(No Model.)

F. E. KINSMAN.

GALVANIC BATTERY.

No. 264,304. Patented Sept. 12, 1882.

Fig. 1.

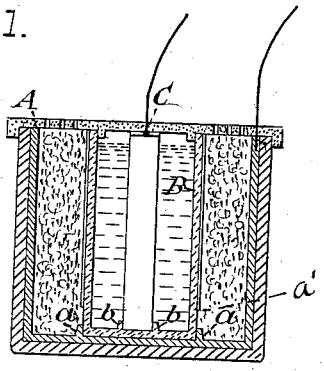
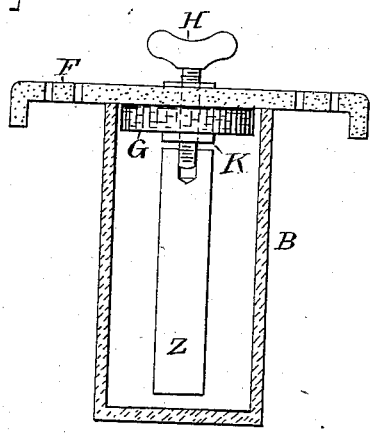


Fig. 2.



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UNITED STATES PATENT OFFICE.

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GALVANIC BATTERY.

SPECIFICATION forming part of Letters Patent No. 264,304, dated September 12, 1882.

Application filed June 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. KINSMAN, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Galvanic Batteries, of which the following is a specification.

The object of my invention is to produce a simple, cheap, efficient, and durable galvanic battery; and to this end my invention consists of certain novel combinations of elements and certain specific features of construction, which I will proceed to describe, and then specifically point out in the claims.

Referring to the accompanying drawings, Figure 1 is a vertical section of a galvanic battery embodying my invention, and Fig. 2 is a vertical section of my novel cover-plate.

A indicates a cup or cell of iron, which may be either cast or stamped up, and which serves, in connection with iron filings, scrap, or small pieces of iron of any other kind or form contained therein, as one of the elements of the battery. When the iron-containing cell is made in the manner stated by casting or stamping it up in a single piece free from soldered joints, there is no danger of leakage, and the battery is entirely free from the difficulty attaching to batteries as hitherto constructed with a containing-cell of iron, which latter, being made with soldered joints, is liable to leak, owing to the action of the battery-liquids upon the solder.

B represents a cup, which contains the other element of the battery C, which latter is of zinc, and is immersed in a solution of a caustic alkali, such as potash. The cup B is impervious to moisture from its top to a point near the bottom, as at *a'*, and for the remainder of the distance downward is porous, so as at this portion to constitute a porous diaphragm or partition. I prefer to construct this cup by taking an ordinary porous cup of earthenware and glazing, varnishing, shellacing, or treating it in any other suitable manner so as to render it impervious from its top to the point *a'*. Formed upon the bottom of the cup B is an annular projection or a suitable number of separate projections, *b b*, which embrace the end of the element C and serve to hold it in place and out of contact with the sides of the cup. The same object might be accomplished by forming projections upon the element C, which would rest against the interior walls of the cup B. Cast or in any other suitable manner formed upon the bottom of the iron cell A is an annular projection, *a a*, which serves to keep the cup B in proper position.

In the space between the inner cup, B, and the walls of the iron cell A is a mass of iron filings, turnings, or some other suitably-divided form of iron, which rests in contact with the walls of the cell A, and with which is mixed an indestructible absorbent in loose form—such as mineral wool or asbestus in shredded or fibrous condition—which serves to keep the iron filings and the interior walls of the cup A sufficiently moist to allow a proper galvanic action to take place, the object being to do away with a body of liquid in contact with the element, and to thus facilitate depolarization. The liquid thus drawn up by the bibulous or absorbent material is at the bottom only of the cup, a suitable supply being kept up by the percolation of the liquid through the porous portion of the cup B, which is normally full of the solution. The supply is governed by the height of the non-porous portion of the cup B in accordance with the size of the outer cup and the consequent rapidity of the evaporation.

Although I have specified the use of an indestructible absorbent for mixture with the iron filings, I do not limit myself thereto, as other absorbent material may be used in the place of those mentioned. I prefer to use the materials specified, as the durability of the battery is largely increased. In order to assist the depolarization, the inside of the cell A is roughened.

I have found in practice that the efficiency of the battery is largely increased by the employment of soft iron for the filings and for the iron cell.

