

No. 701,915.

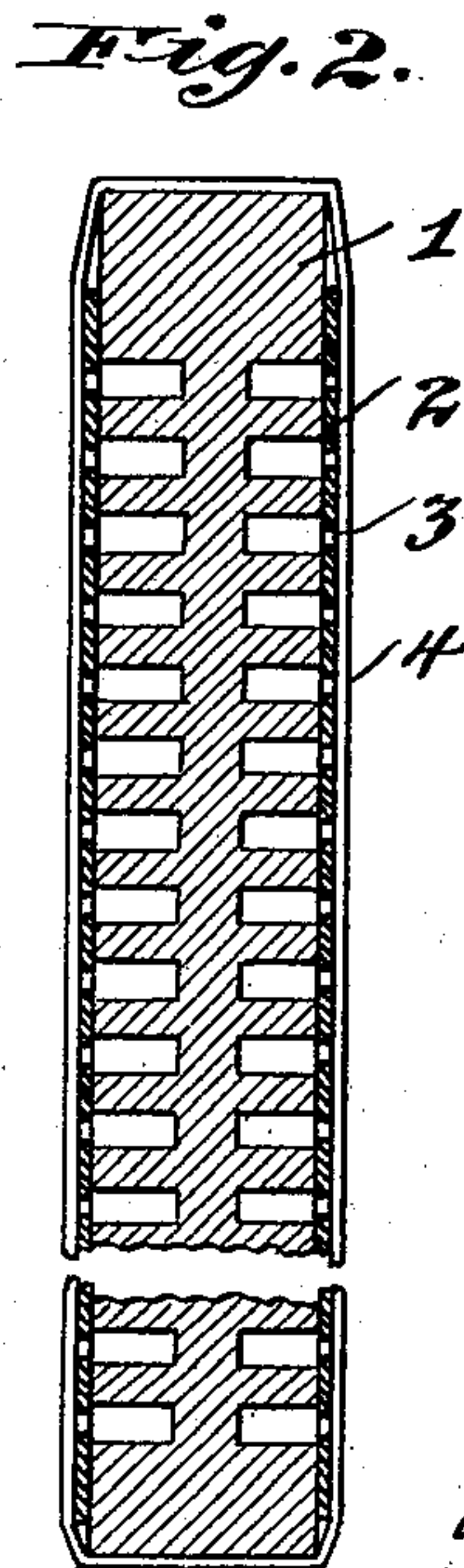
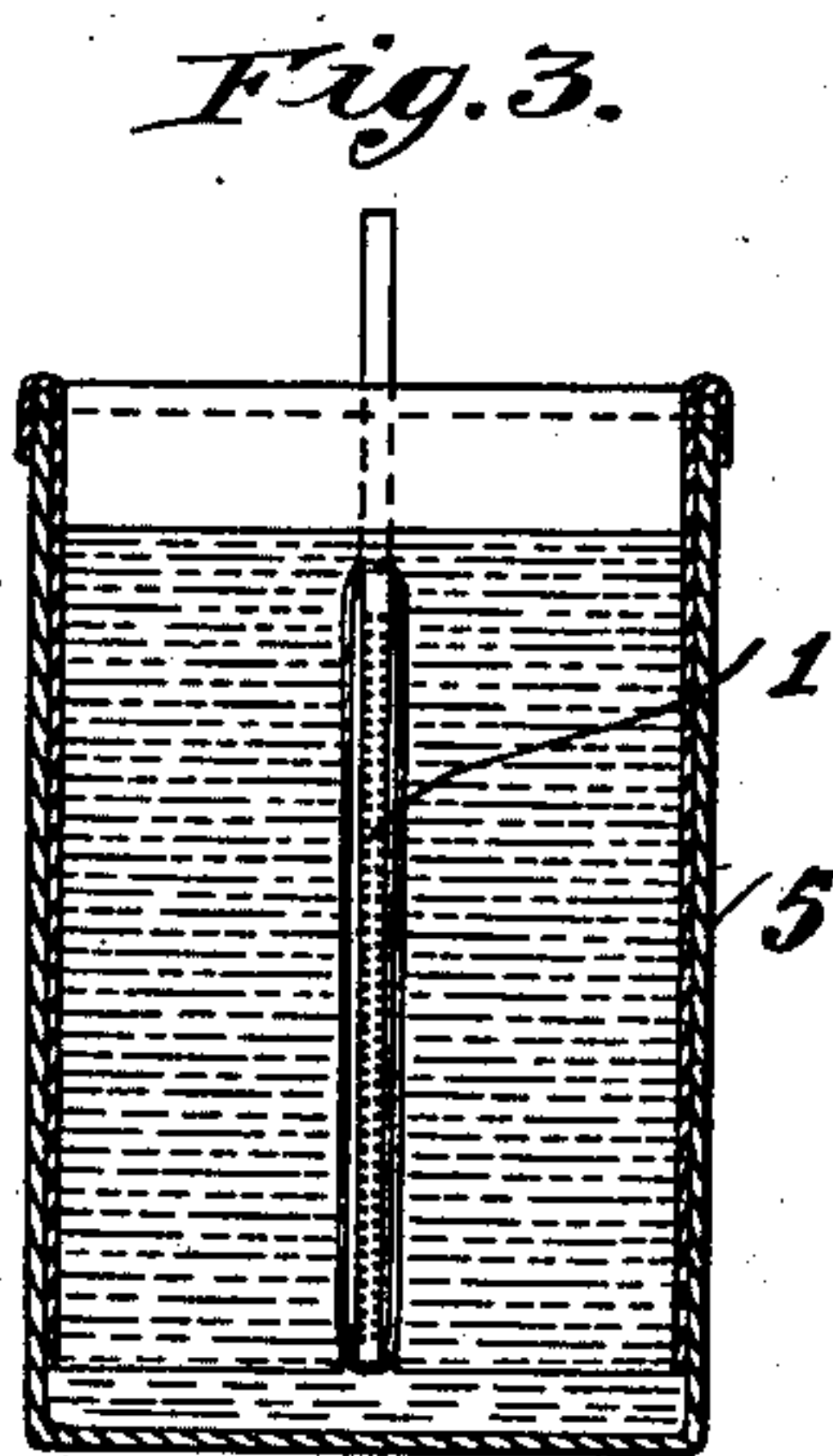
