

(No Model.)

J. T. VAN GESTEL.

ELECTRODE FOR STORAGE BATTERIES.

No. 388,746.

Patented Aug. 28, 1888.

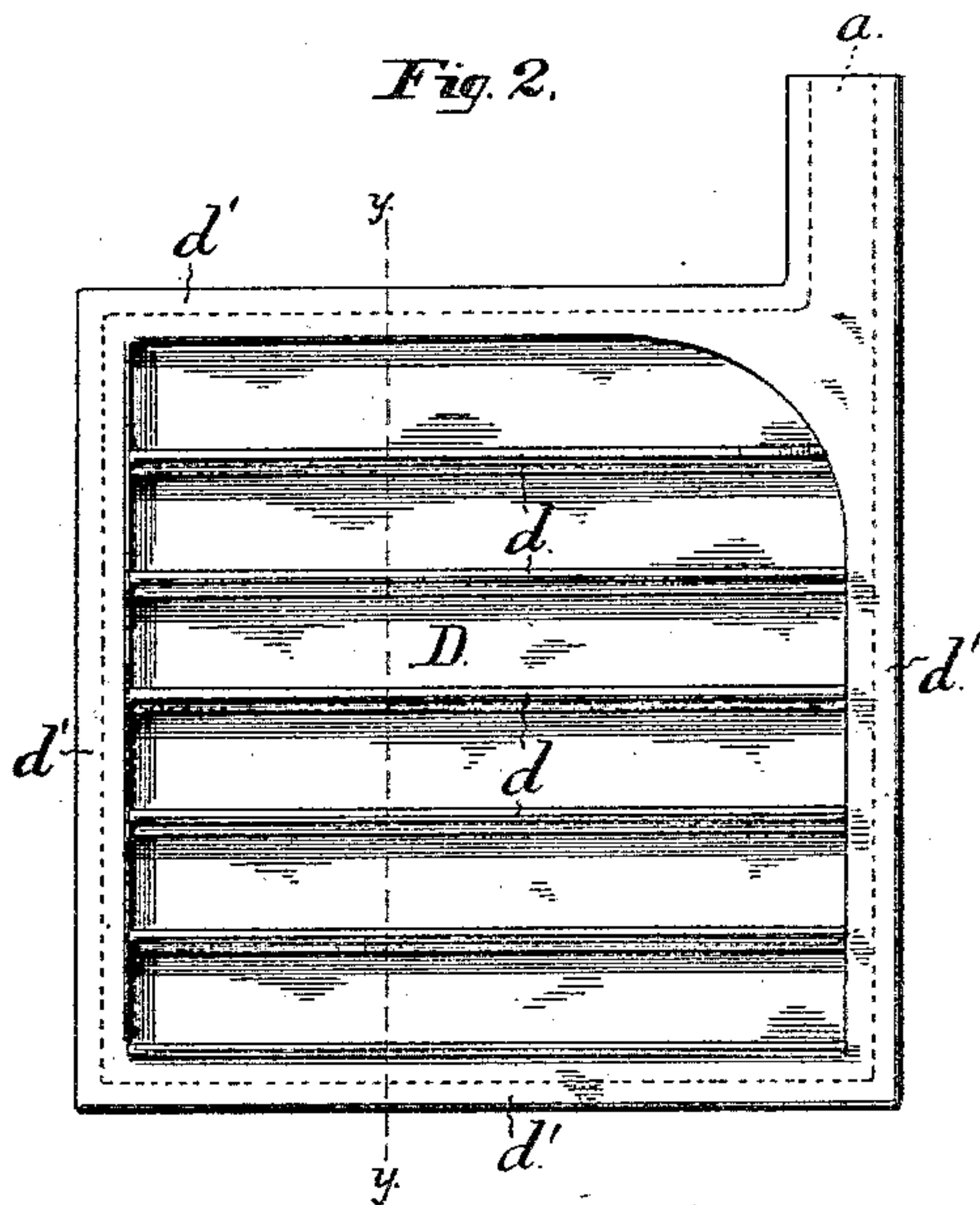
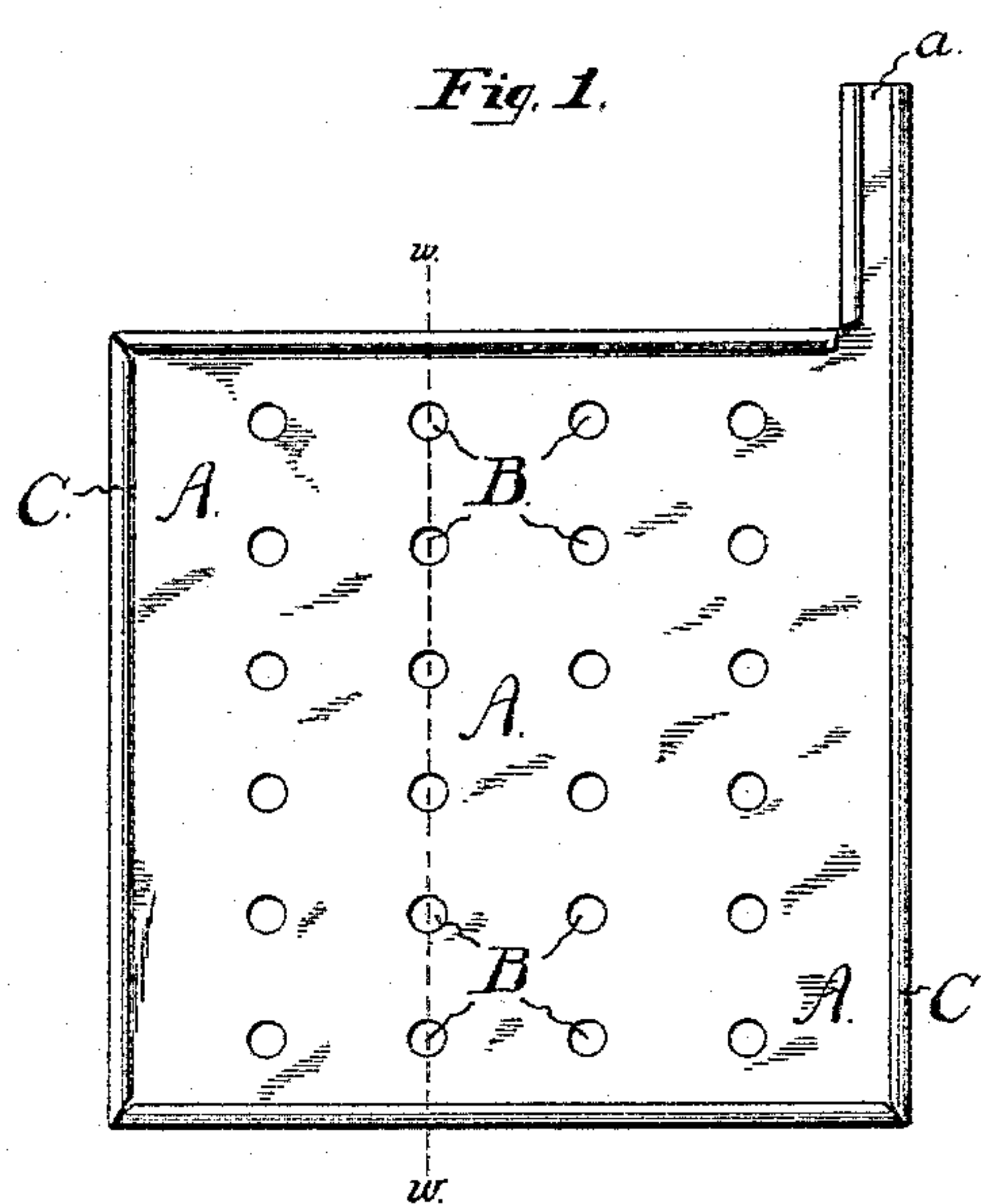


