

No. 665,679.

Patented Jan. 8, 1901.

R. E. HALL.  
ELECTRIC BATTERY.

(Application filed Dec. 15, 1899.)

(No Model.)

Fig. 1.

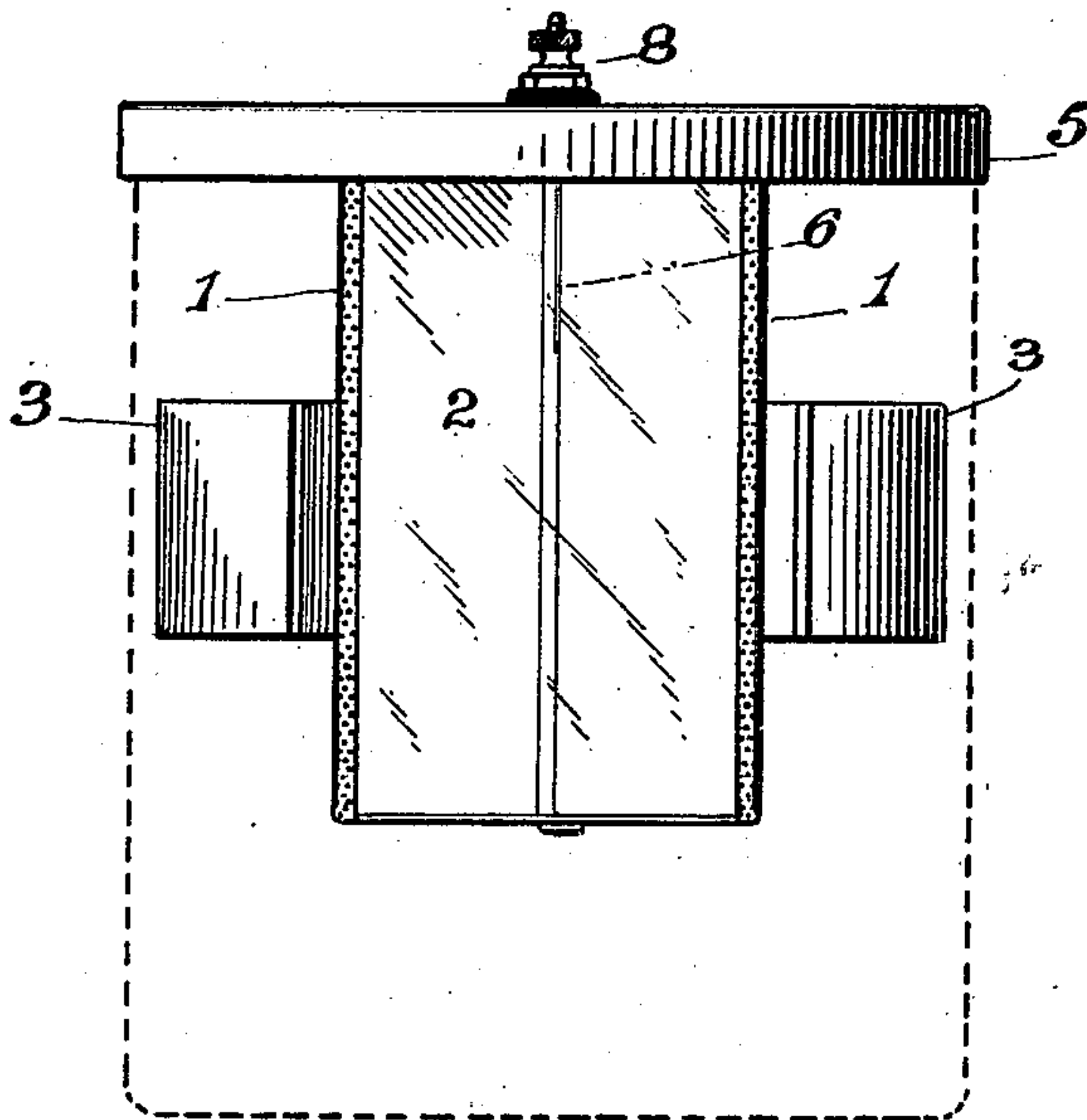
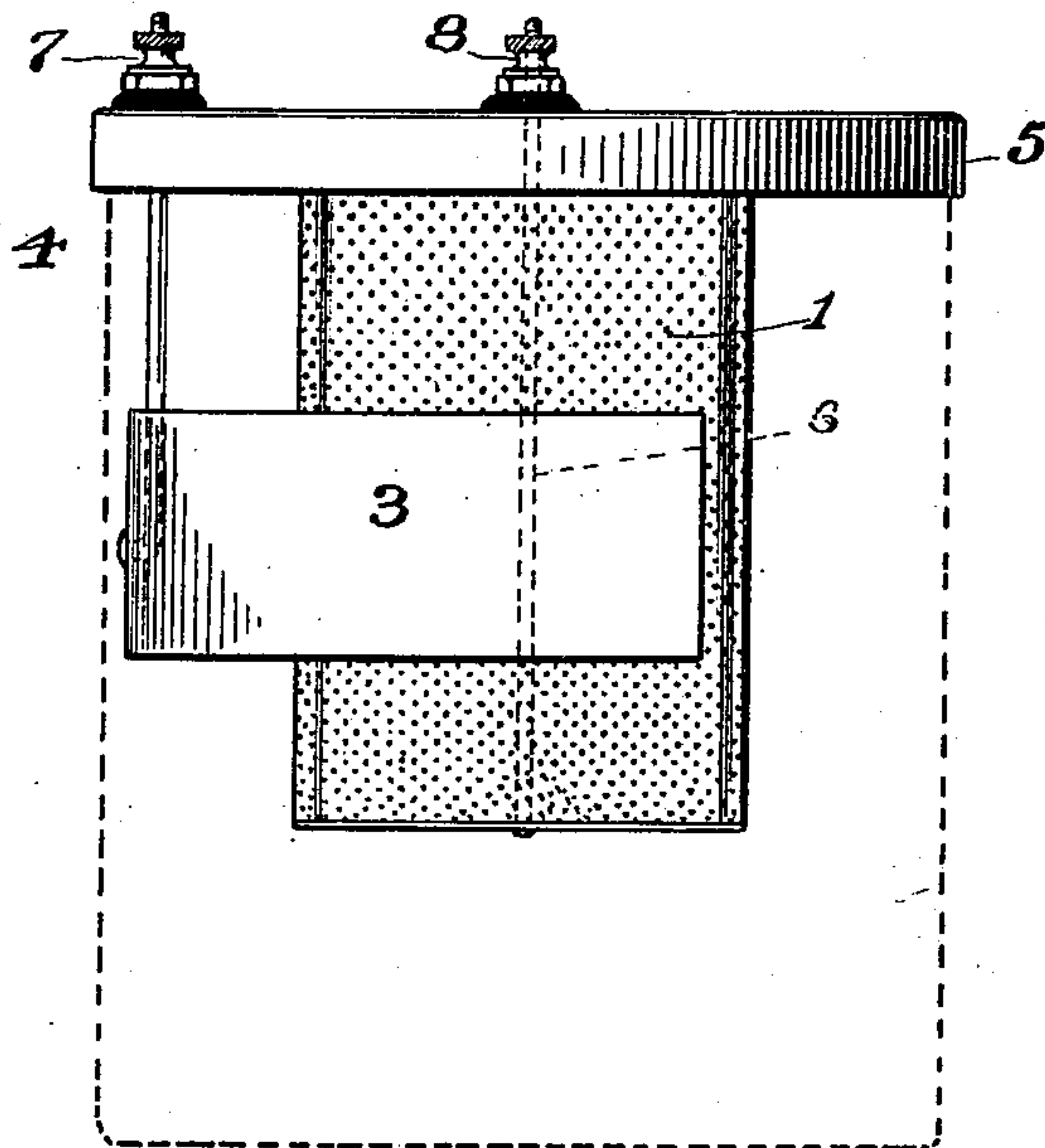


