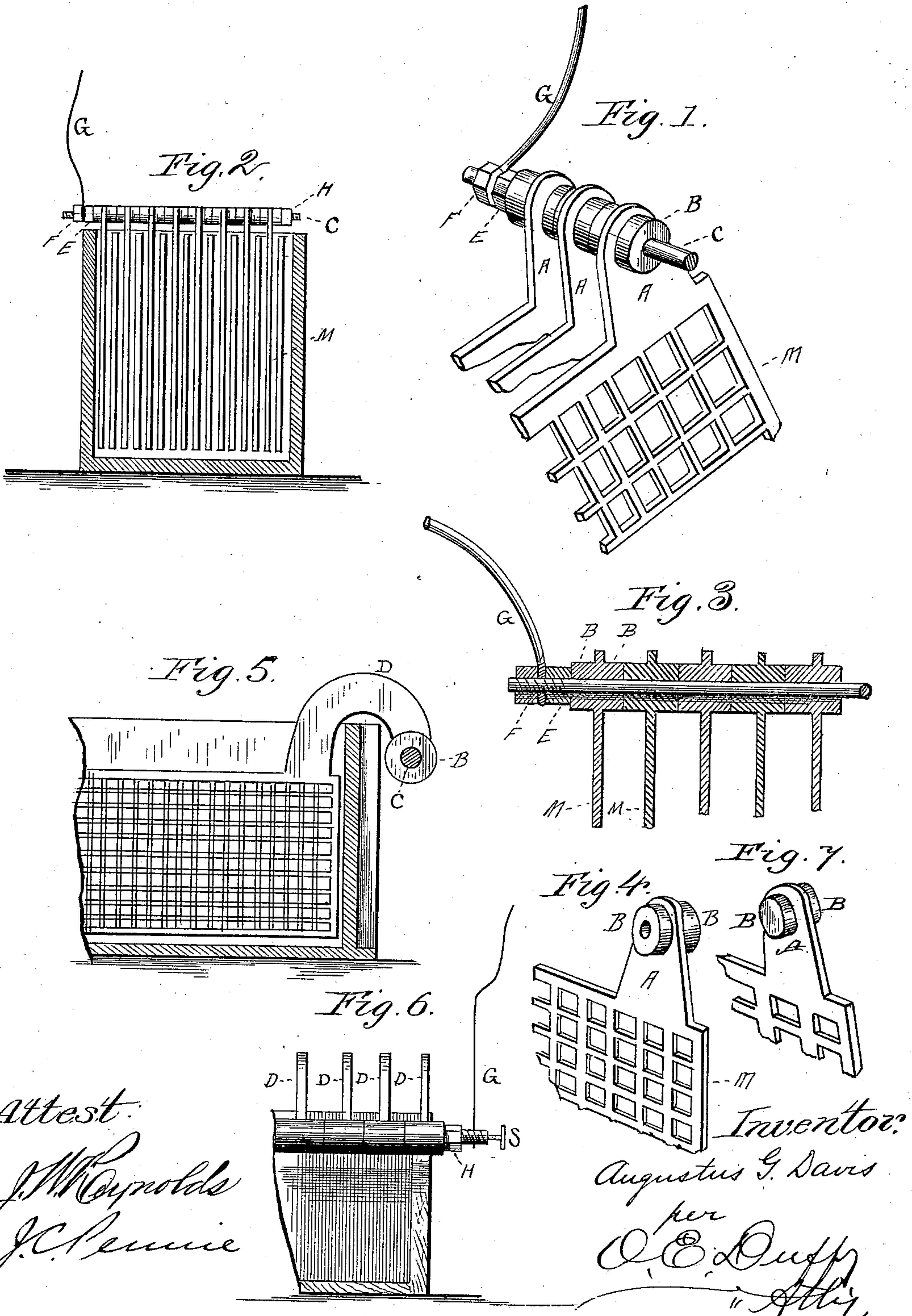


(No Model.)

A. G. DAVIS.
SECONDARY BATTERY.

No. 300,052.

Patented June 10, 1884.



UNITED STATES PATENT OFFICE.

AUGUSTUS G. DAVIS, OF BALTIMORE, MARYLAND.

SECONDARY BATTERY.

SPECIFICATION forming part of Letters Patent No. 300,052, dated June 10, 1884.

