Jan. 27, 1948. E. A. RICHARDS 2,434,960

METAL RECTIFIER

Filed Feb. 16, 1943

FIG. 2.

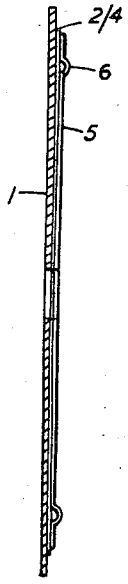


FIG. 1.

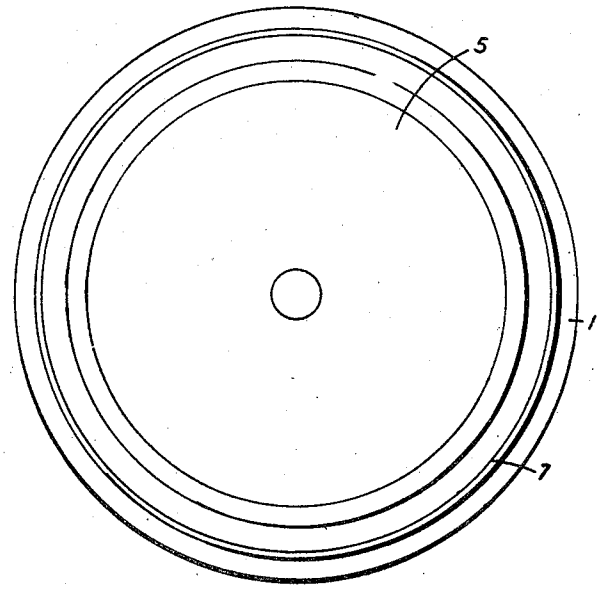


FIG. 3.

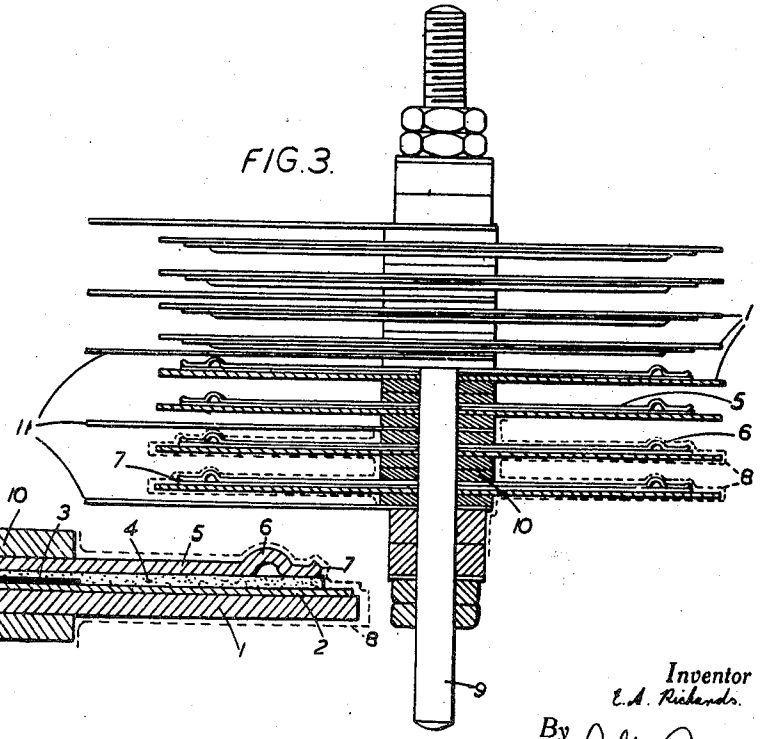


FIG. 4.

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METAL RECTIFIER

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9 Claims. (Cl. 175—366)

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This invention relates to metal rectifiers, of the centre contact type described in British Patent No. 320,380 and has for its object to provide an improved arrangement for protecting such rectifiers against the effects of dampness and deleterious atmospheres. In providing such rectifiers with a so-called "tropical finish" it is usual after assembly of the rectifier discs to coat the whole assembly by dipping in enamel. It has been found in practice that the enamel adhering to the sprayed metal rectifier surfaces tends to impair the rectifying qualities of the discs, and once the assembly has been coated with enamel it becomes practically impossible to take it to pieces for the purpose of adjustment or rebuilding without damaging the rectifier discs.

According to the present invention a cover plate is provided to protect the active surfaces of each rectifying disc so that when the assembly is finally coated with the protecting enamel, the enamel is prevented from coming into contact with the active surface of the rectifying discs but the discs are effectively sealed by the enamel around the edges of the cover plates.

Each cover plate is preferably provided with an annular groove near its outer edge to limit the penetration of the enamel as will be hereinafter described.

The invention will be described with reference to the accompanying drawings in which:

Figure 1 is a face view of a rectifier disc with the cover plate in position.

Figure 2 is a central section thereof.

Figure 3 is a part sectional view of a rectifier assembly incorporating the invention.

Figure 4 is a sectional illustrative diagram of a portion of a disc and cover plate.

