No. 688,788. Patented Dec. 10, 1901.

H. I. LURYE.

PRIMARY BATTERY.

(Application filed Jan. 30, 1901.)

(No Model.)

Fig. 1.

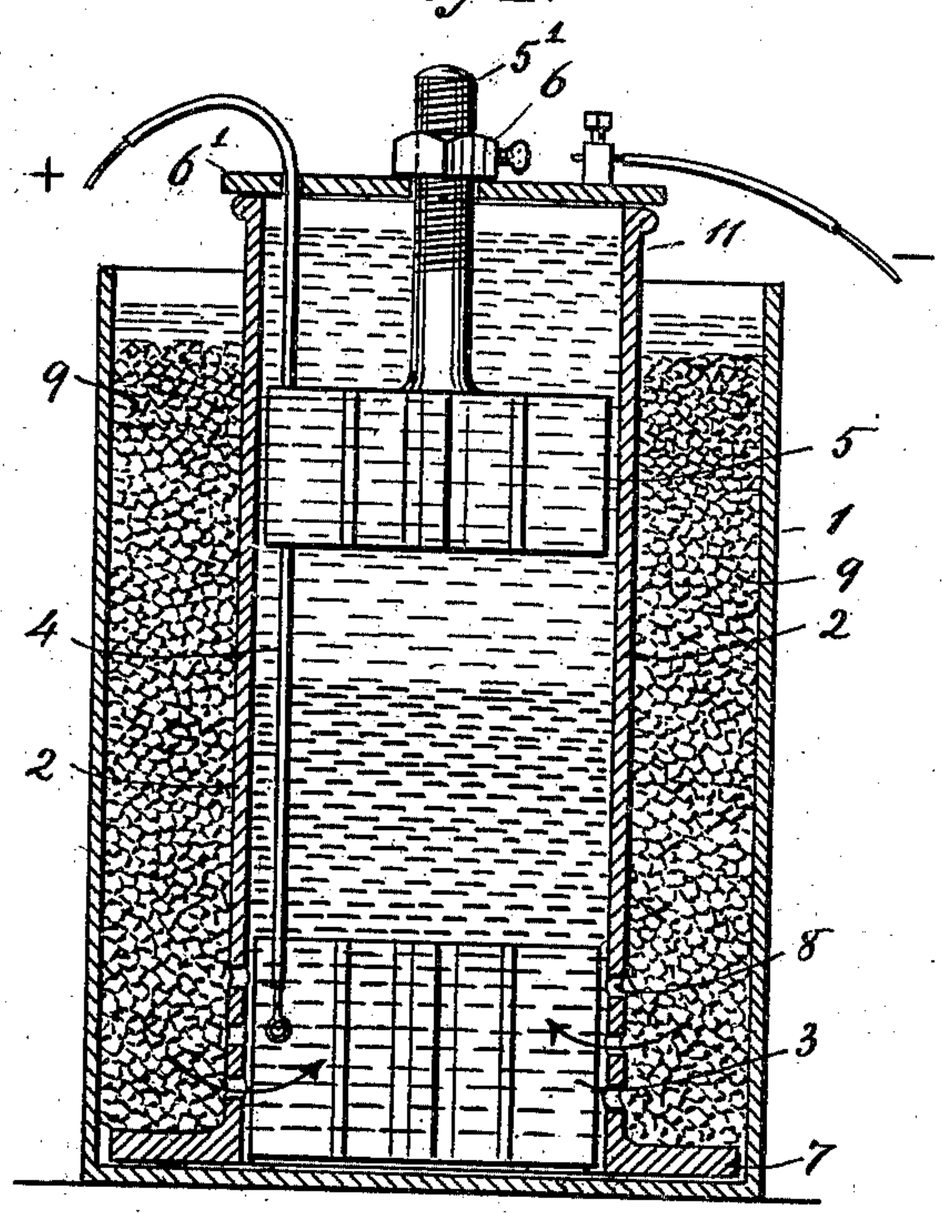


Fig. 2.

