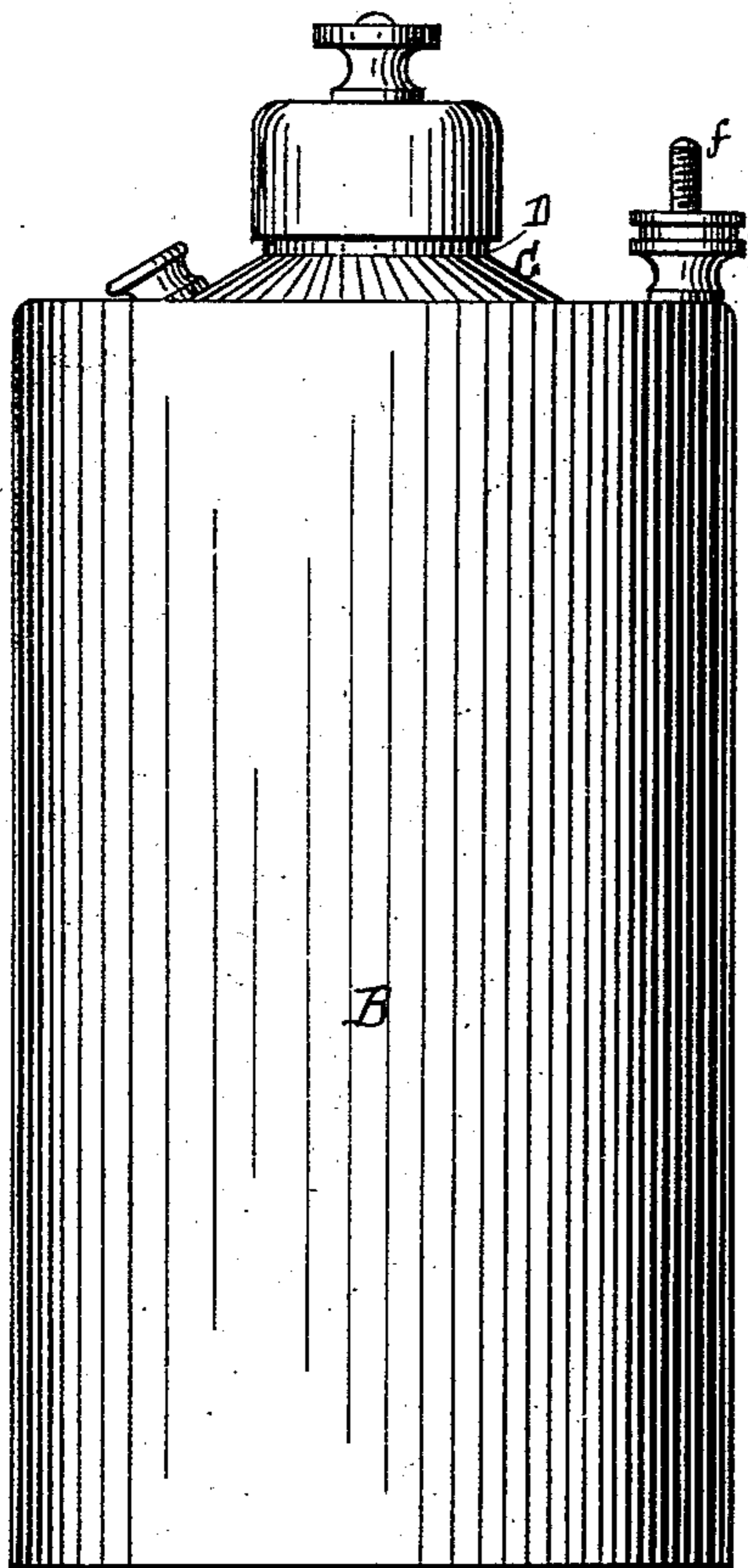


G. A. CONVERSE.  
Galvanic-Battery Cell.

