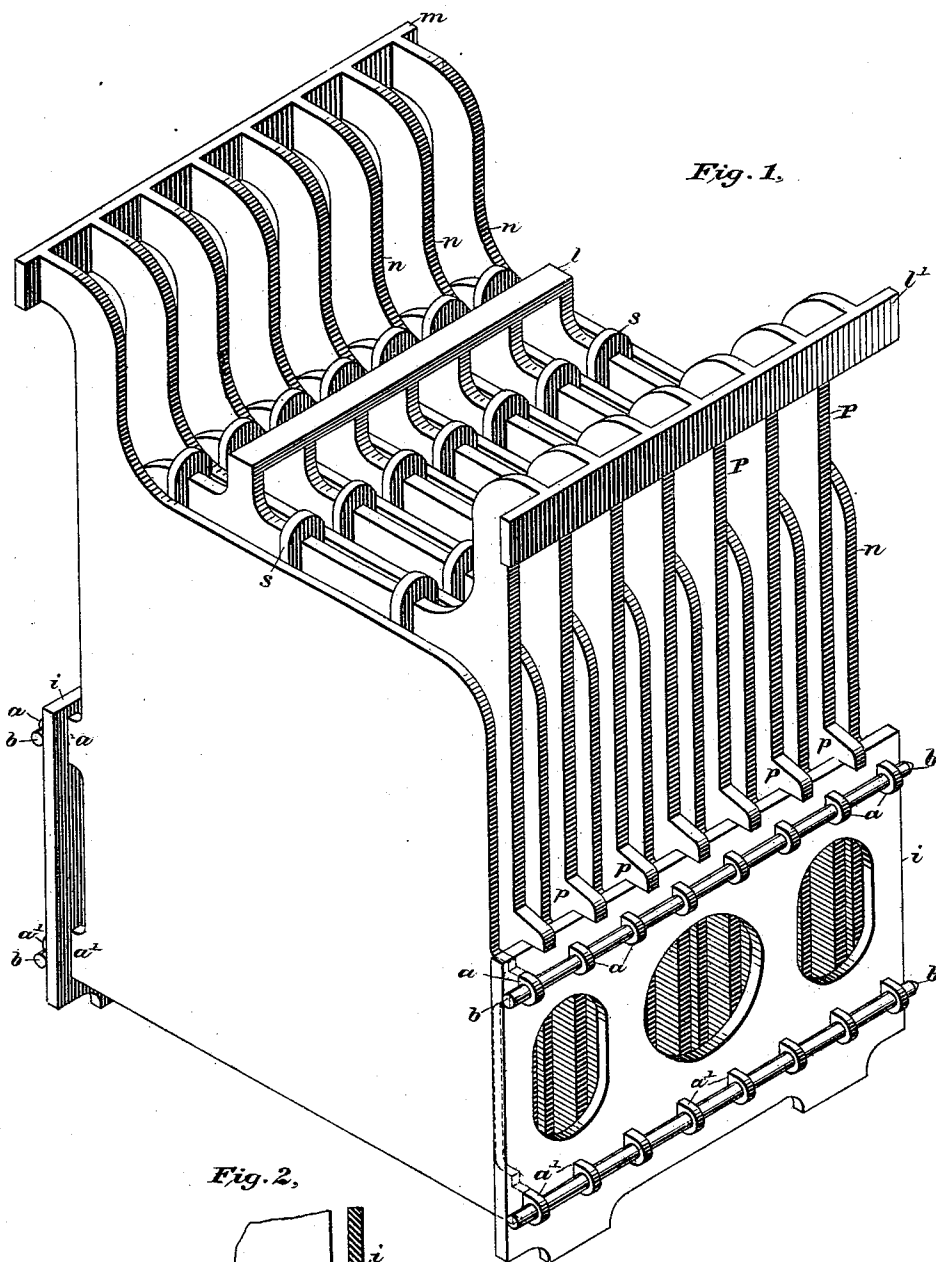


(No Model.)

J. B. PRICE.
SECONDARY BATTERY.

No. 403,957.

Patented May 28, 1889.



Witnesses,
Geo. W. Breck
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Inventor
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UNITED STATES PATENT OFFICE.

JOHN B. PRICE, OF WOLLASTON HEIGHTS, MASSACHUSETTS, ASSIGNOR TO
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SECONDARY BATTERY.

SPECIFICATION forming part of Letters Patent No. 403,957, dated May 28, 1889.

