

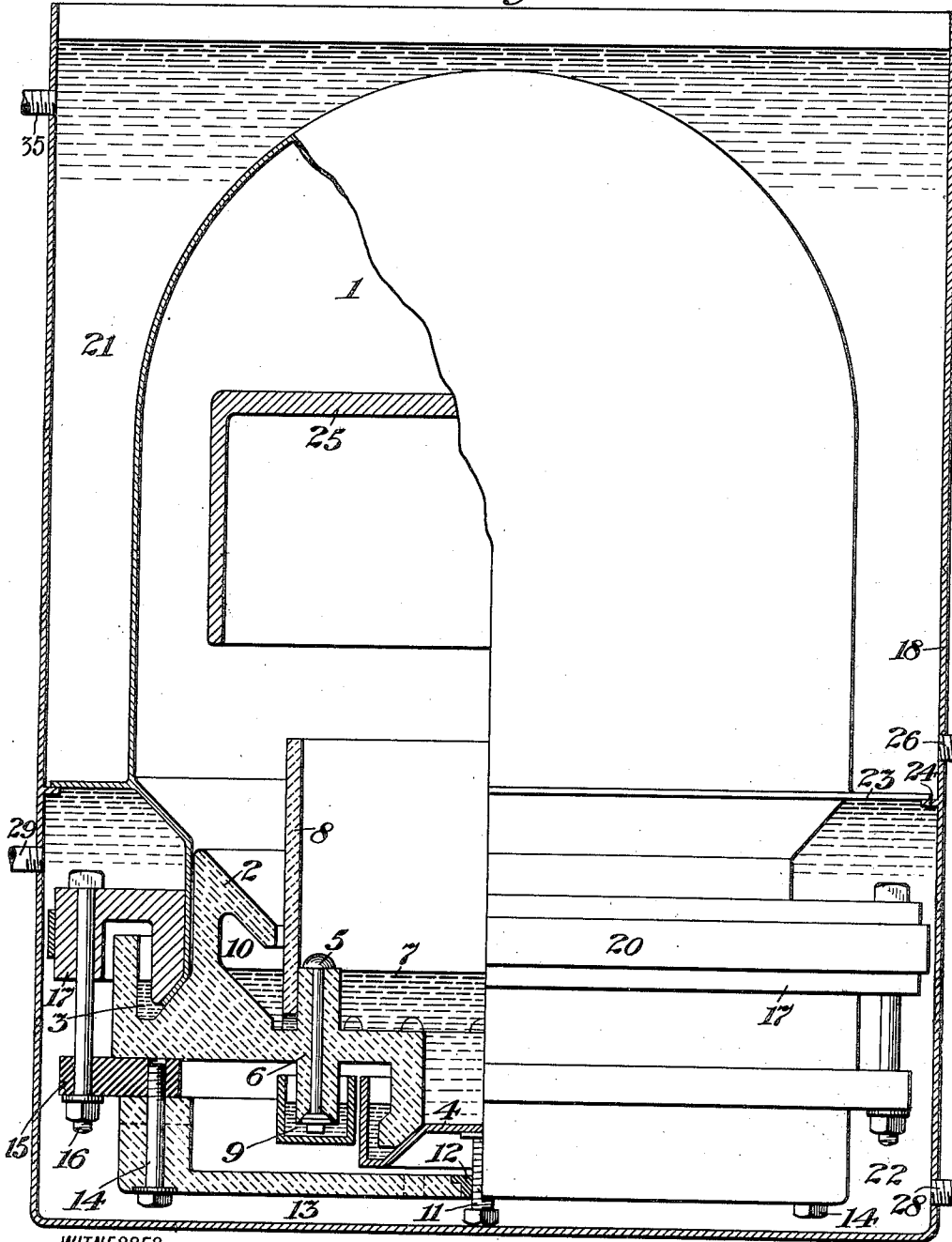
P. C. HEWITT.
VAPOR ELECTRIC APPARATUS.
APPLICATION FILED APR. 3, 1912.

1,110,560.

Patented Sept. 15, 1914.

