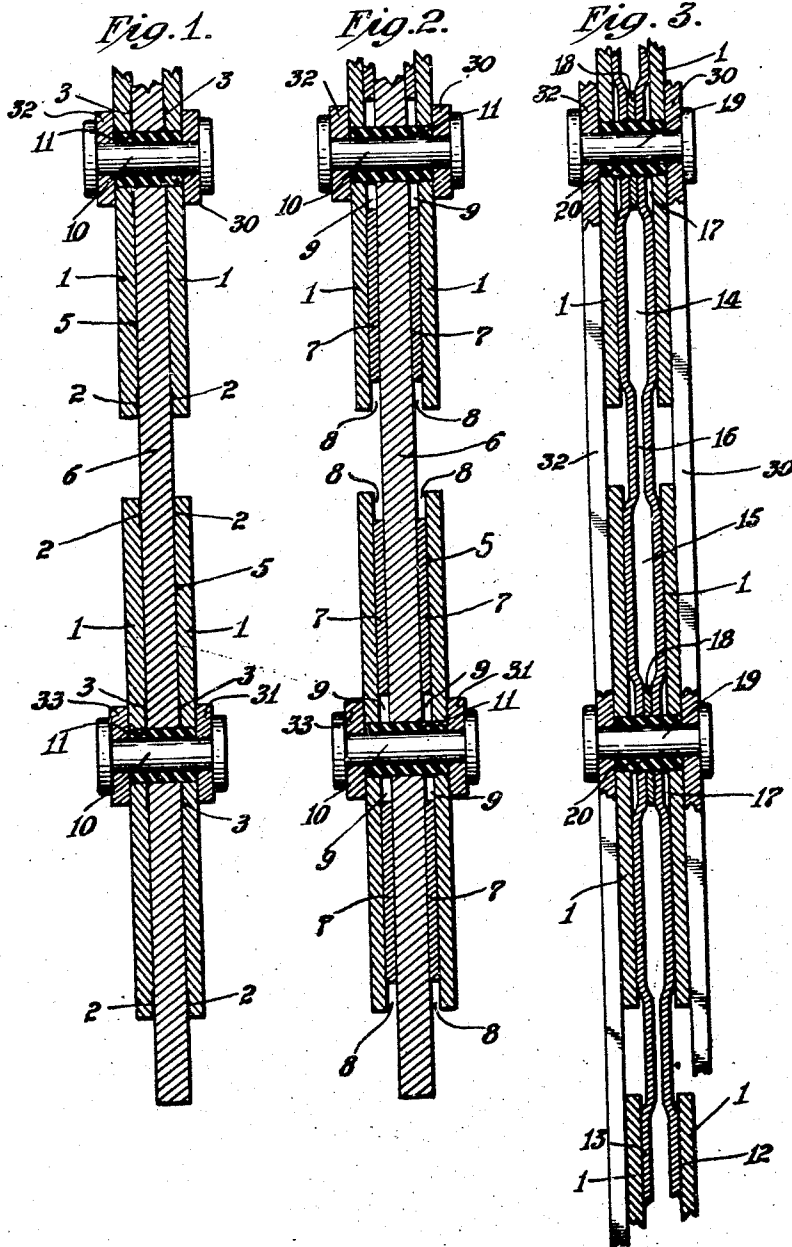


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HIGH CURRENT RECTIFIER
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HIGH CURRENT RECTIFIER

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1 Claim. (Cl. 175-366)

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This invention relates to new and useful improvements in mounting structures for rectifiers.

The objects of the invention are a rectifier assembly which requires few electrical contacts and which can be cooled easily.

With these objects in view, according to one feature of the invention, the electrode surfaces of a number of rectifiers, e. g., selenium discs or plates, are pressed into contact with a metal supporting plate which functions as a good heat radiator when placed in a cooling fluid (oil, air, etc.). This insures good heat conduction from the rectifier to the radiator and avoids the need of special contact fingers. A thin layer of a good conductor, e. g., copper, may advantageously be provided between the rectifier and the plate.

The exposed selenium edges of the rectifier plates are, according to another feature of the invention, insulated from the metal plate by means of air spaces, coatings of varnish applied to the plates, or by thin insulating gaskets.

According to still another feature of the invention, the mounting plate is hollow to provide a large surface over which the cooling fluid may circulate.

These and other features of the invention will be explained in connection with Figs. 1, 2 and 3 of the drawing which illustrates three embodiments, Figs. 1 and 2 in transverse cross-section and Fig. 3 in lengthwise cross-section, only so much being shown as is necessary for a clear understanding.

