

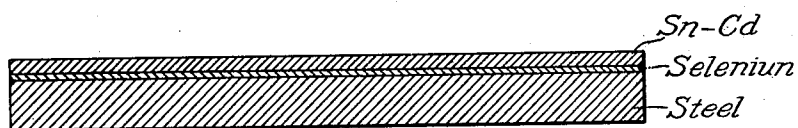
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SELENIUM CONTACT ELECTRODE

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WITNESSES:

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SELENIUM CONTACT ELECTRODE

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1 Claim. (Cl. 175—366)

My invention relates to dry rectifiers and especially to the selenium dry rectifier.

An object of the invention is to provide a very efficient selenium rectifier.

Another object of the invention is to provide a very intimate contact by electrodes to the rectifying layer of selenium.

Another object is to provide a method of reducing the reverse current in selenium rectifiers.

Other objects and advantages of the invention will be apparent from the following description and drawing, in which the figure is a cross-section through a preferred type of rectifier embodying the invention.

In forming the rectifier, I preferably take as an electrode a material of the iron group, and particularly a plate of cold rolled steel such as that illustrated in cross-section in the drawing. One surface of this electrode is roughened to a mat surface by any convenient process such as sand blasting or acid etching. Upon this surface I coat the rectifying layer which may be any one or combination of the selenium or sulphur group. I prefer, however, to coat the roughened surface of the plate with amorphous selenium at a temperature between 220°C. and 250°C. and to apply the selenium to a thickness of several mils and to cool it quickly. This selenium is preferably of a commercially available quality having the highest order of electrical conductance when in the metallic form.

The coated steel plate is then preferably heated to approximately 130° C. and is pressed against a smooth flat surface with sufficient force to reduce the plastic selenium to a smooth uniform layer preferably about two mils thick. This smooth flat surface may be conveniently provided by the use of a phenol condensation product, especially that sold under the trade name of "Micarta." The plate is then put preferably into an oven at room temperature and heated gradually to approximately 180° to 190° C. within a period of two hours, after which it is annealed at the acquired temperature for several hours, preferably at least six. In practice, this can be

conveniently done overnight. The oven is then preferably gradually cooled to room temperature before the plate is removed, the time taken being preferably that of three hours.

In order to provide an intimate contact with the other electrode thereon, I prefer to spray the material of the other electrode onto the selenium surface. I have discovered that cadmium in the sprayed electrode contributes towards the formation of a rectifying layer between the selenium and the electrode coating thereon. A preferred cadmium alloy is that of the eutectic of cadmium and tin which is approximately 75% tin and 25% cadmium with a melting point about 165° C. The percentage of cadmium may be varied from 100% or all cadmium to that of a small percentage, for example 0.1% with the tin.

A typical element made as specified will deliver about 5 amperes per square inch in the forward direction at 3 volts, and about .03 ampere for the same voltage in the reverse direction.

I have also discovered that the reverse current can be still further reduced by applying sufficient alternating-current voltage to the element to bring the temperature momentarily to approximately 150 to 175° C. Repeated applications of this treatment may reduce the reverse current by a factor of 5 or 10 with only a relatively slight decrease in forward conductance.

Many modifications may be made in the form and arrangement of the parts disclosed in the rectifier, and also various modifications may be made in the various steps and temperatures in forming the selenium rectifier. Accordingly, I desire only such limitations to be imposed upon the following claim as is necessitated by the prior art.

I claim as my invention:

The method of reducing the back current in a selenium rectifier which comprises applying sufficient alternating-current voltage thereto to bring the temperature momentarily to approximately 150° to 175° C.

EARL D. WILSON.