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STARTING ELECTRODE FOR VAPOR ELECTRIC APPARATUS.

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1,159,914. Patented Nov. 9, 1915.

Fig. 1.

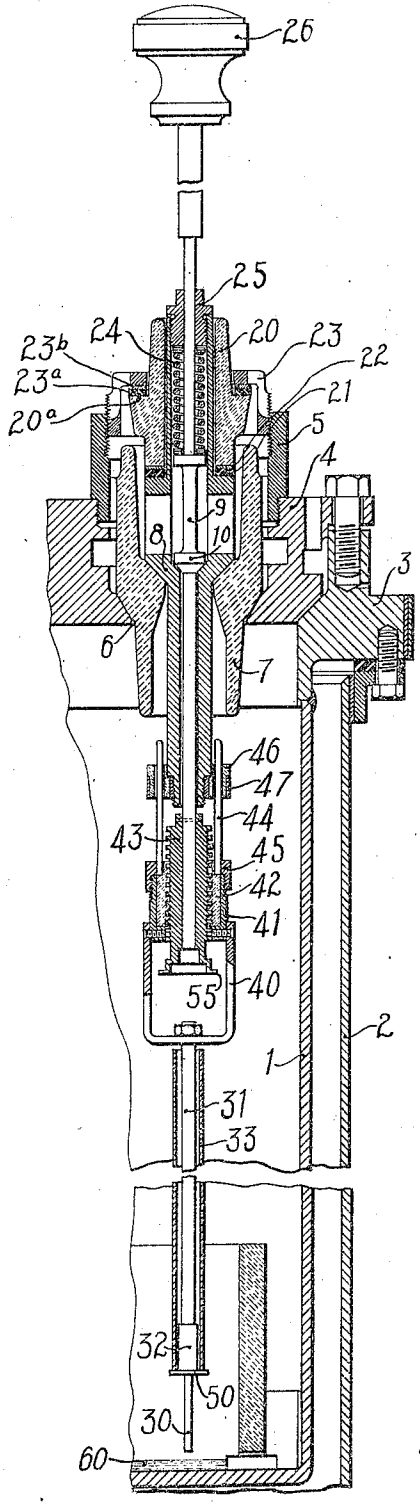
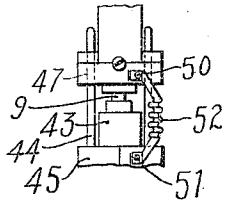


Fig. 2.



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STARTING-ELECTRODE FOR VAPOR ELECTRIC APPARATUS.

1,159,914. Specification of Letters Patent. Patented Nov. 9, 1915.

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To all whom it may concern:

Be it known that we, SIDNEY W. FARNSWORTH, DAVID E. CARPENTER, and LESLIE E. FROST, citizens of the United States, and residents, respectively, of Pittsburgh, Wilkinsburg, and Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Starting-Electrodes for Vapor Electric Apparatus, of which the following is a specification.

Our invention relates to vapor electric apparatus, such as current rectifiers and lamps, and it has particular reference to starting or "keeping-alive" electrodes for metal case rectifiers of large capacity.

One object of our invention is to provide a starting electrode which may be quickly and readily adjusted from the exterior of the casing.

Another object of our invention is to provide means for preventing disengagement between the electrode and its supporting and adjusting means.

In the accompanying drawing, Figure 1 is a vertical sectional view showing a portion of a metal case rectifier equipped with our improved starting electrode, and Fig. 2 is an elevational view showing a detail of the structure shown in Fig. 1.

Referring now to Fig. 1 of the drawing, a portion of a casing 1 of a rectifier is shown surrounded by a spaced jacket 2. The casing carries around its upper edge a flange 3 to which a heavy metallic cover 4 is secured in any suitable manner. A collar 5 is screwed into the cover 4 and surrounds an opening 6 in the cover in which a porcelain bushing 7 is seated, the cover and the bushing being provided with inclined engaging faces. The bushing 7 is provided with an interior inclined seat on which an annular shoulder on a tubular terminal member 8 is adapted to rest. Extending through the tubular member 8 is a rod 9 having an enlargement 10 resting upon an inclined seat within the said tubular member. The tubular member has openings of considerable size immediately adjacent to the enlargement 10 in order to permit observation of the joint between the enlargement 10 and the tubular member 8.

