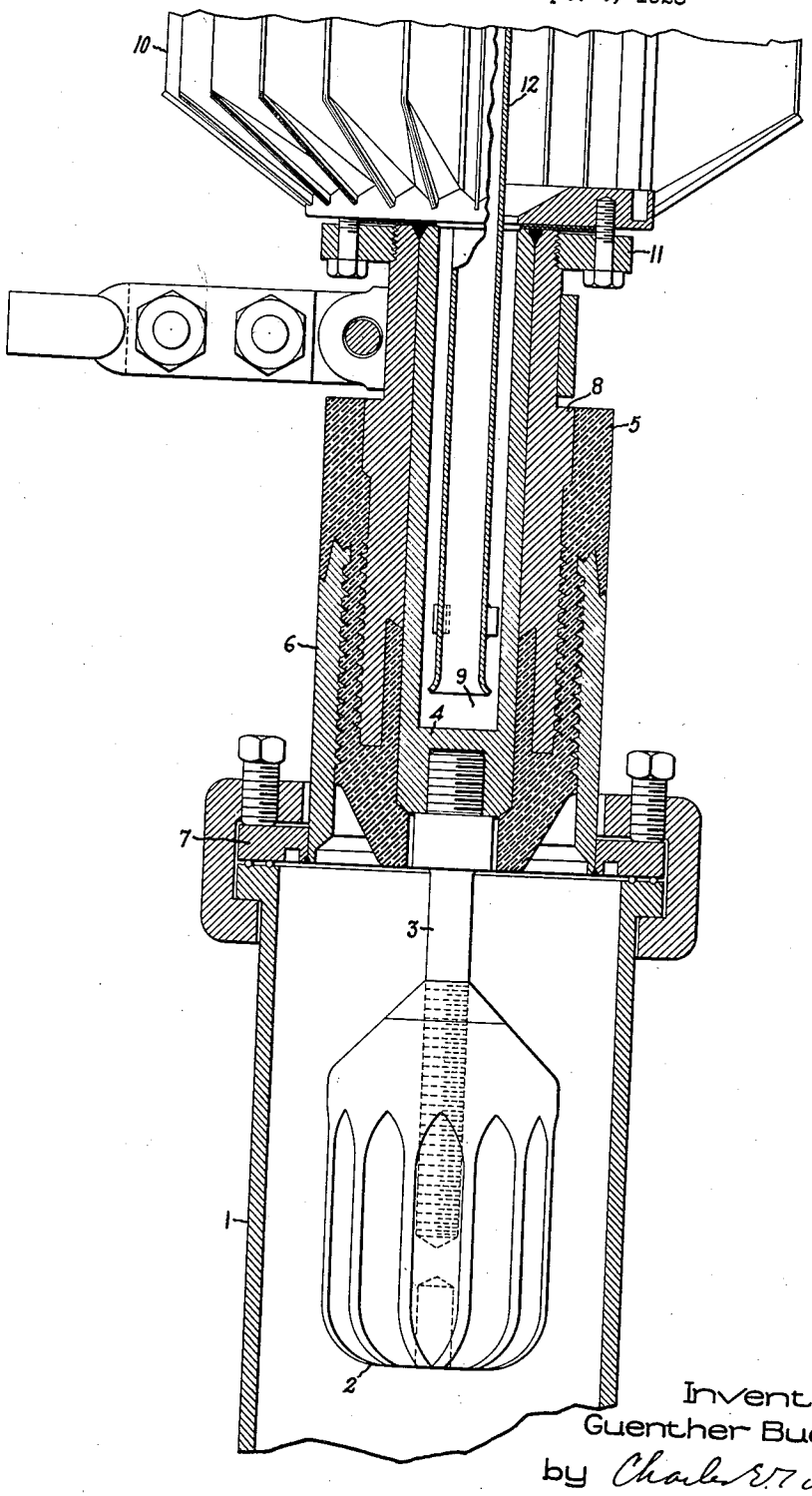
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GAS TIGHT SEAL AND METHOD FOR MARKING SAME

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GAS TIGHT SEAL AND METHOD FOR MAKING SAME

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2 Claims. (Cl. 49—81)

This application is a division of my application Serial No. 304,141, filed September 5, 1928.

My invention relates to gas tight insulating seals and has for its principal object the provision of an improved anode seal for mercury arc rectifiers.

