(No Model.)

J. SERSON.

GALVANIC BATTERY.

No. 405,609. Patented June 18, 1889.

Fig. 2.

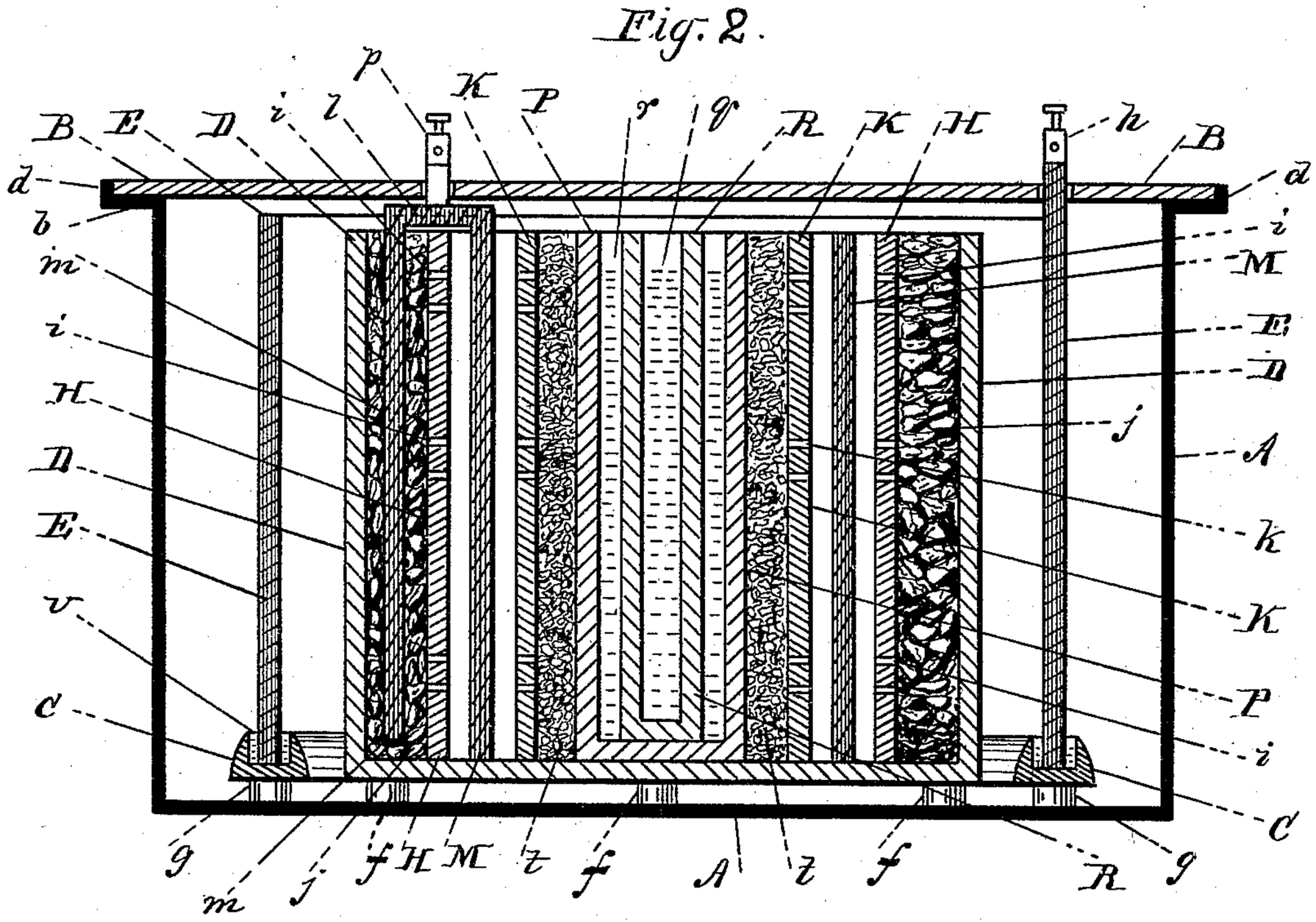
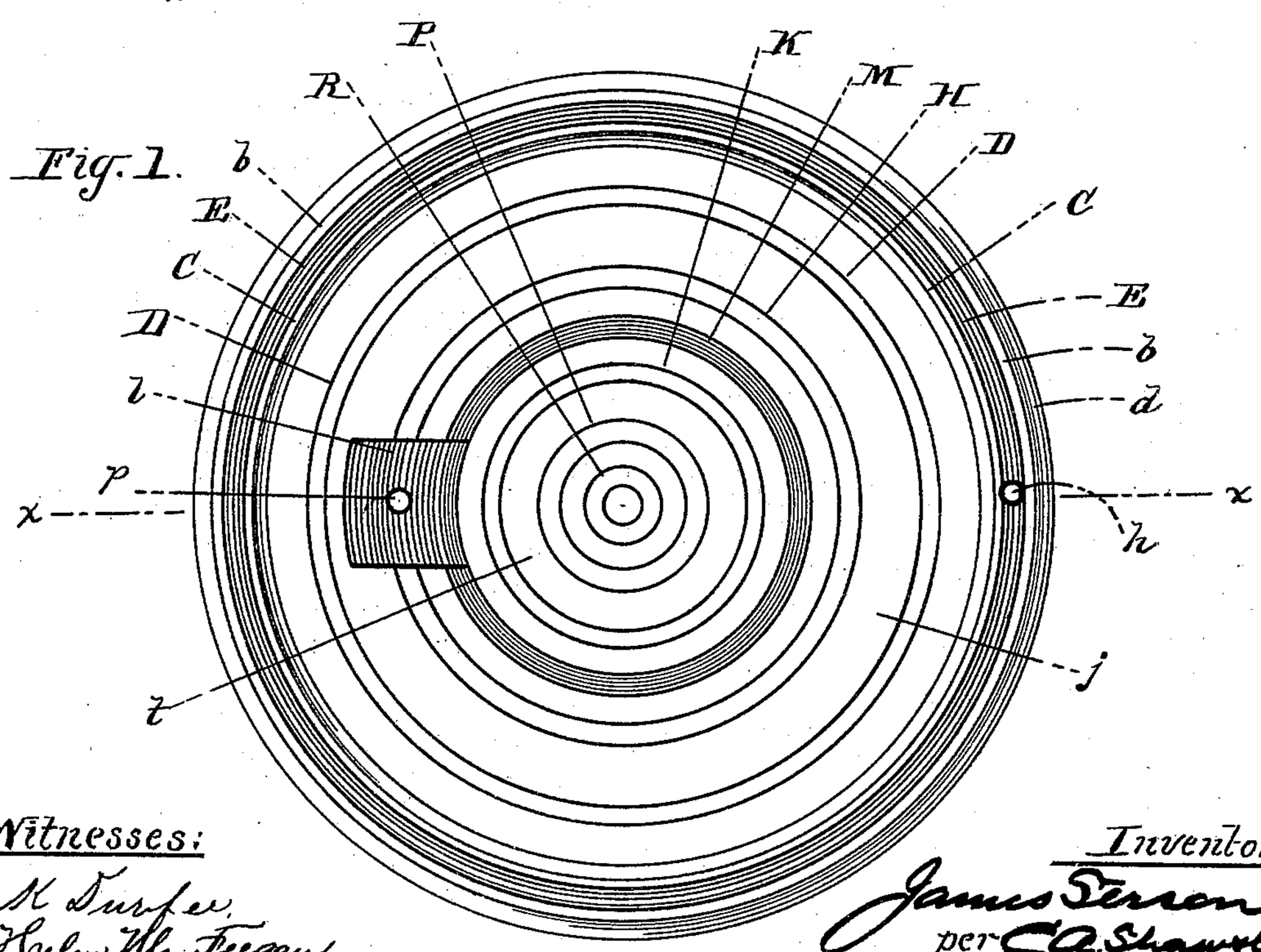


