No. 654,113. Patented July 17, 1900.

G. HEIDEL.

BATTERY ELECTRODE.

(Application filed Oct. 2, 1899.)

(No Model.)

Fig. I.

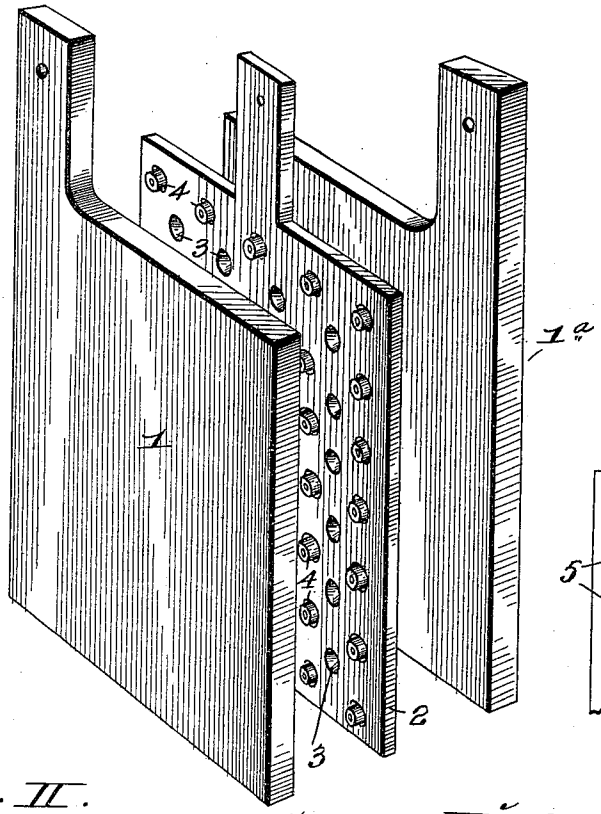


Fig. VI.

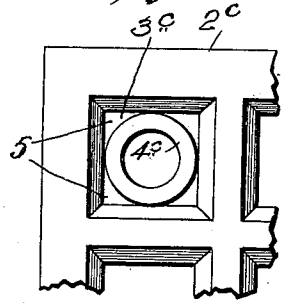


Fig. II.

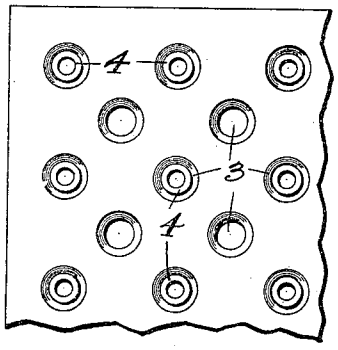


Fig. III.

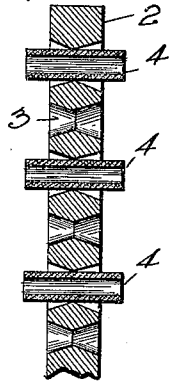


Fig. IV.

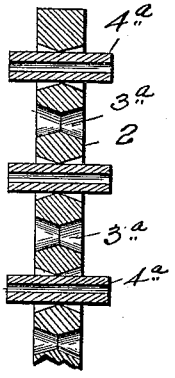
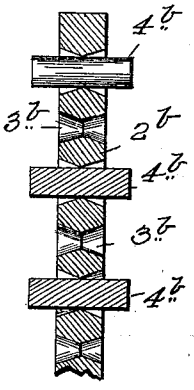


Fig. V.



Attest

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UNITED STATES PATENT OFFICE.

GUSTAVOS HEIDEL, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE GLOBE ELECTRIC COMPANY, OF SAME PLACE.

BATTERY-ELECTRODE.

SPECIFICATION forming part of Letters Patent No. 654,113, dated July 17, 1900.

Application filed October 2, 1899. Serial No. 732,272. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVOS HEIDEL, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Battery-Electrodes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to means for holding electrodes of batteries from contact with each other, so that their functions may be fully maintained.

The invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a perspective view of a pair of common electrodes with one of my improved electrodes interposed between them. Fig. II is an enlarged detail side view of a portion of my electrode. Fig. III is a cross-sectional view of the electrode. Fig. IV is a cross-sectional view similar to Fig. III, showing tubular spacing-plugs of cork. Fig. V is a similar view to Fig. III, showing solid plugs instead of tubular plugs. Fig. VI is an enlarged detail view of a fragment of the electrode provided with rectangular openings instead of circular openings.

1 1^a designate two electrodes, such as commonly used in batteries.

2 designates an electrode of any suitable material, but preferably of aluminium, as this material is slow to decompose under the action of electrolysis or the chemicals used in batteries. The plate is provided with a plurality of openings 3, extending through the electrode from side to side. The openings preferably taper inwardly from each side of the plate toward a common center in order to provide for a free entrance of the battery fluid into the openings to pass therethrough. The angular incline at the center of each opening also provides a binding-bearing for the spacing-plug 4, inserted in series of the openings. These plugs are preferably arranged in rows, as seen in Fig. I, the intervening rows of openings being unobstructed. The plugs are preferably tubular, as illustrated in Figs. I to IV, inclusive, and in Fig. VI, in order to permit free flow of the battery fluid therethrough to either side of the electrode. The plugs shown in Fig. III are of rubber; but I do not desire to be limited to plugs made of this material, as other materials might be utilized to advantage. The plugs 4^a (shown in Fig. IV) are of tubular form and are of cork, they being inserted in the electrode 2^a similarly to the manner illustrated in Fig. III.

In Fig. V, I have shown an electrode 2^b, the openings 3^b of which receive solid plugs 4^b, of rubber, cork, or other suitable material.

In Fig. VI, I have shown an electrode 2^c, provided with rectangular openings 3^c, that receive the plugs 4^c, of rubber, cork, or other suitable material. By making the openings of rectangular form spaces 5 are provided at the corners of the openings around the plugs, through which the battery fluid may flow from side to side of the electrode, thereby permitting a more ready flow of the fluid therethrough.

The plugs are securely held in the openings in the electrode by reason of the pliable nature of the material from which they are constructed, which permits the plugs to be compressed as they are inserted in the openings and to expand in the openings, so as to maintain their position. The plugs are designed to receive the impact of the adjacent electrodes at either side of the electrode 2 in the event of such electrodes being moved toward the electrode 2, thereby holding all the electrodes out of contact with each other.

I claim as my invention—

1. An electrode for batteries provided with openings extending transversely therethrough, and non-active hollow resilient plugs located in said openings.

2. In combination, an electrode provided with openings tapering inwardly from its sides to a common center and extending transversely therethrough, of a hollow non-active plug secured in and projecting from said openings beyond the sides of the electrode.

3. An electrode for batteries, provided with openings beveled to a common center and extending transversely therethrough, and tubular spacing-plugs of rubber secured in and

projecting from said openings beyond the sides of the electrode.

4. In combination, an electrode provided with openings tapering inwardly from its sides to a common center and extending transversely therethrough, of a hollow resilient non-active plug, open at each end, secured in and projecting from said openings, beyond the sides of the electrode.

GUSTAVOS HEIDEL.

In presence of—
E. S. KNIGHT,
N. V. ALEXANDER.