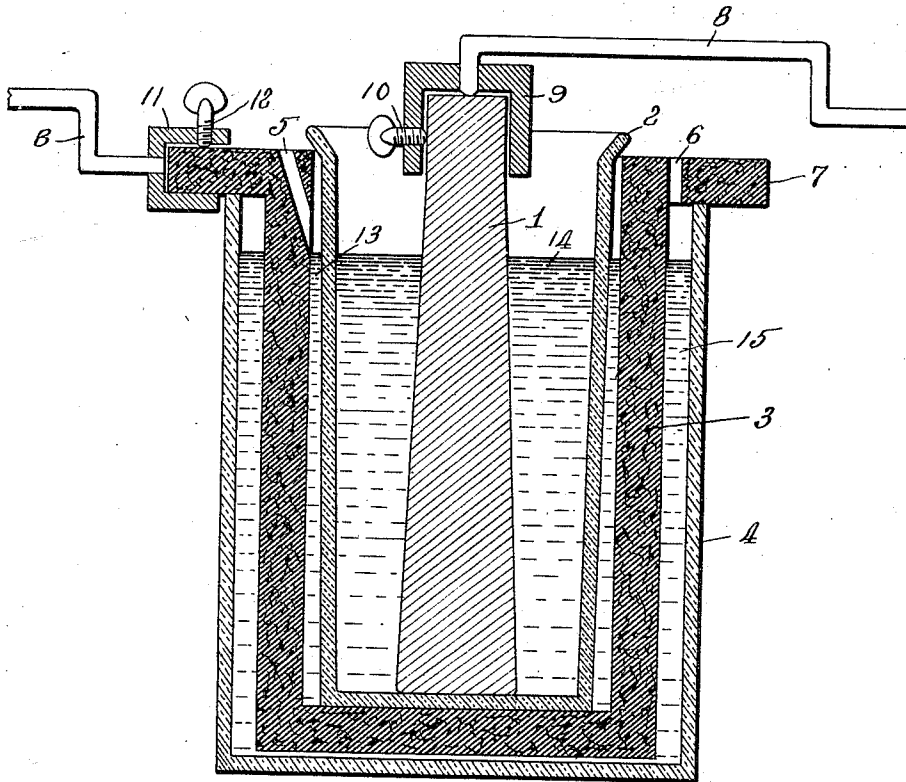


E. C. BRICE.
PRIMARY BATTERY.
APPLICATION FILED APR. 24, 1912.

1,049,333.

Patented Jan. 7, 1913.



Witnesses
H. C. Robinson
J. M. Stueker

Inventor
Edward C. Brice

By *Augustus C. Williams & Co.*
Attorneys

UNITED STATES PATENT OFFICE.

EDWARD C. BRICE, OF MANSFIELD, ARKANSAS.

PRIMARY BATTERY.

1,049,333.

Specification of Letters Patent.

Patented Jan. 7, 1913.

Application filed April 24, 1912. Serial No. 692,984.

To all whom it may concern:

Be it known that I, EDWARD C. BRICE, a citizen of the United States, residing at Mansfield, in the county of Sebastian and State of Arkansas, have invented new and useful Improvements in Primary Batteries, of which the following is a specification.

My invention relates to primary batteries, my more particular purpose being to produce a battery of this kind in which depolarization is avoided or reduced to a minimum, and in which a large output of current at a good voltage may be maintained for a long time without the necessity of re-filling the battery or of giving it any attention.

While the construction of my battery may be varied within wide limits and the materials employed may be changed or varied considerably, I describe one representative form of the invention in order that its principle of operation may be readily understood.

Reference is made to the accompanying drawing forming a part of this specification, and in which like letters indicate like parts, the figure being a substantially central, vertical section through my improved battery, in one of its simplest forms.

The anode which in this instance is made of amalgamated zinc is shown at 1, and has a substantially frusto-conical form. A porous cup 2, which may be of the usual or any desired pattern, is slightly flared at its upper end and is substantially concentric to the anode. The porous cup, which is saturated with a depolarizing fluid hereinafter described, is located within a cup 3 of massive, porous carbon. This carbon cup is located within a containing vessel 4, which may be of glass or other material suitable for the purpose of a containing vessel. The carbon cup 3 is provided with holes 5, inclined obliquely inward, and employed for the purpose of introducing the depolarizing fluid from time to time as needed. The carbon cup is the cathode of the battery. It is provided with an annular flange 7 integral with it; and through this flange extend holes 6 which are used for the purpose of introducing a liquid, forming a part of a battery fluid as herein described.