Fig. 1.



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UNITED STATES PATENT OFFICE.

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GALVANIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 405,609, dated June 18, 1889.

Application filed March 5, 1889. Serial No. 301,847. (No model.)

To all whom it may concern:

Be it known that I, JAMES SERSON, of Boston, in the county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Electric Batteries, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of my improved battery, the cover being removed; and Fig. 2, a vertical transverse section of the battery.

Like letters and figures of reference indicate corresponding parts in both figures of the drawings.

My invention relates, especially, to primary batteries; and it consists in certain novel features, as hereinafter fully set forth and claimed, the object being to produce a simpler, cheaper, and more effective device of this character than is now in ordinary use.

In the drawings, A represents the containing-jar, which is preferably constructed of hard rubber, and is provided at its upper edge with a horizontally-arranged annular flange *b*, having a vertical ring *d* on its outer edge, the cover B being fitted to rest on said flange. Disposed within the containing-jar and supported on legs *f* there is a porous cup D of the biscuit-porcelain or similar material. An annular gutter C is provided with legs *g*, resting on the bottom of the jar A, and is disposed around the cup D. The gutter C is adapted to contain free mercury, and disposed in said gutter there is a cylinder E of zinc, provided with a post and connector *h*, of the ordinary form, which projects through an opening in the cover B. A porcelain cylinder H, provided with perforations *i*, is disposed within the cup D, a space *j* being left between said cylinder and cup. A similar cylinder K, provided with perforations *k*, is disposed in the cup D within the cylinder H. In the space between the cylinders H and K there is disposed a carbon cylinder M, provided on the side opposite the zinc connector *h* with a horizontal arm *l*, extending over the top of the foraminous cylinder H. An arm *m* of carbon extends downward from the arm *l* into the space *j* between the cylinder H and cup D, said arm being preferably about three inches wide. A post and connector *p* projects upward from the arm *l* through the cover B. A porous cup P is disposed in the cup D within the perforated cylinder K, and inside said cup P is disposed a similar porous cup R. The cup R is filled with a solution of nitric acid *q*, and is surrounded by a solution of sulphuric acid *r*, contained in the cup P. The space *t* between the cup P and perforated cylinder K is filled with bichromate of potash. The outer chamber *j* between the walls of the porous cup D and the perforated cylinder H is filled with finely-broken carbon. Mercury *v* is placed in the gutter C, whereby the zinc cylinder E may be continuously amalgamated or restored to its normal condition as its surface is destroyed by the action of the acid solution. A solution of sulphuric acid, preferably seven parts of water to one of acid, is disposed in the containing-jar A.