As shown in Fig. 1, a flat plate or disc 1 of metal coated with selenium and a counter-electrode is provided with two rings of insulating varnish 2 and 3, one at the outer edge and the other around the customary central perforation in the plate. The varnish is applied to cover the exposed selenium, and overlaps the counter-electrode 5 sprayed on the selenium surface by about $\frac{1}{16}$ inch by any known means as masking devices or the like.

The varnish rings 2 and 3 are very thin (of the order of a few thousandths of an inch) and sufficiently resilient so that when the rectifier 1 is pressed against a surface, e. g., a metal plate 6, the electrode 5 will make good contact over most of its area without the necessity of providing special contact fingers or the like. The varnish rings 2 and 3 prevent contact between the supporting plate 6 and the unsprayed selenium.

The rectifier plates are clamped in position by means of bolts 10 passing through the perforations in the plates and corresponding perfora-

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tions in the plate 6. The bolts 10 are insulated at 11 from the plate 6 and the edges of the discs or plates. 30, 31, 32, 33 are bus-bars through which connection may be established with a row of rectifiers.

In Fig. 2 a structure is illustrated in which the rectifier discs 1 without varnish rings 2 and 3 are used. The metal plate 6 has raised platforms 7 provided on both faces by plating or spraying copper or other metal to a height of approximately 0.02 inch. The platforms 7 are centered around the perforations in the supporting plate and their dimensions is such that when a rectifier plate 1 is placed thereon, the counter-electrode surface 5 overhangs the outer and inner edges of the platform by about $\frac{1}{16}$ of an inch as indicated at 8 and 9. Thus an insulating air space of approximately 0.02 inch separates the exposed selenium from the supporting plate 6. The rectifier plates 1 are held in position by the clamping means 10 passing through the perforations in the rectifiers 1 and plate 6 and insulated from the latter as indicated at 11.

The metal plate 6 carrying any desired number of pairs of rectifiers functions as a heat radiator and may be placed in an oil bath or in other suitable cooling fluid, e. g., a blast of air to cool the structure during operation.

The mounting plate may be hollow to serve as a better heat radiator. As shown in Fig. 3, two metal plates 12 and 13 are embossed so that when placed face to face they will enclose pairs of chambers 14, 15 separated by a restricted portion 16. The spacing within the restricted portion 16 is about $\frac{1}{16}$ of an inch. The next pair of chambers 14, 15 is spaced from the previous pair by a restricted portion 17 which is longer than the restricted portion 16. Within the restricted portion 17 is placed a steel washer 18 and both the washer and the restricted portion 17 are perforated.

In this structure the rectifier plates 1 are placed on the two faces of the hollow support with the holes 4 in the plates registering with the holes through the restricted portions 17. The embossings serve the same purpose as the platforms 7 in Fig. 2, the outer and inner edges of plates 1 overhanging the depressions between adjacent embossings and being thus insulated from the metal supporting plate. Clamping bolts 19 insulated from the steel plates and the edges of the rectifier discs as indicated at 20 hold together the discs on the two sides of the plates.

In this as in the structures of Figs. 1 and 2, as many rectifier discs may be mounted on a com-

mon support as is required, and oil, air or other cooling fluid may be caused to circulate between plates 12 and 13 and over the outside surfaces of the plates and the rectifier discs.

In none of the structures illustrated is it necessary to provide the customary spring finger contact to connect with the rectifier. In a 9 volt, 30,000 ampere, three-phase, full-wave bridge rectifier, the standard stack construction of 112 mm. discs required 7200 electrical connections exclusive of spring finger contacts. The constructions illustrated in Figs. 2 and 3 would reduce the connections to 180, hence less voltage drop, better efficiency, easier mechanical assembly and more compact construction.

Furthermore, my improved structures lend themselves readily to moistureproofing, and oil or air cooling. Any one of the three embodiments with its plurality of rectifying elements becomes in effect one large single rectifying ele- 20

ment capable of rectifying large currents of electricity.

What is claimed is:

In combination, two embossed metal plates enclosing chambers connected by restricted passages and forming on the outside embossings, washers between said plates in alternate restricted passages, the washers and the plates contacting therewith being perforated, perforated rectifier plates having electrodes contacting on both sides of the supporting assembly with the perforations in the plates and the rectifying members aligned, substantially the entire surface of the electrode of each plate contacting with an embossing and the edge of the plate overhanging a depression between embossings, and clamping bolts projecting through the perforations in the plates and the rectifying elements insulated from the plates and the edges of the rectifiers.

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