Fig. 3.

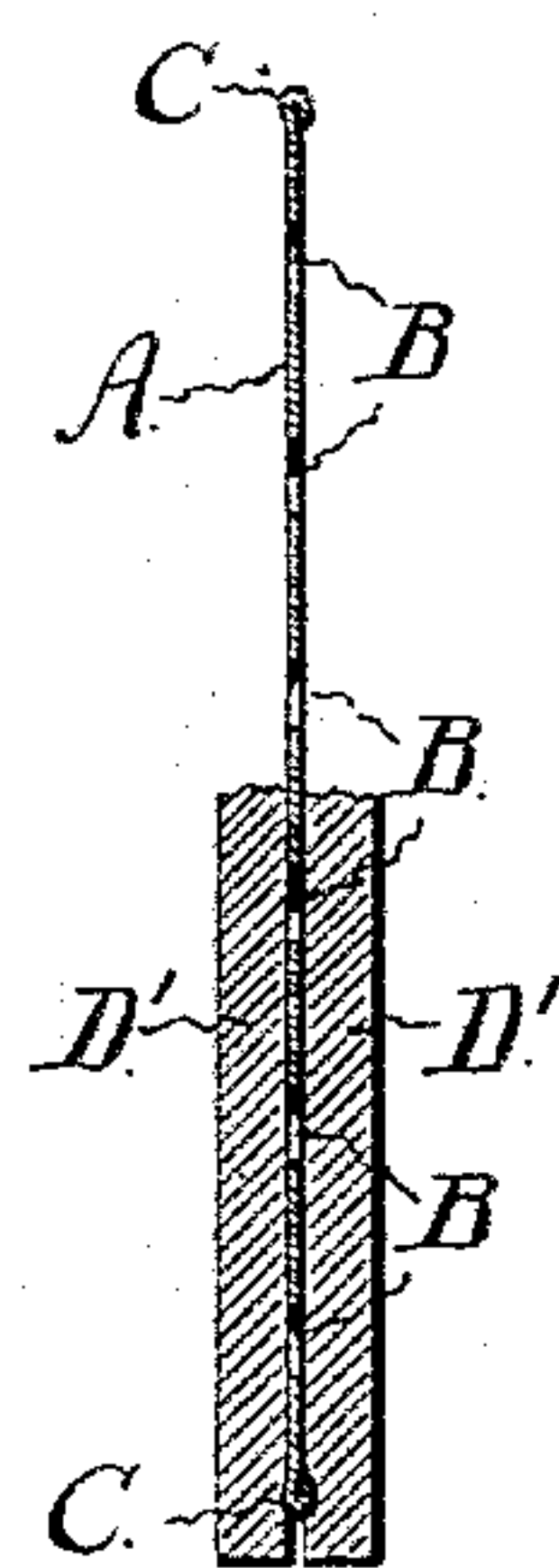


Fig. 4.

