No. 621,048. Patented Mar. 14, 1899.

C. P. ELIESON.

ELECTRIC STORAGE CELL.

(Application filed May 9, 1898.)

(No Model.)

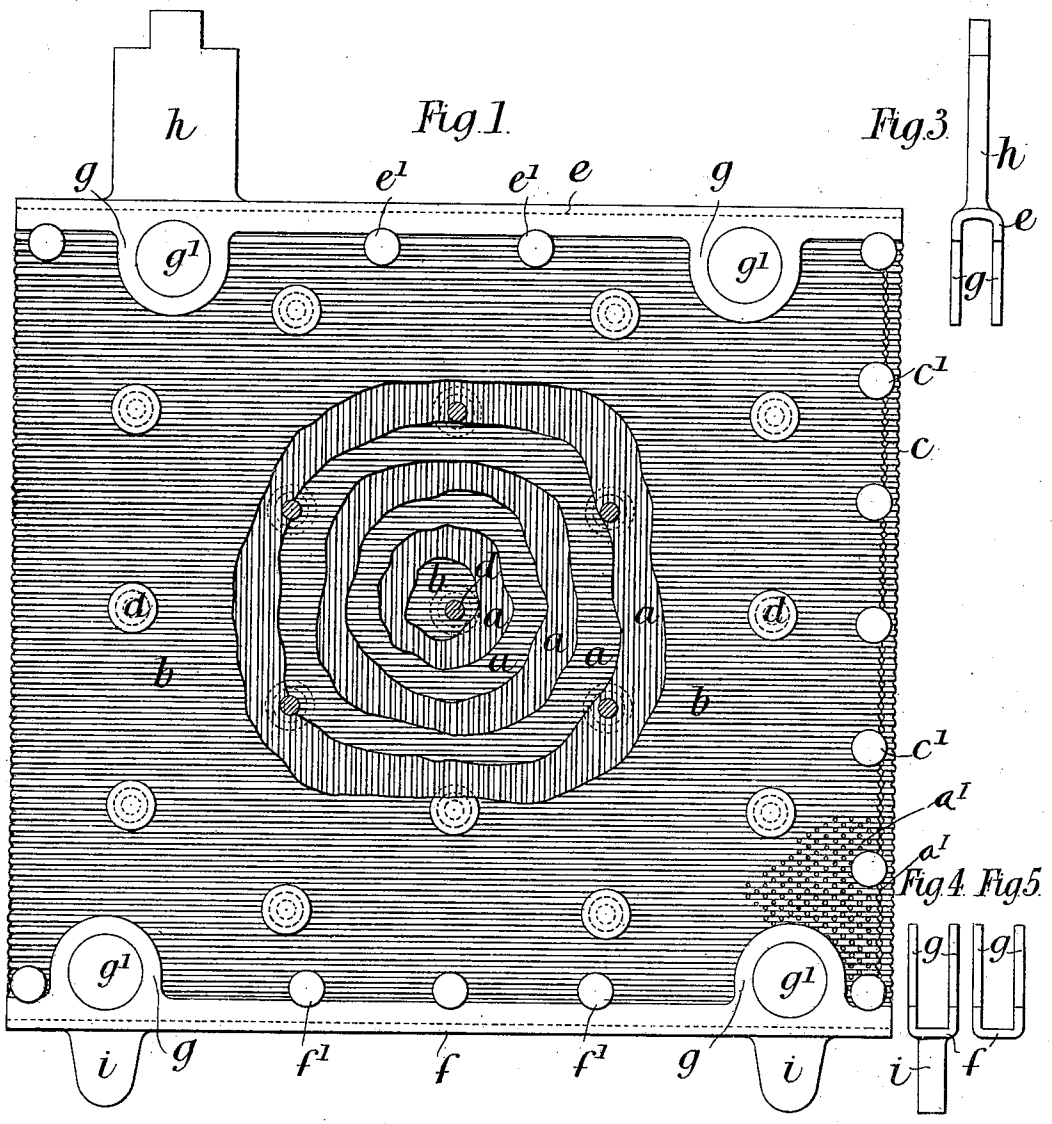


Fig. 1.

Fig. 3.

Fig. 4. Fig. 5.

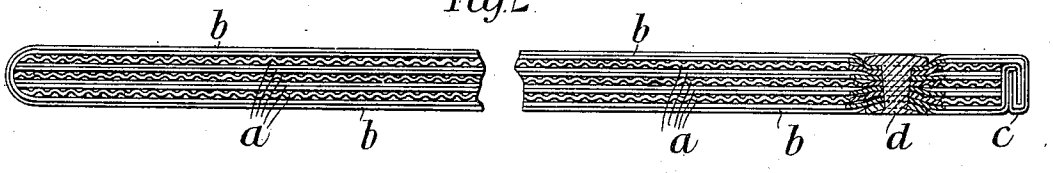


Fig. 2.

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UNITED STATES PATENT OFFICE.

CHAIMSONOVITZ PROSPER ELIESON, OF LONDON, ENGLAND.

ELECTRIC STORAGE-CELL.

SPECIFICATION forming part of Letters Patent No. 621,048, dated March 14, 1899.

Application filed May 9, 1898. Serial No. 680,135. (No model.)

