

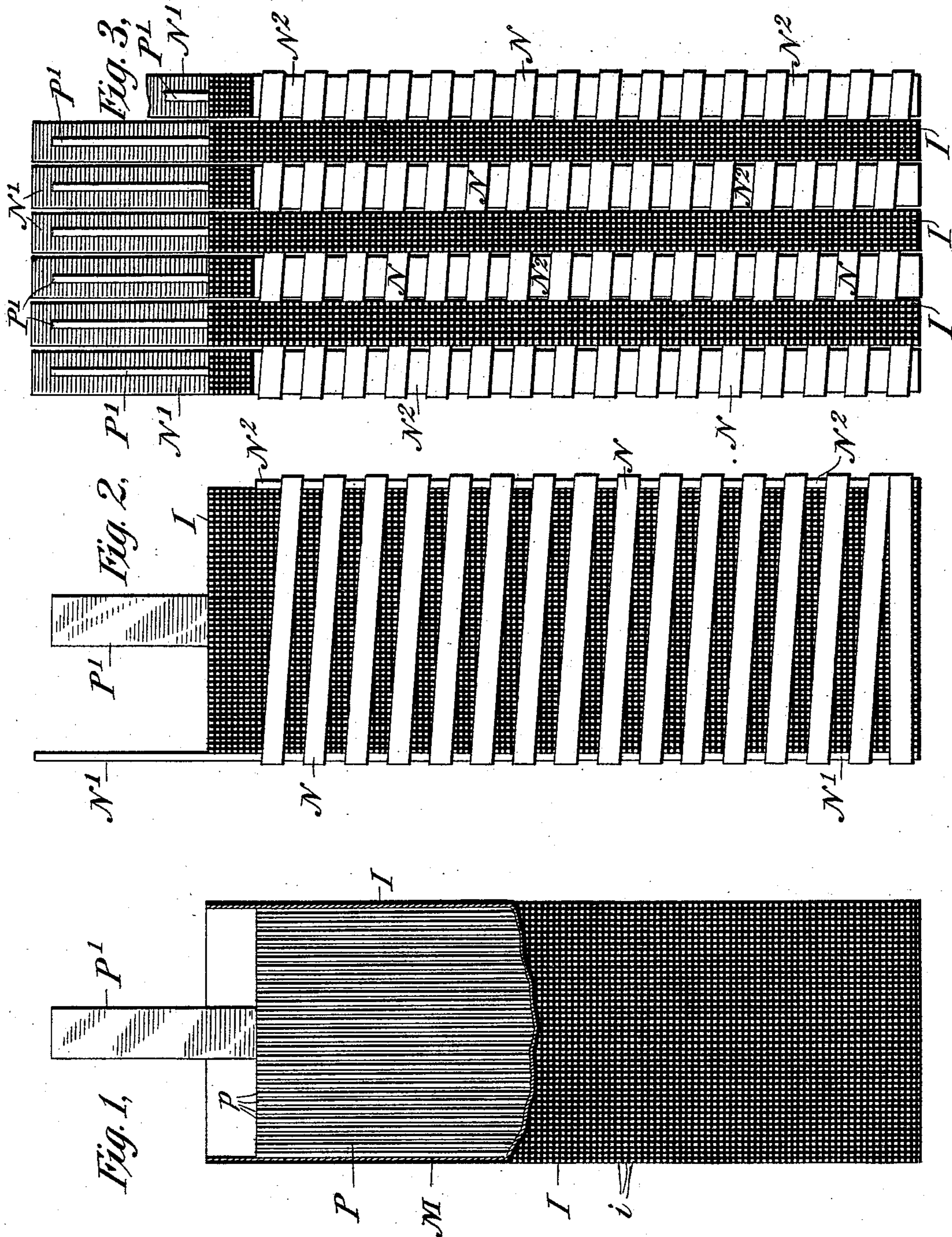
(No Model.)

2 Sheets—Sheet 1.

C. J. REED.
STORAGE BATTERY.

No. 528,647.

Patented Nov. 6, 1894.



