Sept. 20, 1927. 1,643,216

C. KRÄMER

MERCURY VAPOR ARC RECTIFIER

Filed Aug. 29, 1921

Fig. 1

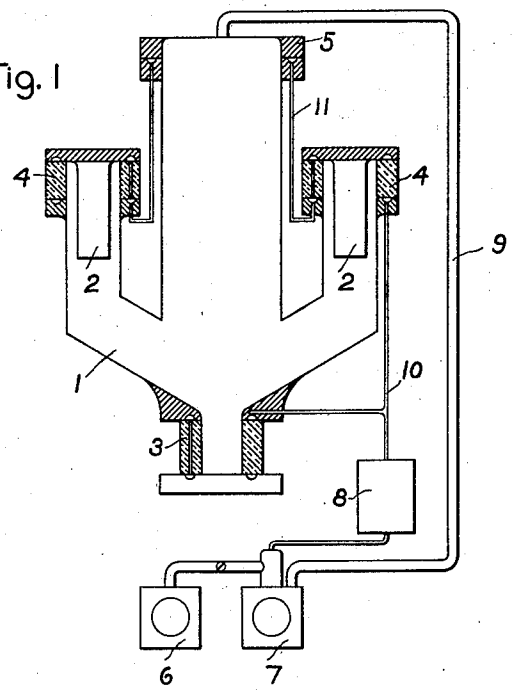
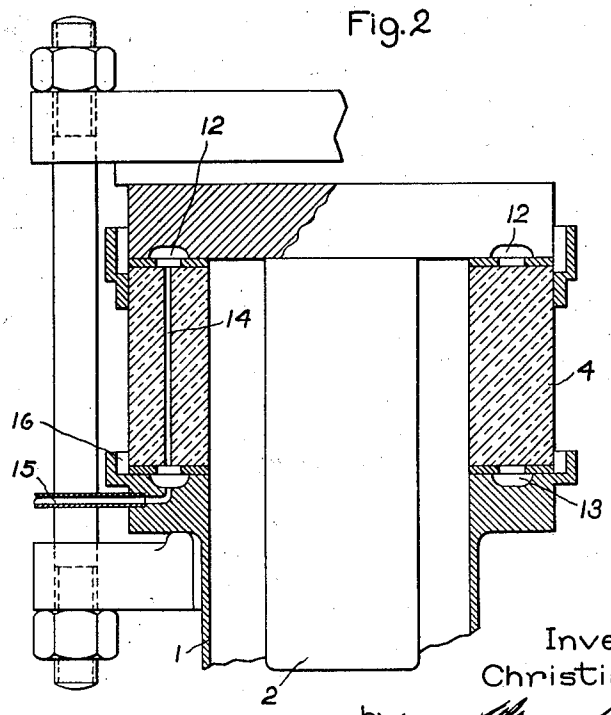


Fig. 2



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MERCURY-VAPOR-ARC RECTIFIER.

Application filed August 29, 1921, Serial No. 496,564, and in Germany November 25, 1915.

My invention relates to mercury vapor-arc rectifiers and more particularly to large rectifiers of the kind described. One object of my invention is to provide means in such devices by which air is prevented from entering at the seals and particularly where the insulated electrodes are introduced.

According to my invention, I employ the usual solid sealing means and I also provide annular chambers at the seals which chambers are connected to one another and to the evacuated interior of the device. The difficulty connected with insulating from one another the several connecting pipes, is overcome in the most simple manner by perforating the insulators, thus providing an insulating air gap between the electrodes and the seals of the casing.

In the drawings affixed to this specification and forming part thereof, an embodiment of my invention is illustrated diagrammatically by way of example. In the drawings

Fig. 1 is an elevation of my improved device, partly in section,

Fig. 2 is a sectional elevation of a detail on a larger scale.