Fig. 2.



WITNESSES:

H. F. Lamb  
M. J. Longden

INVENTOR

R. E. Hall

BY

J. H. Smith  
ATTORNEY

# UNITED STATES PATENT OFFICE.

ROBERT E. HALL, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE WATERBURY BATTERY COMPANY, OF WATERBURY, CONNECTICUT.

## ELECTRIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 665,679, dated January 8, 1901.

Application filed December 15, 1899. Serial No. 740,458. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT E. HALL, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Electric 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 certain new and useful improvements in electric batteries, but more particularly relates to batteries of this description which utilize oxid of copper, preferably in the form of copper scale, and a caustic-alkali solution.

The object of my invention is to provide a construction in which the degree to which the battery has been exhausted may be readily apparent to an unskilled person; and with this end in view my invention consists in certain details of construction and and combination of parts, such as will be hereinafter fully set forth and then specifically be designated by the claim.

In the accompanying drawings, which form a part of this application, Figures 1 and 2 are, respectively, elevations taken from different points of view of a battery constructed in accordance with my improvement.

Similar numbers of reference denote like parts in both figures of the drawings.

In a battery of this description the copper scale has been held within a perforated basket, which latter is suspended within the solution, and as the scale is acted upon by the solution it will turn red, beginning at the outside and working inwardly toward the center, and it is therefore difficult for an unskilled observer to ascertain the amount of energy remaining in the battery. It has been essayed to overcome this difficulty by using a glass jar containing a perforated cylinder and by placing the copper scale between the jar and the cylinder; but this construction will not readily ascertain the degree to which the copper has been acted upon by the solution, and, moreover, this construction contemplates, as a necessity, the use of a glass jar and is, moreover, quite expensive.

In my improvement a glass jar is preferably used; but it is not absolutely necessary, as will be readily understood from the following description.

I preferably utilize a box having two opposite perforated metal sides 1, and two opposite imperforate glass sides 2, and a zinc ring 3, suspended by a conductor-rod 4, which latter is secured to the cover 5 of the jar and properly insulated therefrom. I also employ a conductor-rod 6, which is connected with the metallic portion of the box and is secured to the cover 5 and properly insulated therefrom. Ordinary fastening contact devices 7 8 are used at the upper ends of these rods 4 6, respectively

In the drawings the jar is denoted by dotted lines, and I employ any suitable caustic alkali—such as caustic soda—in making the solution, which is poured within the jar. Since the glass is a non-conductor and is imperforate, the action of the solution upon the copper scale will be through the perforated metal sides from the outside of the scale in parallel vertical planes, which gradually approach each other as the scale is acted upon, and as fast as the solution acts upon the scale the latter will turn red, so that it will be readily apparent through the glass sides whether or not there is any great amount of energy left within the battery. For instance, when at the vertical center of one of the glass sides a considerable amount of the scale appears unaffected by the solution it will be evidence that the battery has quite a while to run, while, on the other hand, should the vertical red columns of the scale be quite close to each other, leaving only a narrow vertical strip of the normal scale apparent through the glass sides, this will be evidence that the battery will have to be renewed within a short time.

The advantage in using a glass jar is that the observer may instantly determine without removing the box the actual condition of the battery; but glass jars are objected to by many, especially railroad-men, on account of their fragile nature, and therefore it frequently becomes necessary to use jars made of any suitable tough material. My improvement does not therefore contemplate as one of its essential features the use of any par-



ticular kind of jar, and if an opaque jar be used it simply becomes necessary to raise the box slightly in order to determine the condition of the battery.

- 5 I have shown in the drawings a four-sided box, two of the opposite sides being glass; but it will be obvious that the structure so far as the glass is concerned may be considerably varied without departing from the spirit of my invention. For instance, since  
10 the object of the perforated metal sides is simply to allow the solution to act upon the copper it will be clear that the box might be made entirely of glass, and in this case the  
15 box would be submerged an inch or two below the level of the solution, so that the latter would act upon the copper from the top, the result of this being that the reddish ap-

pearance would begin at the top and gradually extend toward the bottom of the box. 20 Therefore I do not wish to be limited to the exact construction of this box shown; but

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

In an electric battery as described, the herein-described box for the reception of oxid of copper in the form of copper scale, said box having two opposite sides made of solid glass and the other two opposite sides made of a pervious material, substantially as set forth. 25 30

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

ROBERT E. HALL.

Witnesses:

M. T. LONGDEN,  
CLITUS H. KING.