Witnesses
C. E. Ashley
H. W. Lloyd

Inventor
Charles J. Reed
By his Attorney.
Charles J. Kinner

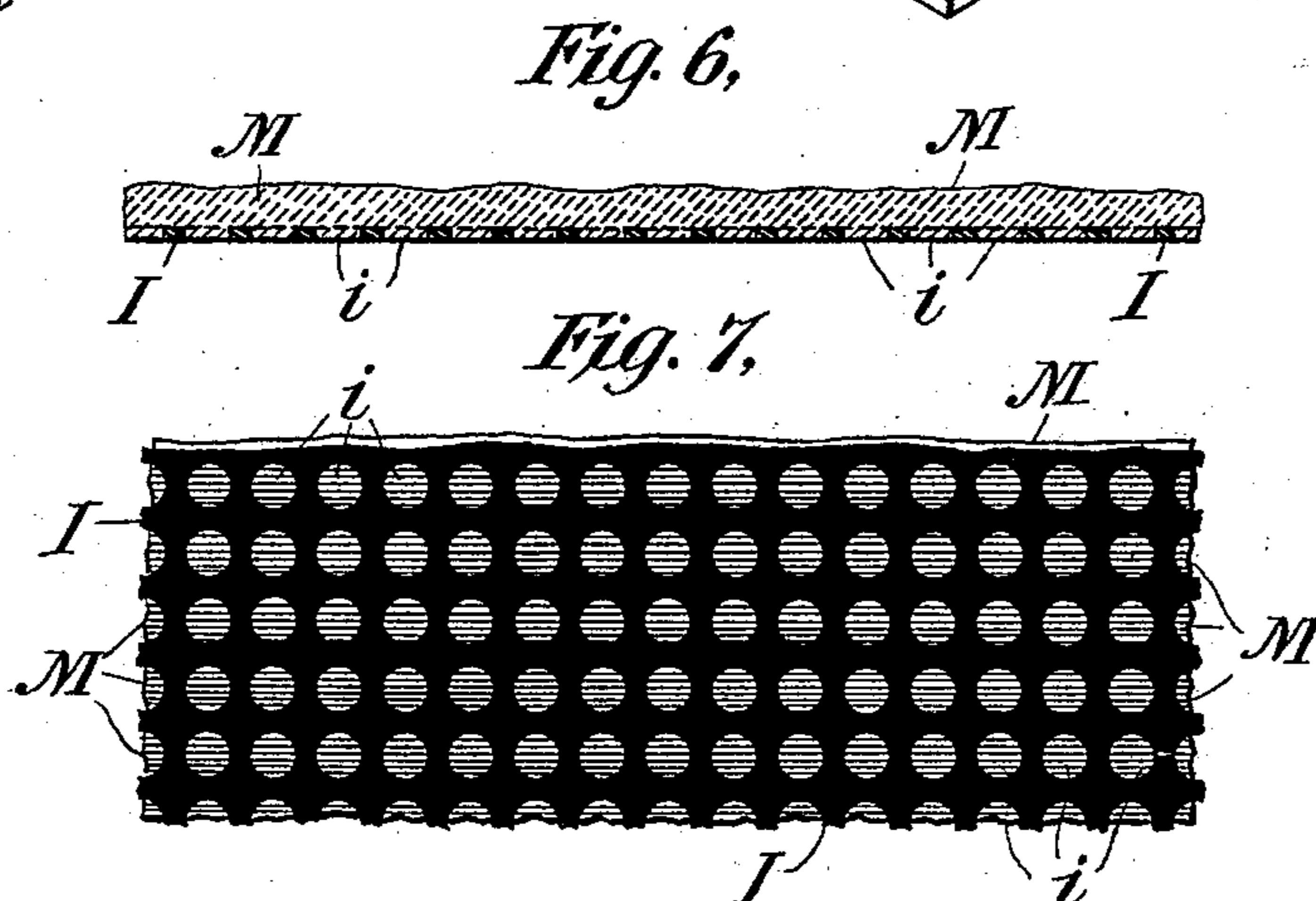
