(No Model.)

# I. D. FULLER.

## ELECTRIC BATTERY JAR AND METHOD OF INSULATING THE SAME.

No. 304,265. Patented Aug. 26, 1884.

Fig. 1.

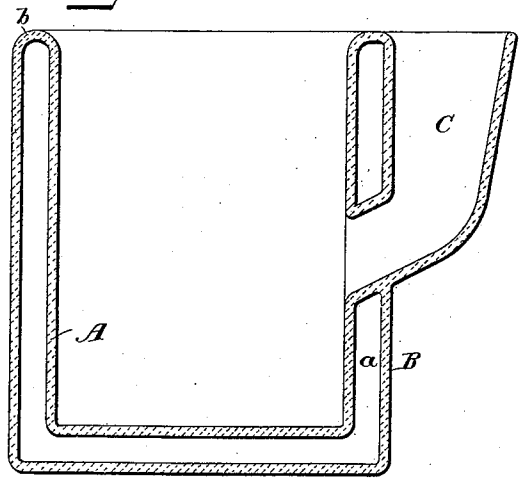



Fig. 4.

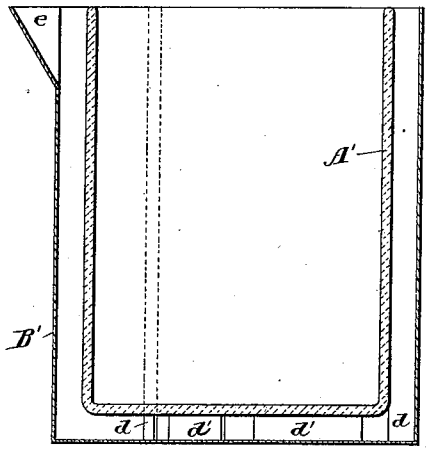



Fig. 2.

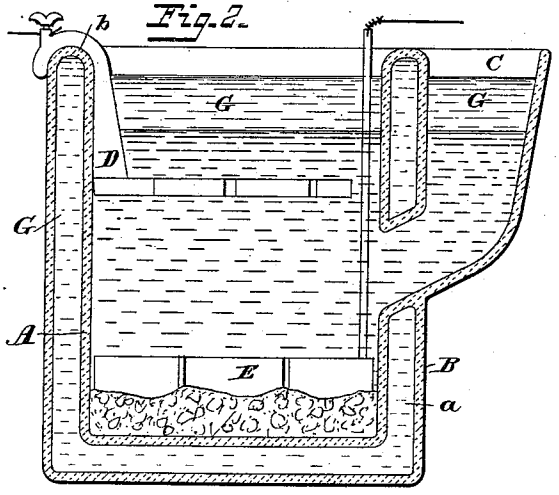



Fig. 5.

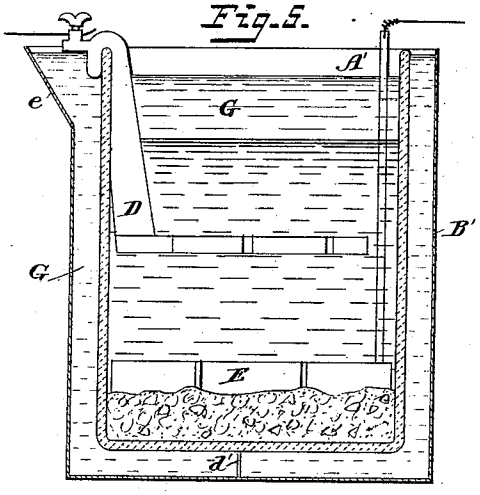



Fig. 3.

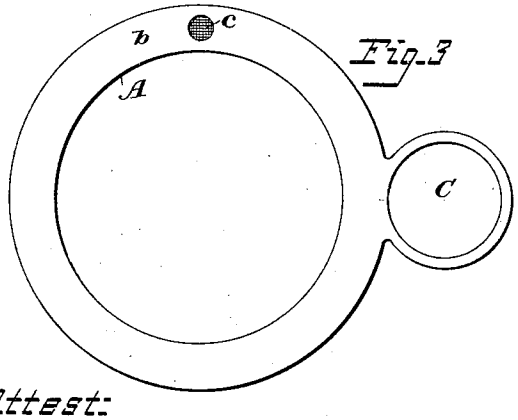
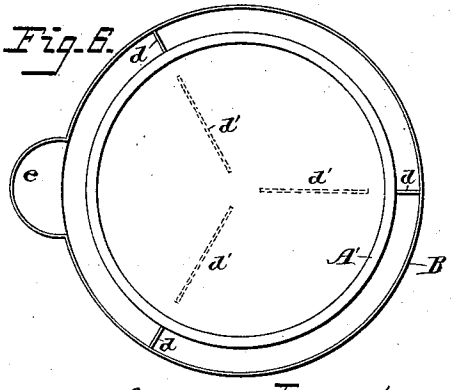



Fig. 6.