2 SHEETS—SHEET 1.

Fig. 1



WITNESSES

INVENTOR

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Fig. 2

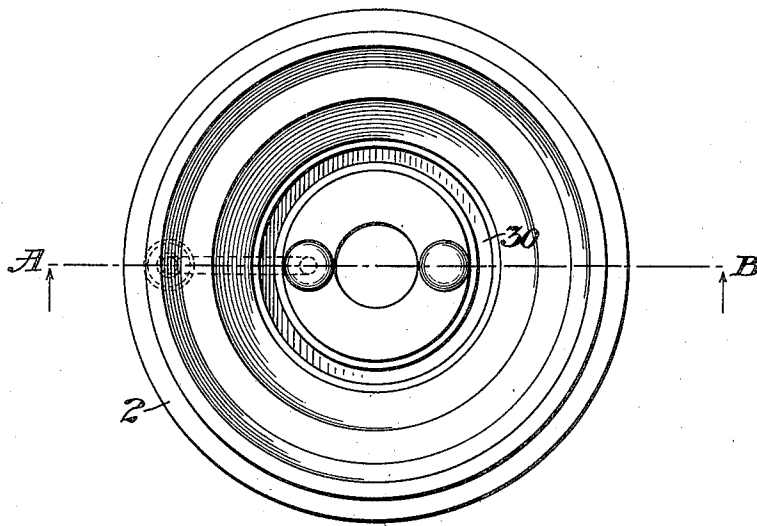
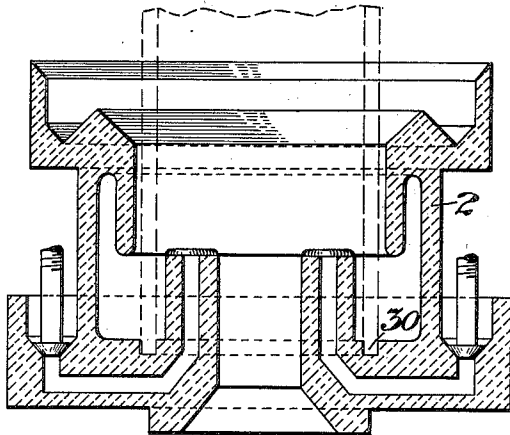


Fig. 3



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UNITED STATES PATENT OFFICE.

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VAPOR ELECTRIC APPARATUS.

1,110,560.

Specification of Letters Patent

Patented Sept. 15, 1914.

Original application filed January 3, 1911, Serial No. 600,448; Divided and this application filed April 3, 1912. Serial No. 688,172.

To all whom it may concern:

Be it known that I, PETER COOPER HEWITT, a citizen of the United States, and resident of Ringwood Manor, county of Passaic, State of New Jersey, have invented certain new and useful Improvements in Vapor Electric Apparatus, of which the following is a specification.

The present application is a division of my application Serial Number 600,448, filed January 3rd, 1911.

The invention relates to improvements in vapor electric apparatus having regard more particularly to means for controlling the gaseous conductor in such apparatus; to permitting the passage of heavy currents through the apparatus; to means for dissipating the internal heat generated in operation; and to means for maintaining the chamber tight and in operative condition.

As a means for carrying out the invention, attention has been directed to the character of the walls of the containing vessel; the proper assembling of the parts; the special construction of the electrodes; means for maintaining the negative electrode in a condition of low resistance and for dissipating the heat generated at said electrode; and, in general, suitable circuits for the system. Moreover the conveying of the leading-in conductor through the walls of the containing vessel and the connecting of said conductors to the electrodes electrically; maintaining the positive electrode within proper temperature limits; preventing short circuiting; properly controlling the cycle of evaporation; securing and maintaining control of the condensation and return of the fluid of the electrode; maintaining the vacuum, and other matters are the subject of attention in the apparatus herein described.

The application refers more specifically to a rectifier for one wave or one impulse of the heavy current circuit, similar rectifiers being used for other supply impulses. Accordingly, the device here shown as a rectifier may be regarded as an electric valve controlling one wave of a supply system. This is not intended to exclude the duplication or multiplication of the anodes in a given vessel, whereby more than one wave may be made subject to control.

The invention with which the present di-

visional application is concerned is illustrated in the accompanying drawings in which—

Figure 1 shows a form of rectifier provided with special cooling arrangements and Figs. 2 and 3 represent respectively a plan and a vertical section of an insulating part of the container of a rectifier adapted to pass heavy currents.

In the drawing 1 is a dome shaped gas tight inverted metal bowl resting upon an insulating section, 2, preferably of porcelain, the parts 1 and 2 being made tight by means of a mercury seal, 3. The container is closed by a base cap, 4, through which pass auxiliary anodes, one of which is shown at 5. The said anode, 5, is supported upon an insulating tube, 6, which may form a part of the porcelain section, 2. The cathode of the apparatus is shown at 7 as being constituted of mercury held by the insulating section, 2, and the base cap, 4. The cap which may thus constitute the lead to the cathode, a cable or strap being readily bolted thereto externally.

