D. M. COOK.

Galvanic Battery.

No. 110,206. *Fig. 1* Patented Dec. 20, 1870.

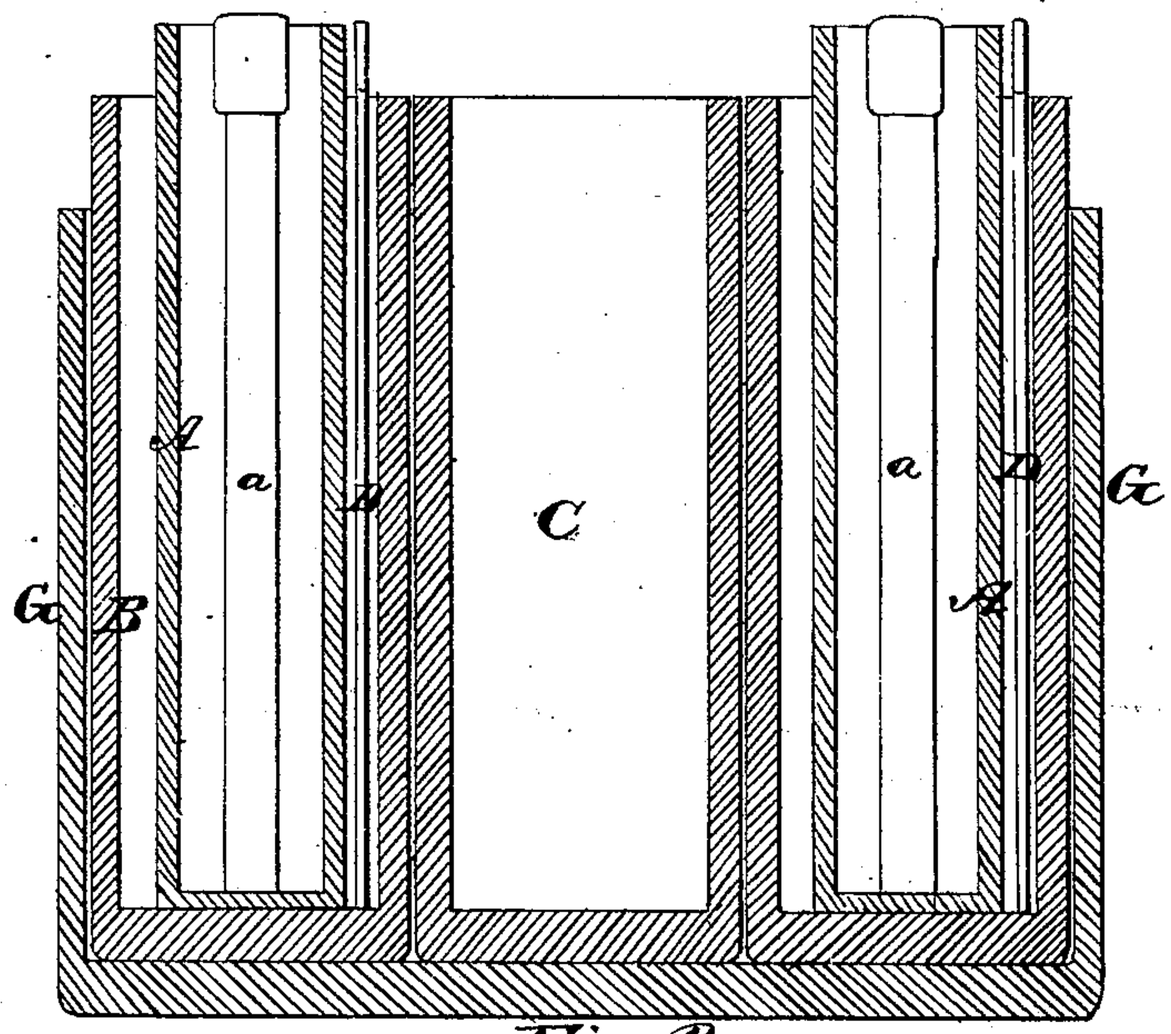
