

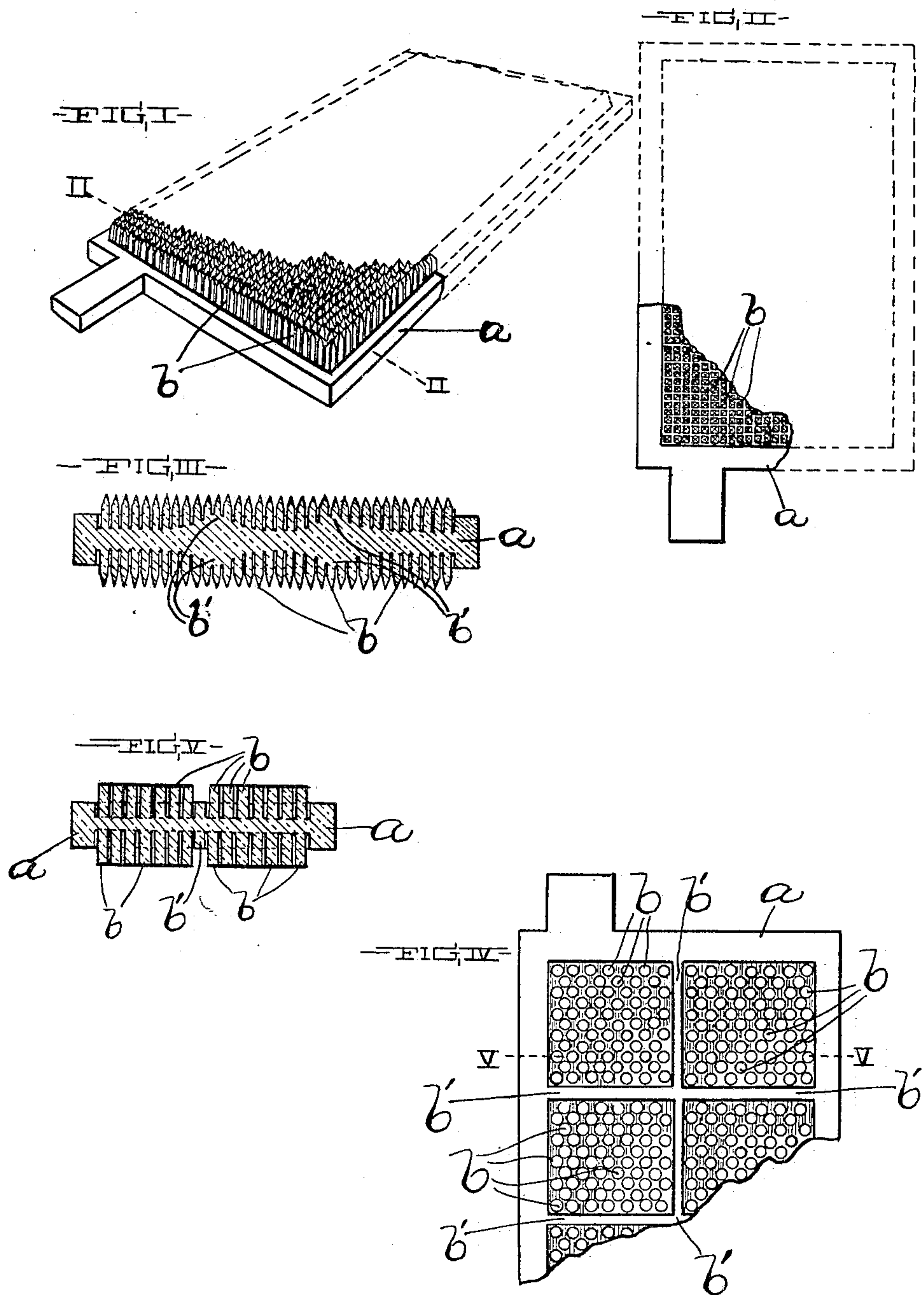
No. 758,692.

PATENTED MAY 3, 1904.