Referring now to Fig. 1, 1 designates the evacuated casing 2, 2 are the anodes, 3 and 4 are insulators separating the anodes or cathodes, respectively, from said vacuum casing, 5 is a cover for closing said casing, 6 is the preliminary and 7 the finishing vacuum pump. 8 is an intermediate tank which may be provided, if desired, 9 is the suction pipe connecting pump 7 with casing 1, 10 and 11 are pipes connecting the seals with the preliminary pump 6 or the intermediate tank 8, respectively.

The pipe flange as well as the cathode container and the anodes are provided with annular grooves 12 dividing the sealing faces into two portions. If these grooves 12 are connected with the preliminary vacuum pump air which may enter from the outside is drawn away instantly so that it is unable to penetrate the inner sealing surface. It is important that the grooves should be connected with the preliminary vacuum pump, so that necessarily a limited pressure prevails in the grooves. Instead of a preliminary vacuum pump 6, a larger preliminary vacuum tank may be provided which is of such size as to maintain the vacuum at a suitable low value for a longer time notwithstanding small quantities of air which may enter. In this manner, air is almost absolutely prevented from entering the casing.

Preferably, the insulators for introducing the electrodes are perforated and the grooves at the flanges of the casing are connected by metal pipes with one another and the preliminary vacuum tank so that separate insulations are not required.

Referring now to Fig. 2, the anode 2 and the flange of casing 1 supporting it are provided with grooves 12 and 13, respectively, which are connected with one another by a bore 14 of insulator 4. One of the grooves, here 13, is connected with the preliminary vacuum by a pipe 15.

If desired, the faces of the seals may be further protected by a liquid, for instance, oil. In this case, I provide annular channels 16 in the vicinity of the faces of the seals which tanks are filled with the protecting liquid. All passages, pipes, etc., which are connected with the preliminary vacuum should be so arranged that oil which may enter the device flows toward the preliminary vacuum without penetrating the second sealing surface.

Preferably, in order to reduce the mass of the oil if such is used as a protecting liquid, and to render it more solid it is mixed with a solid finely divided material such as kieselguhr.

The sealing devices shown in both figures are intended to be permanent features, although they may obviously be used to affect initial exhaustion only.

I claim:

1. The combination of a closed receptacle comprising a plurality of separable wall portions provided with abutting edges adapted to form a sealed chamber between said edges, and means for evacuating said chamber.

2. In combination with a closed receptacle comprising a plurality of separable parts, means having engaging surfaces for making a gas-tight seal between said parts, at least one of said surfaces having a groove and means for evacuating said groove.

3. A vapor electric apparatus comprising a receptacle, a conductor or conductors for conveying current through the wall of said receptacle, insulating means therefor having a sealing surface engaging with said con-

ductor or conductors, an annular groove on at least one of said engaging surfaces, means for evacuating the groove and for maintaining a vacuum therein.

4. The combination of a closed receptacle comprising a plurality of separable wall portions provided with abutting edges adapted to form a sealed chamber between said edges, a channel arranged on the exterior of said receptacle and adjacent to said edges, a sealing liquid in said channel, and means for evacuating said chamber.

5. A mechanical seal for evacuated receptacles comprising members having sealing faces adapted to engage with each other one of said faces being provided with a groove, means for evacuating said groove and a mixture of a sealing liquid and a finely divided solid material applied to the junction of said sealing faces.

6. A closed receptacle comprising alternate conducting and insulating wall sections provided with edges adapted to engage one another and to form sealed chambers between said edges, and vacuum containing means connected to one of said chambers through an opening formed in said insulation wall section.

7. A receptacle seal comprising a plurality of separable parts having abutting edges arranged to form a sealed chamber between said edges, means for evacuating said chamber, and a vacuum tank connected between said means and said chamber.

8. A mechanical seal for evacuated receptacles comprising two outer members and an intermediate member, a groove in each outer member, a bore connecting said grooves and means for evacuating said grooves.

In testimony whereof I affix my signature.

CHRISTIAN KRÄMER.