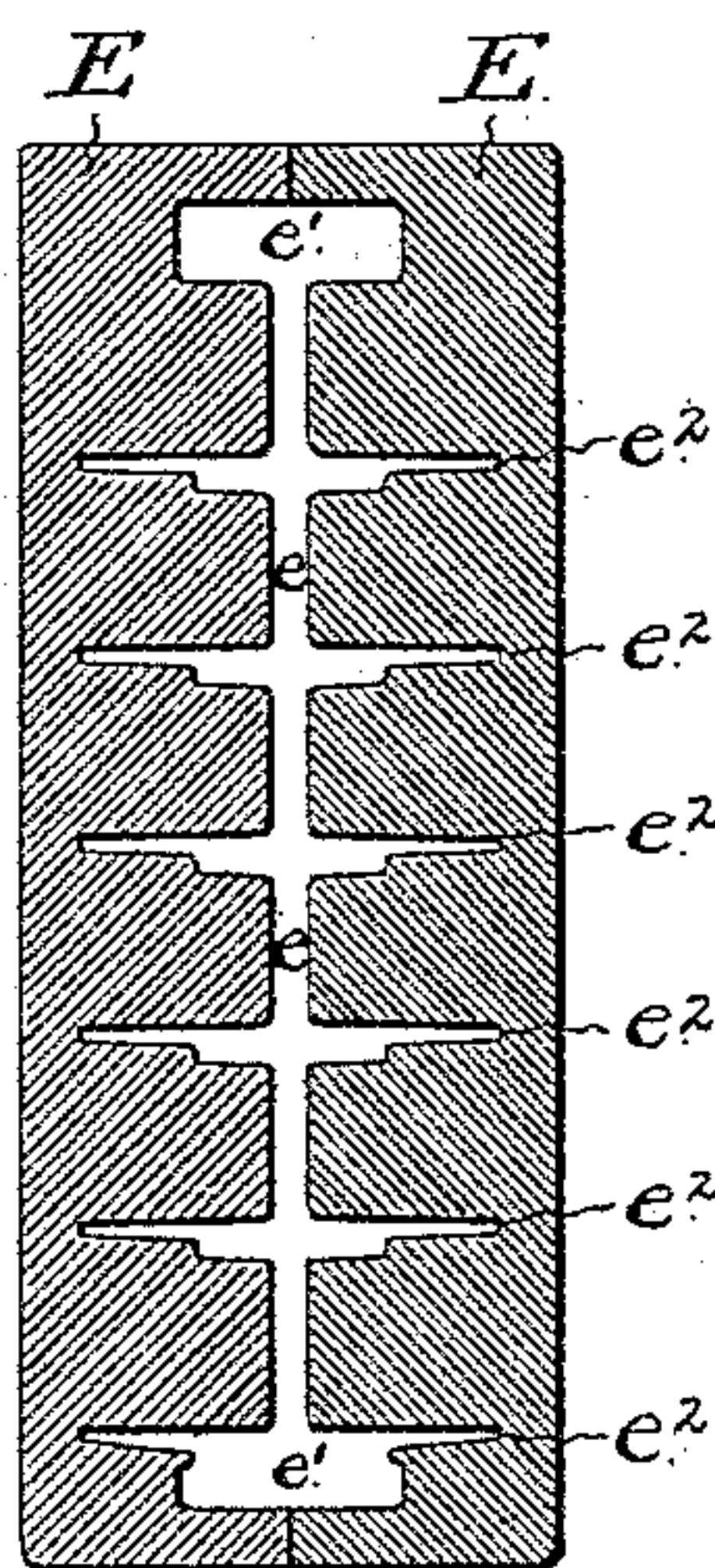


Fig. 5.