In the operation of mercury arc rectifiers considerable difficulty is encountered in maintaining a gas tight joint or seal between the anode leads, the metallic casing and the interposed insulation. The repeated temperature changes between operating and shut down conditions, as well as variations during operation tend to cause unequal expansion and contraction of the metal and insulating parts of the seal whereby leaks often develop between them. In accordance with my invention this difficulty is substantially eliminated by a novel construction of the seal.

In accordance with my invention an insulating compound placed between the anode stem and a surrounding shell is compressed and forced into intimate contact with the surfaces of the stem and shell by the insertion of a metallic cylinder, this metallic cylinder being constricted and welded to the anode stem at the exposed end in such a way that the leakage path along the anode stem is greatly increased.

The novel features which I consider characteristic of my invention are pointed out in the appended claims. The invention itself however will best be understood by reference to the accompanying drawing in which the single figure illustrates an anode for a mercury arc rectifier with the seal, made in accordance with my invention, shown in cross section.

Referring to the drawing in detail, 1 illustrates in cross section a part of the mercury arc rectifier casing. Part 2 is the anode supported on stud 3 which is in turn supported by anode stem 4. The stem 4 is surrounded by insulating material 5 which is preferably an insulating compound composed of mica and a vitreous binder such as glass. This compound is known as micalex and is fully described in Letters Patent of Percy Broadbent Crossley, Reissue 15,727. The insulation 5 and stem 4 are placed inside of shell 6 which is provided with a flange 7 by means of which it is attached to the rectifier casing 1. Enough insulating material 5 is used so that the space between 4 and 6 is completely filled and some of the material extends above the edge of shell 6. This assembly is heated until the micalex 5 is plastic. A cylinder 8 of a non-corrosive alloy, preferably a high percentage chromium alloy, is then forced into the micalex so that it is imbedded therein a substantial distance between the opposed surfaces of 4 and 6 but does not completely pierce the insulation. Cylinder 8 has any convenient diameter such that it is imbedded in the insulation 5 between 4 and 6 and has a thickness such that it forces the insulation 5 into intimate contact with the surfaces of 4 and 6 which may have corrugations or grooves therein and compresses the material further, throughout its entire body, to a uniform predetermined density. The cylinder 8 is constricted for a considerable part of its length so that it fits snugly against stem 4 and is welded to this stem at its exposed end. In this manner a gas tight pocket is formed between 4 and 8 so that if a leak starts along the surface of 4 it must travel along both surfaces of the cylinder 8 before reaching the atmosphere. The length of the constricted part of the cylinder 8, in relation to the total length of the cylinder, may be varied to obtain the required compression of the insulation 5.

The shell 6 being exposed to the surrounding air undergoes much less temperature change than the anode stem. There is therefore less likelihood of leaks developing along its surface than there is of such leaks developing along the anode stem and less precautions need therefore be taken. The cylinder 8 forces the insulation 5 into sufficiently intimate contact with the ridges on the inner surface of shell 6 to prevent leakage.

In order that stem 4 may be kept as cool as possible, cooling fluid is caused to circulate within it. For this purpose it is provided with a recess 9. A reservoir 10 is fastened over this recess by means of flange 11, so that an opening in the bottom of the reservoir 10 registers with the recess 9. A pipe 12, having an outside diameter smaller than the diameter of recess 9, is so mounted that its lower end is near the bottom of the recess and its upper end is within reservoir 10. Reservoir 10 is filled with cooling fluid, which is preferably water, so that the level is above the upper end of pipe 12. In operation automatic circulation of the fluid takes place, down along the walls of the recess and up through the pipe 12.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. The method of making a gas-impervious insulating seal between a conductor and an enclosing metal shell which consists in interposing between said conductor and said shell a mass of vitreous material, heating said assembled article to the softening temperature of said vitreous material, and forcing a cylindrical member into said

material a substantial distance between said conductor and said shell whereby said material is caused completely to fill the space between said conductor and said shell and to adhere to the opposed surfaces of said conductor and shell.

2. The method of making a gas-impervious insulating seal between a conductor and an enclosing metal shell which consists in interposing between said conductor and said shell a mass of vitreous material, heating said assembled article to the softening temperature of said vitreous material, forcing a cylinder a substantial distance between said conductor and said shell into said material whereby said material is caused completely to fill the space between said conductor and said shell and to adhere to the opposed surfaces of said conductor and shell, and attaching said cylinder to the conductor at the exposed end, thereby lengthening the gas leakage path along the conductor.

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