieces of non-conducting material, with the interposed supporting and spacing bars of like material, and with the bolts or other means of clamping the various parts into a united body.

In the accompanying drawings, Figure 1 is a transverse section of my improved battery on the line X X of Fig. 2. Fig. 2 is a transverse section of the same on the line Y Y of Fig. 1.

Similar letters of reference indicate like parts.

A is the containing vessel or cell. B B' B'' B''' are the electrodes. These electrodes are made of strips of lead bent in convolutions, which convolutions are united to form a plate substantially as described in United States Letters Patent No. 341,860, granted to me May 11, 1886. The ends of the strips forming each plate are brought together and constitute the terminal of the plate.

To the terminals C C'' of the plates B B'' is secured by a bolt or other suitable means a fork D, and to the terminals C' C''' of the plates B' B''' is secured a similar fork D'. To said forks are to be attached the conducting-wires from the battery.

The plates B B' B'' B''' are placed parallel to one another in the cell A. Each plate rests upon a bridge-piece, as E. Said bridge-piece is made of hard rubber or other non-conducting material and is provided with legs F, so that when it is laid in the bottom of the vessel A there is a free space for the liquid in said vessel to circulate beneath it. It will be noticed that the plates B, &c., do not extend across the bridge-pieces, but stand with their lower edge faces upon and parallel to the upper surfaces of said bridge-pieces. This affords a support along the entire lower edge

of the plate and prevents any sagging of the plate between the points on which it rests.

Between the plates are placed bars or rods, as G H I, made of hard rubber or other insulating material and having flat faces, which bear against the flat surfaces of the plate. I here show three of said rods between adjacent plates, but I may alter the number. Similar rods, as J K, are disposed against the exterior of the outer plates of the series. The sets of rods are placed in line transversely the plates, as shown in Fig. 1.

Passing through the middle points of each transverse series of rods and also through the bodies of the plates is a bolt M, of hard rubber or other insulating material, provided at one end with a head N and at the other with nut O. By setting up the nuts O the plates and rods are drawn together, so that all the parts are bound into a closely-united body.

The rods G H I J K, &c., do not extend to the bottom of the cell. Their ends terminate just below the upper longitudinal portions of the bridge-pieces E, so that said bridge-pieces while not secured to the plates directly are nevertheless held in place by compression between said rod ends. The entire combination of plates, rods, and bridge-pieces being thus bound together, may be lifted bodily into and out of the cell for purposes of examination or repair by means of the terminal forks D D', which also serve as convenient handles.

In practice I make the intermediate rods about one-quarter inch and the outer rods one-eighth inch in diameter; but I may vary these proportions. I also may secure the binding-bolts M in place by any other means than a nut and head suitable to the purpose. I may also increase the number of such binding-bolts, and arrange them to pass through the rods and plates above or below the central plane indicated in the drawings.

The rods serve the double object of keeping the plates a certain distance apart and of supporting said plates against buckling or deformation.

It is well known that in the storage-battery the chemical energy exerted within the mass

of active material is exceedingly liable to give the plates a warped shape, and this, when the plates are in close proximity, as is necessarily the case, often results in their contact
5 and a consequent short-circuiting of the cell.

My plate here as illustrated is to a certain extent flexible and free to yield to forces acting within its mass. In this way I prevent its disintegration, and at the same time, by
10 the use of the supporting-rods, I hold it in its proper position in the cell and prevent its bending or warping. The apertures for the bolts are made directly through the plates without regard to whether the lead body or
15 the active material, or both, are penetrated. It will be observed that neither the bolts nor the rods nor the bridge-pieces are united rigidly, or are in comb-like or lattice form. Each part is separate and is of very simple
20 shape, and hence is easily and cheaply made. The rods being placed vertically afford no space for lodgment of material escaping from the plate or impurities. The tops of the bridge-pieces being surmounted by the plates
25 also offer no ledge for similar material.

All parts are easily and quickly put together, are solidly united in place, and may be handled as a unit for all necessary purposes.

30 I claim—

1. In a galvanic cell, a containing-vessel, a bridge-piece upon the bottom of said vessel, and an electrode in plate form having its lower edge resting longitudinally upon the
35 upper surface of said bridge-piece, substantially as described.

2. In a galvanic cell, a containing-vessel, a bridge-piece upon the bottom of said vessel and having a transverse opening, and an
40 electrode in plate form having its lower edge resting longitudinally upon the upper surface of said bridge-piece, substantially as described.

3. In a galvanic cell, a containing-vessel, a
45 loose bridge-piece upon the bottom of said vessel, and having a transverse opening, and an electrode in plate form having its lower

edge resting longitudinally upon the upper surface of said bridge-piece, substantially as described. 50

4. In a storage-cell, an electrode containing active material in openings in said electrode, two or more separate supporting-bars of non-conducting material applied against a face
55 of said electrode, and bolts of non-conducting material extending through said electrode and said bars and securing said electrode and bars together, substantially as described.

5. In a storage-cell, an electrode containing active material in openings in said electrode, two or more separate supporting-bars of non-conducting material applied against opposite
60 faces of said electrode, and bolts of non-conducting material extending through said electrode and each pair of bars disposed relatively opposite each other and on opposite
65 sides and securing said bars to said electrodes, substantially as described.

6. In a storage-cell, two electrodes, two or more separate supporting-bars of non-conducting material interposed between said
70 electrodes, and bolts of non-conducting material extending through said electrodes and interposed bars and securing said electrodes and bars together. 75

7. In a storage-cell, an electrode, a loose supporting bridge-piece of non-conducting material applied against one edge of said electrode, bars of non-conducting material applied to opposite sides of said electrode and
80 said bridge-piece, and a means of clamping said bars against said electrode and said bridge-piece, substantially as described.

8. The combination, in a storage-cell, of the electrodes B B', &c., spacing-bars C J, &c., of
85 non-conducting material interposed between said electrodes, bridge-pieces E, upon which said electrodes rest, and the bolts M, passing through said spacing-bars and said electrodes, substantially as described.

CHARLES SORLEY.

Witnesses:

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PARK BENJAMIN.