To prevent the cathode spot from climbing up upon the central surface of the container wall, I provide a sleeve or ring piece, 8, of insulating material, dipping below the surface of the mercury electrode, 7, and thus preventing a cathode spot from reaching the walls of the container.

Operation may be started by making a connection between one of the anodes 5, 5, and the cathode 7, as by agitating the mercury until it touches one of the auxiliary anodes. This mode of starting is well known. Or the starting may take place by applying high potential to one or both of the auxiliary anodes 5, 5, by any suitable means, a number of which are well known. This high potential breaks down the initial starting reluctance of the cathode whereupon it is free to receive current from any of the anodes of the rectifier.

The auxiliary or supplemental anode, 5, is close to the inside of the ring piece, 8, and has a separate seal and cap, shown at 9.

The porcelain section is provided with a reentrant portion, 10, for preventing the formation of a continuous circuit to the cathode through draining mercury. The bolt or screw, 11, passing through an in-

ternally screw threaded bushing, 12, may be used to press the base cap, 4, against the porcelain section, 3, to aid in securing tight joints.

5 The insulating bottom plate, 13, the bolts, 14, 14, the metal ring, 15, the bolts, 16, 16, and the metallic sectional ring, 17, are intended to provide means for tightening and making secure the entire apparatus; all of which is contained within a tank, 18, as shown. The sections of the ring, 17, may be held together by a strap, 20.

The tank is divided into an upper portion 21 and a lower portion 22 by means of a circular flange, 23, resting upon a shoulder, 24, extending around the inside of the tank.

In this form of apparatus the anode itself is shown at 25 as being suspended from the dome of the part 1, or otherwise supported thereby. The anode, 25, is of some suitable metal and is provided with appropriate means for connecting it to the external circuit. Into the upper and lower space in the tank a cooling medium such as oil, water, glycerin, or a forced draft of air may be introduced. In some instances natural air currents may be relied upon. The cooling fluid in the upper portion may enter at the pipe, 35, and may pass out or be removed through the exit pipe, 26, after absorbing heat from the dome shaped element, 1, and the anode, 25. If desired the structure may be given sufficient heat radiating capacity and the fluid merely circulated within the same, transferring heat from the rectifier to the tank. In like manner, the cooling fluid may enter the lower space at the entering tube, 29, and leave by the exit tube, 28; or the renewal of the fluid may be omitted and the tank distribute the heat externally.

The consideration of the design of this apparatus brings out two major principles as to the main positive electrodes, namely, one according to which the main anode is maintained separated from and inside the case, and the other according to which the case or part of the container forms the anode or an anode. In the latter case, for large units it is practical, and seems often advisable, to use a separate device for each working wave of current supply; in fact, for

extra large units in a majority of cases, this should prove advisable on account of the laws of surface and contents, or squares and cubes.

This form of rectifier is provided, as shown, with two cooling means or systems, separated so as to maintain the required ratio of temperatures, and relative temperatures at the positive and the negative electrodes.

In Figs. 2 and 3, the details of an appropriate insulating section, 2, are shown. In the plan appearing in Fig. 2, the general contour of the section, 2, are shown while in the vertical section, Fig. 3, drawn along the line A—B of Fig. 2, the details of the section 2 and its relations to neighboring parts appear in both figures a circular groove, 30, for receiving the lower end of the insulating cylinder, 8, is represented in the drawing.

I claim as my invention:

1. A vapor rectifier consisting of a case of conducting material, a positive electrode, a liquid negative electrode, means for insulating the said electrodes from the case and an insulating sleeve or cylinder projecting below and above the surface of the liquid and means for initiating a flow of current from the positive electrode to that portion of the liquid electrode lying inside of said sleeve or cylinder.

2. A vapor rectifier consisting of a case of conducting material, a positive electrode, a liquid negative electrode, means for insulating the said electrodes from the case, an insulating sleeve or cylinder projecting below and above the surface of the liquid, and means for initiating a flow of current from the positive electrode to that portion of the liquid electrode lying inside of said cylinder or sleeve, and an auxiliary electrode also located within said sleeve or cylinder.

Signed at New York in the county of New York and State of New York this 27th day of March, A. D. 1912.

PETER COOPER HEWITT.

Witnesses:

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THOS. H. BROWN.