No. 704,759. Patented July 15, 1902.

H. RODMAN.

STORAGE BATTERY SEPARATOR.

(Application filed July 29, 1901.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 2.

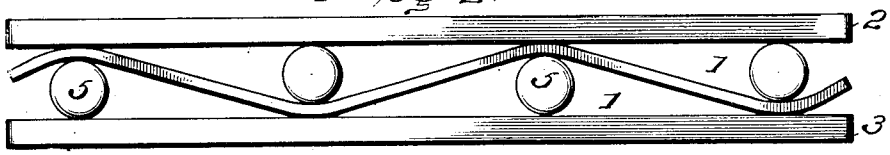


FIG. 3

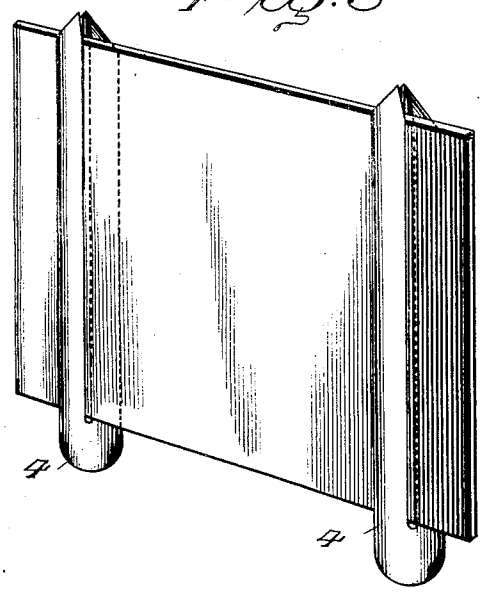
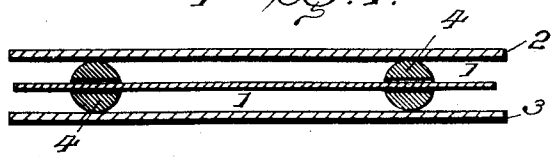


FIG. 1.



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Fig. 4.

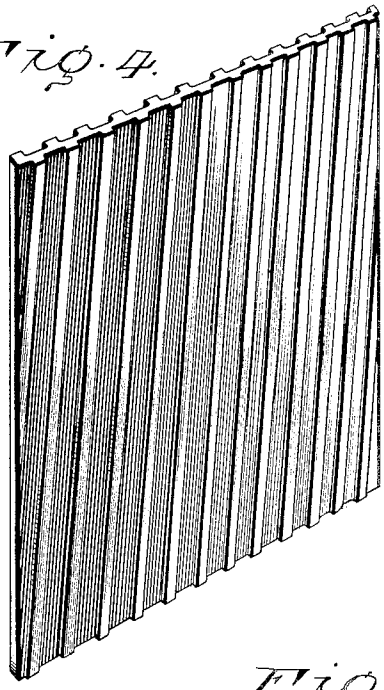


Fig. 6.

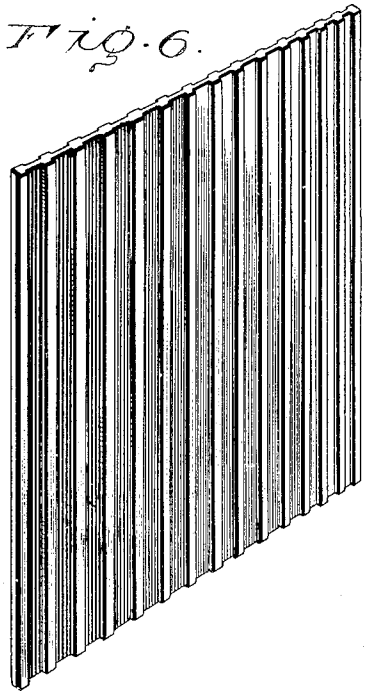


Fig. 7.