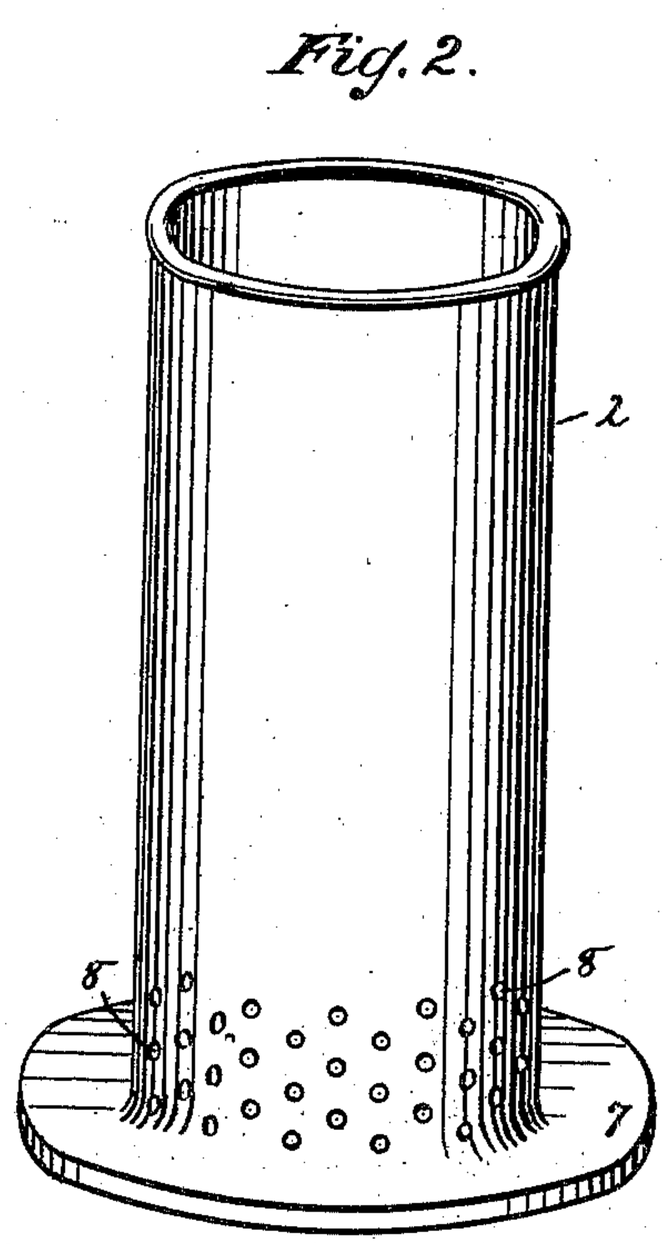
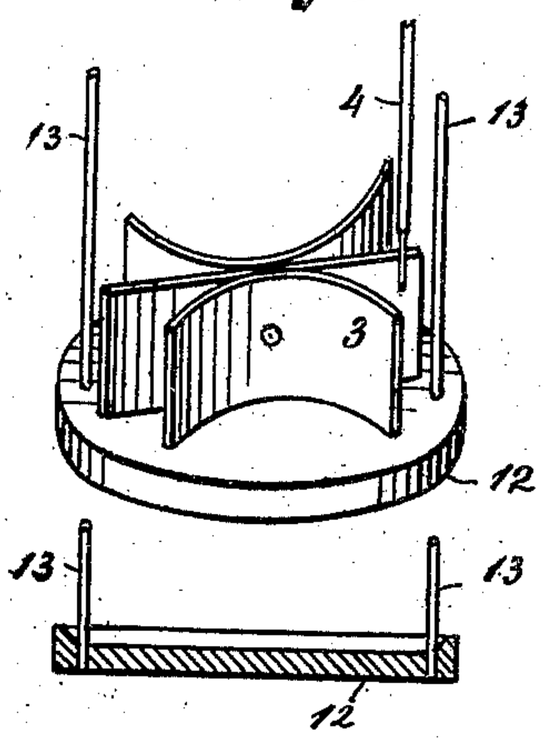


Fig. 3.

Fig. 4.



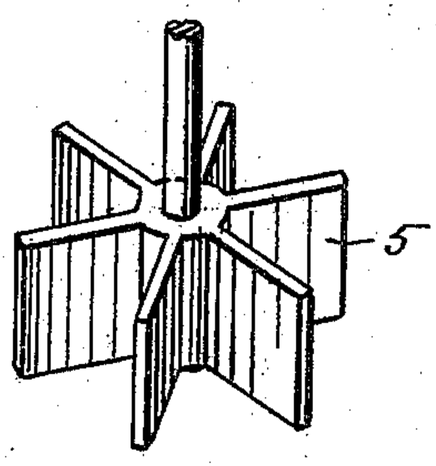


Fig. 5.

