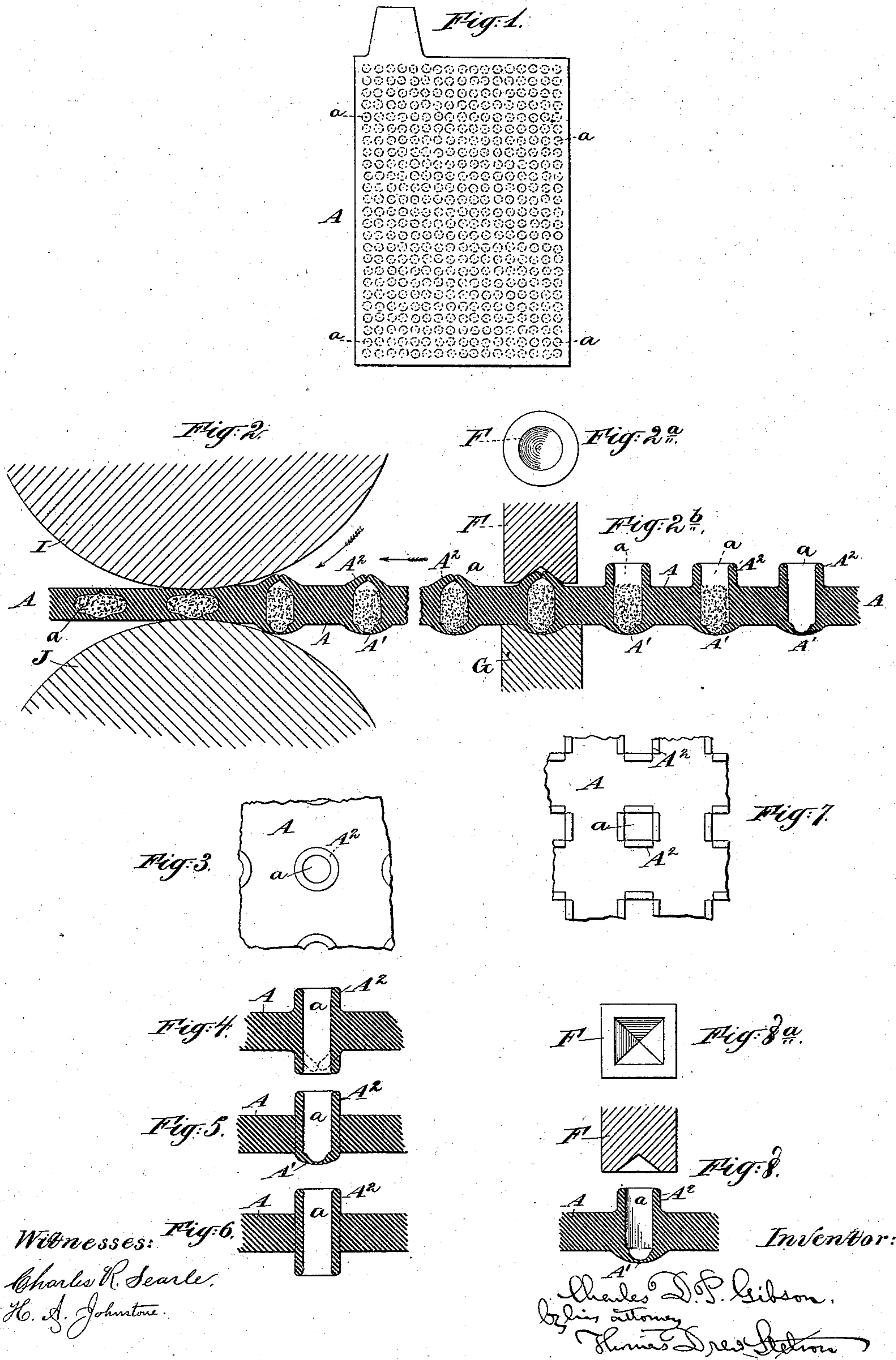


(No Model.)

C. D. P. GIBSON.
PLATE FOR STORAGE BATTERIES.

No. 382,358.

Patented May 8, 1888.



UNITED STATES PATENT OFFICE.

CHARLES D. P. GIBSON, OF NEW YORK, N. Y.

PLATE FOR STORAGE-BATTERIES.

SPECIFICATION forming part of Letters Patent No. 382,358, dated May 8, 1888.

Application filed December 28, 1887. Serial No. 259,213. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. P. GIBSON, of the city and county of New York, in the State of New York, have invented a certain new and useful Improvement in Plates for Storage-Batteries, of which the following is a specification.

