

UNITED STATES PATENT OFFICE.

JULES JULIEN, OF BRUSSELS, BELGIUM.

METHOD OF MAKING SOLUBLE METAL ELECTRODES FOR ACCUMULATORS.

SPECIFICATION forming part of Letters Patent No. 600,693, dated March 15, 1898.

Application filed September 26, 1896. Serial No. 607,098. (No specimens.) Patented in Belgium March 10, 1896, No. 120,281; in Germany March 18, 1896, No. 35,697; in France April 1, 1896, No. 255,227; in England April 2, 1896, No. 7,259; in Austria April 25, 1896, No. 46/5,130, and in Hungary April 27, 1896, No. 2,857.

To all whom it may concern:

Be it known that I, JULES JULIEN, engineer, a subject of the King of Belgium, residing at Brussels, in the Kingdom of Belgium, have
5 invented a new and useful Improved Method for Making Soluble Metal Electrodes for Accumulators, (for which patents have been obtained in Belgium, dated March 10, 1896, No. 120,281; addition, dated March 23, 1896, No. 120,529; in Germany, dated March 18, 1896,
10 No. 35,697 of certificate; in France, dated April 1, 1896, No. 255,227; in Great Britain, dated April 2, 1896, No. 7,259; in Austria, dated April 25, 1896, No. 46/5,130, and in
15 Hungary, dated April 27, 1896, No. 2,857 of certificate,) of which the following is a full, clear, and exact description.

The soluble metal electrode for electric accumulators which forms the subject of the present application appertains to the class of electrodes formed by the galvanoplastic deposit of a soluble metal—such as zinc, cadmium, or other equivalent or analogous metal—upon a
20 base, either of an insoluble or soluble metal, serving as a support; but my invention is distinguished from its predecessors in that any one of the soluble metals indicated—such as zinc, for instance—is deposited by galvanic process upon a frame or base of copper in such
25 a manner as to cause it to adhere thereto by means of a new manufacturing process which affords it all the advantages belonging to this class of electrodes without retaining any of the drawbacks which have prevented the general use of these elements, however preferable
30 in theory. In the first place, the said electrodes, for which a support of lead or of zinc has generally been adopted, which receive the various galvanic deposits, are of little strength
35 by reason of the flexibility in the support of lead and its fragility in the case of zinc, which

becomes fragile under action of the current. A still more serious drawback is that of the local actions, which materially reduce the working power of the accumulator. Now my new
45 process of forming the soluble metallic electrode admits not only of the use of copper plates as a support and prevents entirely local action, but it has also an extremely favorable influence upon the galvanic deposition
50 in that it is not attacked and only decomposes in proportion to the discharge in order to reconstitute itself in the same manner during the charging.

The process of producing the soluble metallic electrodes according to my present invention consists in electrolytically depositing
55 upon a plate of copper a layer of copper, which gives it a very finely porous surface of pure copper, then amalgamating the copper surface so produced, and finally electrolytically
60 depositing upon the amalgamated copper plate a coating of zinc, which forms the active electrode-surface. The positive electrodes prepared in this manner may be used
65 in a secondary battery in conjunction with negative electrodes of any suitable kind.

Having thus described my invention, the following is what I claim as new therein and
70 desire to secure by Letters Patent:

The process of producing a soluble electrode for use in secondary batteries, consisting in depositing on a copper plate, by electrolysis, a finely-porous surface of pure copper, then
75 amalgamating the copper surface so produced, and finally depositing on the amalgamated surface, a coating of zinc to form the active surface of the electrode.

JULES JULIEN.

Witnesses:

AUG. JOERISSEN,
GREGORY PHELAN.