To all whom it may concern:

Be it known that I, CHAIMSONOVITZ PROSPER ELIESON, a subject of the Queen of Great Britain, residing at London, England, have invented new and useful Improvements in Electric Storage-Cells, (for which I have applied for a patent in Great Britain, No. 23,489, dated October 12, 1897,) of which the following is a specification.

My improvements relate to electric storage-cells or accumulators of the type known as "Planté" accumulators, and have for their objects to improve the mechanical construction of the lead plates and of their attachments, thereby giving them greater strength and durability than heretofore, and to subject the interiors of the plates more uniformly than hitherto to the electrochemical process known as "formation."

According to my invention an accumulator-plate is built up of several layers of perforated and corrugated sheet-lead, the said layers being so placed relatively with one another that the corrugations of one layer cross or are at an angle to those of adjacent layers, the several layers being secured together by lead rivets. To the top and bottom of the several layers so united are autogenously soldered channel-pieces of lead. To protect the outer surfaces of the plates in order that the interiors thereof may be uniformly subjected to the electrochemical action, I apply during the process of formation an exterior coating of protecting varnish.

To enable my invention to be fully understood, I will describe the same by reference to the accompanying drawings, in which—

Figure 1 is a sectional elevation of a lead plate with its attachments constructed according to my invention; and Fig. 2 is a sectional plan view of the plate without the attachments, drawn to a larger scale than Fig. 1. Figs. 3, 4, and 5 are end views of the attachments hereinafter described.

In carrying out my invention a series of pieces *a a a*, of thin sheet-lead of the required size and perforated with holes, as indicated on parts of the outer plate at *a' a'* in Fig. 1, and corrugated, (by passing through rollers or in other known manner,) are laid upon or against one another so that each piece with, say, vertical corrugations is adjacent to another piece or pieces with, say, horizontal corrugations, and then an outer sheet *b*, also perforated and corrugated, is preferably wrapped around the assembled pieces to hold them together. This outer wrapping or sheet has its edge folded or rolled in, as shown at *c*, and secured or tacked at several spots *c'* by autogenous soldering, commonly known as "lead-burning," which may be effected in the usual way by the flame of a hydrogen-blow-pipe or preferably by the use of a well-heated copper bit resembling a soldering-iron. The assembled sheets *a a* thus secured in their outer wrapping of corrugated and perforated lead *b* are then further secured by lead rivets *d d*, passed through them at suitable distances apart. These rivets are at one end provided with heads, and over the projecting stems of the rivets at the other ends are slipped leaden washers, which are melted by autogenous soldering to the stems and to the adjacent parts of the assembled sheets. The top and bottom edges of the plate are then firmly secured together by applying to them leaden pieces or channel-pieces *e f*, preferably of channel form, as shown, the said channel-pieces being preferably united with the plate at several points, as at *e' f'*, by autogenous soldering.

In order to obtain a good electrical connection between the several sheets or layers of a plate and the channel-pieces, the latter are preferably provided with pairs of sweating-lugs *g g*, which project over the plate at the top and bottom, and these lugs are united with the several layers in the following manner—that is to say, a hydrogen flame or a hot bit is brought into contact with each lug, so as to melt a hole through it and into the plate, and while in this melted condition lead is "burned" in until the cavity is filled up. After the lugs on one side of the plate have been burned, as described, the plate is turned over and the operation is repeated upon the lugs on the other side. *g'* in Fig. 1 indicates the burned-in portions, which perfectly unite the armatures or conductors with the several layers. In order, further, to insure the uniform distribution of the electric current over the plate, and the consequent uniform charging and discharging at all points, I advantageously burn the lateral edges of the several

sheets or layers of a plate together. In some cases also I burn the sheets together at the top and bottom edges before the channel-pieces are applied.

The channel-piece *e* is provided with a projection or lug, such as *h*, for making connections between the several plates in a battery. The channel-pieces *f*, which I prefer to provide for the lower edges of those plates which are to act as positives in my cells, are flat underneath, as shown in Fig. 5, while the channel-pieces for the lower edges of those plates which are to act as negatives are preferably provided with projections or feet *i i*, on which to stand in the cell, as shown in Figs. 1 and 4.

After the described processes of construction have been completed the plate is preferably rolled or compressed in a press to secure a general flatness or at least to reduce any parts that may project too highly. The plate thus put together and secured by autogenous soldering is then well varnished over or coated with a suitable bituminous or resinous varnish or the like and is then subjected in suitable cells to the electrochemical process of formation. The object of the preliminary varnishing is to insure that the said process of formation shall take place first in the interior of the plate, where surfaces are exposed at its interstices, before the outside is attacked. After the process of formation has been completed the varnish or so much of it as has not disintegrated is removed by brushing or otherwise.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A plate for an electric accumulator comprising a series of parallel perforated and corrugated plates, the corrugations of one plate being arranged at an angle to those of the adjacent plates, the exterior plates being formed of one piece bent to surround the interior plates and having its ends secured together and rivets of the same material as said plates uniting the same, the several plates being united by autogenous soldering, substantially as described.

2. A plate for an electric accumulator comprising a series of parallel perforated and corrugated plates, the corrugations of one plate being disposed angularly to those of the next adjacent plates, the exterior plates being formed in one piece bent around the interior plates and having its ends secured together, channel-pieces embracing the upper and lower edges of the composite plate and provided with sweating-lugs, autogenously connected to all of said plates, substantially as described.

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