I produce hollow projections, which I term "bosses," on both faces of the lead plates, or rather of the skeletons, which are to become, when properly charged and prepared, the complete plates. Each hollow boss on one side is opposite a hollow boss on the other side, and the cavity is continued through the plate. One or both of the bosses is open when the plate is cast or otherwise shaped. The cavity thus exposed, extending quite through the plate and out into the boss on the farther side, is filled with peroxide of lead, the material being introduced by hand or by other suitable means. Care should be taken not to supply too great a quantity of such material. The active material charged into the cavity is not capable of being much compressed. It is important to only introduce so much as may be readily reduced to the contracted dimensions to be finally maintained. After the charging the lip which constitutes the open boss is deflected inward by a suitable die. This operation is followed by treatment which flattens the bosses and makes the completed plate, presenting a practically plane surface on each face. The open boss is so conditioned with regard to thickness and the extent of its projection beyond the face of the plate that when it is drawn together and flattened down it will nearly, but not quite, close that side of the recess. The opposite boss may be similarly formed—that is to say, it may be made in the open condition and afterward drawn together; but I prefer for ordinary cases to make one boss closed, but it should be thin in the central portion, so that a little disintegration of the surface of the plate under the intense action of the dynamos will oxidize quite through at that point and allow the free access of the fluid to the active material within.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a general side view of one of the plates. The remaining figures represent portions on a larger scale. Fig. 2 is a section showing a plate in the act of having its bosses flattened. This figure also shows a pair of metal rolls for effecting this operation. Fig. 2^a is an end view of one of the series of dies, formed each with a conical cavity in the end, which is employed to deflect the lips of the open boss together. Fig. 2^b is a vertical section, showing this die and a suitable counter-die in the act of closing the boss. This figure shows also a portion of the plate in its previous condition. The extreme right of the figure shows the condition in which the bosses are cast. Farther to the left shows the condition after the cavities have been charged with the proper quantity of active material. Farther to the left is a boss in the act of being closed by the dies; and still farther to the left is a boss closed, ready to be flattened. Fig. 3 is a plan view of a portion in the condition in which it is cast. The remaining figures show modifications. Figs. 4, 5, and 6 are vertical sections through the axis of a pair of bosses. The strong lines in Fig. 4 show both bosses open and cast in one with the plate. The dotted lines show the lower boss partially closed, ready to receive the partial filling of active material. Fig. 5 shows one boss closed and the other boss open. Both bosses are formed in a piece cast separately and forced into a hole of corresponding size cast or otherwise produced in the plate. Fig. 6 shows both bosses formed in a separate piece correspondingly inserted, but with both bosses open. Fig. 7 is a top view of a modification, in which the bosses are rectangular, and the cavity for the reception of the active material is correspondingly rectangular. Fig. 8 is a vertical section through the same, with the die over it ready to close the open boss on its descent. Fig. 8^a is a bottom view of such top die.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

I will first refer to Figs. 1, 2, 2^a, 2^b, and 3. In these figures, A is the main body of the plate, and *a a* are the cavities which are to receive the active material. The position of

the plate when in use is vertical; but I will describe its manufacture as being conducted while in the horizontal position. A' is a seal formed by an extension of the lead across the bottom of a cavity and closing the lower side thereof. The middle of this seal is thin, so that when the plate is subsequently exposed to the current and disintegration of the surface commences the entire thickness in the middle of this seal will be disintegrated and the solution will have access to the active material in the cavity. A² is a lip extending upward around the cavity. It is of proper form and size to close the upper side of the cavity a whenever it is properly deflected inward and pressed down. The seal A' projects as a boss at the lower side of the plate. The lip A² projects as a boss at the upper side of the plate. The cavities a having been charged with the proper quantity of active material, introduced either by hand or machinery, the upper bosses, A², are drawn together by being treated with dies F having hollow faces, the lower side of the plate being supported during this operation on a surface, G, which is concave to correspond with the boss A'. After all the cavities a have received the proper quantities of the active material and all the bosses A² have been deflected inward, either separately or simultaneously, nothing remains but to flatten the plate. This is effected by passing it between a pair of rolls, I J, which may be cylindrical rolls of metal turned by any suitable power. The effect of these rolls is indicated in Fig. 2, in which the plate is passing through from right to left. It emerges with the pairs of bosses completely flattened, so that both faces of the plates are plane.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention.

The bosses may be treated singly or in series.

I believe it practicable to deflect inward all the lips A² of an entire plate by a single movement of a platen of proper length and breadth carrying a sufficient number of dies, either formed separately and mounted in a single platen or all formed in one piece of metal.

I propose ordinarily to provide a suitable support, G, and a suitable top die or series of

top dies, F, to treat one row of the bosses, and to reciprocate such compound upper die up and down at a suitable speed to allow the attendant to shift the plate forward one row at each reciprocation, thus subjecting all the rows in succession to the closing action of the dies.

It is important that the lower bosses, A', be closed or nearly closed before the partial filling of active material is introduced into the cavities a; but it is not essential that they be cast in the form above described extending across the bottom of the cavity. Fig. 4 shows both formed open, and the dotted lines show the lip which forms the lower boss deflected inward. Figs. 5 and 6 are sections showing modifications. In these the bosses corresponding to A' A² and the space corresponding to a are formed in pieces separate from the body of the plate and afterward set in previously-prepared holes of proper size. Fig. 7 is of interest. It shows a face view of a plate with square holes and suitable projections on the four sides thereof corresponding in function to the lip A². These projections may be wedge-like or A-shaped. Figs. 8 and 8^a show the provisions for deflecting these projections inward.

I claim as my invention—

The method described of producing plates for storage - batteries by forming them with closed or nearly-closed bosses A' on one face, adapted to be accessible to the acid, and open bosses A² opposite thereto, with cavities a between, next depositing a limited quantity of the active material in such cavities, then nearly closing the open bosses, and finally flattening both sets of bosses and compressing and confining the active material between them, while allowing access for the acid thereto, as herein specified.

In testimony whereof I have hereunto set my hand at New York, this 15th day of December, 1887, in the presence of two subscribing witnesses.

CHAS. D. P. GIBSON.

Witnesses:

DANL. W. EDGECOMB,
CHARLES A. TERRY.