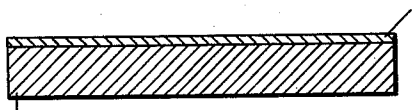
June 21, 1938. A. LOTZ 2,121,603

METHOD OF PRODUCING SELENIUM RECTIFIERS

Filed April 14, 1937



Selenium plus reducing agent of any of:-

1- Organic material such as
Pyrogallol.
Hydroquinine.
Phenol.
Phenol derivatives as phenol hydrazin.
Resorcin.
Hydrazin.
Hydrazin derivatives as methol hydrazin.
Oleic acids.
Unsaturated carbonates.
Quinoline.
Aniline.
Dimethol aniline.
Methol aniline.
Thiophen.

2- Inorganic.
Stannic salts.
Sulphur dioxide.
Hydrochloride.

WITNESSES:
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METHOD OF PRODUCING SELENIUM RECTIFIERS

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2 Claims. (Cl. 175—366)

The invention relates to rectifiers, and especially to the selenium, dry-plate type of rectifiers.

An object of the invention is to reduce the value of back current in selenium rectifiers.

Other objects and advantages of the invention will be apparent from the following description, taken in conjunction with the accompanying drawing in which the single figure is a cross-section through a selenium rectifier plate and its contact layer.

Selenium has been utilized as the effective layer in dry plate rectifiers because it can withstand a comparatively high blocking potential, for example, 20 volts per cell. One of the difficulties, however, with the selenium type of rectifier has been the fact that there is a very considerable so-called back current that flows in the blocking direction with this high potential. This back current is a maximum immediately after the rectifier is produced and decreases in time to smaller values with the aging of the rectifier in use. The magnitude of the back current, however, when high blocking potential is applied is undesirably too large in value, even after the rectifiers have been in use for some time.

The invention provides means for reducing the value of this back current by preferably pretreating the selenium layer of the rectifier with a reducing agent before assembling the rectifier. This treatment may consist of a vaporization of the reducing means in a vacuum or by wet treatment of the selenium. As reducing agents, organic materials are preferably used. Certain inorganic materials, such as, for example, stannic salts, sulphur dioxide, and hydroxylamine ($NH_2.OH$) may be utilized. Of the organic materials, those which are preferably effective are generally known as photographic developers, such, for example, as pyrogallol, hydroquinine and others. Other suitable materials are phenol and phenol derivatives as well as resorcin; hydrazin and its derivatives, for example, methol hydrazin or phenol hydrazon; certain unsaturated compounds, for example, oleic acids and several unsaturated carbonates; nitrogen or sulphur containing organic compounds, for example, quinoline, aniline and its derivatives, dimethol aniline, methol aniline and thiophen.

After the selenium has been treated with the reducing agent, it is preferred to place a layer of ductile metal on the selenium layer of the rectifier. This metal can be sprayed on, for example, in a liquid condition, or by vaporization in a vacuum. The metal most desirable is cadmium.

The drawing illustrates the selenium effective layer of the rectifier with the preferred cadmium layer thereon, as well as listing the materials that have been found suitable for reducing agents. Although the treatment of the selenium layer with one or more of the reducing agents or their compounds or derivatives, as above specified, somewhat decreases the forward directional or transmission current, yet this decrease is not of vital importance. In each case it is possible to attain a condition such that the magnitude of the back current is reduced to usually small values, for example, 20 milliamperes at 20 volts blocking potential and not infrequently a resistance relationship of 1 to 800 and better is attained.

The above described treatment of selenium rectifier plates with reducing materials may be applied if necessary to plates of the type in which the selenium layer has already been covered with a metal coating.

I claim as my invention:

1. The method of reducing the value of the back current in a selenium rectifier which comprises treating the selenium with an organic reducing agent.

2. The method of reducing the value of the back current in a selenium rectifier which comprises treating the selenium with any one or more of the following reducing agents: pyrogallol, hydroquinine, phenol, resorcin, hydrazin, oleic acids, unsaturated carbonates, quinoline, aniline, thiophen, stannic salts, sulphur dioxide, and hydroxylamine.

ALBERT LOTZ.