(No Model.)

H. GROSWITH.

GALVANIC BATTERY.

No. 406,726. Patented July 9, 1889.

Fig. 1.

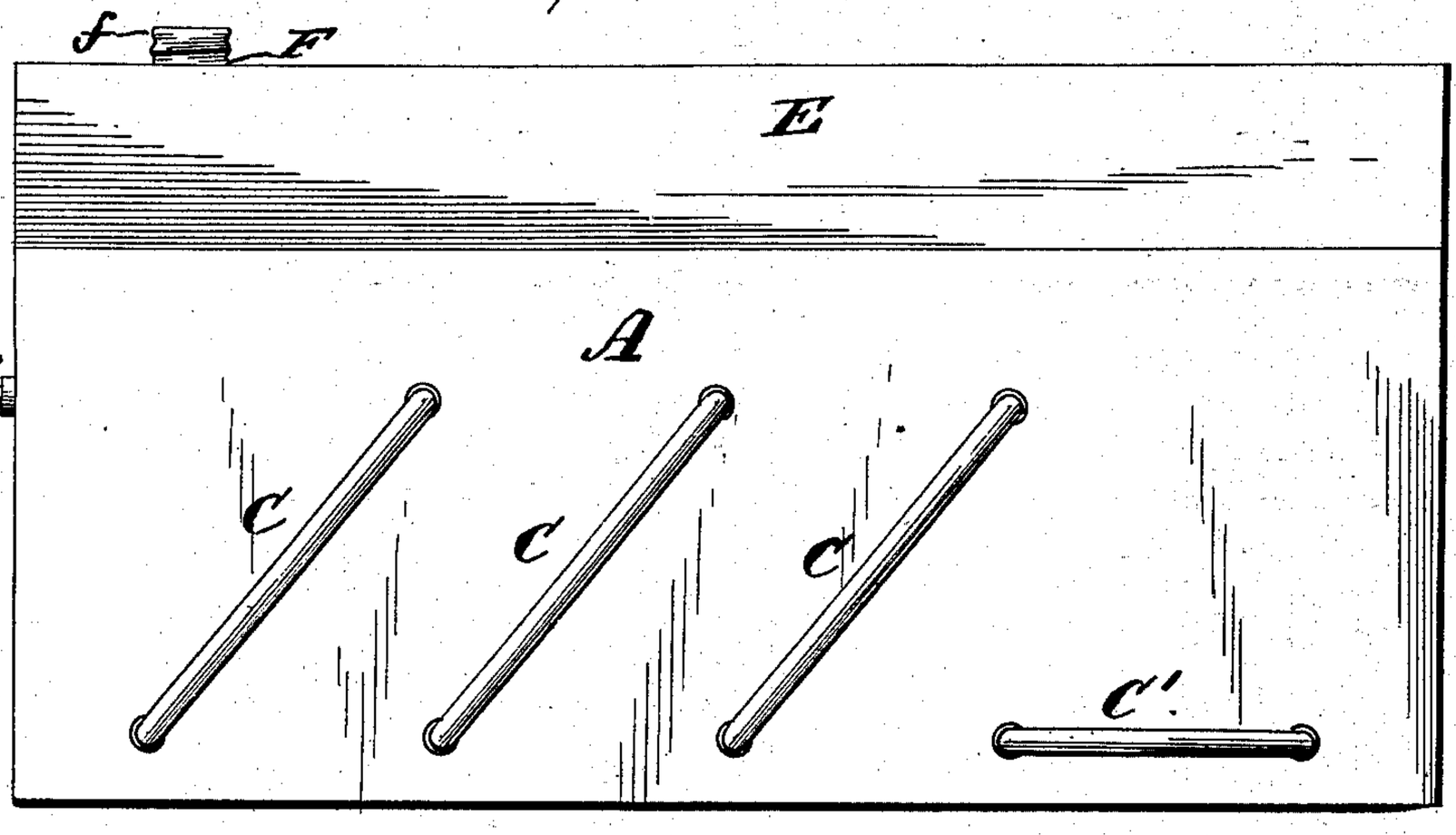
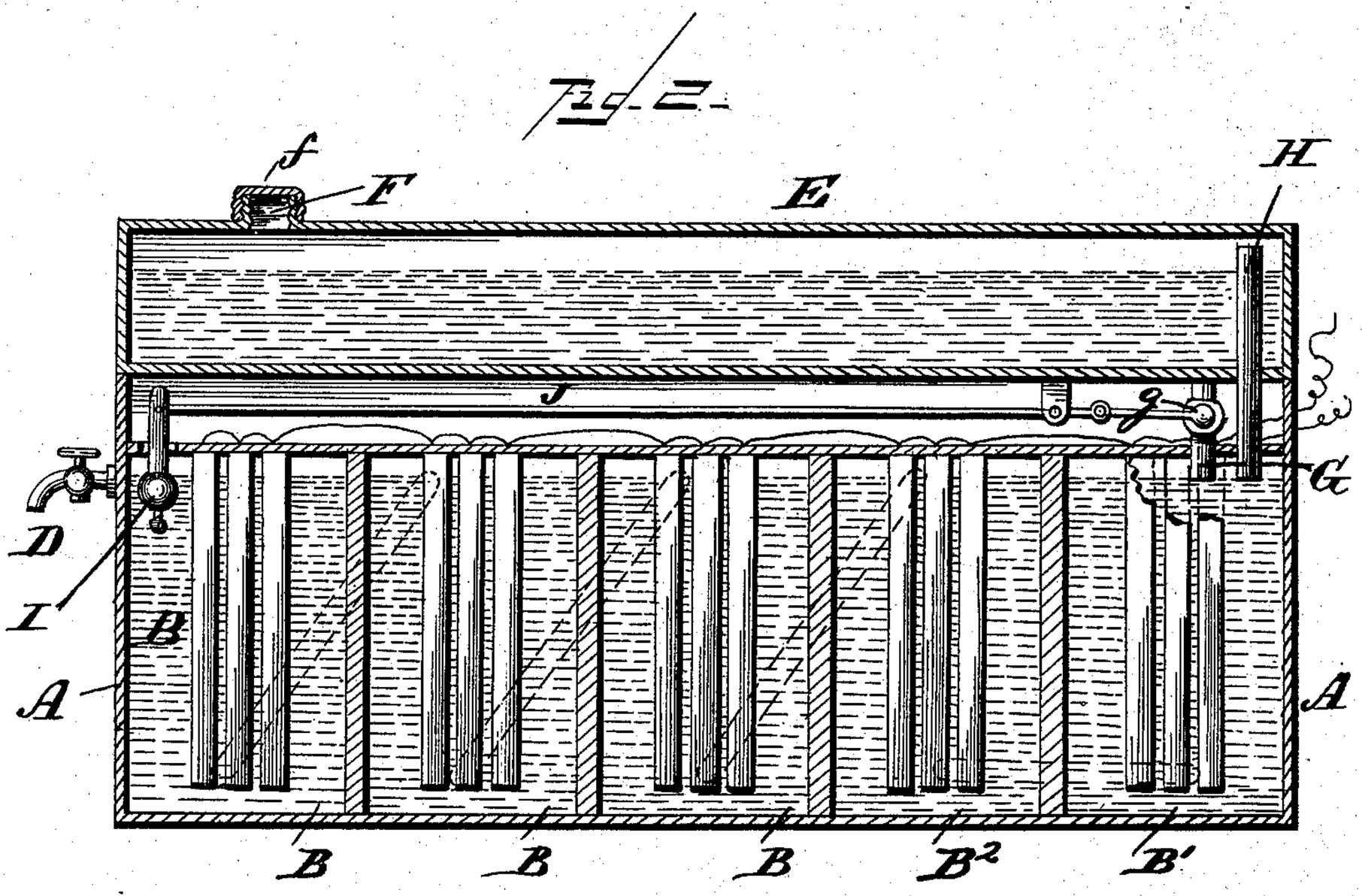


Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY GROSWITH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF THREE-FOURTHS TO CHARLES W. KENNEDY AND RANSOM F. RANKIN, BOTH OF SAME PLACE.

GALVANIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 406,726, dated July 9, 1889.

Application filed April 16, 1889. Serial No. 307,399. (No model.)

To all whom it may concern:

Be it known that I, HENRY GROSWITH, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Galvanic Batteries; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation of my improved battery; and Fig. 2 is a longitudinal sectional view, on a vertical plane, of the same.

Like letters of reference denote corresponding parts in both the figures.

My invention relates to batteries for generating galvanic electricity, adapted for the operation of electric motors and for other purposes, and has for its object to increase the vitality of such batteries, or, in other words, render them to a certain degree "constant," and thus obviate the frequent refilling or replenishing of the cells with the exciting-liquor.

With this object in view my improvement consists in the combination, with the battery, of an automatically-operating feed or replenishing tank for supplying fresh liquor to the cells as the same is required, as well as maintaining the proper density of the liquor to keep the battery in proper working order, substantially as will be hereinafter more fully set forth.

In the accompanying drawings, the letter A denotes a galvanic battery composed of any desired number of Bunsen or other cells B. These cells are connected to one another by oblique pipes C, passing through their side walls, with the exception of the two first cells in the battery, (marked, respectively, with reference-letters B′ and B²,) which are preferably connected by a straight pipe C′, so as to form convenient exterior handles for moving and handling the apparatus. Near the upper end of the last cell in the series (at the end opposite to the cell marked B′) is an outlet-pipe D, through which the spent liquor may be discharged into a barrel or other suitable receptacle placed below the pipe.

Covering the top of the battery is a closed tank E, preferably of such shape and dimensions that it will conform to the outline of the battery (for example rectangular) and form a top or covering for the same. In the top of this tank is an aperture F, through which it may be filled, said aperture being closed by a tightly-fitting screw-plug or other suitable air-tight stopper *f*.

The liquor contained in the tank is discharged through the bottom pipe G into the first cell B′ in the series, from which it flows into the next adjacent cell B² through the straight outside connecting-pipe C′. When the liquor in this cell has risen to the height of the oblique pipe C, connecting it to the next adjacent cell or jar, it flows through said pipe into the next cell or jar, and so on through the entire series till all the cells are filled to their proper height—*i. e.*, to a level with the discharge-pipe D, through which the overflow will escape.

Inserted through the bottom of tank E is an air-pipe or vent-pipe H, the lower end of which projects down into the cell B′ on a level with the outlet D, (say about two inches, more or less,) while its upper end extends up into the tank till within a short distance of its top.

The tank being filled with the acidulated water or other liquor which is used as the excitant and hermetically sealed by the plug *f*, covering the filling-aperture F, it will flow through the outlet or bottom pipe G into cell B′, and from this through the several connecting-pipes C′ and C until the battery has been properly charged. When the liquor in the several cells has risen to a level with the discharge-pipe D and the lower end of the vent-pipe H, the latter will be sealed by the liquor, and thus cut off the supply of air to tank E, which results in stopping the flow of liquor. As, however, during the working of the battery liquor is gradually used up, and its level in consequence sinks below pipe H, air will again be admitted through said pipe into the tank, and sufficient liquor will be admitted into the battery to make up for the loss. In

this manner it will be seen that the battery will be kept constantly charged with its proper supply of liquor, so as to keep it at all times and automatically at its maximum capacity for working.

As an additional safeguard in the event that the vent-pipe H should become stopped up, or air should be admitted into the tank through an imperfectly-fitting stopper, or if for any other unforeseen reason the device should fail to work properly, I employ an auxiliary device consisting of a hydrometer I, which is pivotally attached to the outer end of a delicately-poised lever J, the other end of which is connected by a hinge-joint with a valve *g* in pipe G and so arranged that when the float or bulb of the hydrometer sinks below the level of pipes D and G the valve will be opened, while when it (the float) rises by the increased density of the liquor to its proper level the valve will be closed. By these means I provide for any contingencies or unforeseen emergencies, so that the battery will be kept in constant working order as long as any liquor remains in the supply-tank.

The object of using a hydrometer for operating the valve-actuating lever instead of a plain float is to actuate this lever by the specific gravity or density of the liquor in the cells, which decreases as the liquor becomes spent, thereby lowering the hydrometer and thus opening the supply-valve and supplying fresh liquor until the proper density or gravity has been restored. By these means not only is the height of the liquor in the battery kept permanent, but its quality (density) will be kept up as well.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of the battery, the supply-tank, the outlet or overflow pipe, the pipes connecting the several cells of the battery to one another, the vent-pipe, the feed-pipe having a valve for opening or closing it, and the lever jointed at one end to said valve and having a hydrometer at its other end, substantially as and for the purpose set forth.

2. The combination, with the cells and the automatically-operating feed-tank, of the regulating device consisting of the hydrometer, in combination with the lever and valve for opening or closing the outlet of the feed-tank, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

HENRY GROSWITH.

Witnesses:

R. F. RANKIN,

C. W. KENNEDY.