It is evident that so far as concerns the employment of the absorbent material mixed with the iron filings the value of my invention is not dependent upon the kind of cup A that is used, and that this feature of the invention might be found of value with a cup of glass or other non-conductor or with other metals in a battery using other solutions. This portion of the invention is, however, chiefly of value

in a battery in which the cell itself forms a portion of one of the elements.

The absorbent material might be applied in other ways instead of mixing it intimately with the iron filings in the manner indicated—as, for instance, by embedding in the filings at frequent intervals vertical threads or strands of the fibrous material. I do not, however, limit myself to any particular method of applying the material, the idea only being to make use of the capillary action of the absorbent in contact with the filings to keep them thoroughly moistened without covering them with the liquid. Electrical connection with the iron elements is preferably formed by a zinc or copper wire cast into the cup A. Connection with the zinc element is formed in a similar or any suitable manner.

Applied to the outer surface of the metallic cell A is a non-conducting envelope of mineral wool or asbestus, applied by first shellacing or otherwise covering the surface of the cup with a cementing or binding material and then applying the asbestus or mineral wool in loose short fibers. I might, however, use for the purpose asbestus board or other form of the materials mentioned. When the cup is provided with a non-conducting envelope of this kind any number of them may be set closely against one another, and may be readily handled without danger of breakage.

F, Fig. 2, is a cover-plate for the battery, preferably perforated near its edge over the space containing the filings, and provided at its central portion with a plug or stopper, G, for the inner cup, which fits the mouth of said cup tightly. Said stopper is made of some compressible elastic material, and is clamped against the inner side of the cover-plate by means of a screw, H, which screws through the plate and carries at its lower end a washer, K. By tightening the screw the stopper is compressed vertically and expanded laterally, so as to fit the end of the cup B closely. The screw H screws into the end of the zinc and holds it suspended in the cup, preventing it from touching the sides thereof. At the same time good electrical connection with the zinc can be made through the screw.

When the battery is constructed as above described and provided with the cover-plate shown it may be conveniently transported without danger of spilling its contents, while at the same time its negative element is exposed to the access of air, so that it is promptly depolarized.

What I claim as my invention is—

1. The combination, with metal filings or scraps forming an element for a galvanic battery, of an absorbent mixed loosely therewith, in the manner described, so as by capillary action to keep the metal filings moist.

2. A battery element consisting of a cup of metal containing metal plugs or scraps, with which is loosely mixed an absorbent material and means whereby liquid may be admitted gradually to the bottom of the cell, so that said filings may be kept moist by the capillary action of the absorbent without being covered by the liquid.

3. The combination, with metal scraps or filings forming an element for a galvanic battery, of an absorbent mixed with said scraps or filings and formed of asbestus or mineral wool.

4. An element for a galvanic battery, formed of a cup of iron containing iron scraps or filings, with which is mixed absorbent mineral wool or asbestus.

5. In a galvanic battery, an element composed of scraps or turnings of soft iron immersed in a solution of a caustic alkali.

6. The combination, with a metal containing cup or cell forming an element of a galvanic battery, of an envelope of asbestus or mineral wool, as and for the purpose described.

7. A galvanic battery composed of a containing-cell porous at a portion only of its surface, and containing a plate of zinc immersed in a solution of a caustic alkali, and a second containing-cell of iron cast or stamped so as to be free from soldered joints, as and for the purpose described.

8. A galvanic battery composed of a cup, A, of iron, containing iron scraps or filings mixed with an absorbent, and a cup, B, porous near its bottom only, and containing a zinc element immersed in a solution of caustic potash or alkali.

9. A galvanic battery formed of an outer cell or cup, A, of iron, containing iron filings mixed with an absorbent, and having a non-conducting envelope, a cup, B, porous near its bottom only, and an element, C, of zinc, contained in said cup and immersed in a solution of a caustic alkali, such as potash.

10. The combination, with the element formed of the cup A and its contained metal filings, of the element C, contained in a cup porous at its bottom only, and a cover perforated over the element A and closed over the element C.

11. The combination, with the cover F, perforated near its edge, of the compressible and expansible plug G, as and for the purpose described.

12. The combination of the cup B, the plate F, the plug G, and the screw H, as and for the purpose described.

13. A galvanic battery consisting of a liquid-containing cell porous near its bottom and holding one of the elements of the battery and the battery solution, and a second containing cell or receptacle contiguous to the first and holding a mass of metal filings or scraps mixed with an absorbent to constitute the other element.

Signed at New York, in the county of New York and State of New York, this 16th day of June, A. D. 1882.

FRANK E. KINSMAN.

Witnesses:
H. C. TOWNSEND,
THOS. TOOMEY.