

931,806.

Fig. 1

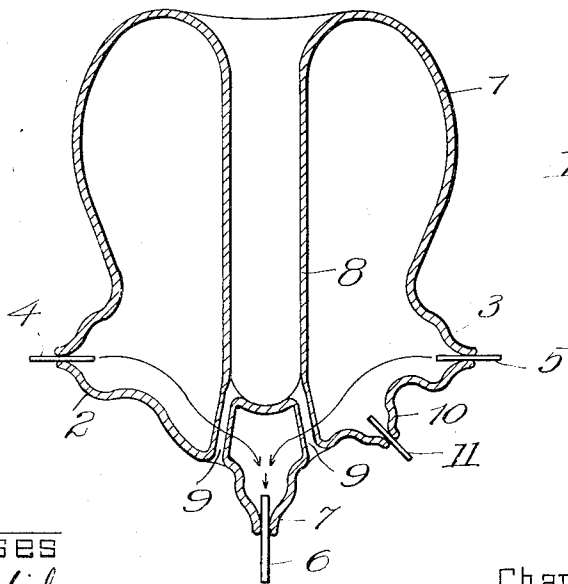
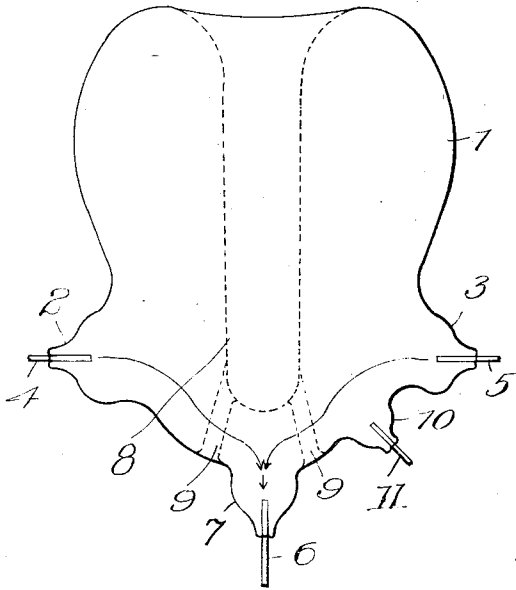


Fig. 2.

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RECTIFIER.

931,806.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed November 2, 1907. Serial No. 400,352.

To all whom it may concern:

Be it known that I, CHARLES W. SIRCH, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a certain new and useful Improvement in Rectifiers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to rectifiers for converting alternating current flow into direct current flow, as, for instance, mercury vapor rectifiers, and is chiefly concerned with the construction of the glass bulb containing the mercury and partial vacuum, the object being to provide for better cooling facilities, and also to obtain better circuit conditions within the bulb. I preferably make the body of the bulb in the shape of a bell, the top of the bulb being introverted and extended downwardly a distance below a plane passing through the main positive electrodes. These main electrodes are in practice, usually connected with the terminals of an alternating current generator and the introverted part extending between these electrodes will prevent short circuit flow between them. The cathode is at the lower end of the bulb and below the end of the introverted part, this introverted part therefore confining the current to flow between the anodes and the cathode. The lower end of the introverted tube is connected with the base of the bulb by tubular braces which connect the lower end of the tube with the atmosphere so that there will be continued circulation through the braces and the introverted part which is also open to atmosphere at its upper end, thereby causing air which has been heated by the current flow, to be carried away. The bulb is therefore kept cool by this continued circulation of cooling air through the interior thereof.

On the accompanying drawing, I have shown the construction of the rectifier in accordance with my invention.

Figure 1 is an elevation view of the bulb, and Fig. 2 is a diametrical sectional view.

The body part 1 has the shape of a bell at opposite sides of which, and at the lower end thereof, are the projections 2 and 3, for receiving and holding the anodes 4 and 5. The cathode 6 enters through the projection 7 disposed centrally at the lowest end of the bulb, and below the plane of the anodes as

shown. The bulb is preferably made of glass and the material of the top thereof is introverted to form a tubular tongue or extension 8 having the form of a test tube. The lower end of this tube terminates a short distance above the cathode 6, but below the plane of the anodes 4 and 5. Strengthening braces 9 extend between the lower end of the tube and the base of the bulb, and these braces are tubular so as to connect the tube with the atmosphere, and the upper end of the tube being also open to the atmosphere, there will be a continuous current of cooling air flowing upwardly through the tube. The interior of the bulb which would ordinarily be highly heated by continued current flow there-through will now be kept cool by this continuous circulation of cooling air through the center thereof and through the very heart of the current field.

In practice, the main anodes 4 and 5 would usually be connected with the terminals of an alternating current generator and there would be a tendency for the alternating current to flow directly between the anodes. This short circuit current flow is however prevented by the lower end of the introverted tubular part which extends below the plane of the anodes and short circuiting thereof is therefore prevented, the current being deflected to the cathode 6.

I have shown an additional projection 10 between the projections 3 and 7, through which a supplementary electrode 11 enters the bulb, which electrode may serve as a starting electrode.

I desire to secure the following claims by Letters Patent:—

1. A rectifier comprising a body part in the form of a bulb, anodes extending through the walls of the body part, a cathode extending through said walls and below the anodes, and an introverted part extending through the bulb between the anodes and below the plane of said anodes to prevent direct current flow between the anodes and to confine current flow to paths between the anodes and the cathode, said introverted part being open at both ends to the atmosphere whereby air may circulate therethrough to carry away heat generated by the current flow within the bulb.

2. In a rectifier of the class described, the combination of an inclosing glass bulb, electrodes supported from the walls of the bulb,

and an air chamber extending through the interior of the bulb and into the field of the current flow between the electrodes, said chamber being open at its ends to the atmosphere whereby air may circulate therethrough to carry away heat generated by the current flow between the electrodes.

3. A rectifier for transforming alternating currents into direct currents, said rectifier being in the form of a glass bulb, anodes extending into said bulb from the sides, a cathode extending upwardly into the bulb from the lower end thereof, a tubular part extending vertically and centrally through the bulb and terminating below the plane of the anodes and above the cathode thereby serving to deflect current flow to prevent the current from flowing directly between the anodes, and connections between the lower end of said tube and the lower wall of the bulb, said connections forming passage ways for the atmosphere to the lower end of the tube, the upper end of said tube being also open to the atmosphere whereby air may circulate upwardly through said tube to

carry away heat generated by the current flow, said bulb, tube and connections being an integral structure.

4. A rectifier comprising a body part in the form of a bulb, a tubular part extending downwardly from the top of said bulb and open at its upper end to the atmosphere, anodes entering the bulb from opposite sides thereof, the lower end of the tubular part interposing between said anodes, a cathode entering the bulb below the lower end of said tubular part, braces securing the lower end of the tubular part to the lower wall of the bulb, and passage ways through said braces connecting the lower end of the tubular part with the atmosphere whereby there may be circulation of cooling air through the tubular part.

In witness whereof, I hereunto subscribe my name this 16th day of October, A. D. 1907.

CHARLES W. SIRCH.

Witnesses:

L. AVISE,
V. H. PECK.