Attest:
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Isham D. Fuller
by Wm. G. Henderson

N. PETERS. Photo-Lithographer. Washington, D. C.

# UNITED STATES PATENT OFFICE.

ISHAM D. FULLER, OF ATLANTA, GEORGIA, ASSIGNOR OF ONE-HALF TO GREEN J. FOREACRE, OF NEWARK, OHIO.

## ELECTRIC-BATTERY JAR AND METHOD OF INSULATING THE SAME.

SPECIFICATION forming part of Letters Patent No. 304,265, dated August 26, 1884.

Application filed January 3, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, ISHAM D. FULLER, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Electric-Battery Jars and Methods of Insulating the Same; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to electric batteries, and has for its object the formation of the battery-jar and the insulation of the same.

Heretofore great inconvenience and impairment of the energy and life of electric batteries have resulted from the escape from the battery of that element commonly known as "climbing salts," generated by bringing into the presence of each other in the battery-jar zinc, copper, sulphate of copper, and water, which element settles on the external surface of the jar in the form of a whitish deposit, with which all electricians are familiar.

Various methods have been practiced with the view of preventing, or at least checking or reducing, the escape of such deposit. The jars have been closed, they have been waxed, and they have been greased, and while to some extent the formation of the deposit on the exterior surface has been checked, still heretofore more or less of such deposit has been made. After many experiments I have at last succeeded in very effectually preventing the escape and settling of such deposit on the jar. My invention not only prevents the deposit from being made on the outside of the jar, but in consequence it prolongs the life or usefulness of the zinc, the copper, and the sulphate of copper employed in such batteries, and also increases the power of the current generated, and also destroys or prevents from being evolved the disagreeable odors heretofore experienced. Such results are reached by enveloping the jar in a suitable insulating-envelope which retains within the jar that element which otherwise would escape and form the deposit on the exterior surface of the jar, and which would gradually make its way to other parts. This insulating-envelope also maintains such a uniform temperature that will prevent the jar from freezing, whereby the chemical action of the battery is maintained and the battery never demoralized. Such method can be applied to batteries already in use at very little expense; but I prefer to use it in connection with my improved jar, which is made with an outer chamber, with provision for introducing the insulating matter into the same, so as to envelop the sides and bottom of the inner jar. Such jar is also provided with means for introducing the sulphate of copper into it below the top thereof, so as not to agitate the liquid within the same or disturb the current. The liquid used can be introduced through the same opening, or withdrawn therefrom, if necessary, by means of a syringe.

In the accompanying drawings, Figure 1 is a vertical section through my improved jar. Fig. 2 is a similar view showing the jar in operative condition. Fig. 3 is a plan view. Fig. 4 is a vertical section through a jar of ordinary construction with my addition applied thereto. Fig. 5 is a similar view showing the same parts in operative condition, and Fig. 6 a plan view thereof.

To carry out my method of insulation to the best advantage, I construct, in any manner well known to glass-makers, a jar, A, with an outer casing or shell, B, of some suitable non-conducting material, the same as the jar proper, for instance, of glass, so as to form a space, *a*, between the bottom and sides of the two vessels, and close the space at the top of the two vessels by a bridge, *b*, in which is formed an aperture, *c* (to be closed by a suitable stopper,) for the introduction of the material G, forming the insulating-envelope, sufficient quantity of said material being introduced to fill the space *a*. The material which I have found suitable for the purpose is the ordinary kerosene or coal oil of commerce. This oil I have used and found to effectually prevent the escape of the element which forms the deposit when other oils or oleaginous and other substances employed have failed. The oil may be used in any quantity found sufficient for the purpose; but I have produced perfectly satisfactory results by using a body

of oil from an eighth to a quarter of an inch in thickness. Besides filling the space between the two vessels, I cover the top of the fluid in the battery with the oil to the extent of, say, half an inch, although this may be varied in quantity, the same as in enveloping the sides and bottom of the inner jar. By thus enveloping the jar containing the water, zinc, copper, and sulphate of copper the deposit on the jar heretofore experienced is prevented, the properties essential to the electrical current are retained within the jar, and hence a stronger and more regular current produced and maintained, and the battery is kept up at a much smaller consumption of material, and hence at less expense, one attendant can take care and charge of more batteries, and there is no liability of the battery freezing, since the latent heat within the oil that keeps it from freezing also prevents the battery which is enveloped in the oil, from freezing.