A connector is shown at 8, and is simply a conductor used for connecting an anode of one cup with the cathode of another cup,

or as a terminal. The connector is mounted upon a clamp 9, which is provided with a set screw 10 for gripping the upper end of the anode. Each connector 8 is further provided with a clamp 11 carrying a set screw 12 and used for gripping the annular flange 7 of the carbon cup. The connectors, being old, need not be further described. Within the carbon cup 3 is a body of liquid 13 made by mixing together nitric acid and sodium chlorid (common salt) in the following proportions: 3640 grams of nitric acid of 36° to 36.1° Baumé and 640 grams of sodium chlorid. The sodium chlorid thus constitutes approximately 12½% of the solution and the nitric acid constitutes about 87½% of the same.

The sodium chlorid and a small portion of the nitric acid react upon each other and form sodium nitrate and hydrochloric acid so that the resulting liquid is a mixture of sodium chlorid, sodium nitrate, hydrochloric acid and free nitric acid. This liquid as a whole is a depolarizing solution, and absorbs gases as generated. The porous cup 2 is thoroughly saturated with a quantity of the depolarizing solution, and is then pressed downwardly into the body of depolarizing solution contained within the carbon cup, so that the level of the liquid rises nearly to the top of the carbon cup. A solution of strong brine, in the proportion of 1500 grams of pure water, such as rain water to 360 grams of sodium chlorid, is next poured into the porous cup 2. The sodium chlorid thus constitutes about 19½% by weight of the solution. The brine thus formed, and contained within the porous cup, is the electrolyte proper, and is shown at 14. The carbon cup, the porous cup and the anode, being treated and assembled as above described, are as a unit let down into the containing vessel 14 in which is a body of liquid 15, the latter being preferably either brine of the kind above mentioned, or pure water, as desired. The battery is now ready for use.

If pure rain water is used in the outer containing vessel it is soon permeated with the liquid contained within the carbon cup for the reason that the carbon cup, being porous, allows the liquid contained within it to soak through its wall and to become diffused through the rain water. Owing to this fact, and to the fact that chemical changes are produced within the liquid con-

tained within the outer containing vessel and surrounding the carbon cup, the chemical composition of the liquid within the outer containing vessel soon undergoes changes.

I find from experience that if brine of the kind above mentioned be employed at the start as the liquid contained by the outer containing vessel the efficiency of the battery is much greater than if other liquids be employed in this relation. I also find from experience that pure rain water used in the relation stated is very good and that after the battery has been in action for a little time its efficiency increases—owing apparently to the changes brought about in the character of the liquid in question, under action of the electric current.

With the battery above described there is little or no polarization, and the current produced is very strong. The battery may be neglected for comparatively long periods of time without substantial impairment of its efficiency. The parts are readily accessible for the purpose of cleaning or renewing. The battery is cheaply constructed and may be operated at a small cost.

The particular compound used in this primary battery is made the subject matter of the co-pending application filed May 27, 1911, Serial Number 629,826.

What I claim is:

1. A battery comprising a containing vessel, a carbon cup extending down into the vessel in spaced relation to the walls thereof and having an outturned flange bearing upon the upper edge of said containing vessel to support the carbon cup, said flange having openings therethrough for the introduction of a substance into said vessel about the carbon cup, a porous cup in the carbon cup in spaced relation to the walls of the latter and having an enlargement at its upper end bearing upon the top of the carbon cup to close the space between the carbon and porous cups, the carbon cup having openings leading from the top thereof down through its inner wall for the introduction of a substance into said space between said cups, and a zinc member located in the porous cup.

2. A battery comprising a containing ves-

sel, a carbon cup arranged within the vessel and providing therewith an annular space above the carbon cup, said carbon cup having an outwardly extending flange bearing upon the upper edge of the containing vessel to close the same and being provided with vertical openings adapted for the introduction of water into said annular space, a porous cup fitting in said carbon cup and providing therewith an inner annular space, said porous cup having a flaring upper end bearing against the upper edge of the carbon cup to close said inner annular space, said carbon cup being provided with oblique openings extending from the top thereof into said inner annular space and adapted for the introduction of a depolarizing fluid into the inner annular space, and a zinc pencil arranged within the porous cup and being provided with a substantial base whereby to support the pencil in upright position and an electrolyte contained within the porous cup about said pencil.

3. A battery comprising a porous cup adapted to contain an electrolyte, a pencil mounted in said porous cup and having a reduced upper end for engagement with a battery connector, a carbon cup surrounding said porous cup and adapted to contain a depolarizing fluid exterior of the porous cup, said porous cup having a flaring upper end which closes the upper end of the carbon cup, a containing vessel surrounding said carbon cup in spaced relation thereto and adapted to contain water, said carbon cup being provided with an outwardly extending flange bearing upon the upper edge of the containing vessel whereby to close the same, said flange extending beyond the side of the vessel and being provided thereat with a second battery connector, and having openings leading downwardly into the interior of the carbon cup and interior of said containing vessel.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDWARD C. BRICE.

Witnesses:

S. A. GRAVES,
W. L. YOWELL.