No. 757,446. PATENTED APR. 19, 1904.

L. H. FLANDERS.

SECONDARY BATTERY.

APPLICATION FILED JULY 10, 1903.

NO MODEL.

Fig. 1.

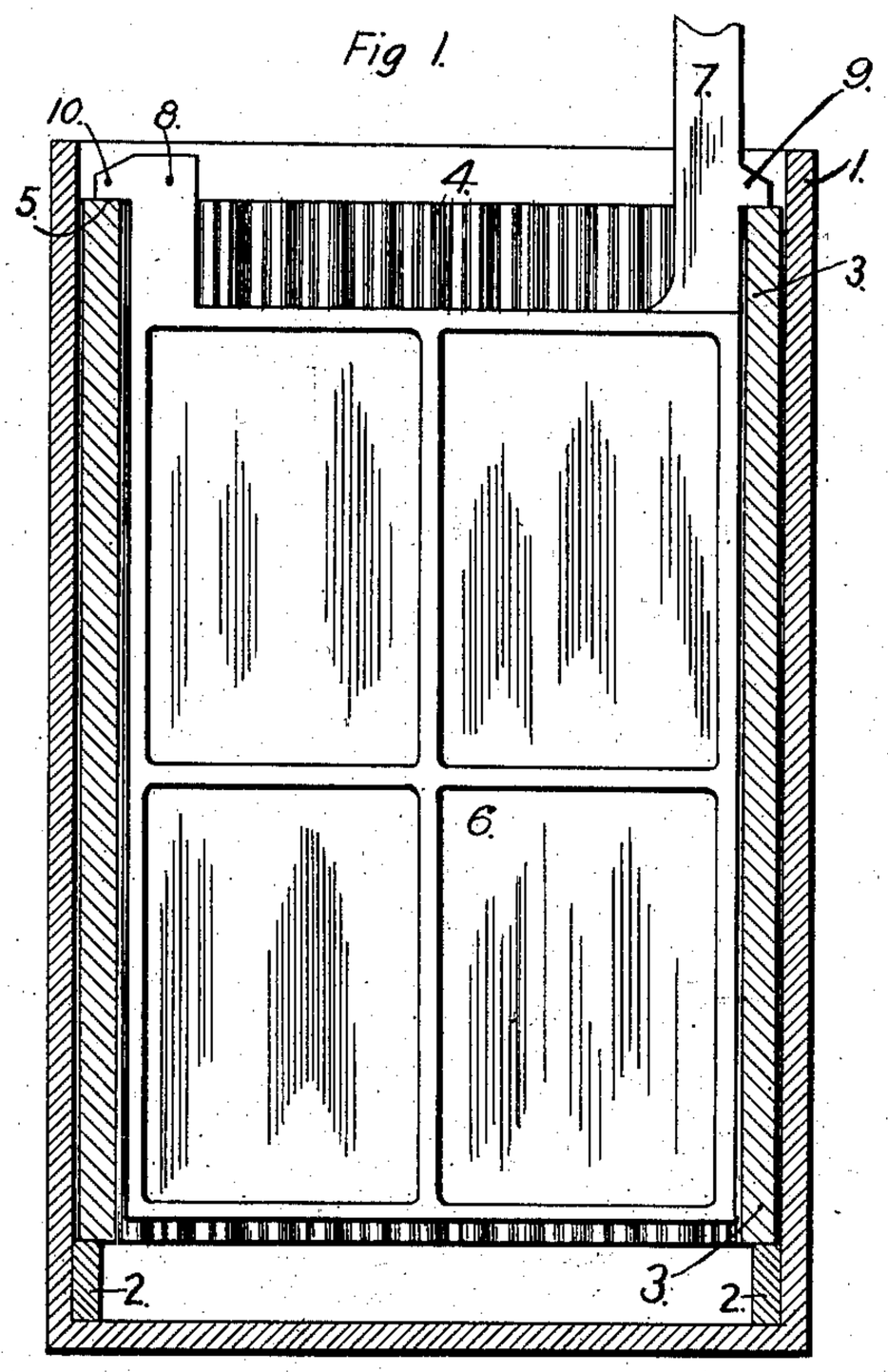


Fig. 3.