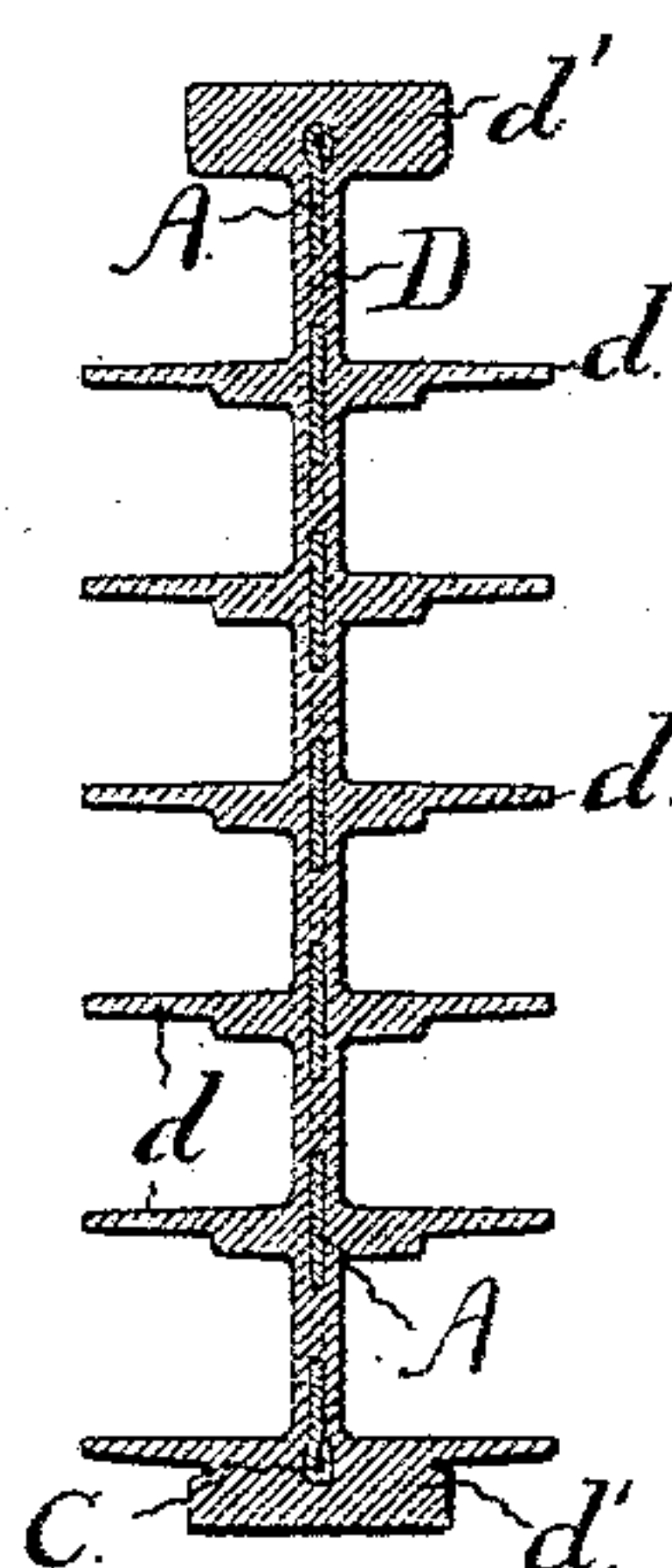


Fig. 6.