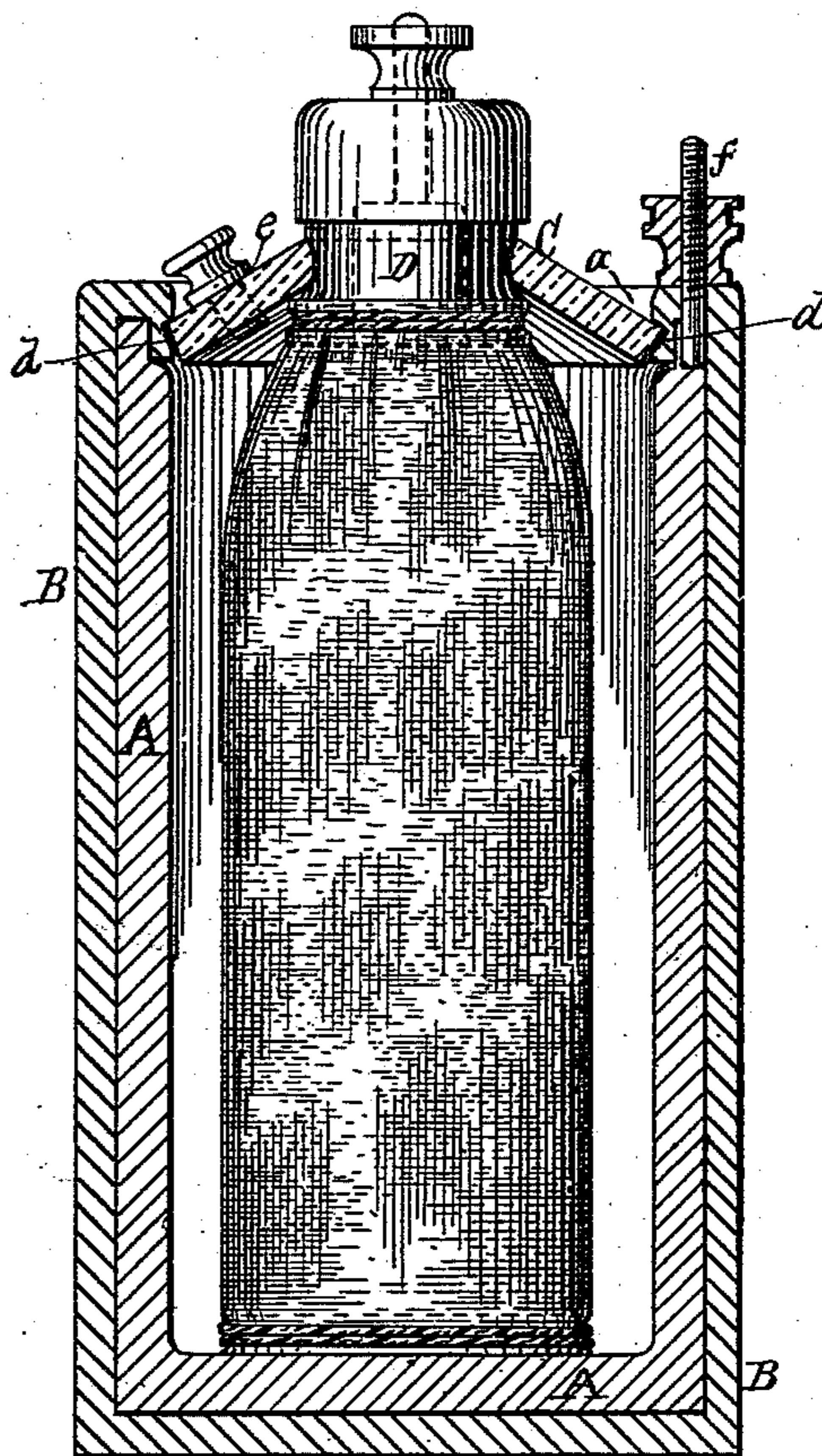
No. 224,328.

Patented Feb. 10, 1880.

