

E. G. DODGE.
BATTERY PLATE.

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1,045,823.

Patented Dec. 3, 1912.

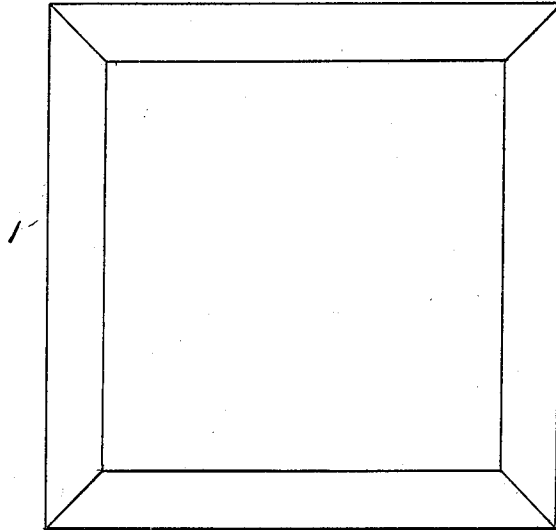


Fig. 1.

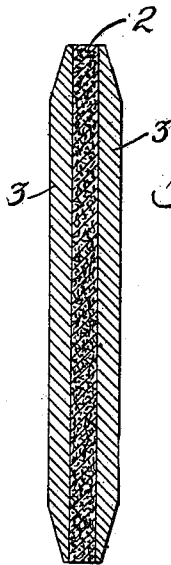


Fig. 2.

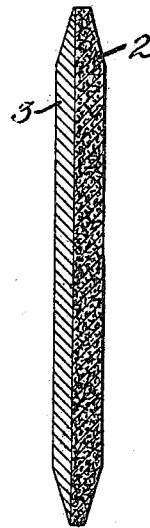


Fig. 3.

WITNESSES:

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BATTERY-PLATE.

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To all whom it may concern:

Be it known that I, EBEN G. DODGE, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Battery-Plates, of which the following is a specification.

My invention relates to that class of electric batteries in which a metallic oxid such as oxid of copper is employed as a depolarizing substance. In this class of batteries it has heretofore been the practice to make up the copper oxid into a plastic mass by mixing it with a suitable liquid, preferably caustic soda, and then to fire the mass after molding and compressing in the mold to consolidate or solidify the mass and reduce its friability and liability to disintegration through the chemical processes which take place in the operation of the battery. This solidification or consolidation of the copper oxid obviates to a great extent the difficulties arising from the disintegrating action due to the chemical processes but is not satisfactory and resort has been had also to the employment of a metallic frame inclosing the mass of compressed copper oxid to protect and support the same. In both cases however it has been necessary to use a plate of very considerable thickness in order to effectually avoid the liability to breakage of the plate.

The prime object of my present invention is to produce a battery plate which shall be cheap, strong and have large surface for the chemical action and which shall be less liable to the objections incident to those former constructions wherein a thick mass of copper oxid only is employed, strengthened or not by the use of the inclosing frame.

My invention consists substantially in a battery plate having a layer of the oxid fused to a backing plate or support of any suitable kind.

By the use of my invention, it is possible to employ a very thin plate of copper oxid and therefore a large surface for chemical action as compared with the mass of copper oxid employed, thereby enabling me to produce a copper oxid plate of great cheapness.

In carrying out my invention, I employ a backing plate or support for the copper oxid or other metallic compound of any desired kind and to which the layer of oxid is fused by heat. Said backing may be composed

for instance of finely divided material ground to the desired degree of fineness or otherwise divided and molded or formed to the desired dimensions, the mass of copper oxid being spread upon the surface thereof and fired and fused thereto by the firing operation, preferably that which is ordinarily employed in firing the copper oxid itself to consolidate or solidify the same as well understood in the art. When the backing is thus constructed the layer of copper oxid, if compressed upon its backing, may be compressed thereon in the operation of compressing or molding the backing itself. I do not, however, limit myself to a plate or backing made up by compressing a plastic mass of finely divided material but may employ one of solid material upon which the copper oxid is spread to the desired thickness, after which the backing and layer are fired to produce a union of the meeting surfaces of the backing and oxid, best described as a fusion or semi-fusion of the surfaces together.