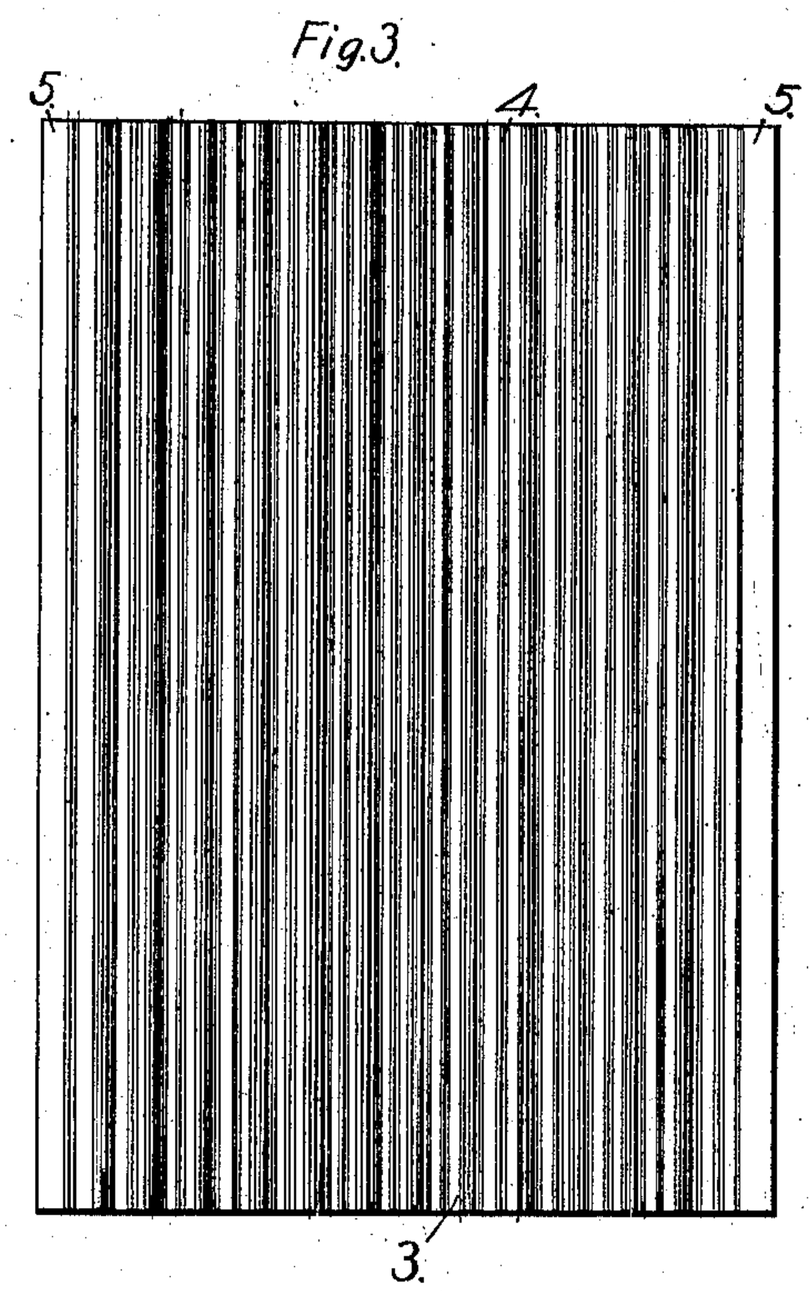


Fig. 2.