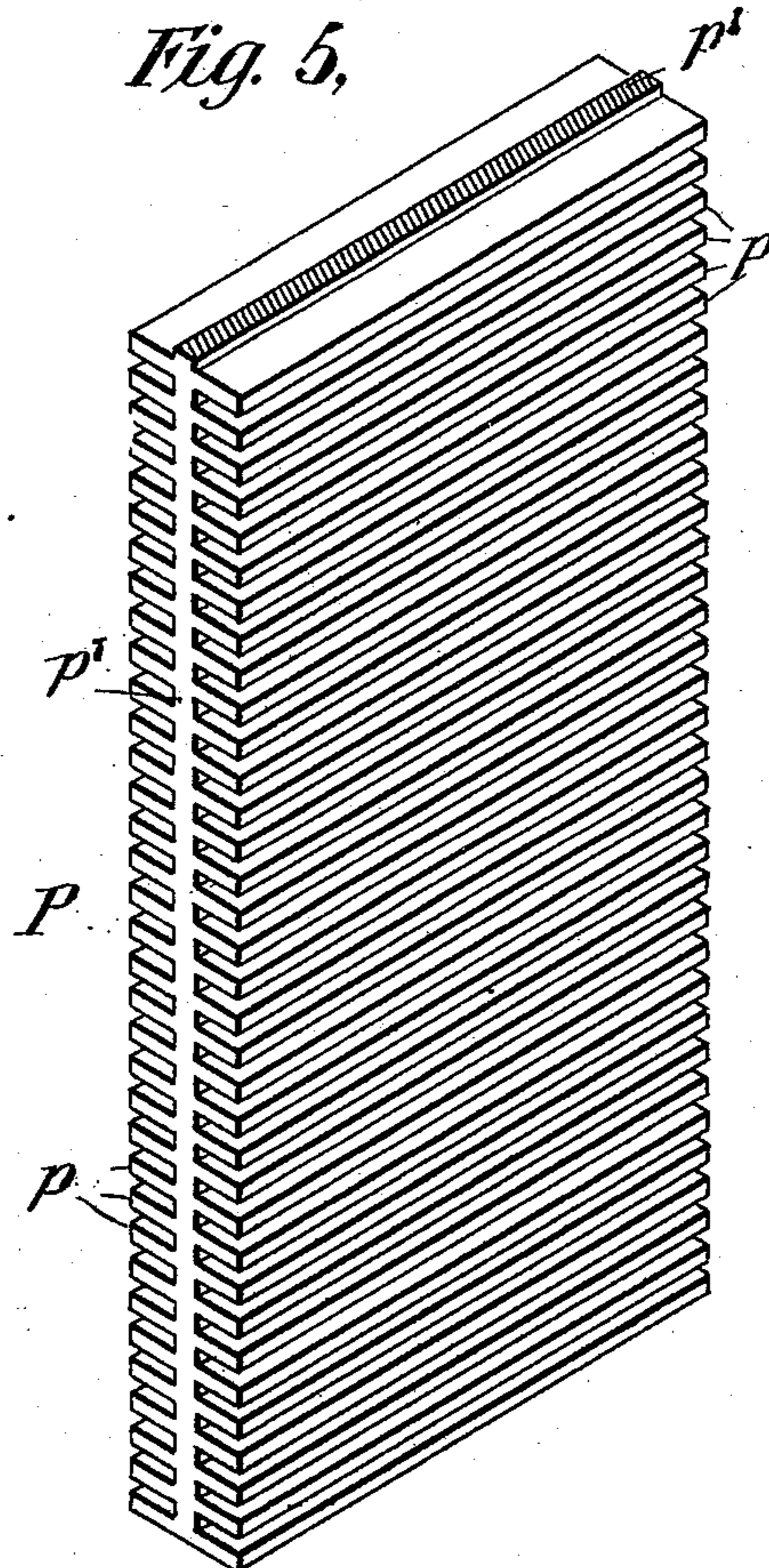
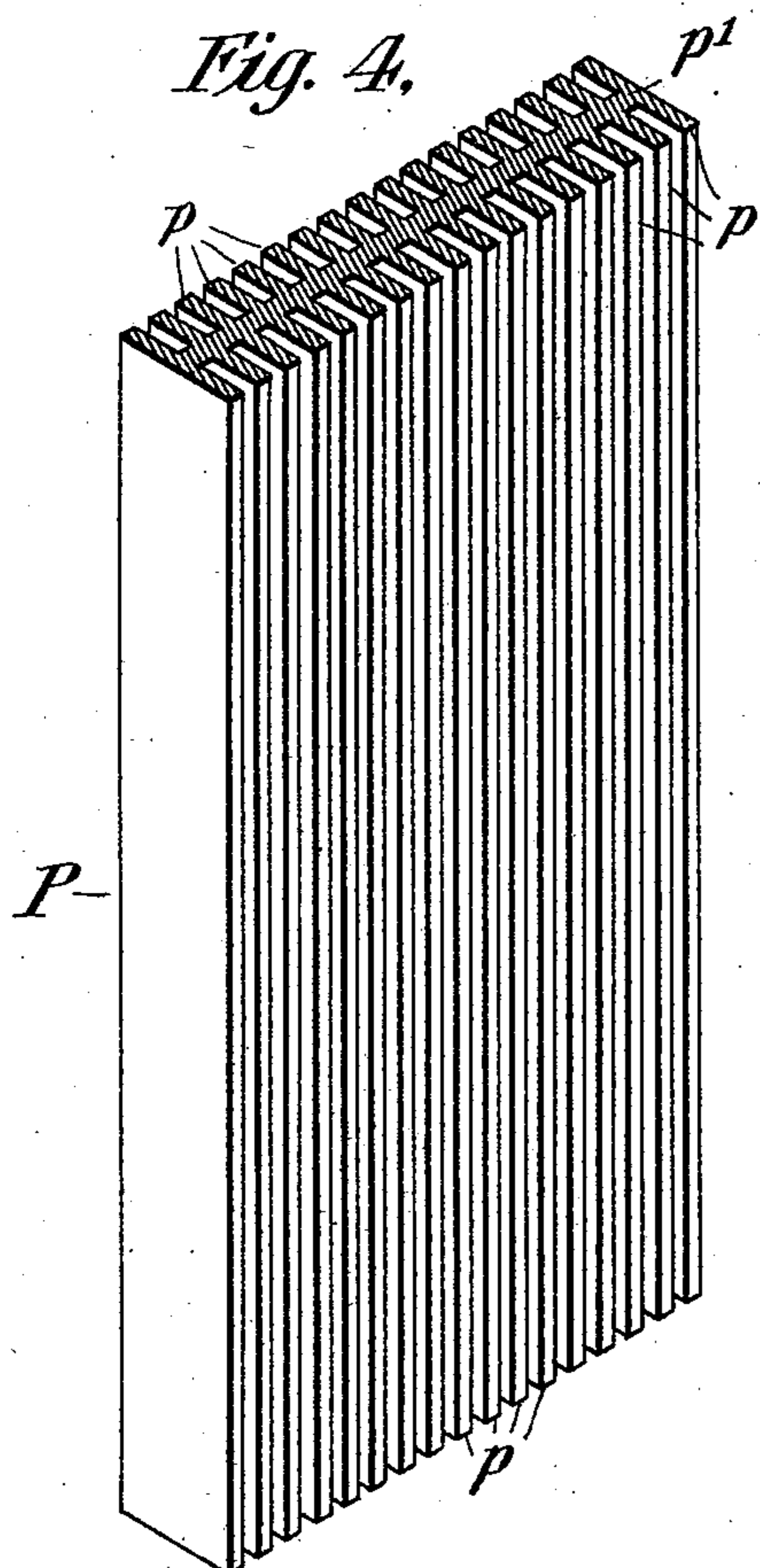
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UNITED STATES PATENT OFFICE.