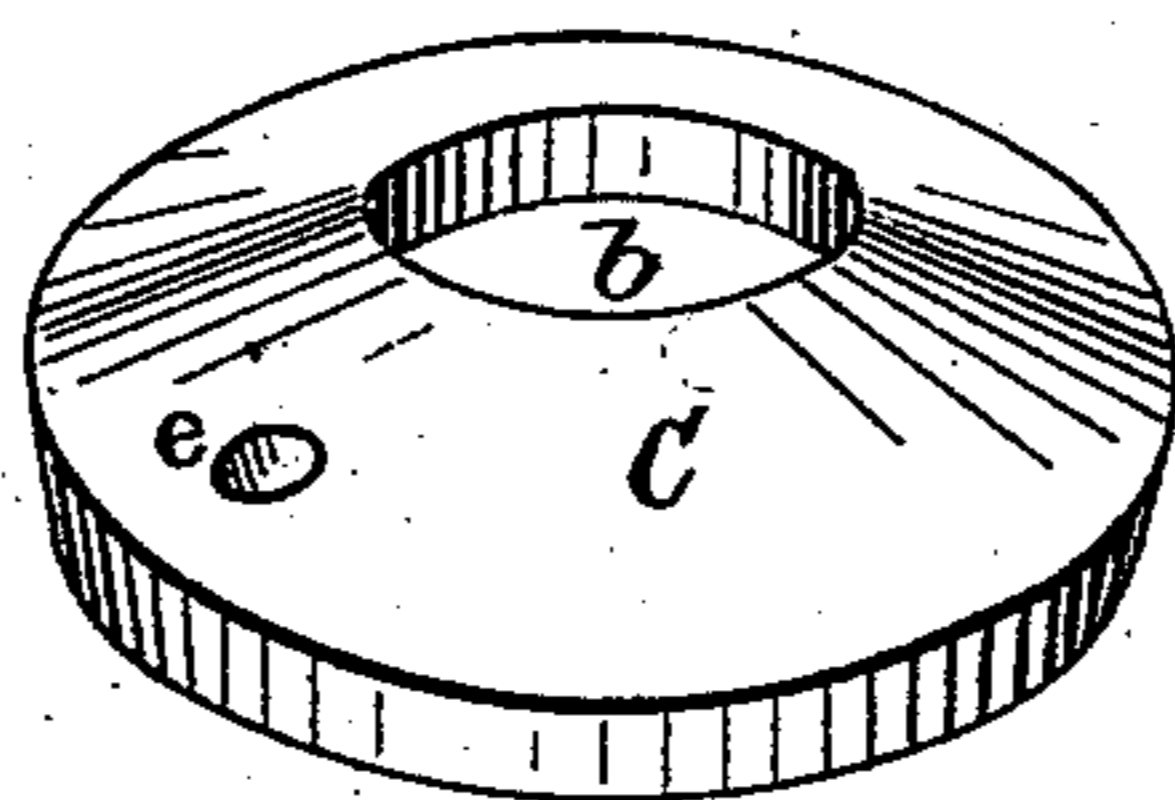
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses:  
*Philip F. Garner.*  
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# UNITED STATES PATENT OFFICE.

GEORGE A. CONVERSE, OF UNITED STATES NAVY, ASSIGNOR TO WALTER N. HILL, TRUSTEE, OF NEWPORT, RHODE ISLAND.

## GALVANIC-BATTERY CELL.

SPECIFICATION forming part of Letters Patent No. 224,328, dated February 10, 1880.

Application filed August 11, 1879.

*To all whom it may concern:*

Be it known that I, GEORGE A. CONVERSE, of the United States Navy, have invented certain new and useful Improvements in Galvanic-Battery Cells; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

The object sought by me is a galvanic-battery cell particularly adapted for use on ship-board and elsewhere under similar changeable and exposed conditions. Such a battery-cell should be well inclosed and electrically insulated, so as to retain its contents in various abnormal positions, and to be capable of practical use in wet or damp places, or even under water. It should also be compact in form, simple in its construction, easily and promptly accessible internally, not liable to be damaged through rough usage or accident, and, so far as may be consistent with these several requirements, the cell should be attainable at low cost.

For the attainment of these ends my invention consists, mainly, in a zinc shell or cup embedded in an insulating and protecting jacket which wholly incloses the exterior of the zinc cup—that is to say, not only are the bottom and outside walls of the zinc cup inclosed, but its upper edge also. It is also desirable that said jacket be extended downward from the upper edge over and upon the inner surface of the cup when a cap is employed therewith, as hereinafter described. It is of practical value that the upper edge of the zinc cup be protected by the jacket, thereby obviating accidental conductivity from one battery to another in the same series, as from contact with loose wires, wet lines, &c. Moreover, when the upper edge of the zinc cup is exposed it is liable to be speedily corroded, and zinc salts accumulate thereon to a highly objectionable extent. This jacket may be composed of any good insulating material which has sufficient rigidity and strength to properly perform the protecting function; but I prefer to use gutta-percha, kerite, papier-maché, or such other material as will admit of the cup

being closely embedded therein, and thus attain a solid, firm, and durable structure.

My invention further consists in the combination, with a battery-cell composed of zinc embedded in an insulating and protecting jacket, of a flexible cap composed of insulating material, which tightly engages at its periphery with the jacket of the cell, and has a central opening for tightly embracing the neck of the negative element.