In these drawings the invention is shown as applied to the centre contact type of rectifier assembly described in British Patent No. 320,380; and referring to Figure 4, which for purposes of illustration shows the layers on an exaggerated scale, the reference 1 indicates a disc of iron or other suitable metal having one face provided with a selenium coating 2. This coating is provided at the central portion with an insulated area shown at 3 over which the counter electrode 4 covering the selenium coating is applied as described in the aforesaid specification.

The cover plate 5 is merely laid during assembly on the face of the rectifier disc in contact with counter electrode 4.

The cover plate 5 has a semi-circular annular groove 6 pressed near its outer edge so that when the rectifier is dipped into enamel or like protective substance the latter is drawn between the surfaces of the disc and cover plate by capillary attraction, but this action ceases when the enamel reaches the groove 6 because the distance between the cover plate and the disc at this point is too great for it to operate. To ensure penetration of the enamel around the periphery of the cover plates the outer edge of each cover plate is slightly lipped as indicated at 7. The result is that an effective seal is obtained all round the edge of the cover plate, but the main working area of the disc is unaffected. The protective coating of enamel or the like is indicated in dotted lines at 8 in Figures 3 and 4. The cover plate 5 should preferably be made of the same material as the base 1 of the disc, so as to avoid strain due to unequal expansion, and can be made as a light metal pressing.

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Figure 3 shows a rectifier assembly in which the rectifier discs with their cover plates are assembled together on an insulated spindle 9 by means of separating conducting washers 10 between the cover plate 5 of one disc and the back plate 1 of the adjacent disc, the whole being clamped together to provide a centre contact assembly which is then dipped in the protective enamel or the like. Suitable connecting tags are indicated at 11.

By the arrangement according to this invention, the exposed area which is protected by the enamel only is reduced to a narrow ring around the edge and the sprayed metal surface forming the counter electrode 4 is not coated with enamel. A rectifier assembly which has been enamelled can be taken to pieces without damage to the discs, because the cover plate adheres firmly around the outer edge but separates easily at the centre as it will be seen that this part is free from enamel. In other words each rectifier disc with its cover plate adhering thereto comprises a sealed capsule to which electrical contact is made at the centre when clamped on the spindle.

What is claimed is:

1. A dry rectifier element comprising a base plate, a semi-conducting layer, a counterelectrode and a cover plate covering the counterelectrode and in close annular marginal contact therewith, said contact being provided to exclude liquid coating material from the inner portion of the counterelectrode, and an annular groove in said cover plate near its outer edge adapted to limit the penetration of the coating material of the rectifier element.

2. A rectifier element as set forth in claim 1 in which the cover plate includes a marginal lip

extending away from the counter-electrode, arranged to facilitate marginal penetration of the coating enamel.

3. A dry rectifier element comprising a base plate, a semi-conducting layer, a counter-electrode and a cover plate covering the counter-electrode, said cover plate comprising a flat disc provided with a marginal annular zone having capillary spacing from the counter-electrode arranged for marginal intrusion of a coating liquid between the counter-electrode and the coating plate by capillary attraction, and a continuous blocking zone having greater than capillary spacing from the counter-electrode, arranged to block intrusion of said liquid beyond the blocking zone.

4. A rectifier element as set forth in claim 3 in which the blocking zone is formed by an annular groove in the cover plate.

5. A rectifier element as set forth in claim 3 in which the outer edge of the cover plate is lipped to provide an inlet for coating liquid between the cover plate and the counter-electrode margin.

6. A dry rectifier element comprising a base plate, a semi-conducting layer and a counter-electrode, a centrally located layer of insulation between the counter-electrode and the semi-conducting layer, and a cover plate covering the counter-electrode having a marginal portion engaging the counter-electrode provided with an annular groove extending along the counter-electrode face, arranged to block intrusion of liquid coating material, said groove being substantially spaced radially from the layer of insulating material.

7. A dry rectifier element comprising a base plate, a semi-conducting layer, a counter-electrode and a cover plate covering the counter-electrode and in close annular contact therewith, and a continuous coating extending over the cover plate and base plate and between the counter-electrode and the cover plate over a marginal zone radially limited by an annular groove adjacent the margin of the cover plate and facing the counter-electrode.

8. A dry rectifier stack comprising a plurality of rectifier elements each including a base plate, a semi-conducting layer, a counter-electrode and a cover plate covering the counter-electrode and in close annular marginal contact therewith, a stack support arranged to retain said elements in superposed adjacent position to form a stack, and a coating extending continuously over the exposed faces of said elements and support. and in each rectifier element between the counter-electrode and the cover plate over a marginal zone limited by an annular groove adjacent the margin of the cover plate and facing the counter-electrode.

9. A rectifier stack comprising a plurality of rectifier elements, each including a base plate, a semi-conducting layer, a counter-electrode, a cover plate covering the counter-electrode and in close annular marginal contact therewith and a continuous protective coating extending over the cover plate and base plate, in which a support for the stack comprises a spindle passing through the elements, and spacing elements around the spindle located between and engaging adjacent elements, the cover plates extending into coating-excluding engagement with the spacing elements, said cover plate covering the counter-electrode surfaces except adjacent the outer margins of said surfaces and being provided with an annular groove extending along the counter-electrode face to limit the intrusion of the coating material beyond the said groove.

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