Application filed March 26, 1889. Serial No. 304,845. (No model.)

To all whom it may concern.

Be it known that I, JOHN B. PRICE, a citizen of the United States, and a resident of Wollaston Heights, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Secondary Batteries, of which the following is a specification.

My invention is an improvement in secondary batteries or accumulators.

The invention more particularly has reference to the arrangement of the plates in the cell, whereby they are supported free from the bottom of the cell in a manner which facilitates the removal of one element without disturbing the other, which retains the plates at a uniform distance from each other. Heretofore others have united the several plates forming one element of a pair by strips of metal fixed upon opposite edges near the central height of the plates, and have provided the plates of the complementary element with projections upon opposite edges, designed to rest upon and be supported by the strips of the first element. Others have supported both series of plates upon projections located within the cell midway its vertical distance, projections being provided upon opposite edges of each element to rest upon such supports. One form of construction last described consists of a pair or strip of insulating material having two lines of perforations, through which projections from one element are thrust and riveted by beating down the projecting end.

My invention consists in providing boards or strips of insulating material extending across the cell and about half its height. Near the upper edge and near the lower edge there are rows of equidistant perforations. Projections from each plate of an element are thrust through these perforations. The outer end of these ears or projections are perforated, and a rod is run through the entire series of projections to fasten them in position, at the same time providing for their easy and expeditious removal without the use of special tools.

The accompanying drawings illustrate my invention.

Figure 1 is a complete perspective view of

the two elements. Fig. 2 is a detail view showing a section of the board of insulating material, the perforated projections from the plate, and the removable rod in position.

The two elements P and *n* are each composed of a series of perforated plates, interleaved with each other in a well-known manner.

i is a board of insulating material, in width about half the height of an element and in breadth equal to the width of the cell. The plates of the element P are united mechanically and electrically by lugs or strips *l* and *l'*. About half the vertical distance of each plate of the element P and on opposite edges there are projections *p*.

i is a board of insulating material, as hard rubber. It is about one-half the height of an element, and extends completely across the interior of the cell. It is furnished with a row of equidistant perforations near its upper edge and a similar row of perforations near its lower edge. From each plate of the element *n*, upon opposite edges, there are projections *a* near the central height. There are similar projections upon both edges near the lower corners, such as *a'*. These projections fit the perforations in the board *i*, and extend completely through said board. Near the outer end each projection *a* and *a'* is perforated to receive a rod, *b*. This rod is preferably of insulating material, as hard rubber. By this arrangement the series of plates *n* are maintained equidistant, and are supported free from the bottom by the board of insulating material *i*. By withdrawing the rod *b* any plate may be removed and replaced without the use of special tools. The element P has its plates interleaved with the plates of the element *n*, and when in position its projections *p* upon both edges rest upon and are supported by the board of insulating material *i*. In this way both elements are free and clear from the bottom of the cell, and by placing the hands on strips *l* and *l'* the element P can be easily removed without disturbing the element *n*. Parallel strips of insulating material, united at the upper ends, *s*, are placed over each plate of the element P to mechanically and electrically separate such plates from the plates of the element *n*.

The plates of the element *n* are united at their upper extremity by a strip of conducting material, *m*.

5 In Fig. 2 a section of the board *i*, showing the perforation near the lower edge, the projection *a'* from a plate of the series *n*, and the rod *b* in position are clearly shown.

What I claim, and desire to secure by Letters Patent, is—

10 1. In a secondary battery, the combination of two elements or electrodes, an inclosing-cell therefor, an electrolytic liquid, and means for supporting both electrodes free from the bottom of the cell, consisting of boards or
15 strips of insulating material having one or more rows of perforations, perforated projections from opposite edges of one element located in said perforations, a removable rod for locking said projections in position, and
20 a series of projections upon the complementary element supported by said board or strip, substantially as described.

2. In a secondary battery, the combination of two elements, each consisting of a series of plates interleaved with each other, a board 25 of insulating material forming a support for said elements, a series of projections from opposite edges of one of said elements resting upon the edge of said board, and a series of perforated projections from the other element 30 extending through perforations in said board, and one or more rods located in said perforated projections to removably fix said element in position, substantially as described. 35

Signed at New York, in the county of New York and State of New York, this 22d day of March, A. D. 1889.

JOHN B. PRICE.

Witnesses:

DANIEL E. DELAVAN,
V. E. SCHAUMBURG.