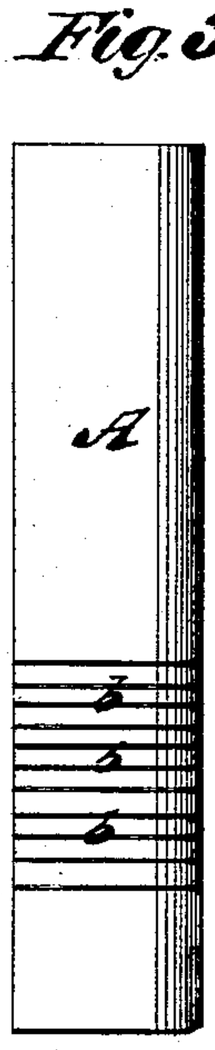
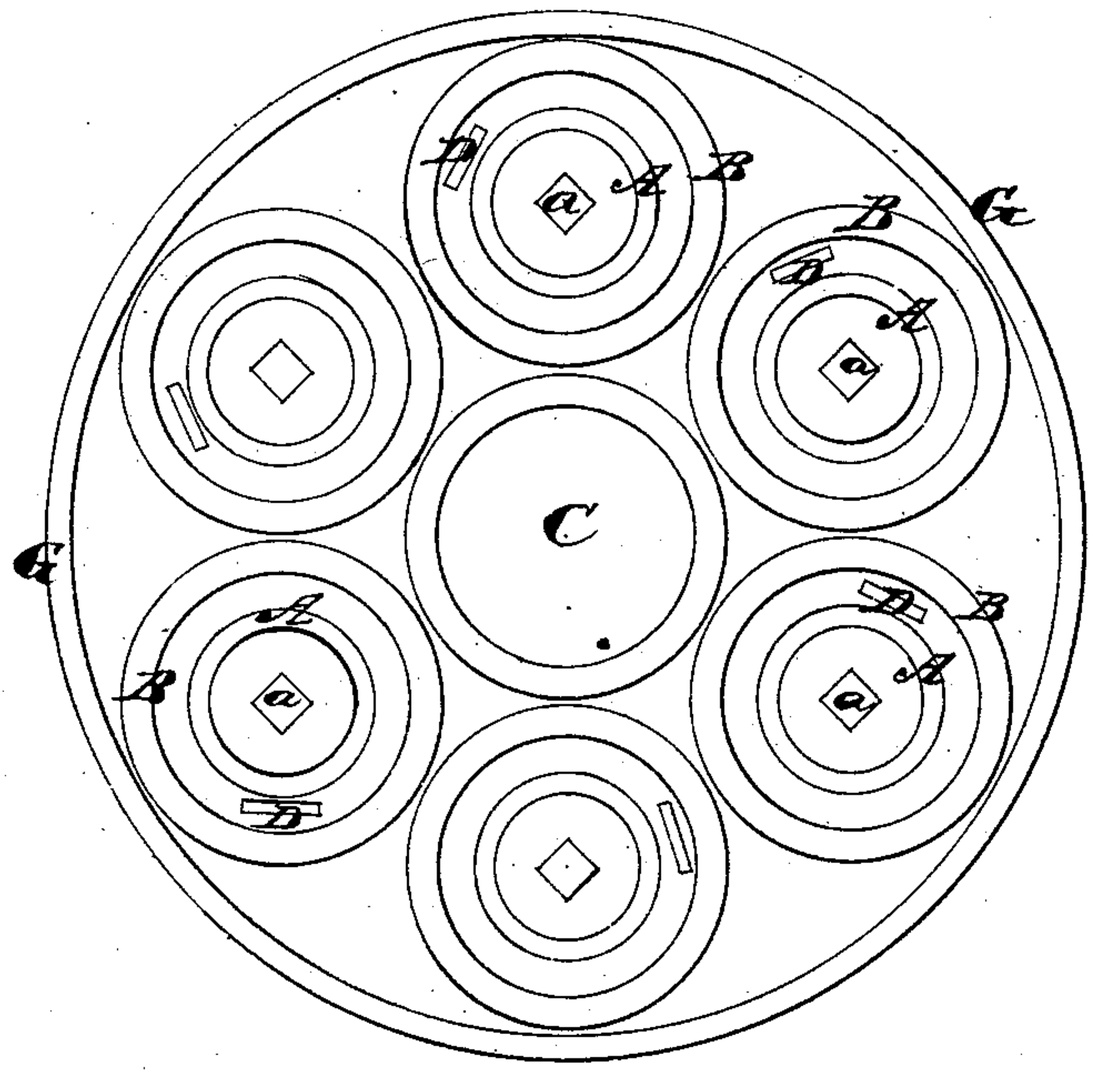