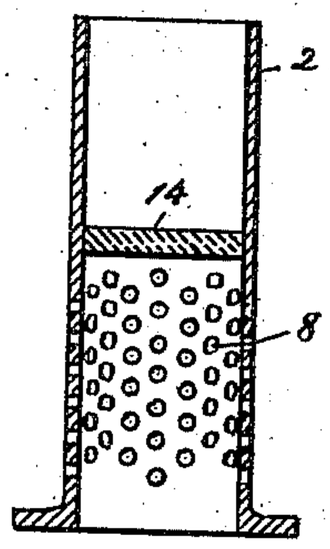
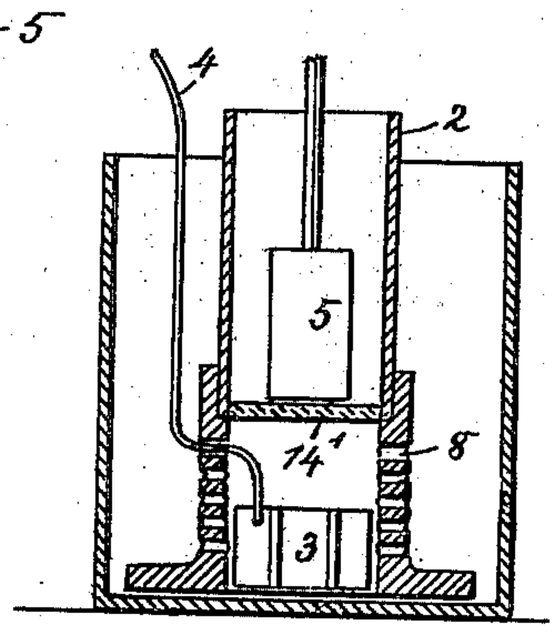


Fig. 6.



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UNITED STATES PATENT OFFICE.

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PRIMARY BATTERY.

SPECIFICATION forming part of Letters Patent No. 688,788, dated December 10, 1901.

Application filed January 30, 1901. Serial No. 45,378. (No model.)

To all whom it may concern:

Be it known that I, HENRY I. LURYE, a citizen of the United States, residing at Manhattan borough, in the city, county, and State of New York, have invented new and useful Improvements in Primary Batteries, of which the following is a specification.

This invention relates to a galvanic or electric battery or cell which is adapted to give a constant current and which can be readily cleaned or assembled without unnecessarily disturbing various parts.

The invention resides in the novel features of construction set forth in the following specification and claims and illustrated in the annexed drawings, in which—

Figure 1 is a sectional elevation of a battery embodying this invention. Fig. 2 is a perspective view of the inner receptacle of a battery. Fig. 3 is a perspective view of a form of a zinc element, although any convenient form can be employed. Fig. 4 shows a perspective and sectional view of a dish or plate for catching mud or deposit. Fig. 5 shows a modified form of inner receptacle by providing the same with a partition. Fig. 6 shows an inner jar on the plan shown in Fig. 5, but composed of two parts.

The cell consists of the outer jar 1 and a receptacle 2 contained within the same. The latter has at its bottom the flange 7, and just above this flange is a series of perforations or holes 8. At the bottom of the receptacle 2 is located the negative (copper) element 3, from which leads the conducting-wire 4. At 5 is indicated the positive (zinc) element, with stem 5′, which can be adjusted to various heights by means of the screw 6, fastening lid 6′ to stem 5′, so that the zinc element is suitably supported in the upper part of the inner receptacle.

To put the battery in operation, receptacle 2 is placed in outer jar 1, its flange 7 serving to keep and steady the former in its position in the latter, and such flange serves also as a bottom for the crystals of copper sulfate 9, which are filled in the space between the two parts 1 and 2. The liquids most conveniently used are sulfate of copper and sulfate of zinc. The copper element 3 is then placed at the bottom of receptacle 2, its conductor 4 being insulated and passing out through lid 6′. Then the zinc element 5 is adjusted by means of its hanger arrangement 6 6′ in the upper part of the receptacle 2. Both these elements may be of any suitable form or construction. Water is now poured over the copper-sulfate crystals 9, and in passing down through the crystals forms the solution of copper sulfate, which passes through the perforations 8 and rises in the receptacle 2, attacks the zinc plate 5, and deposits copper on plate or element 3, as well known, to produce a current of electricity. A clear copper-sulfate solution is thus fed through the perforated or sieved portion of the receptacle 2, and by its action on the zinc element forms zinc-sulfate solution, which being lighter than the copper solution is caused by the latter in the jar or reservoir to rise in the receptacle 2, as indicated at 11, which latter jar is made higher than outer jar 1.

