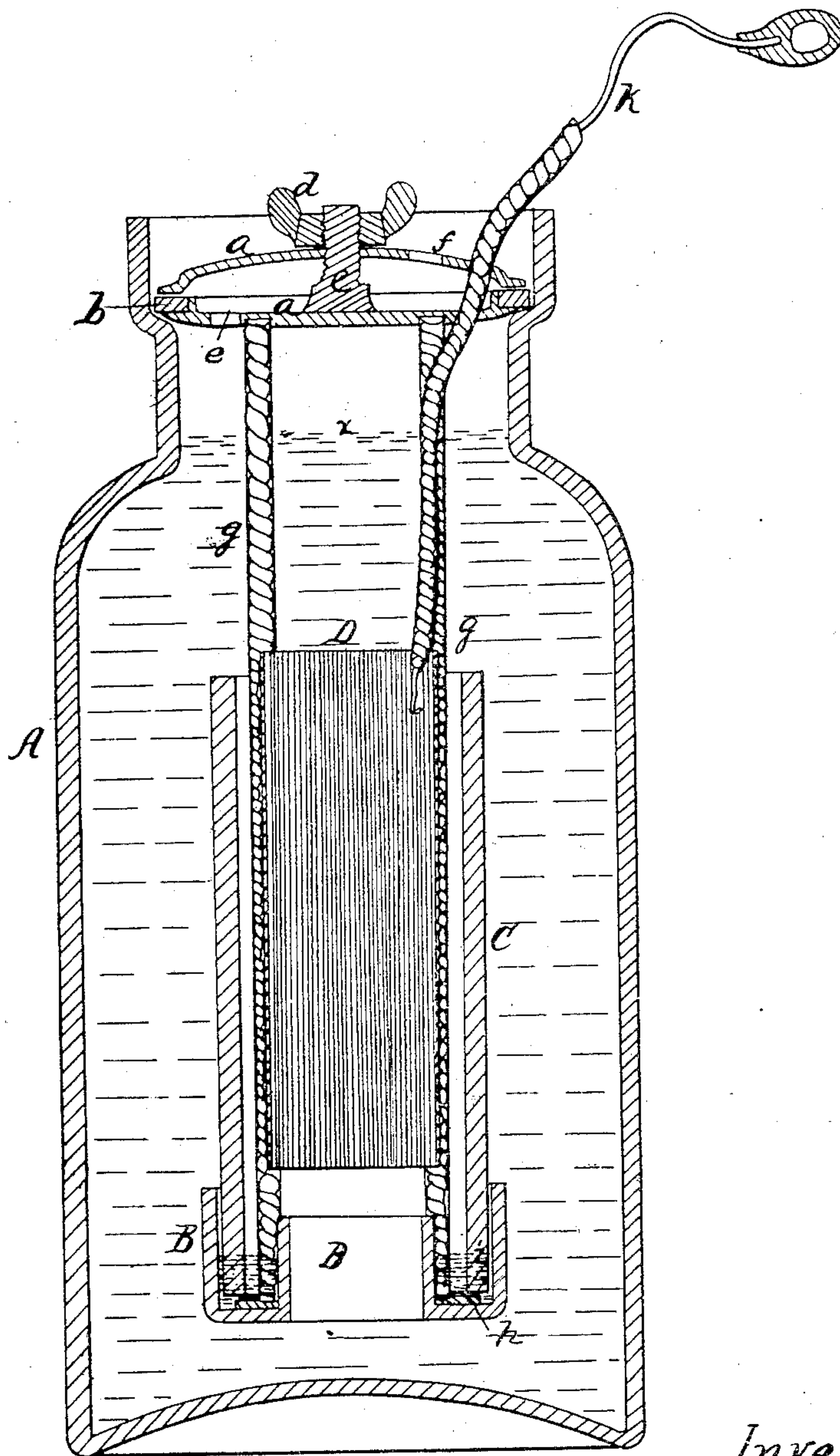


J. BLACKIE.  
GALVANIC BATTERY.

No. 49,824.

Patented Sept. 5, 1865.



Witnesses  
W. C. Dodge  
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# UNITED STATES PATENT OFFICE.

JOHN BLACKIE, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO HIMSELF, WM. C. DODGE, AND WM. S. KING.

## IMPROVEMENT IN GALVANIC BATTERIES.

Specification forming part of Letters Patent No. 49,824, dated September 5, 1865.

*To all whom it may concern:*

Be it known that I, JOHN BLACKIE, of Washington city, in the District of Columbia, have invented certain new and useful Improvements in the Construction of Batteries for Generating Electricity; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon, in which one of the jars or cells, with its accompanying parts, is shown in section.