The best way known to me at present of carrying out my invention is to compress the copper oxid upon its backing prior to the firing and to employ for said backing a mass of finely divided material made up into a plastic mass as hereinafter more particularly described. For the finely divided material I may use some earthy material or ground pumice, from which latter substance I have obtained good results.

In the accompanying drawings, Figure 1 is a front elevation of a form of plate constructed in accordance with my invention. Fig. 2 is a vertical transverse section through the same. Fig. 3 is a vertical transverse section of the preferred form of plate.

In Fig. 1, the plate 1 is of the form commonly employed in batteries in which the plate of copper oxid has beveled edges to adapt it to be held in a suitable frame.

In Fig. 2 the copper oxid is indicated at 2 and the support plate or plates at 3.

In Fig. 3 the layer of copper oxid is shown applied to one surface only of the support plate.

Assuming that the support plate 3 is made of some ground or finely divided mass molded and compacted by pressure, as for instance, of an earthy material or pumice, the preferred procedure in constructing the plate is as follows: The material constitut-

ing the backing is made up into a plastic mass by mixing the same with a solution of caustic soda or other suitable flux and is spread in a layer of the desired thickness in a mold. Over this the layer of copper oxid made into a plastic mass in the usual or any proper manner is spread. Preferably, in making such plastic mass I employ the usual solution of caustic soda but do not limit myself to the use of any particular solution. This plastic mass is spread over the earthy material in the mold and the two layers are then compressed in a hydraulic press to compact them in the same way heretofore adopted for making the plate composed wholly of copper oxid. The plate thus constructed is then fired at a temperature of one thousand degrees Fahrenheit more or less or such temperature as would be usually employed in making compressed and solidified plates composed wholly of copper oxid. The result is an intimate union or coalescence of the oxid and the backing which can be best described as a fusion of the surfaces of the two layers together, such fusion being due probably to the presence of the flux in the material of the backing plate and in the layer of the copper oxid or in either or both. The same operation of firing obviously also results in the usual solidification or hardening of the copper oxid itself such as is brought about in previous practice when the plate is composed wholly of copper oxid. Owing to this semi-fusion or union of the opposed surfaces of the mass of copper oxid together with the solidification and hardening of the copper oxid itself, there is little liability to disintegration or detachment of the copper oxid portion of the plate from its support plate or backing and which will therefore give very long service at small initial cost.

I do not limit myself to any particular constitution of backing plate containing the fluxing material like caustic soda, but prefer to employ one composed of some earthy material that will itself flux in the fire and become consolidated or hardened thereby upon cooling.

It is plain that my improved plate requires much less copper oxid than previous plates but will nevertheless give practically

the same amount of service and material for action in the battery.

While I have shown a flat plate or backing and one that is imperforate, I do not limit myself to any particular form.

In place of the solution of caustic soda as a flux and binder, any other flux such as is used in pottery work might be employed in making up the support portion of the compound plate.

What I claim as my invention is:

1. A battery plate comprising a layer of depolarizing material and a support therefor, said layer united by fusion to said support.

2. A battery plate comprising a layer of copper oxid and a support plate, the meeting surfaces whereof are fused together.

3. A battery plate comprising copper oxid and a backing of molded finely divided material compressed and fused together on their meeting surfaces, as and for the purpose described.

4. A battery plate comprising a mass of copper oxid compressed and fused to a backing of compressed and solidified material, as and for the purpose described.

5. A battery plate comprising a backing plate made of earthy material and a surface layer of copper oxid united therewith, by fusion of material of the meeting surfaces of the backing plate and copper oxid layer.

6. A battery plate consisting of a mass of copper oxid compressed and solidified upon and fused with a back or support comprising compressed and solidified earthy material, as and for the purpose described.

7. A compound battery plate consisting of copper oxid and earthy material in two or more compressed and solidified coalescent layers.

8. A battery plate comprising copper oxid and pumice in compressed and solidified coalescent layers, as and for the purpose described.

Signed at New York in the county of New York and State of New York this 10th day of June A. D. 1907.

EBEN G. DODGE.

Witnesses:

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LILLIAN BLOND.