The receptacle 2, of insulating material, as glass, stoneware, hard rubber, or the like, with its outwardly-extended flange, is held in concentric or suitable position in the outer jar, and this flange forming a bottom or support in the outer jar the weight of the crystals or contents in the latter holds the receptacle 2 down or in place. Such flange also prevents the crystals falling or resting on the bottom of the outer jar.

This battery has been found to possess certain advantages, as about three to five times as much copper sulfate can be used for the same size jar (depending on the size of crystals) as is used in the ordinary gravity-battery, so that this battery will last three to five times as long without recharging.

As the zinc-sulfate solution in the center receptacle 2 becomes more and more concentrated and some of it must be removed from time to time, the copper-sulfate solution automatically feeds as a clear solution into the center receptacle, through the sieve 8 at the lower part of such inner receptacle. As the copper sulfate must pass through the sieve 8 before entering the center receptacle, it enters as a clear solution and the deposit of copper is uniform, causing the current to be steady and uniform.

As this battery will run from three to five

times as long as the ordinary gravity-battery, a zinc plate three to five times as large may be used. Both the copper and zinc plates may be removed for inspection without disturbing the working solutions.

The inner receptable, as noticed, is open at top and bottom, and in or at its bottom can be placed a disk or plate, such as a shallow dish 12 of insulating material, with a handle such as a bail or rods 13 of some insulating material by which such dish can be lifted out. The element or copper plate 3 being placed on this dish instead of directly on bottom of jar or reservoir 1, this dish will catch all the copper mud which drops from the zinc plate, and all that will be necessary to clean the battery will be to remove first the zinc and copper plates and then by means of the two rods this shallow dish with its mud deposit. After cleaning and restoring this dish and replacing the copper and zinc plates the battery will again be in successful operation. By means of this dish the battery need never be recharged. All that will be necessary is to clean the shallow dish, as described, and constantly add crystals of copper sulfate to the reservoir from the top.

In the modifications shown in Figs. 5 and 6 the copper sulfate and zinc sulfate can be used separately and in different vessels, so as not to mix. A partition 14, Fig. 5, of porous material can be either cemented to or made part of the inner receptacle, the lower part of which, as noted, is in form of a sieve, or such partition, as seen in Fig. 6, could be formed by the bottom 14′ of the upper section of the inner receptacle, the latter in this modification being composed of two parts. The zinc plate being placed in the upper and the copper element in the lower or sieved portion or chamber of the inner receptacle, such inner receptacle can be placed or inclosed in the outer jar or reservoir, as noted.

In mentioning zinc and copper as elements and zinc sulfate and copper sulfate as solutions it is course understood that any serviceable elements or substance can be employed. It may also be mentioned that by having the center receptacle 2 without a bottom the weight of the device is lessened. The elements being entirely inclosed or contained in the inner receptacle so as not to project or extend into the reservoir, the battery is complete in said inner jar, and the outer jar or reservoir supplies a cleansed or standard solution to the battery to produce a constant current. The elements can be removed and replaced in the inner receptacle without disturbing the crystals or contents of the reservoir, thus facilitating, cleansing, and assembling.

The form shown in Fig. 5 or in Fig. 6, having a partition for the inner receptacle, is applicable to a so-called "standard Daniell cell."

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

1. A battery comprising a reservoir, a communicating receptacle in and substantially coextensive with said reservoir and of electro-non-conducting material, and elements inclosed by but not projecting from said receptacle.

2. A battery comprising a reservoir, a receptacle in and substantially coextensive with said reservoir, having a filtering portion near its lower end, and elements inclosed by said receptacle but not projecting therefrom.

3. A battery comprising a reservoir and a receptacle inside said reservoir sustained upon the bottom of the reservoir and having holes in proximity to said bottom and elements inclosed by said receptacle.

4. A battery comprising an inner receptacle with elements inclosed therein, and an outer reservoir, said inner receptacle being perforated to act as a strainer and being provided with a flange forming a bottom or support for the contents of the outer receptacle substantially as described.

5. A battery comprising a receptacle having removable elements therein, a reservoir inclosing said receptacle, and a removable bottom or disk for said receptacle.

6. A battery comprising an outer jar and an inner receptacle open at top and bottom and having a lower straining portion and an outwardly-extended flange made to form a bottom or support in the outer jar, said outer jar being made to form a reservoir for crystals or the like, and said inner receptacle being made to contain elements within said receptacle.

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

HENRY I. LURYE.

Witnesses:
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E. F. KASTENHUBER.