I am well aware that glass battery-cells have heretofore been provided with caps composed of insulating material and secured in a closed position by means of bolts and nuts; and that glass cells have been incased or jacketed in wood and other insulating and protecting material; and that battery-cells of glass and of metal have been inclosed within cases or boxes, as in therapeutic electrical apparatus; and also that zinc has heretofore been used in the form of a shell or cup, both with and without an open or a perforated bottom, for use independently or within a separate cell or vessel which contains the excitant liquid, and also having a closed bottom, so as to serve as a receptacle for fluid.

I am also aware that carbon cups have heretofore been coated on the bottom and outer sides with a waxy mixture for attaining impermeability as to the excitant fluid within the cup, and that an exterior casing has also been provided therefor, composed of india-rubber or other soft elastic material. Such cells are not, however, wholly inclosed by said soft and elastic casings; but, on the contrary, their upper edges are fully exposed to wasteful and objectionable conductivity, and the bottoms of the cups rest upon a layer of waxy material. Carbon cups thus constructed would have insufficient strength to warrant their use in the service for which my cells are specially adapted.

To more particularly describe my invention I will refer to the accompanying drawings, in which—

Figure 1 represents, in side view, one of my battery-cells complete. Fig. 2 represents the same in central vertical section. Fig. 3 represents the flexible cap detached.

The zinc cup A is usually formed by casting, and its thickness may be varied to meet special requirements. This cup should be free from blow-holes, as it performs the function of a cell for containing the excitant fluid as well as that of the positive element in the battery.

The insulating and protecting jacket B incloses the entire exterior of the cup, its upper edge, and also a small portion of its interior surface below said edge, as at *a*. I deem it desirable that the zinc cup and the jacket should be as closely united as possible, to afford a firm solid structure and prevent any movement of the cup independent of its jacket.

The jacket may be composed of any suitable insulating material which will materially contribute to the strength of the cell, and I find that gutta-percha is well adapted to the purpose, because of its rigidity and the facility with which it may be applied in close contact with the zinc; but there are other well-known materials which can be employed with substantially the same results; and I do not therefore limit my invention to a jacket of any particular material, provided that said jacket, when considered without reference to the zinc, constitutes in itself a strong, rigid, cup-like structure which will be capable of resisting external pressure and properly supporting the negative element resting on the upper edge of the jacket, even after the zinc cup has been so far decomposed as to have no self-sustaining capacity as a cup or cell.

The cap C is preferably composed of elastic vulcanized rubber. It is circular in form and has a central opening, *b*. The periphery *c* of the cap is fitted to forcibly engage with the surface of an annular recess, *d*, provided therefor in the jacket B at that portion thereof which overlaps the top of the zinc cup on its inner side.

The cap is preferably in the form of a frustum of a cone, and its peripheral dimension at the base is such that it must be contracted to enter the annular recess *d*, and then, by its uniform expansion, to press tightly against the jacket and make a fluid-tight joint therewith. On the contrary, the inside dimension of the opening *b* at the top of the cap is such that it must be expanded to receive the neck D of the negative element, (which may also be annularly recessed,) so that by con-

traction it will also make a fluid-tight joint with the neck, and thus render the cell fluid-tight.

For enabling the battery to be supplied with liquid, and to afford the occasional escape of gases, a hole, *e*, is made in the flexible cap, which is provided with a plug easily applied and removed, the flexible material affording an elastic seat for the plug, which secures an air and fluid tight closure.

The neck D of the negative element is also composed of insulating material, and the metallic conductor in its center is so snugly embraced within it as to afford no passage for air or liquid.

The post *f* is applied to the zinc cup through the edge of the jacket at the top, as shown.

It will be seen that the zinc cup, being thus protected and inclosed, is not liable to injury from rough usage or to spill its contents, and it is well insulated electrically, so that it may be used under variable conditions and circumstances of exposure, and also that the opening and closing of the cell can be promptly and easily effected.

The economical utilization of the zinc and its jacket in forming a battery-cell is of considerable practical consequence.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A galvanic-battery cell composed of a zinc cup, operating as a receptacle for excitant liquid and as a battery element, solidly embedded within a strong, rigid inclosing-jacket, which insulates the bottom, outer side, and upper edge of the cup, and constitutes in itself a cup-like structure capable of securely maintaining the zinc element in its cylindrical form regardless of its lack of bulk and strength, substantially as described.

2. The combination, with a battery-cell composed of a zinc cup inclosed within an insulating and protecting jacket, of a flexible cap fitted at its periphery to tightly engage with the jacket of the cell, and provided with a central opening for tightly engaging with the neck of the negative element, substantially as described.

GEORGE A. CONVERSE.

Witnesses:

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