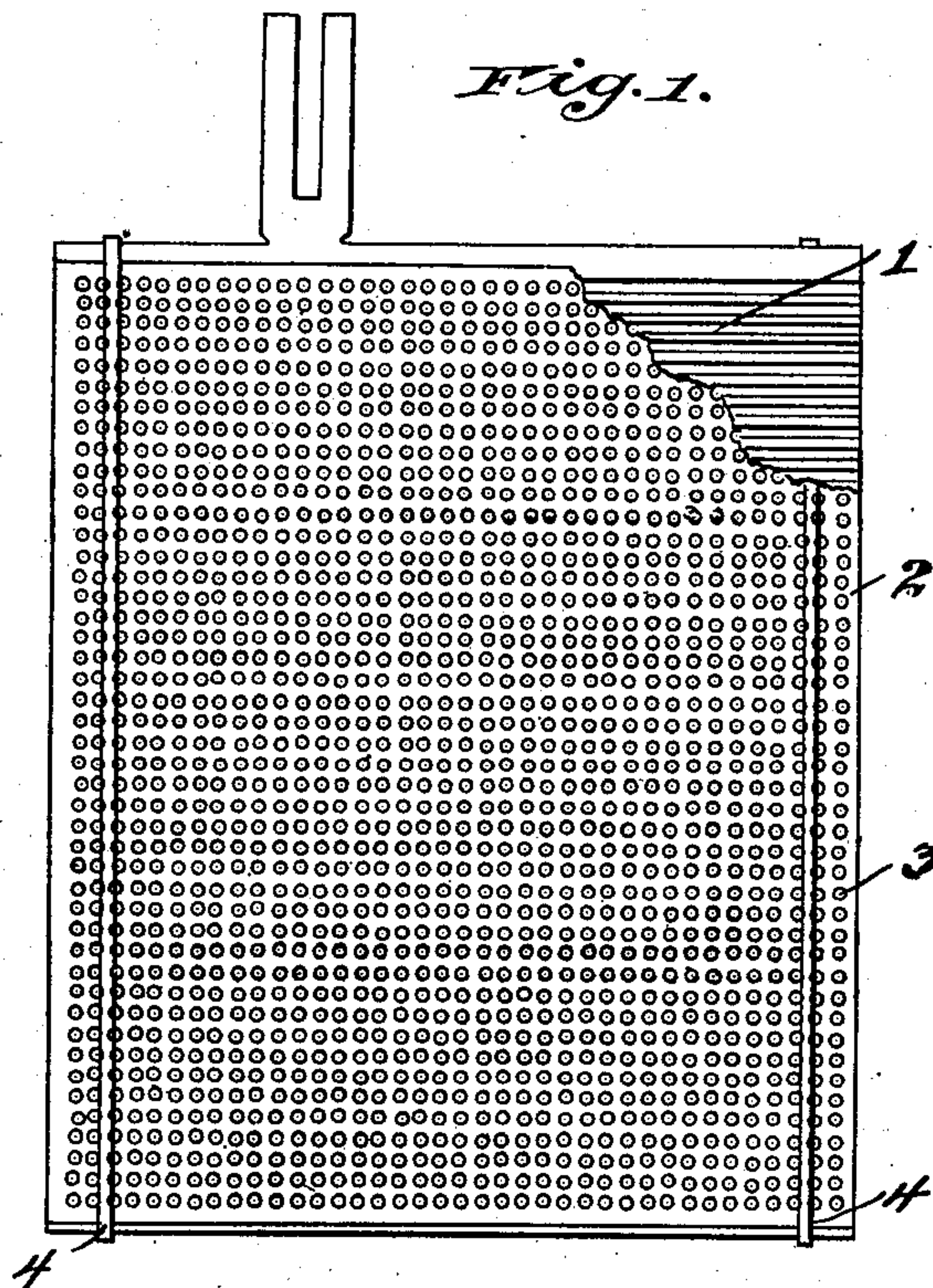
Patented June 10, 1902.