Application filed January 14, 1884. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS G. DAVIS, of Baltimore, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Secondary Batteries; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

Prior to my present invention the prevalent method of forming the terminals of plates for secondary batteries has been to cast integrally with the plates, and at one of the upper corners, a lug having its sides in the same plane as those of the plate, and provided with a surmounting pin-extension. The plates being then arranged in the ordinary manner in the battery-cell transverse rods provided with perforations for the reception of the extensions bring the terminals of the negative and positive plates, respectively, in alignment at each end of the cell, the rods being forced down upon the lugs by nuts and washers. This construction is objectionable on account of multiplicity of parts, frailty of the extension-pins, difficulty in securing and maintaining perfect electrical contact between the rod and plates, and loss of time in making up the cell. My invention is designed to obviate these defects and to present to the trade a battery-cell of certain and positive action, cheapness and durability of construction, and capable of easy manipulation and adjustment.

Referring to the drawings hereunto annexed, in which like letters indicate like parts, Figure 1 is a perspective view of a portion of my invention. Fig. 2 is an end view thereof on a smaller scale, the cell being shown in section. Fig. 3 is a sectional view through a portion of the plates and lugs. Fig. 4 is a detail perspective view of one of the plates. Fig. 5 is a side view, and Fig. 6 an end view, of a modification of my invention. Fig. 7 is a detail perspective view of a further modification of my invention.

M M represent a series of secondary-battery plates of a perforated or other suitable con-

struction, arranged in the ordinary manner in the battery-cell, to constitute either the positive or negative element. Each plate is provided with an upwardly-extending projection, A, carrying the opposite side lugs, B B, of preferably circular contour. These side lugs may be cast in a single piece with the main body of the plate or separately therefrom, and afterward soldered in the position shown. Passing centrally through the lugs B B and through the extension A is a perforation for the reception of the retaining and clamp rod C, having screw-threaded outer ends. The plates are arranged upon these rods by passing the latter through the lug-perforations of each series, the faces of the lugs abutting against each other. Upon the opposite ends of the rod are screwed nuts—the tap-nut H and tightening-nut E—bearing, respectively, against the lugs of the outer plates of the series. By means of a hand-wrench or other suitable device the tension of these screws can be increased at will, and the faces of the lugs forced together in firm electrical contact over their entire surfaces. The central rod should be of material that will not corrode when exposed to the fumes rising from the bath, and for this purpose I employ an alloy made of lead and antimony, preferably in the proportion of fifteen parts of the former to eighty-five of the latter, forming a composition of excellent conductivity and sufficiently hard for screw-threading. The employment of brass or copper rods I find to be objectionable, for the reason that with the best precautions a thin layer of sulphide produced by chemical action of the fumes upon the rod will form between the rod and plates, insulating them from each other, and thus interfering with or arresting the operation of the battery. This difficulty may, however, be in part obviated by giving to the extensions A of the battery-plates the goose-neck form represented by D D in Figs. 5 and 6. In this case the lugs B and the cross-rod C are out of the path of the rising fumes, and practically free from their action.

In all the figures the letter G designates one of the wires connected with the appropriate pole of the dynamo or other charging source.

It is important that the best possible electric contact should exist between the rod and these wires, and for that purpose I propose to use one or the other of the alternative modes of connection shown in the drawings. Thus, as shown in Figs. 1, 2, and 3, the wires may be hooked or looped about the rod and clamped firmly in place against the nut E by an outer nut, F; or, as in Fig. 6, the rod may be diametrically perforated, and the wire passing through such perforation be held by a binding-screw, S, working in the end of the rod.

It is evident that various modifications might be made in the construction of my device that would still fall within the generic scope of the invention. For instance, I contemplate in some instances dispensing entirely with central rod and the perforations in the lugs, and instead thereof simply uniting the abutting lug-faces in a continuous series by soldering. The lugs in such case would have the continuous imperforate abutting faces shown in Fig. 7. In addition to using the central rod, I may solder the edges of the lugs, preventing the access of fumes to the rod itself. In both these instances the soldered joints could readily be separated after use by means of the ordinary tinman's shears.

Having thus described my invention, what I claim is—

1. In a secondary battery, a series of plates provided with upward extensions and side lugs, and means for uniting the series, substantially as described.

2. In a secondary battery, the combination, with a series of plates provided with upward projections and side lugs, of a central rod screw-threaded at its ends and provided with tightening-nuts, substantially as described.

3. In a secondary battery, the combination, with a series of plates provided with goose-neck projections having side lugs and extending beyond the sides of the cell, of means for uniting the series, substantially as described.

4. A secondary-battery plate provided with upward projections and side lugs, substantially as described.

5. A secondary-battery plate provided with goose-necked upward projections and side lugs, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

AUGUSTUS G. DAVIS.

Witnesses:

ALEX. H. BAUER,
A. B. PROAL.