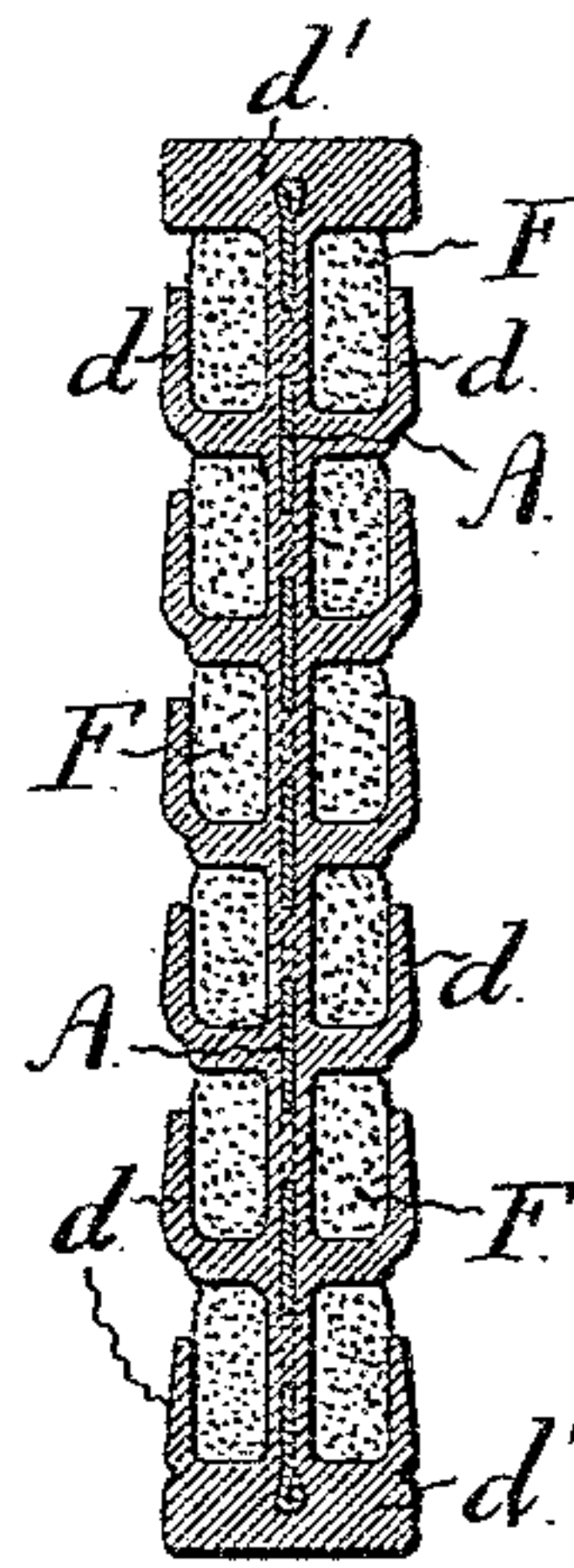
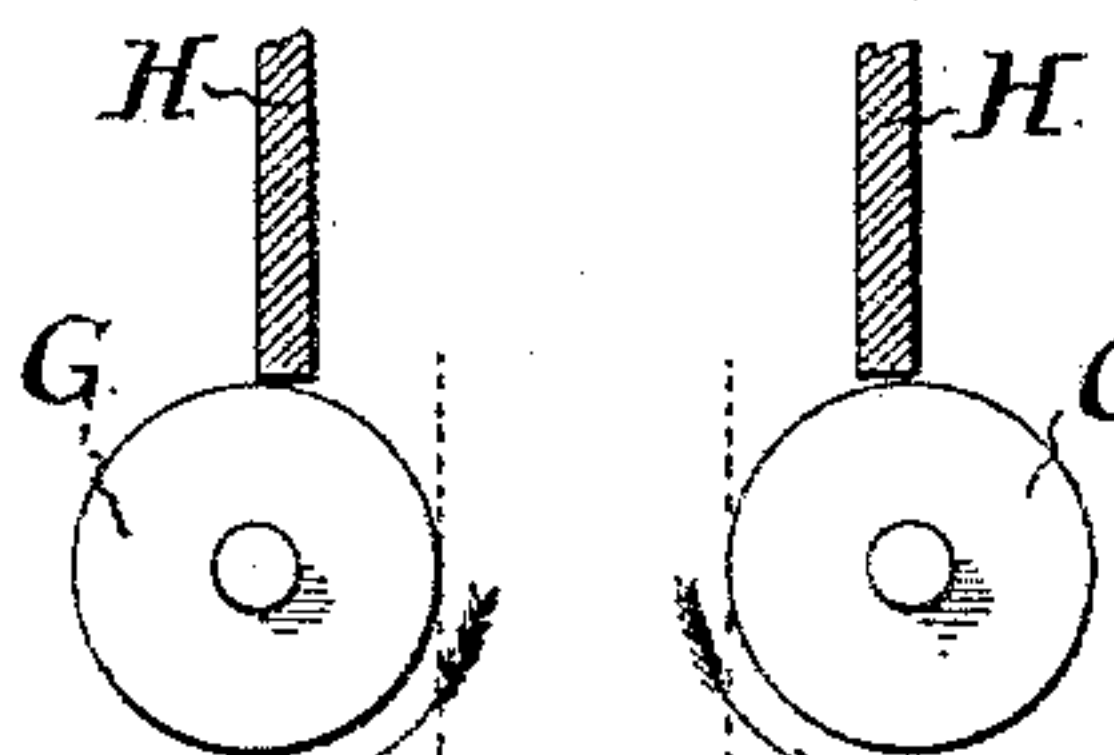