In order to disinfect the oil and check its evaporation, and to prevent the formation of the sediment that otherwise will form, I add to the oil about one-tenth or one-eighth of its volume of Darby's prophylactic fluid—a compound well known to the public, and especially to chemists and druggists. When the water or sulphate of copper is introduced into the battery through the top of the jar in renewing the battery, the liquid within the battery is much agitated and the current materially and seriously disturbed. In order to overcome that difficulty, I form the jar with a spout or tube, C, the same preferably being made as a part of the jar and its casing, and communicating with the inner jar intermediate of its two ends, preferably about midway, and opening upwardly at the outside. By providing the jar with this spout or tube I am able to introduce the water and sulphate of copper into the jar very gently by means of a syringe, so as to prevent agitating the liquid, as heretofore, and disturbing the current. I am also by the same means enabled to introduce the sulphate of copper in a liquid form, and to withdraw it, if necessary, so as to thereby regulate the supply or quantity of the sulphate of copper, and to bring it and keep it within such proximity to the zinc as to effect the best working of the battery. I have observed that the best results are produced when the sulphate of copper is kept within about three-quarters of an inch of the zinc. The liquid of the battery that stands in the spout or tube C is covered to about the extent of half an inch with the oil, or mixture of oil and Darby's fluid, so as to prevent the foaming of the battery at that point.

In applying my invention to batteries already in use I provide an outer casing or shell, B′, of sheet metal or other suitable material, and form on its inside a series of vertical ribs, *d*, which extend nearly to the bottom of the casing, and also form on its bottom three or more radial ribs, *d′*, extending from near the sides of the casing to near the center of the bottom, so as to leave spaces or openings for the passage of the insulating material between the casing and the jar A′, which is of ordinary construction and set inside the casing. The space between the jar and casing is filled with the kerosene or coal oil, or the same mixed with Darby's fluid, which is also placed on top of the liquid in the jar, in the same manner as applied in the preferred form of battery already described.

The shell B′ is formed with a recessed lip, *e*, to receive the hook of the zinc D, which is suspended in the usual manner. When the hooked end of the zinc fits within the lip *e*, it is free from contact with the metallic shell or casing.

The battery last described is thoroughly insulated, so as not to freeze, and so as not to allow the deposit to be made, the same as the preferred form first described, in which form, however, the oil will not evaporate as in the last form.

The battery is provided with the zinc D, the corrugated copper ribbon E, and the other necessary attachments of an electric battery.

I do not herein claim the construction of battery illustrated in Figs. 4, 5, and 6, as the same will form the subject for a separate application.

The kerosene or coal oil may be applied to seal the top of the jar, instead of being also applied to its side and bottom, so as to prevent foaming from the mouth of the jar; but when applied to the side and bottom as well as to the top freezing as well as foaming is prevented.

Having described my invention and set forth its merits, what I claim is—

1. A battery-jar inclosed within a shell or casing, forming a chamber about the jar closed at the top, and having an orifice for establishing communication with said chamber for the introduction of materials into the same, substantially as set forth.

2. A battery-jar provided with a tube or spout at its side communicating with the interior of the jar intermediate of its ends for the introduction of materials below the surface of the jar, substantially as and for the purpose set forth.

3. A battery-jar inclosed within a shell or casing, forming a chamber about the jar to receive an insulating material, and provided with a tube or spout at its side communicating with the interior of the jar intermediate of its ends for the introduction of matter into the jar below its surface, substantially as and for the purpose set forth.

4. In an electric battery, an insulating-covering of kerosene or coal oil to the surface of the liquid in the jar, to seal the jar and prevent the deposit on the outside of the jar, substantially as and for the purpose set forth.

5. In an electric battery, an insulating-covering of kerosene or coal oil and Darby's pro-

phylactic fluid to the surface of the liquid in the jar, to seal the jar and prevent the deposit on the outside of the jar, substantially as and for the purpose set forth.

6. In an electric battery, an insulating-covering of kerosene or coal oil enveloping the sides and bottom of the jar, and a covering of the same oil to the surface of the contents of the jar, to seal the jar and prevent the deposit on the outside of the jar, and also freezing of the battery, substantially as set forth.

7. In an electric battery, an insulating-covering of kerosene or coal oil and Darby's prophylactic fluid enveloping the sides and bottom of the jar, and a covering of the same compound to the surface of the contents of the jar, to seal the same and prevent the deposit on the outside of the jar, and also freezing of the battery, substantially as set forth.

8. In an electric battery, an insulating-covering therefor composed of an oil and a disinfecting-fluid, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ISHAM D. FULLER.

Witnesses:
FRANKLIN H. HOUGH,
WM. G. HENDERSON.