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2,496,692

SELENIUM RECTIFIER

Filed March 20, 1947

Fig. 1.

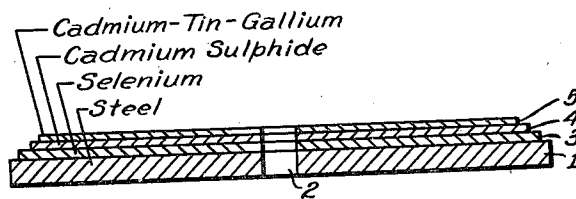
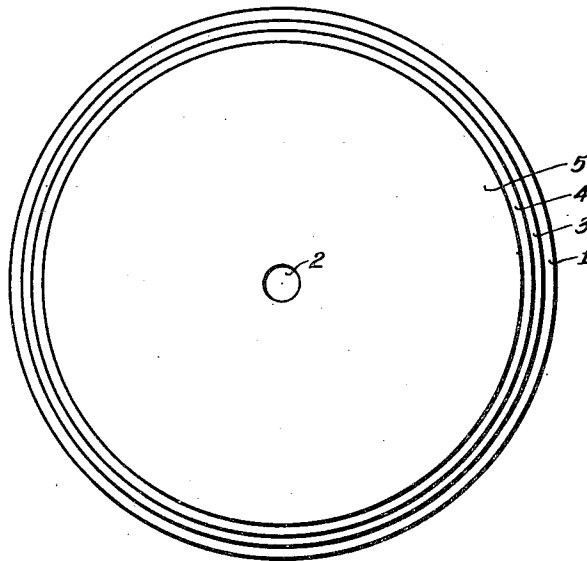


Fig. 2.



WITNESSES:

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SELENIUM RECTIFIER

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8 Claims. (Cl. 175-366)

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My invention relates to selenium rectifiers and, in particular, to a counter-electrode which produces an improved barrier layer, or rectifying interface in such rectifiers. It is based on the discovery that an improved rectifying ratio at a surface of selenium, or particularly a selenium-cadmium sulphide surface, is obtained by employing a counter-electrode of cadmium, or cadmium, or cadmium-tin, to which have been made small additions of gallium, boron, cerium selenide, columbium oxide or a metal from the alkali or alkaline-earth groups.

One object of my invention is, accordingly, to produce an improved selenium rectifier.

Another object of my invention is to produce a dry-contact type rectifier having a better rectification layer than rectifiers of the prior art.

Still another object of my invention is to provide a dry-contact type rectifier of the type employing selenium surfaced with cadmium sulphide with a counter-electrode which improves the barrier layer of the rectifier.

A yet further object of my invention is to provide an improved type of counter-electrode for rectifiers of the selenium type.

Other objects of my invention will become apparent upon reading the following description, taken in connection with the drawing in which:

Figure 1 is a mid-section and Fig. 2 a top view of a rectifier embodying the principles of my invention.

Referring in detail to Figs. 1 and 2, a rectifier in accordance with my invention may be produced by employing a backing plate 1 of steel, which may have a central hole 2 and which has preferably been sand-blasted and nickel-plated. This plate is coated with a layer 3 of amorphous selenium by dipping it in a molten bath of selenium and throwing off the excess thereof by centrifugal force. The free surface of the selenium is then coated by evaporation and condensation with a thin layer 4 of cadmium sulphide. This procedure may be carried out as described in more detail in my copending application, Serial No. 514,371, filed December 15, 1943.

The unit thus produced may then be annealed at a temperature of 185° C., and the counter-electrode 5 then applied by Schoop-spraying or other suitable process known in the art. While I have described the selenium as coated with cadmium sulphide before the application of this counter-electrode, for certain purposes it may be suitable to omit the coating with cadmium sulphide. Furthermore, it is within the scope of my invention to apply the counter-electrode before carry-

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ing out the annealing process mentioned above.

The counter-electrode is formed from an alloy or aggregate comprising substantially 70 parts cadmium, 30 parts tin, with the addition of a small amount, about 1 part of one or more substances from the following group: an alkali or alkaline-earth metal, gallium, boron, cerium selenide and columbium oxide.

Of the addition agents just listed, I have found gallium to be particularly desirable in cases where the counter-electrode is applied before the heat treatment above mentioned is given, inasmuch as this treatment does not cause tarnishing of the alloy containing gallium.

I claim as my invention:

1. A rectifier comprising a barrier layer between selenium surfaced with cadmium sulphide and an alloy containing cadmium, tin and gallium.

2. A rectifier comprising a barrier layer between selenium surfaced with cadmium sulphide and an alloy of substantially 70 parts cadmium, 30 parts tin and up to one part of gallium.

3. A rectifier comprising a barrier layer between selenium and an alloy containing cadmium, tin and gallium.

4. A rectifier comprising a barrier layer between selenium and an alloy of substantially 70 parts cadmium, 30 parts tin and about one part of gallium.

5. An electrical circuit element comprising selenium in contact with an alloy of cadmium combined with about 1% of gallium.

6. An electrical circuit element comprising selenium surfaced with cadmium sulphide in contact with an alloy of cadmium combined with about 1% of gallium.

7. An electrical circuit element comprising selenium in contact with an alloy of cadmium-tin combined with about 1% of gallium.

8. An electrical circuit element comprising selenium surfaced with cadmium sulphide in contact with an alloy of cadmium tin combined with about 1% gallium.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,193,610	Wilson	Mar. 12, 1940