W. MORRISON.

PROCESS OF FORMING SECONDARY BATTERY ELECTRODES.

(Application filed June 18, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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PROCESS OF FORMING SECONDARY-BATTERY ELECTRODES.

SPECIFICATION forming part of Letters Patent No. 701,915, dated June 10, 1902.

Application filed June 18, 1900. Serial No. 20,658. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MORRISON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Forming Secondary-Battery Plates and Apparatus Therefor, of which the following is a specification.

This invention relates to an improvement in forming secondary-battery plates and apparatus therefor, and has for its object to preserve the plates during the process of forming them by electrochemical action to prevent "blowing" or the forcible detachment of portions of the spongy or granular lead by the occluded gases generated during the operation of forming.

To this end the invention consists in certain novel features, which I will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is an elevation, partly broken away, of a structure employed in carrying out my invention. Fig. 2 is an enlarged detail sectional view of the same, partly broken away; and Fig. 3 is a view illustrating a further portion of the apparatus employed in carrying out my invention.

In the formation of secondary-battery plates from lead plates provided with grooved surfaces and treated by passing an electric current through said plates while in a suitable acid-bath it has been found that under certain circumstances the gases evolved by the electrolytic action accumulate with such rapidity and in such volume underneath portions of the spongy or granular lead already formed upon the plate that their escape becomes somewhat in the nature of an eruptive discharge and portions of the spongy or granular lead are thus blown from the plate, thereby reducing its efficiency. In carrying out my invention I propose to overcome this difficulty by covering or protecting the grooved sides of the plate with a foraminous sheet of material, preferably of a practically rigid character, and held in place in any suitable manner, so that while the body of the sheet prevents the spongy lead from becoming de-

tached from the body of the plate the gases have a free escape through the apertures in the protecting-sheets.

In carrying out my invention I employ in conjunction with the grooved plate, which is indicated at 1, sheets or thin plates 2, preferably constructed of hard rubber and adapted to fit and be held against the grooved sides of the plate 1. These sheets have openings 3 for the escape of the gases, and these openings are preferably arranged, as shown, so as to coincide with the grooves of the battery-plate. As a simple and effective means for holding these protective sheets in position I may employ rubber bands 4, which are passed around the sheets and plate at the ends thereof. The plate thus protected is placed in a cell 5, containing an acid-bath, and a current of electricity is passed through the same, thereby converting the surface portion of the plate from solid into granular or spongy lead. During this conversion the plates prevent the blowing off of any portion of the lead, while at the same time they permit free escape of the gases.

It is obvious that the details of construction of the protective sheets and the mode of holding them in position may be varied without departing from the principle of my invention. For instance, while I have referred to the protective sheet as being "foraminous," it will be understood that any material sufficiently porous to permit the escape of the gas and at the same time retain the lead will come within the scope of my invention, and I wish to be understood as including such permeable material by the use of the term "foraminous" in the claims.

I claim—

1. The improved process in the art of forming battery-plates having multirecessed faces, which consists in covering the recessed faces with a sheet of thin substantially rigid foraminous material, securing the latter yieldingly against said face, then placing in a forming-bath and forming by the aid of an electric current and finally removing the foraminated sheet before use, substantially as described.

2. As an improvement in the art of form-

ing double-faced recessed secondary-battery plates, first inclosing the plate between non-conducting substantially rigid foraminous sheets firmly but yieldingly pressed against
5 the active surfaces of the plate, and then subjecting said battery-plate while inclosed between said embracing-plates to the forming process and finally removing the inclosing plates therefrom, substantially as described.

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