Fig. 2

Fig. 3





Witnesses.
R. Campbell
J. N. Campbell

Inventor
D. M. Cook
by
Mason, Fenwick & Lawrence

United States Patent Office.

DANIEL McFARLAND COOK, OF MANSFIELD, OHIO.

Letters Patent No. 110,206, dated December 20, 1870.

IMPROVEMENT IN GALVANIC BATTERIES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, DANIEL McFARLAND COOK, of Mansfield, in the county of Richland and State of Ohio, have invented a new and improved Galvanic Battery; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a diametrical section through my improved battery.

Figure 2 is a top view of the battery.

Figure 3 is an external view of one of the porous cups.

Similar letters of reference indicate corresponding parts in the several figures.

In the construction of galvanic batteries, when it is desired to obtain electric quantity, it is common to enlarge the batteries and also to increase the decomposition of the metals and electrolytes. It is also common to use open porous cups or cells of different materials, which allow a free admixture of the liquids.

The object of my invention is—

First, to prevent the mixture of the liquids almost entirely, and, at the same time, obtain an electric quantity even superior to that obtained by an equal-sized open cup.

Second, to obtain an increase of electric quantity with less decomposition and of long and steady action.

Third, to economize in material and in the time and labor of attention required to keep the battery in good working order.

The nature of my invention consists—

First, in the division of the electric current in the exciting liquid by means of a glazed cup or cell, or a cup or cell made of any suitable porous substance, such as bonnet-board or wood, covered with any impervious material having fine lines cut into it so as to leave exposed porous surfaces between the impervious surfaces, which will cause an attraction (according to an electric law) between the different parts of the action, thereby producing a large increase in the several quantities of the divisions on each other; that is to say, if there are two or more division lines or spaces on the surface of the cup or cell, and the quantity of one line is measured by the magnetometer, the second line will indicate an increase until the ultimate quantity will be equal to the capacity of the liquids and the tension to carry that quantity.

Second, in reducing the area or quantity of these lines to the smallest limit, and making one or more rings on the exterior of one or more cups or cells, and uniting their quantities so as to cause their separate quantities to double on each other.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In carrying out my invention I do not confine myself to any particular form or size of cup, cell, or plate, nor to any particular size or number of lines, rings, or open spaces on the surface thereof, observing only such a relation between the spaces and liquids as will produce the desired result.

The divisions may be effected by means of separate cups, either in the same liquid or in separate liquids. Dilute sulphuric acid will not act properly with one liquid, as this acid requires separate liquids and elements in order that the several elements shall double on each other.

In practice I shall generally use a hydrogen absorbing liquid, such as the sulphate of copper or nitric and nitro-sulphuric acids, and a glazed earthen cup or cell, or a cup or cell made of bonnet-board or of wood coated with a varnish made of beeswax and resin. I cut through the glazing or varnish on the cup A so as to leave annular or spiral lines *b*, fig. 3, thus allowing a divided action of the current through the cup. Instead of the cut lines and glazed cup a wire may be wound spirally around an unglazed cup, and thus produce a division of the current. I prefer, however, as a matter of economy, to use the glazed cup or its equivalent, cut as described. The area of the lines *b* is made larger or smaller, according to the amount of electric quantity required. If this quantity be too small, as in telegraphing and other like purposes, the lines or rings *b* should be as small as possible—in fact, there need be but a few punctures through the glazing. And when two or more such cups are connected as one element, the quantity of the several elements will double on each other the same as the several rings or lines *b* in one cup will do.

If the lines, rings, or punctures are small enough in the cups, a telegraph battery of great force may be run for several months, or even a year, or more, without any attention. In fact, any common glazed earthenware is sufficiently porous, without rings, lines, or punctures made through their glazing, to yield sufficient current for most purposes, especially for main telegraph batteries; or even a glass cup may be substituted for the glazed cup, in which case the action passes over the moist top of the cup and through the pores of the glass. But, in any kind or form of cup or cell, it is more economical to use one or more cups either placed in one cup with the negative solution around them, or by uniting them as separate batteries, so that their several quantities will double or tend to double on each other.

Instead of glazing the cups, it is quite as well to form the lines or divisions *b* by means of varnish or

beeswax, or the ends of the cups may be dipped into beeswax, thus more or less closing them, so as to prevent the mixture of the liquids and allow a steady and long-continued action, such as is adapted to telegraphing or any of the common uses of electric currents.

The closing of the cups or cells in this manner is very important—

First, because the liquids are left separate, and consequently the positives are prevented from wasteful decomposition.

Second, where the action is divided it causes a doubling of the equal quantities on each other without increasing the decomposition.

Third, it is important for the reason that when separate elements are combined as one, and when the lines or divisions, as described, are proportionate to the required current, each element added as quantity not only doubles its own quantity and the quantity of the other elements combined with it, but it also diminishes the decomposition, so that by a sufficient number of separate elements large-quantity currents may be supported for a long time by the latent quantity in the battery being retained by the insulation of the cups; that is to say, if six elements, properly balanced, run with a given quantity for, say, one day, then the seventh element added will cause the combined elements to yield that quantity for two days, and the eighth element will increase the time to four days. Each additional element will thus double the time or endurance of the battery, provided the quantity of the separate elements are correspondingly diminished by closing their surfaces, also provided the negative surfaces and liquids are of sufficient capacity.

In all dilute acids it is necessary to use plenty of carbon surface; platinum will not answer well except in strong acids, as the hydrogen adheres to its surface, and therefore lowers the tension and the quantity of the current. The use of carbon will obviate this difficulty, and it may be used either in the form of a plate, a cylinder, or a cup, the latter being preferable for convenience.

When two or more elements are connected to form a doubling base, they should be boiled in beeswax until they will be impervious to the liquids and not interfere with the conduction thereof.

The action of this battery is the same as the common galvanic battery, except by its divided condition; the quantity of current is greatly superior to the quantity of the decomposition of the positive metal used.

In the drawing the cups A are represented in vessels B, which are arranged around a central cup, C, for support.

The positive metal strips D are contained in the cups B.

All the cups are applied in a large vessel, G.

The carbon bars *a* are in the cups A, and suitably connected to the strips D by wires, so as to produce the effect of tension.

Having described my invention,

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

1. A cup or cell A for a galvanic battery, constructed substantially as described, and for the purposes set forth.

2. Two or more similar elements, combined in the manner and for the purpose specified.

DANIEL McFARLAND COOK.

Witnesses:

H. D. KEITH,

JOEL MYERS.