Fig. 7.



WITNESSES:

James H. Bell.
John C. Williams.

INVENTOR,

Jean Theodor van Gestel.

UNITED STATES PATENT OFFICE.

JEAN THEODORE VAN GESTEL, OF NEW YORK, N. Y.

ELECTRODE FOR STORAGE-BATTERIES.

SPECIFICATION forming part of Letters Patent No. 388,746, dated August 28, 1888.

Application filed November 10, 1887. Serial No. 254,770. (No model.)

To all whom it may concern:

Be it known that I, JEAN THEODORE VAN GESTEL, a subject of the King of the Netherlands, at present residing in the city of New York, in the State of New York, have invented certain new and useful Improvements in Elements for Storage-Batteries, whereof the following is a specification, reference being had to the accompanying drawings.

My invention consists in a novel organization including a flat sheet of metal having low resistance, such as copper, which I term the "base-plate," and a shell of lead or lead alloy integral throughout its own extent and also practically integral with the metal of the base-plate, said shell having such a configuration as to provide numerous receptacles for holding in the most advantageous manner a filling of oxide of lead or other active material of the battery, as hereinafter more in detail described preparatory to a designation of the subject-matter claimed.

In the drawings, Figure 1 represents a side view of the base-plate. Fig. 2 is a similar side view of the plate after it has received the leaden covering, but before the receptacles are formed and charged with the active material. Fig. 3 is a sectional view on the line *ww* of Fig. 1, showing in the lower portion the leaden covering in the first stage of its application. Fig. 4 is a sectional view showing the inner configuration of the die or mold which I employ. Fig. 5 is a sectional view on the line *yy* of Fig. 2, showing the form of the lead-covered plate as it emerges from the dies and before the receptacles are completed and filled. Fig. 6 is a sectional view of the finished element with its receptacles duly filled. Fig. 7 is a partial view of the bending-rollers and guides which I employ to finally finish the plate.

I form in the first instance a base plate, A, of copper or other metal of low resistance, preferably in sheet form, with holes B through it, or in the form of wire-gauze, and having a rim, C, for strengthening purposes, constructed in the ordinary manner by bending back the edges of the metal. This base-plate I preferably provide with a projection, *a*, for convenience of attachment in the battery. Upon the base-plate, which may be very thin—say not

more than one sixty-fourth of an inch—I deposit by any ordinary method a thin coating of tin. I then apply the shell or covering of lead or lead alloy, preferably in the following manner: I take two sheets of soft lead or lead alloy—say about three-sixteenths of an inch in thickness—and lay them on each side of the base-plate, so as to extend over its entire surface. The position of the leaden sheets is indicated partially by D' D' near the bottom of Fig. 3. I then place the plates thus arranged between a pair of dies or molds of the form shown in cross-section in Fig. 4—that is to say, having a shallow flat cavity, *e*, coextensive with the full size of the plate, but of considerably less depth than the combined thickness of the copper and lead sheets, a series of narrow but deep lateral cavities, *e*², extending from each side of the cavity *e* and across its whole width, and a wider though somewhat shallower cavity, *e*¹, running continuously around the margin of the cavity *e*. When the plates have been placed in said die, heavy pressure is applied thereto, under which the lead in the plates D' D' will flow, so as to not only fill out the cavities *e*, *e*¹, and *e*², but will be united as if by welding to the tinned surface of the base-plate and around the edges, and wherever the holes B occur the opposing sheets of lead will be united into one mass, as indicated at D. The flowing of the lead into the cavities *e*² will form along each surface of the plate a series of shelves, *d*, shown in Figs. 2 and 5 as equidistant from and parallel to one another, while around the entire outer edge of the plate a thick rim or re-enforce, *d*¹, of solid lead will be formed in the cavity *e*¹, adding strength to the plate. Each of the shelves *d* is then loaded or charged with a quantity of oxide of lead, F, or other substance, which is intended to be the active material of the battery, and the plate is then passed carefully downward between guides H H (see Fig. 7) and run through rollers G G, which bend up the outwardly-projecting edges of the shelves *d* into troughs, whose cross-section is shown in Fig. 6, the oxide of lead, F, being held very compactly and firmly within said trough, but exposed along the top of the same to the action of the battery-fluid.

Instead of applying the lead shell by compression of cold metal, it might be cast in the mold E; but I deem the method first specified the most desirable.

5 In the drawings the proportionate size of the shelves and rim is somewhat exaggerated relatively to the dimensions of the plate in order to better illustrate their character.

I thus obtain in a very economical manner
10 an element having these characteristics—viz., a base-plate or central core of low resistance communicating closely with the whole body of the element, so as to distribute and discharge the current readily throughout without danger
15 of polarization, and also a mass of active material compactly sustained and advantageously disposed for operation.

I do not claim, broadly, the idea of covering a copper plate with lead; nor do I claim
20 to have discovered the fact that under pressure two pieces of solid lead will unite and flow so as to fill the cavities of a mold; but

I claim as my invention—

1. In an element for storage-batteries, the combination of the base-plate of metal having
25 low electrical resistance and the covering of lead or lead alloy integral throughout, united at openings through the base-plate from opposite sides thereof, and provided with the series of receptacles at opposite sides containing
30 active material, substantially as set forth.

2. In an element for storage-batteries, the combination of the open-work or perforated base-plate of metal having low electrical resistance and the covering of lead or lead alloy integral throughout, united from opposite
35 sides of the base-plate at openings there-through, provided with the series of receptacles at opposite sides containing active material, and having the thickened rim, substantially as set forth.
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JEAN THEODORE VAN GESTEL.

Witnesses:

HUGH M. STARFIELD,
JULIUS HAAGER.