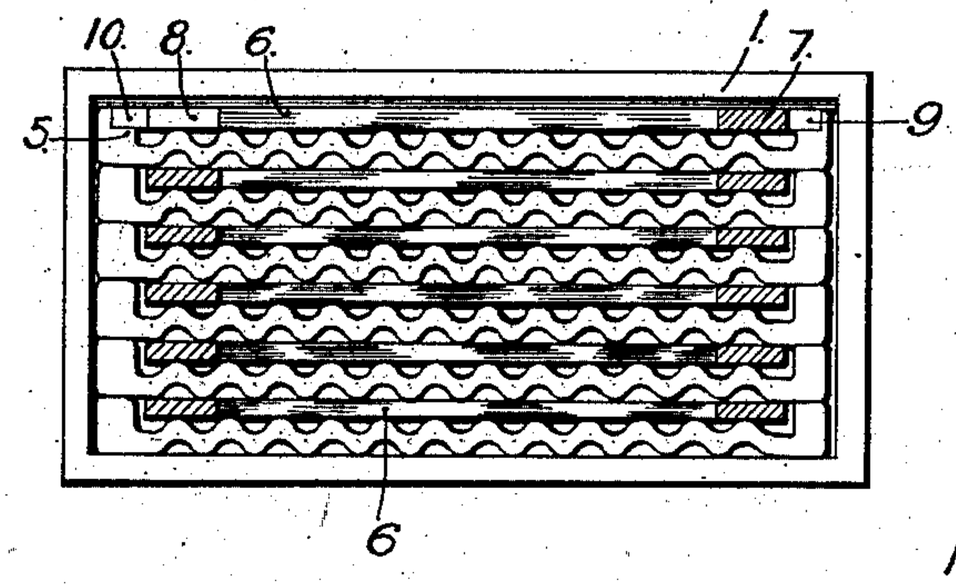


Fig. 4.

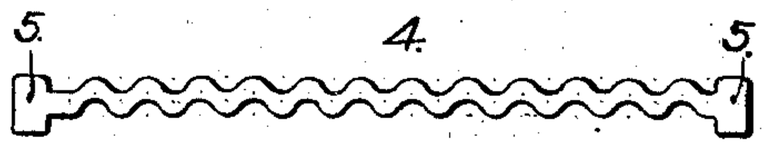
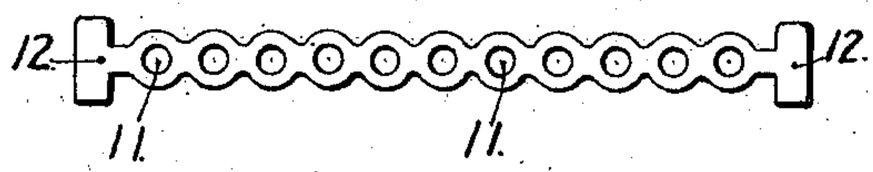


Fig. 5.



WITNESSES:

C. L. Belcher

F. H. Miller.

INVENTOR

Louis H. Flanders

BY

Wesley G. Carr

ATTORNEY

No. 757,446. Patented April 19, 1904.

UNITED STATES PATENT OFFICE.

LOUIS H. FLANDERS, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE MACHINE COMPANY, A CORPORATION OF PENNSYLVANIA.

SECONDARY BATTERY.

SPECIFICATION forming part of Letters Patent No. 757,446, dated April 19, 1904.

Application filed July 10, 1903. Serial No. 165,028. (No model.)

To all whom it may concern:

Be it known that I, LOUIS H. FLANDERS, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Secondary Batteries, of which the following is a specification.

My invention relates to secondary batteries, and particularly to means for supporting and separating the plate-electrodes of such batteries.

The object of my invention is to provide a battery having supporting and separating plates which may be conveniently and cheaply manufactured and assembled and which will effectually prevent the formation of short circuits in the battery and at the same time facilitate the operation and removal of the battery-electrodes.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section through a battery cell or receptacle and showing a battery-plate and separator in front elevation and in position therein. Fig. 2 is a plan view of the battery shown in Fig. 1. Fig. 3 is a front elevation of a separator-plate constructed in accordance with my invention. Fig. 4 is a plan view of the plate shown in Fig. 3, and Fig. 5 is a plan view of a modified form of plate.