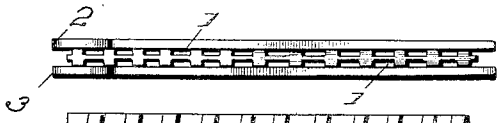
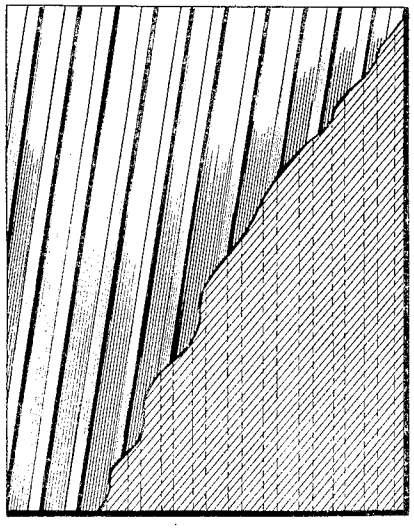


Fig. 5.



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UNITED STATES PATENT OFFICE.

HUGH RODMAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE ELECTRIC STORAGE BATTERY COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

STORAGE-BATTERY SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 704,759, dated July 15, 1902.

Application filed July 29, 1901. Serial No. 70,092. (No model.)

To all whom it may concern:

Be it known that I, HUGH RODMAN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Storage Batteries, of which the following is a specification.

Objects of the present invention are to improve the life, capacity, durability, and efficiency of electric storage batteries; and to this end my invention stated in general terms is based upon the application of diaphragms between the plates, and more specifically stated it consists in the combination, with the plates, of wooden diaphragms having upon both sides thereof wells for the electrolyte and for permitting of free circulation in generally vertical direction and on both sides of the diaphragm.

The nature, characteristic features, and scope of the invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is a sectional plan view showing two plates and a wood diaphragm having upon opposite sides thereof wells, so that there can be free circulation on each side in a generally vertical direction. Fig. 2 is a top or plan view illustrating a modification of the invention. Fig. 3 is a perspective view illustrating a diaphragm embodying features of the invention. Figs. 4 and 5 are respectively a perspective and a sectional view illustrating another modification of the invention. Fig. 6 is a perspective view of a still further modification, and Fig. 7 is a top or plan view illustrating the diaphragm of Fig. 6 in application to the plates of a battery.

In the drawings, 1 represents the acid-wells, which occur on each side of the diaphragm and between it and the adjacent plates 2 and 3. These wells are open in substantially vertical direction, although they may be slightly inclined, as shown in Figs. 4 and 5; but it is the intention to afford free circulation in a vertical direction, and the inclination, if any, is negligible and is only resorted to in the case of Figs. 4 and 5 in order to avoid ribbing the diaphragm parallel with the grain when such a course is thought to be desirable. The wells may be formed by the use of suitable distance-pieces. As shown in Figs. 1 and 3 the distance-pieces 4 are split. As shown in Fig. 2, the distance-pieces 5 are not split, but the diaphragm is placed on opposite sides of them alternately, and in the remaining figures the distance-pieces are made integral with the diaphragms. In every case, however, there are on both sides of the diaphragms wells which are open substantially vertically. The diaphragms themselves must be of wood, as that material appears to possess unique and remarkable properties which adapt it to the purpose. The use of wood between battery-plates has been suggested, but wooden sheets arranged with acid-wells open substantially vertically to permit of free circulation on both sides are productive of remarkable results in increasing the efficiency, durability, and capacity of a secondary battery. Wooden sheets without the wells are not productive of particularly beneficial results and have not gone into commercial use. As an example of the diaphragms, I may state that any kind of wood can be used; but fibrous and porous wood, as bass, possesses some advantages, and the thickness of the diaphragms may be varied, but may be one-eighth of an inch, more or less.

It will be obvious to those skilled in the art to which the invention relates that modifications may be made in details without departing from the spirit thereof. Hence I do not limit myself to the precise construction and arrangement of parts hereinabove set forth, and illustrated in the accompanying drawings; but,

Having thus described the nature and objects of the invention, what I claim as new, and desire to secure by Letters Patent, is—

In a secondary or storage battery the com-

bination with the plates thereof of an imperforate wooden diaphragm between each pair of plates said diaphragm having acid-wells on both sides thereof, said wells substantially vertical and open to afford free circulation between each plate and the diaphragm in vertical direction.

In testimony whereof I have hereunto signed my name.

HUGH RODMAN.

In presence of—
BRUCE FORD,
W. A. BLACKFORD.