CHARLES J. REED, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
REED ELECTRIC COMPANY, OF SAME PLACE.

STORAGE-BATTERY.

SPECIFICATION forming part of Letters Patent No. 528,647, dated November 6, 1894.

Application filed June 5, 1894. Serial No. 513,562. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. REED, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have made a new and useful Improvement in Storage-Batteries, of which the following is a specification.

My invention has for its objects, first, the construction and arrangement of parts in a storage battery in such manner that the electrodes of opposite polarity will be located as closely as possible to each other without having actual contact; second, the provision of means whereby on the disintegration of active material there will be little or no liability of the short circuiting of adjacent plates; third, to provide a storage battery having a maximum surface or area in as small or compact a space as possible. I accomplish these several objects in the utilization of the several elements which go to make up a complete storage battery as hereinafter described, the essential features of novelty in my invention being particularly pointed out in the claims at the end of this specification.

Referring to the drawings in detail: Figure 1 represents a side elevational view of one electrode constructed in accordance with my improvement, a part of the wrapping material or envelope which surrounds said electrode being broken away to better illustrate the interior structure. Fig. 2 is a similar side elevational view of two of my improved electrodes positive and negative as combined. Fig. 3 is a side elevational view illustrating a cell involving seven positive and four negative electrodes united together for use. Fig. 4 is a perspective view of the positive electrode illustrating the manner of obtaining large surface or area for the same. Fig. 5 is a modified form of the same part showing a different arrangement of the surface grooves. Fig. 6 is an enlarged sectional and Fig. 7 an enlarged side elevational view illustrating my improved means of separating the electrodes from each other in such manner as to prevent short circuits.

