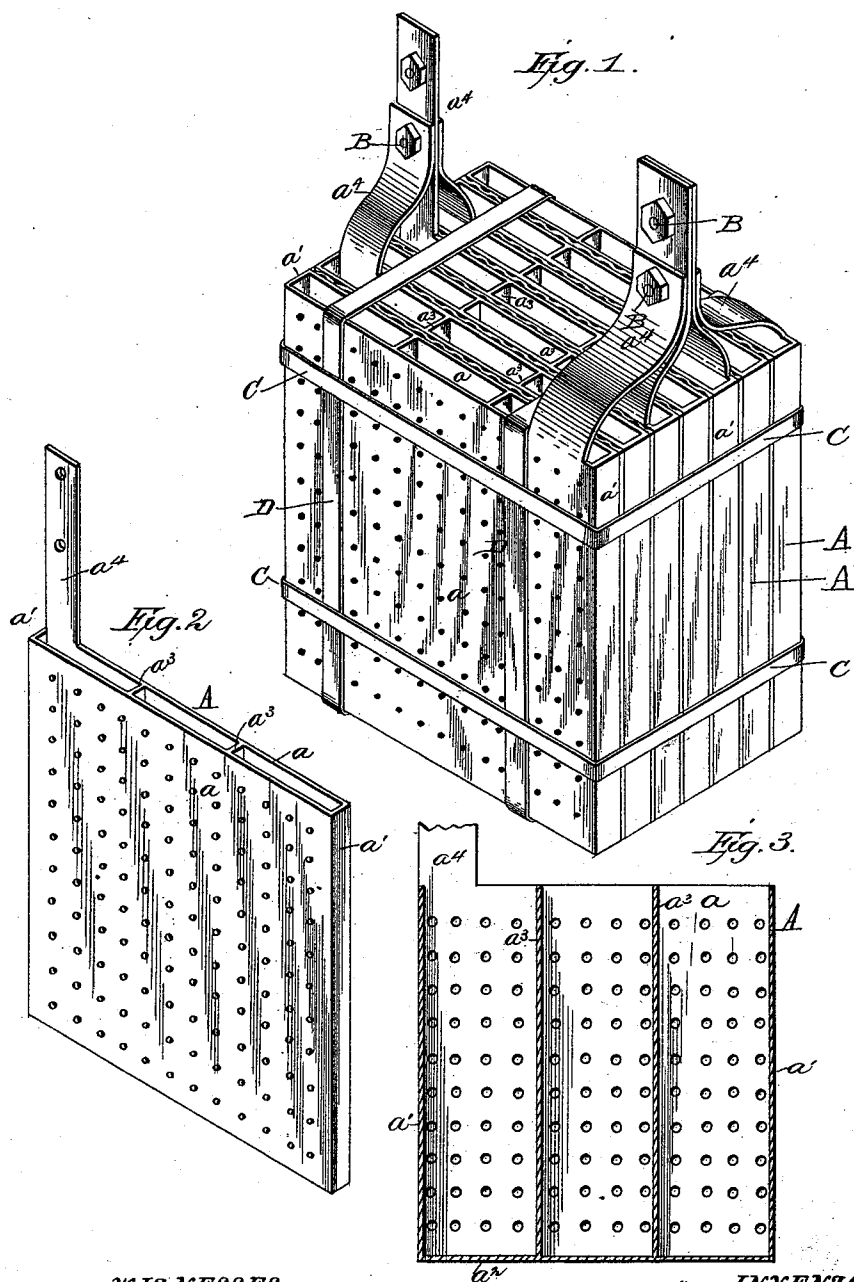


(No Model.)

J. E. RHETTS.  
SECONDARY BATTERY.

No. 528,445.

Patented Oct. 30, 1894.



WITNESSES  
F. L. Ouraud  
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# UNITED STATES PATENT OFFICE.

JOHN E. RHETTS, OF SALEM, INDIANA.

## SECONDARY BATTERY.

SPECIFICATION forming part of Letters Patent No. 528,445, dated October 30, 1894.

Application filed November 22, 1893. Serial No. 491,629. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN E. RHETTS, a citizen of the United States, residing at Salem, in the county of Washington and State of Indiana, have invented certain new and useful Improvements in Electrodes for Secondary Batteries; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in electrodes for secondary batteries, or accumulators.

The object of my invention is, not only to avoid the "buckling" which takes place in these forms of cells with which I am acquainted, but also to construct an electrode without any soldered joints.

The invention will first be described in connection with the accompanying drawings, and then particularly pointed out in the claim.

In the drawings—Figure 1 is a perspective view of a series of electrodes as they appear when clamped together ready for insertion in a cell. Fig. 2 is a perspective view of one electrode, not filled. Fig. 3 is a vertical section of the same.

Referring to the drawings, it will be seen that each electrode consists of a thin receptacle A, having sides,  $a$ , and pieces  $a'$ , a bottom,  $a^2$ , central portions,  $a^3$ , and a binding post lug,  $a^4$ , all cast from one piece of suitable metal, such as lead, the sides, or walls,  $a$ , being perforated as shown in order that the electrolyte may have free access to the interior of the electrode which is filled with proper exciting material, the negative electrode containing litharge or oxide of lead, while the positive electrode contains minium or triplumbic oxide.

A series of pairs of electrodes constructed as just described are placed together in the usual way, with insulating plates between them, the binding post lugs of the positive plates being all at one end, while the lugs of the negative electrodes are all at the other end. The negative and positive plates alternate as usual, and the lugs are bent as shown in the drawings and united by bolts B, which pass through the lugs and are provided with nuts, there being two bolts for each terminal,

the upper bolts serving as the binding posts for the conductors. Around the set of electrodes thus arranged are placed horizontally a series of rubber bands C, while at right angles are placed the rubber bands D, these bands serving to hold the electrodes together.

By scraping the surfaces of the various electrode lugs where they contact with each other a good electrical connection is made when the bolts are screwed up.

The central partitions strengthen the walls, or sides of the separate receptacles and prevent them from "buckling," thereby enabling the electrodes to be used much longer than when not so constructed. Moreover, as the electrodes are cast all in one piece there are no soldered joints to give way and for this reason the electrodes last much longer.

A further advantage attendant on the employment of the vertical partitions  $a^3$  cast integrally with the envelope having an open top and extending from the bottom to the top thereof, lies in the fact that these partitions in no way interfere with the filling of the envelope with the active material, and does away with the necessity of casting the envelope thereabout, whereby the manufacture of the cell is much cheapened and simplified.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In a secondary battery, a series of negative and positive electrodes each consisting of a flattened leaden receptacle having ends and bottom closed and its side walls perforated, the alternate members of said series being provided at opposite ends with integral lugs projecting from their upper ends and forming two series of binding posts, the central lugs of each series being provided with two bolt holes and the remaining lugs of the respective series being bent inward laterally and bolted to the central lugs by bolts passed through the lower bolt holes, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN E. RHETTS.

Witnesses:

ELMER F. BOGGS,  
JACOB Z. ZINK.