The nature of my invention consists in so constructing a battery that it can be used for a long time without other care or attention than merely keeping it supplied with the proper acid, and at the same time preserve the zinc cup or plates from the unequal and rapid decomposition so common in batteries as generally constructed.

A represents a glass or other suitable jar for containing the acid. This jar is provided with a cover or stopper consisting of two metallic disks, *a* and *a'*, having a rubber ring, *b*, inserted between them in such a position as to protrude slightly beyond the periphery of the plates *a* and *a'*.

A stud or short bolt, *c*, projects from the upper surface of plate *a'*, and passes through a hole in plate *a*, being provided with a thumb-screw, *d*, at its upper end, by which the two plates can be drawn together, and by compressing the rubber ring *b* cause it to protrude laterally against the inner sides of the neck of the jar, whereby the cover is held securely in place and the jar stopped perfectly tight.

A small hole, *e*, is made in the lower plate, *a'*, and a similar hole, *f*, is made through the upper plate, *a*; but these holes, instead of being one directly over the other, are placed at opposite sides, as shown in the drawing. By this means the liquid in the jar is prevented from being spilled or thrown out when the jar is moved or carried about—as, for instance, on ship-board, or when carried in a carriage of any kind—as it is obvious that any liquid which may be dashed upward through hole *e* will impinge against the under surface of plate *a*, and being thus arrested will flow back into the jar.

To the under side of plate *a'* three wires or

small rods, *g*, are securely attached and project to near the bottom of the jar, their lower ends being united to a copper ring, *h*, the rods *g* being insulated by being covered with india-rubber or other suitable substance.

A rubber or gutta-percha, cup, *B*, is secured to the copper ring *h*, as shown in the drawings, the cup being made double, so as to leave an open passage vertically through its center for the liquid to flow or pass readily through, and in this cup is placed a small quantity of quicksilver, *i*. A zinc cylinder, *C*, cut longitudinally through its center, is then placed so as to encircle the rods *g*, with its lower end resting in the cup *B* and immersed in the quicksilver *i* therein. A smaller cylinder, *D*, made of thin corrugated sheet-silver, is then secured in the space between the three rods *g*, as shown in the drawings. To this silver tube or plate *D* an insulated wire, *k*, is attached, which passes thence up through the plates *a* and *a'*, as shown. The parts being placed in position, as shown, the jar is then filled nearly full of dilute-sulphuric acid, the acid reaching up to the line *x* or higher, so as to cover entirely the zinc cylinder *C*. When thus arranged the quicksilver in the cup *B* is drawn by capillary attraction up the sides of the zinc tube, whereby its entire surface is kept constantly coated with a thin film of the quicksilver, so long as the zinc is kept wet, and it is for this purpose that the zinc is entirely immersed in the acid. By this means the zinc is protected from the rapid and local decomposition which is so apt to occur in the batteries in general use. Experience has shown that such local action upon the zinc plate is most likely to occur at the surface of the liquid when the zinc is only partially immersed; but by having it entirely immersed, as here shown, the entire surface of the zinc is kept coated with the quicksilver, and is thereby protected and made to last for a much longer period. This being the case, the necessity for frequent examination and renewal of the zinc plates is obviated, and hence this battery may be used for months without any other attention or care than merely to supply the liquid lost by evaporation, a battery constructed on this plan having been used continuously for ten months without repair.

The advantages of such a battery will be ap-



parent to all familiar with the use of such instruments, especially in operating telegraph-lines, where much time and attention is necessarily bestowed on the ordinary batteries to keep them in working order.

If it be desired to unite a series of these jars in order to form a stronger battery, it is only necessary to unite the wire *k* of one jar to the stud *c* of another, which can be readily done by bending the wire around the stud *c* and screwing the nut *d* tightly down upon it. In this way any desired number may be united, and a battery of any desired strength formed. The current from one jar will then pass from stud *c* to plate *a'*, thence down the insulated rods *g*, and thus be added to the current generated in the second jar.

Having thus described my invention, what

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

1. The cup B, suspended by the insulated rods *g*, and plate or ring *h*, as herein shown and described.

2. The perforated plate *a* and *a'*, provided with the stud *c* and nut *d*, when constructed as and for the purpose herein set forth.

3. The combination of the cup B, provided with mercury, the zinc plates C, and the silver plate D, all submerged and arranged to operate substantially as and for the purpose set forth.

JOHN BLACKIE.

Witnesses:

W. C. DODGE,

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