Referring first to Fig. 4, it will be seen that one electrode consists of a sheet of lead P which is rolled in the direction of the length of the electrode so as to produce vertically

arranged ribs *p p* and a central sustaining web *p'*.

In the form shown in Fig. 5 the ribs *p* are horizontally disposed, the electrode P being identically the same in other respects to that shown in Fig. 4. To the upper end of this electrode P is secured the usual lug or ear P' for connecting it to the electrodes of like polarity. See Figs. 1, 2 and 3.

I is a thin sheet of celluloid otherwise known as pyralin shown in Figs. 6 and 7, the same having sufficient area to completely inclose the electrode, and I perforate this sheet with perforations *i* of sufficient diameter to admit of a free circulation of the battery fluid. I then paint or coat one surface of the sheet with alcohol which causes said surface to assume a sticky or pasty nature. I then spread upon this pasty surface a thin layer of mineral wool or equivalent material which is not readily attackable by a storage battery solution. This material immediately adheres to the pasty surface and the two assume the appearance illustrated in Fig. 6. I then closely or tightly wrap the electrode P with this coating, as shown in Fig. 1, the mineral wool surface M being on the inner side next to the electrode and a sufficient inner surface of the celluloid or pyralin sheet being left uncovered at one edge with such mineral wool to enable me to apply a further solution of alcohol so that its inner edge may be securely pasted or fixed to the outer surface, thereby completely inclosing the electrode in an envelope which will prevent the disintegration of any of the active material when the electrode is in use. Instead of coating one face of the sheet of celluloid or pyralin with mineral wool or analogous fibrous material, I may, and in fact prefer to first wrap the electrode with a sheet of paper and then surround the electrode and the paper wrapping with the celluloid or pyralin envelope in the manner already described.

I lay two strips of lead N' N² of substantially the same width as the completed electrode just described upon the lateral edges thereof as shown in Fig. 2, one of said strips projecting above the end of the electrode to constitute a lug or ear similar to the lug or ear P' of the other electrode. I then tightly

wind a strip of lead N around the united parts, securing the ends of said strip to the ends of the strips N' N² in any well known manner, thereby constituting a compound electrode as shown in Fig. 2. I then group the electrodes illustrated in Figs. 1 and 2 in the manner shown in Fig. 3 thereby utilizing the negative electrode of one element in connection with the positive electrodes of two adjacent elements. The lugs or ears P' are all united together and attached to one binding post, and the lugs or ears N' are similarly connected together and attached to the other binding post, thus completing one cell.

Although I have disclosed a negative electrode in which the material N is in the nature of a lead strip, I do not limit myself to this special form as it is obvious that lead might be used either in a sheet like form or perforated, or the structure might be thus departed from in many ways without avoiding the scope of my claims hereinafter made.

Although I have illustrated an electrode which may be formed for use by the well known Planté or other subordinate processes, either electrically or chemically, it is obvious that the grooves between the ribs *p* might be filled with any of the well known materials, such as red lead, and the like, thereby producing an electrode of the Brush type.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A positive storage battery electrode surrounded by a perforated envelope not readily attacked by the battery liquid, in combination with a negative electrode consisting of vertically disposed strips located on opposite faces of the surrounding protecting casing and a spirally disposed strip of lead

wrapped around the entire mass and having its ends secured thereto, substantially as described.

2. A positive storage battery electrode surrounded by a protecting envelope, consisting of a sheet of perforated material having an interior coating of fibrous material, said envelope and coating being not readily attacked by the battery liquid, in combination with a negative electrode consisting of vertically disposed strips located on the opposite edges of the positive electrode and its surrounding envelope, and held in place by a strip of like material wound around the entire mass and having its ends secured, substantially as described.

3. A positive storage battery electrode of grooved form surrounded by a perforated envelope not readily attacked by the battery liquid, in combination with a negative electrode which surrounds or envelops the positive electrode and the aforesaid perforated envelope and holds all of said parts firmly together.

4. A positive grooved storage battery electrode surrounded with a sheet of paper or equivalent material for preventing disintegration, said paper or material being in turn held in place by a close fitting perforated envelope of celluloid, otherwise known as pyralin, in combination with a negative electrode which envelops or surrounds the aforesaid parts, substantially as described.

In testimony whereof I have hereunto subscribed my name this 23d day of May, 1894.

CHARLES J. REED.

Witnesses:

JOSHUA R. MORGAN,
EDWARD EVERITT.