We provide means for insuring intimate contact between the cover 4, the bushing 7, the tubular member 8 and the enlargement 10 on the rod 9. In the embodiment of our invention shown in the drawing, such means comprises a porcelain bushing 20 resting upon a shoulder on the tubular member 8, a washer 21, of asbestos or other suitable slightly compressible material, and a steel washer 22 interposed between the shoulder on the tubular member 8 and the bushing 20. The bushing 20 is forced downward by a steel cap 23 that is screwed into the collar 5 and bears upon a shoulder 20^a, of the bushing 20, an asbestos washer 23^a and a steel washer 23^b being interposed between them. The rod 9 is yieldingly forced downward by a spring 24 that surrounds it and is compressed between a second enlargement and a bushing 25 which surrounds the rod and is screwed into the upper end of the tubular member 8. The rod is surmounted by a knob 26 or other suitable turning means.

Within the casing and suspended from the rod 9 in a manner to be hereinafter described, is the electrode point 30 which is joined to the end of a rod 31 by a connector 32. A sleeve 33 of quartz or other insulating material surrounds the rod 31 and the connector 32 and is supported upon a flange 50 on the connector 32. The rod 31 is hung from a forked support 40 which is attached, by means of screws, to a bushing 41, and the bushing 41 surrounds a threaded bushing or nut 42 formed of graphite or other suitable anti-friction material in which a threaded sleeve or worm 43 is adapted to turn. The bushings 41 and 42 are prevented from rotation by guides 44 that are fixed to a cap 45 which is screwed upon the bushing 41. The guides 44 pass through openings in a bushing 46 of carbon or other suitable material which is inclosed within a support 47 attached to the inner end of the tubular member 8.

A pool of mercury, 60, is provided in the bottom of the casing, to serve as the vaporizable electrode of the rectifier, and the electrode 30 is immersed in the mercury pool and withdrawn therefrom by the mechanism above described.

We provide means for preventing the disengagement of the threaded sleeve 43 and the bushing 42. Such means may consist

of an enlargement 55 on the inner end of the sleeve 43 which is adapted to engage the bushing 41 and limit its downward movement.

Direct current is supplied to the electrode from any convenient source through the tubular terminal member 8 by connections which are not shown on the drawing. Thus, current can reach the electrode 30 through the suspending and adjusting means which we have shown, but we prefer to provide a free path or shunt for the current around the operating parts of the electrode support, thus avoiding roughening of the moving contact surfaces which would result if the full current passed between them. A suitable form of shunt is shown in Fig. 2 as a flexible conducting ribbon 52 that is fastened at one end 50 to the support 47 and at the other end 51 to the cap 45.

In the operation of our device, the electrode point 30 is first caused to be immersed in the mercury pool in the bottom of the casing and which constitutes the cathode of the rectifier. The knob 26 is then turned, to rotate the sleeve 43 and cause the bushing 42 and the support 40 to rise, thus lifting the electrode point 30 from the mercury pool and drawing the starting arc between these electrodes. Thereafter, if the main arc is extinguished it may be reëstablished by turning the knob 26 slightly in the proper direction to lower the electrode point 30 and immediately turning it back again. The electrode support is prevented by the enlargement or stop 55 from being screwed down far enough to fall from the sleeve 43.

It is obvious that many changes might be made in the device which we have shown and described without departing from the spirit and intent of our invention, and we, therefore, do not wish to be restricted to the precise structural details herein disclosed, our invention being limited only by the scope of the appended claims.

We claim as our invention:

1. A vapor electric device comprising a closed casing, an electrode within the casing, a support for the electrode, and a rod extending into the casing from the exterior thereof and having a screw-thread engagement with the said support.

2. A vapor electric device comprising a casing, an electrode and a support therefor within the casing, a rotatable rod extending into the casing from the exterior thereof and having screw-thread engagement with the support, and means for preventing rotation of the support.

3. A vapor electric device comprising a casing, an electrode and a support therefor within the casing, means engaging the support for adjusting its position, and means for preventing disengagement of the support from the adjusting means.

4. A vapor electric device comprising a closed casing, an electrode and a support therefor within the casing, a rod extending into the casing from the exterior thereof, an externally threaded sleeve secured to the inner end of the rod, and a nut fixed to the electrode support and engaging the said threaded sleeve.

5. A vapor electric device comprising a closed casing, an electrode and a support therefor within the casing, a rod extending into the casing from the exterior thereof, an externally threaded sleeve secured to the inner end of the rod, a nut fixed to the electrode support and engaging the said threaded sleeve, and means for preventing disengagement of the rod and the support.

6. A vapor electric device comprising a vacuum chamber, an electrode within the chamber, and means for manually varying the position of the electrode, said means comprising a hanger for the electrode within the chamber, and electrode-operating means projecting outside of the chamber and in screw-thread engagement with the hanger.

In testimony whereof, we have hereunto subscribed our names this 28th day of Jan., 1914.

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Witnesses:
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