

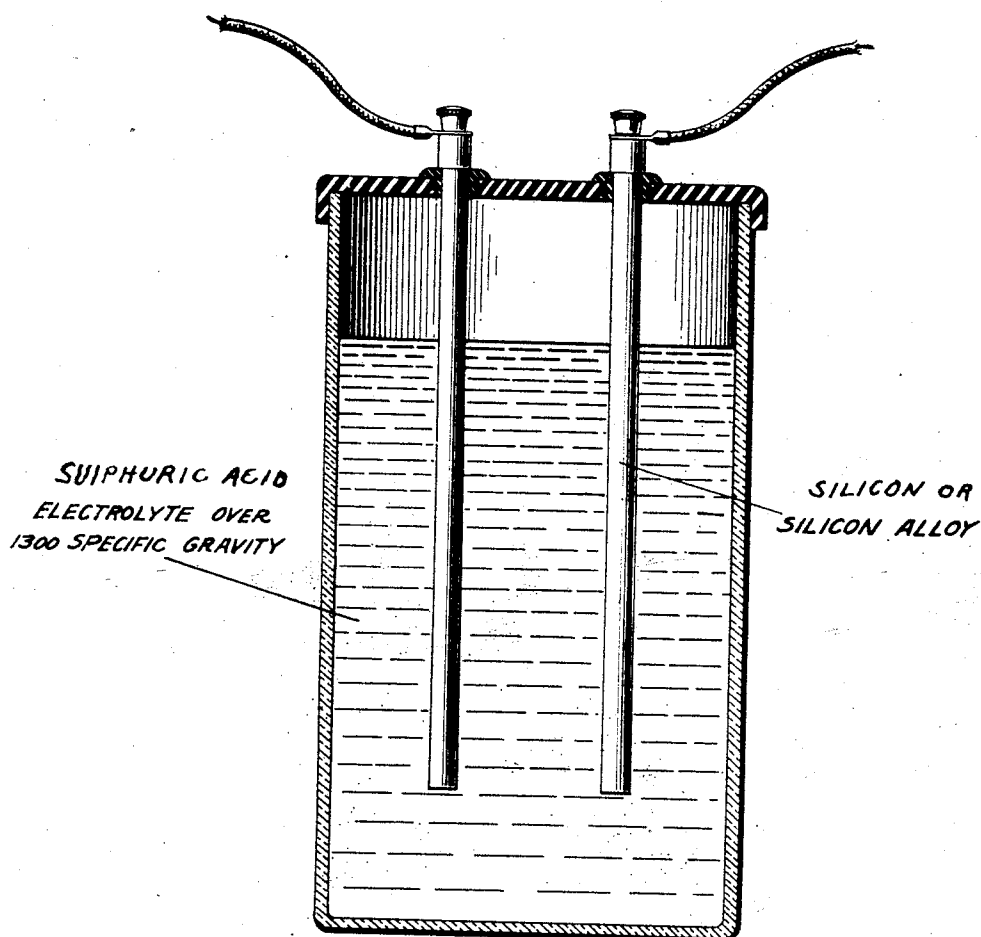
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ELECTROLYTIC RECTIFIER

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UNITED STATES PATENT OFFICE.

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ELECTROLYTIC RECTIFIER.

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The present invention relates to electrolytic rectifiers.

The principal object of the present invention is to provide an electrolytic rectifier adapted particularly for battery charging in which the life of the rectifying electrode is prolonged so that replacements and repairs are reduced to a minimum.

A further object is to provide in an electrolytic rectifier an electrolyte wherein the necessity for the frequent additions of liquid as, for instance, distilled water, is obviated.

A further object of the invention is to provide in an electrolytic rectifier having a cathode of silicon or silicon alloy in an acid electrolyte, by the use of which the life of the electrode is prolonged indefinitely.

In the drawing the figure is a sectional view of an electrolytic rectifier constructed in accordance with this invention.

In electrolytic rectifiers wherein acid is employed as an electrolyte and silicon or a silicon alloy is used for the rectifying electrode, I have found that where the surface of the electrode is not smooth, but is permeated with sand holes or depressions causing numerous sharp points or inequalities in the electrode surface, by the employment of the ordinary acid, that is sulphuric acid of approximately 1250 specific gravity, the electrode is attacked at said points and after a comparatively short period of use the electrode is worn through and breaks, thus requiring replacement before the rectifier can again be used. This difficulty is not experienced where the surface of the electrode is smooth. The fault is caused, according to my observation, not by reason of the acid attacking the metal, but because of the breaking of the rectifying film at the numerous sharp points on the surface of the electrode, thus permitting the current to burn and disintegrate the metal, resulting in ultimate fracture. By the use of an electrolyte of a considerable degree of viscosity, however, I have found that the rectifying film is appar-

ently of increased tensibility so that the same is not fractured at or by the points on the surface of the electrode, and the metal is thus protected from the disintegrating effect of the passage of current at such points, and rapid deterioration of the electrode is obviated.

In carrying out the present invention I have found that the desired viscosity may be obtained either by the addition of a liquid of approximately the same specific gravity as the electrolyte as, for instance, glycerine, or by the preferred method of employing an acid electrolyte of high specific gravity; that is, sulphuric acid of not less than 1300 specific gravity, such high gravity acid being of viscous consistency.

By numerous tests and experiments over a long period of time, I have found that the use of high gravity acid permits the use of electrodes of the character mentioned whether the same are superficially smooth or rough, there being apparently no difference in the durability of the respective electrodes in such acid, whereas when acid of low specific gravity is used in accordance with the practice heretofore obtaining, while the lower resistance gives a slightly greater flow of current, the electrodes unless approximately smooth are practically valueless for the reason that they must be replaced at extremely short intervals by reason of the disintegration above mentioned. Furthermore, where high gravity acid is used it will be understood that the lack of water in the acid results in a much slower disintegration of the electrolyte and therefore requires less frequent additions thereto.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

In an electrolytic rectifier, in combination with an electrode containing silicon, an acid electrolyte comprising sulphuric acid of from 1300 to substantially 1700 specific gravity.

CLARENCE E. OGDEN,