By employing the broken carbon in the chamber *j* and connecting the same with the carbon cylinder between the movable foraminous cylinders H K, so that they will act conjointly to form the positive pole, it will be seen that a large surface of carbon is presented to the action of the excitants from the inner porous cups R P, thereby preventing the strength of the battery from becoming impaired by the decomposition of the carbon, as the broken carbon serves to re-enforce the carbon plate, or vice versa. Moreover, by thus exposing an increased surface of carbon, it is found that a heavy ampère current results. The bichromate in the space *t* is slowly dissolved by the acids in the inner cups, and as the stronger acid is disposed in the inner cup P and slowly percolates through the walls of the cups an equal strength of excitants is maintained until they are exhausted, and the durability of the battery is greatly increased. The broken carbon being separated from the zinc plate only by the walls of the porous cup D, internal resistance in the battery is re-

duced to a minimum and the voltage largely increased.

My improved battery is especially designed for electric lighting, in which a powerful current is necessary. In batteries as ordinarily constructed such a current frequently causes sulphate of zinc to deposit on the zinc plate and porous cup, thus producing polarization. By mounting the cup D and gutter C on legs, as described, a greater portion of the sulphate is thus allowed to deposit on the bottoms thereof, and the danger of polarization thereby greatly diminished.

Having thus explained my invention, what I claim is—

1. In an electric battery of the character described, the combination of a containing-jar, a porous cup supported on legs within said jar, two detachable foraminous cylinders within said cup, and a porous jar within said cylinders, substantially as and for the purpose set forth.

2. In an electric battery, the combination of a containing-jar, a porous cup supported on legs within said jar, a gutter for the zinc pole disposed on legs around said cup, two foraminous cylinders within said cup, a porous cup within the inner cylinder, and a porous cup within said inner cup, all being arranged to operate substantially as described.

3. In an electric battery, the combination of a containing-jar provided with a cover, a porous cup in said jar provided with legs, a gutter surrounding said jar and containing mercury, said gutter having legs, a zinc cylinder in said gutter, an acid solution for said zinc, a perforated cylinder in said cup, broken carbon between said cup and cylinder, a perforated cylinder within said first cylinder, a carbon plate between said perforated cylinders, a porous cup within the inner cylinder surrounded with bichromate of potash and containing sulphuric acid, and a porous cup immersed in said acid and containing nitric acid, substantially as and for the purpose set forth.

4. In an electric battery, the combination of a containing-jar, a porous cup supported on legs within said jar, two perforated cylinders within said cup, and a carbon plate between said cylinders, substantially as described.

5. In an electric battery, the combination of a containing-jar, a porous cup supported on legs within said jar, two perforated cylinders within said cup, an inner porous cup within the inner cylinder, and an innermost porous cup within the inner porous cup.

6. In an electric battery, the combination of a containing-jar, a porous cup therein, two perforated cylinders, one within the other and both within said cup, a carbon plate between said perforated cylinders, broken carbon between the outer perforated cylinder and said cup, and arms extending from the carbon plate into the space between the outer perforated cylinder and porous cup and connecting the carbon plate with the broken carbon.

7. In an electric battery, the combination of the jar A, having the cover B, the porous cup D, provided with legs *f*, the gutter C, having legs *g*, and disposed around said cup, the zinc cylinder E in said gutter, the perforated cylinders H K, disposed within said cup, the carbon plate M between said cylinders, provided with an arm extending laterally from the plate and downwardly into the space between the outer perforated cylinder and said porous cup D, the porous cup P within the cylinder K, and the porous cup R within the cup P, substantially as described.

8. In an electric battery, the combination of the jar A, provided with the cover B, the porous cup D, having legs *f*, the gutter C, containing free mercury and having legs *g*, the zinc M in said mercury, an acid solution for said zinc, the cylinders H K in said cup, the carbon plate M between said cylinders, and having an arm extending laterally from said carbon plate and downwardly into the space between the outer perforated cylinder and said porous cup D, broken carbon in said space, the porous cup P, containing sulphuric acid and surrounded by bichromate of potash, and the porous cup R, containing nitric acid, substantially as described.

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