W. J. REDMOND.  
STORAGE BATTERY.

APPLICATION FILED SEPT. 29, 1902.

NO MODEL.



WITNESSES:

Daniel E. Daly.  
Victor C. Lynch.

INVENTOR

William J. Redmond  
BY  
Lynch & Dover  
his ATTORNEYS.



# UNITED STATES PATENT OFFICE.

WILLIAM J. REDMOND, OF CLEVELAND, OHIO.

## STORAGE BATTERY.

SPECIFICATION forming part of Letters Patent No. 758,692, dated May 3, 1904.

Application filed September 29, 1902. Serial No. 125,261. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM J. REDMOND, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Storage Batteries; and I 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 pertains to make and use the same.

This invention relates to storage batteries.

The object of this invention is to provide a new form of electrode which will not be liable to buckle and which will effectually retain the active material upon its surface, thereby greatly increasing the life and efficiency of the battery.

The invention therefore consists in arranging on the surface of the metallic plate a series of filaments or pin-like projection formed on the plate, as will be hereinafter more specifically described in the specification, pointed out in the claim, and illustrated in the drawings.

In the accompanying drawings, Figure I is a perspective view of an electrode embodying my invention. Fig. II is a top plan of same. Fig. III is a section on lines III III, Fig. II, enlarged one-half. Fig. IV shows a slightly-modified form of my electrode. Fig. V is a section on line V V, Fig. IV.

Referring to the drawings, *a* represents a metallic plate, preferably a lead plate, which forms the body of my electrode.

*b* represents the filaments or pins which are arranged on the face of the plate *a* and form the means for supporting and holding the active material in position. These pins *b* are arranged to project a short distance above the face of the plate and are disposed in close proximity. I have found about two hundred and fifty filaments or pins to the square inch to give very satisfactory results. These pins *b*, which are made from the material of plate, can be formed in various ways; but owing to the extreme fineness of the pins or filaments it is impossible to form an electrode of this character by casting. The pins illustrated in Fig. I are formed by inserting a suitable tool at a

slight angle into the body of the plate, so as to shave or cut a thin filament from the face of the plate, leaving one end thereof attached to the plate, and then turning the filament up or out, so that it stands at approximately a right angle to the body of the plate. Strengthening-ribs *b'* may be left at suitable points along the core of the plate by decreasing the distance which the tool is allowed to penetrate the plate in forming the filaments. The filaments or pins shown in Fig. IV are formed by means of a hollow rotary punch, which draws the material forming the pin up above the level of the surface of the plate. In Fig. V, I have also shown the filaments or pins *b* grouped together and each group separated from the next group by a strengthening-rib *b'*, formed by leaving an intervening strip of the plate unpunched.

My improved electrode has a greater working surface than any electrode heretofore produced, and the great number of filaments or hair-like projections form an absolutely sure means for supporting and retaining the active material on the face of the plate, while the projections themselves on account of their extreme fineness can readily be transformed into active material by electrochemical action.

I have found that when an electrode is provided with shelves for holding the active material, consisting of ridges, ledges, or corrugations which extend horizontally across the plate, the active material is thereby separated into isolated strips, which extend across the face of the plate, and that the plate will always buckle in the direction in which the shelves or strips extend. Now in my plate the active material completely surrounds each pin, while at the same time it remains in a compact body across the whole face of the plate without any actual separation. I have never experienced any trouble through the overcharging or from too sudden discharging of an electrode embodying my invention, and I therefore believe that any liability of an electrode to buckle is almost entirely obviated by my method of construction.

What I claim is—

An electrode for a storage battery consisting

of a metallic plate having its surface provided  
with a multiplicity of hair-like projections  
formed integral with said plate and arranged  
to project beyond the body of said plate, sub-  
stantially as described and for the purpose set  
forth.

In testimony whereof I sign the foregoing

specification, in the presence of two witnesses,  
this 11th day of September, 1902, at Cleveland,  
Ohio.

WILLIAM J. REDMOND.

Witnesses:

VICTOR C. LYNCH,  
G. M. HAYES.