The battery jar or receptacle 1 may be made of any suitable material and provided, if desired, with any suitable lining known in the art. As indicated, the receptacle is provided in the bottom at each end with a supporting block or ledge 2, upon which rest the separator-plates 3. These plates are preferably formed of porous earthenware, and the body portion 4 of each of them, as indicated in Figs. 1 to 4, is of corrugated or wave form in cross-section. The edges 5 are of materially greater thickness than the body portion 4, and these edges may project all at one side, as indicated in Fig. 2, or at both sides, as indicated in Fig. 4, the dimensions in each case being such as to afford a sufficient space between adjacent plates when the edges of such plates are in contact for the plate-electrode 6 of the battery. Each of these plate-electrodes is preferably provided at its upper end with lugs or arms 7 and 8, the former being provided with a lateral projection 9 and the latter with a similar projection 10, each of which rests upon the upper end of the corresponding edge 5 of one of the separator-plates 4, the projection being so located that the bottom of the plate shall be slightly above the bottoms of the separator-plates. With this arrangement of the electrodes and separator-plates ample space is provided at the bottom for the deposit of any materials which may be broken or otherwise removed from the plates and also for the circulation of liquid without any danger of or tendency to the establishment of short circuits, and the edges of the separator-plates fit closely together, so that they are laterally self-supporting and so that each battery-electrode is inclosed in a separate chamber, between which and the adjacent chambers there is no access except through the porous material of the separator-plates and through the space below their lower ends. Since the separator-plates are laterally self-supporting and constitute supports upon which the battery-electrodes rest, the latter may be readily removed either in whole or in part without disturbing the former.

In Fig. 5 I have shown a plate that is functionally the same as that shown in the preceding figures and one that differs structurally therefrom only in having a series of holes 11 extending through it from end to end between the thick edge portions 12.

Other forms of plate may obviously be adopted and employed, if desired, without departing from the invention.

I claim as my invention—

1. An imperforate, porous, earthenware, separator-plate of corrugated structure and having thickened side edges.

2. In a secondary battery, a receptacle, a set of porous separator-plates having thickened side edges and assembled to form a series of compartments that are open at top and bottom

and are closed at their sides by said thickened edges, and plate-electrodes located between said plates and having projections that rest upon their upper edges.

3. In a secondary battery, the combination with a receptacle having supporting-ledges and porous separator-plates that rest upon said ledges and have thickened edges in contact with each other, of plate-electrodes supported by said separator-plates and located in the spaces between them.

4. In a secondary battery, the combination with a receptacle having supporting-pieces at or near its bottom and a series of corrugated, porous plates having thickened edges that rest upon said supporting-pieces, of a series of plate-electrodes located in the spaces between said porous plates and having projections that rest upon the tops of said thickened edges.

5. In a secondary battery, the combination with a receptacle, of a plurality of porous plates having thickened side edges that combine to form the end walls of chambers that are open at top and bottom, and plate-electrodes that are located in said chambers and are supported by said end walls.

6. In a secondary battery, the combination with a receptacle and a plurality of corrugated, porous plates having thickened side edges, of a plurality of plate-electrodes severally located in the chambers formed by the body portions of said porous plates and their thickened edges and supported upon said edges.

7. In a secondary battery, the combination with a receptacle having internal projections at or near its bottom and a plurality of porous plates resting upon said projections and having thickened side edges in engagement so that the plates are laterally self-supporting, of plate-electrodes located between said separator-plates and removably supported upon said thickened edges.

In testimony whereof I have hereunto subscribed my name this 8th day of July, 1903.

LOUIS H. FLANDERS.

Witnesses:

SAMUEL HAZLETT,

BIRNEY HINES.